Complete Streets Policy & Action Plan

Prepared for the City of Bridgeport by the Greater Bridgeport Regional Council
**Abstract:**

In recent years, the City of Bridgeport has focused its attention on how to revitalize the city economically, socially and environmentally. The city is concerned about global warming and the effects climate change will have on its neighborhoods and infrastructure. Its neighborhoods suffer the effects of air pollution caused by over reliance on the automobile for travel and from the way energy is produced and consumed. Additionally, it has become more difficult, with the current poor economic health of the nation, for Bridgeport to revitalize its economy and compete in the global market.

In response to these challenges, the city requested assistance from the Greater Bridgeport Regional Council to create a transportation strategy to promote bicycling and walking, the development of related facilities and installation of green infrastructure. The strategy is embodied in the “complete streets” policy and action plan. The intent is to effectuate a fundamental shift in the way the roadway environment is perceived and used. Instead of dedicating the roadway for the almost exclusive domain of motorized vehicles, the roadway is viewed as a space where the needs of all users are considered, not just drivers.

**Source of copies:**
Greater Bridgeport Regional Council
525 Water Street, Suite 1, Bridgeport Transportation Center, Bridgeport, Connecticut 06604
Phone: (203) 366-5405  Fax: (203) 366-8437
E-mail: info@gbrpa.org  Website: www.gbrct.org

**Date:**
August, 2011

**Acknowledgements:**

This report was prepared by the Greater Bridgeport Regional Planning Council, in cooperation with the City of Bridgeport’s Office of Sustainability and member municipalities under the GBRC’s **FY 2011-2012 Unified Planning Work Program**. It was funded through the **UPWP** by the US Department of Transportation, Connecticut Department of Transportation and member municipalities. The opinions, findings and conclusions expressed in the report are those of the GBRPA, and do reflect the official views of the ConnDOT or the USDOT.

For more information about the GBRC’s transportation planning process and the complete streets policy and action plan, please visit the GBRC’s website:www.gbrct.org
While a “complete street” embraces many common elements, each application is unique and the features selected reflect the land use, needs and characteristics of the area. Key elements include bicycle facilities (routes and lanes), bus priority systems, pedestrian enhancements, streetscape environment, traffic calming measures and green infrastructure.

The policy and action plan recognizes the challenges facing the city but lays out a new direction to transform the city into a thriving, sustainable community, and improve the quality of life, social equity, and economic competitiveness of the city’s residents, workers, and visitors.

The installation of complete streets elements needs to follow acceptable guidelines and standards and be in context with the surrounding neighborhood. The policy and action plan presents the design approach for both bicycle and pedestrian facilities and describes how installation of green infrastructure can convert streets into “green” streets.

Various recommendations are presented based on well thought out and explicit process and scaled appropriately to the area and in-light of costs. This tiered approach will allow improvements to be implemented in a timely manner and prevent delays in advancing projects that may become cost prohibitive. Plan actions include:

- Adoption of the “Complete Streets” policy;
- Amendment of zoning regulations to codify complete street elements and design approach;
- Designate and implement a city-wide bicycle route network;
- Install bicycle lanes along several main arteries;
- Complete the Housatonic Railroad Trail through the city;
- Repair and improve sidewalks and crosswalks;
- Install curb extensions and storm water planters;
- Install rain gardens in several key downtown areas;
- Convert State Street to a “complete street” with bicycle lanes, curb extensions, tree boxes and green infrastructure;
- Install green infrastructure and curb extensions along Main Street in downtown;
- Implement a downtown urban enhancement program; and
- Implement transit priority systems along Main Street and the Coastal Corridor bus route.

Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview &amp; Purpose</td>
<td>1-1</td>
</tr>
<tr>
<td>Complete Streets Policy</td>
<td>2-1</td>
</tr>
<tr>
<td>Bicycle &amp; Pedestrian Safety &amp; Accident Assessment</td>
<td>3-1</td>
</tr>
<tr>
<td>Bicycle Facilities Design Approach</td>
<td>4-1</td>
</tr>
<tr>
<td>Pedestrian Facilities Design Approach</td>
<td>5-1</td>
</tr>
<tr>
<td>Green Infrastructure Elements</td>
<td>6-1</td>
</tr>
<tr>
<td>Green Streets</td>
<td>7-1</td>
</tr>
<tr>
<td>Transit Priority Treatments</td>
<td>8-1</td>
</tr>
<tr>
<td>Neighborhood Revitalization Zones</td>
<td>9-1</td>
</tr>
<tr>
<td>Suitability Analyses: Railroad Avenue &amp; Park Avenue</td>
<td>10-1</td>
</tr>
<tr>
<td>Findings &amp; Recommendations</td>
<td>11-1</td>
</tr>
</tbody>
</table>
In recent years, the City of Bridgeport has focused its attention on how to revitalize the city economically, socially and environmentally. The city is concerned about global warming and the effects climate change will have on its neighborhoods and infrastructure. Its neighborhoods suffer the effects of air pollution caused by over-reliance on the automobile for travel and from the way energy is produced and consumed. Additionally, it has become more difficult, with the current poor economic health of the nation, for Bridgeport to revitalize its economy and compete in the global market.

In response to the challenges facing the city, Bridgeport convened a wide ranging group of community members and leaders, city departments, and the business community to scrutinize these issues. This effort was known as BGreen 2020, a multi-disciplinary effort to identify strategies that could be implemented locally, would make the city more sustainable and livable, and have a positive impact on the environment, climate change, energy dependency and the national economy. The result of the planning project was the BGreen 2020: A Sustainability Plan for Bridgeport, Connecticut.

The key sustainable principles of the plan include:

- Utilize sustainable energy practices and improve energy efficiency of both private and public sector facilities;
- Reduce automobile trips and provide a wide range of mobility options;
- Facilitate redevelopment of underutilized sites into neighborhood amenities;
- Ensure access to open spaces and foster community cohesion and stewardship; and
- Assist green businesses.

The BGreen 2020 plan focused on five critical areas. Among these was mobility. The primary goals are:

- Reduce automobile trips, vehicle miles traveled, and the city’s transportation emissions
- Provide city residents, workers and visitors with a wide range of mobility options that are less carbon intensive.
While a “Transit First” policy is the key transportation strategy to achieve the mobility goals, the plan also recommends promoting walking and bicycling and the development of related infrastructure to provide safe and convenient facilities for all users. Developing bicycle and pedestrian opportunities along with providing transit incentives epitomizes a fundamental shift in the way the roadway environment is perceived and used. Instead of dedicating the roadway for the almost exclusive domain of motorized vehicles, the roadway is viewed as a space where the needs of all users are considered, not just drivers. This concept is embodied in the “Complete Street” policy. A complete street provides access to bicyclists, pedestrians, transit riders as well as drivers, and also enhances the sidewalk area to connect it with the roadway.

To work on developing a “complete streets” policy for Bridgeport, the city established a steering committee working with city departments to develop the specific policy appropriate for Bridgeport and guide its municipal implementation. The Greater Bridgeport Regional Planning Agency serves on the steering committee and was asked to prepare the Complete Streets Plan.

The Complete Streets Plan will guide future development and enhancement of bicycle and pedestrian facilities within the city, and intends to establish walking and biking as integral modes of transportation in Bridgeport. The plan will be consistent and compatible with the BGreen 2020 plan and will include a Pedestrian Infrastructure Improvement Plan and Bicycle Facilities Plan.

1.1 Current Conditions

Before we can plan for the future we must first examine the past and present. The City of Bridgeport was incorporated in 1836, and has become the most populous city in the State of Connecticut. With a population close to 140,000 the City of Bridgeport serves as a cornerstone for the Greater Bridgeport region. Although the formative years of Bridgeport experienced a heavy reliance on fishing and farming, the intense industrialization in the mid-19th century contributed greatly to its current urban form. Its close proximity to the Long Island Sound, and subsequent improvements to the infrastructure, made the City of Bridgeport an ideal location for the manufacturing industry. Bridgeport soon became a thriving industrial center, and the urban environment followed suit. The information outlined below provides insight to the current conditions experienced in the City of Bridgeport, validated by the deep historical roots that continue to influence and direct the activities of local residents.

1.2 Land Use & Transportation

The current urban form of the City of Bridgeport exhibits a challenging land use pattern for the integration of bicycle and pedestrian oriented infrastructure improvements. Historically, Bridgeport developed with a strong reliance on the accommodation of industrial uses.

Bridgeport is well-equipped with a variety of transportation options. With a strong multimodal transportation center along Water Street, residents utilize many forms of modality including bus, rail, and ferry service. The primary shortfall of the transportation network is its connectivity. Although many option are provided linkages between modes are often troublesome for some travelers. Existing connections between bus and rail facilities are adequate, but feeder service providing access to these modes is limited at best. One way of circumventing this spatial disconnect is by enhancing access for non-motorized forms of travel. Currently, the city benefits from a partially constructed shared-use trail facility known as the Housatonic Railroad Trail. The existing trail facility extends north of the transportation center with planned construction extending up into the town of Trumbull through Beardsley Park. Once established, the Housatonic Railroad Trail will provide a strong north/south connection through the city of Bridgeport.

Other existing non-auto-mobile route alternatives come through the provision of various facilities throughout the city. Often these routes are highly isolated, offering minimal connection to the places people want to travel to and from. The absence of a contiguous and direct route for non-motorized travel between local attractors and generators is one of the biggest challenges...
to residents who would like to utilize alternate modes of transportation. Although the city was historically centered around residents who walked to work and an extensive rail network, modern construction and conveniences have transformed the city of Bridgeport into an auto-oriented environment. Furthermore, automobiles are required to traverse streets that are increasingly narrow as they were originally constructed with the pedestrian in mind. As discussed later, adapting this transportation environment for safe bicycle and pedestrian travel will require the achievement of a strategic set of goals and objectives.

### 1.3 Housing & Parking

As the city rapidly industrialized in the 1800s, employee housing was developed to accommodate the rapid influx of workers. The growing need for affordable worker housing led to the development of numerous multi-family dwelling units. The multiple family units developed in the industrial era of Bridgeport typically in the form of row housing or housing that accommodated three-to-six families, and since they were developed before the automobile era and were served by an extensive streetcar system, they often lacked the provision of off-street parking. Since these units are now occupied with tenants who rely on the automobile as a primary source of transportation, the typical solution is to allow on-street parking along both sides of the street. This creates numerous problems for the integration of dedicated bicycle and pedestrian facilities.
Streets are an integral part of our cities and towns, providing and facilitating the movement of people and goods. The road network in Bridgeport is extensive, totaling nearly 290 miles. It serves to connect neighborhoods and provides access to businesses, jobs, schools and a wide range of public and private services. Connections to neighboring cities and towns, regions as well as interstate travel are facilitated by the highway system.

The goal of transportation improvement programs has usually been to make the highway system as efficient as possible, with efficiency defined as making the flow of traffic better. This has resulted in overbuilt roadways, exclusive turn lanes that increase the walk distance across an intersection, additional travel lanes that reduce shoulder area available to bicyclists and traffic signal timing and phasing that favors vehicle movements. The needs of pedestrians and bicyclists have often been either ignored or only considered minimally. However, streets are an important part of a community’s livability and help define it as a special place. The emphasis on vehicle movement has resulted in street environments unfriendly to bicyclists and pedestrians and land uses dependent on the automobile.

The intent of a Complete Streets Policy is to effectuate a change in how the street environment is planned, designed and built and, as a consequence, change how it is used. In essence, the street environment is altered from one where vehicles dominate to one where all users are accommodated. It also encompasses not just the area between the curbs but extends beyond the pavement to include space along the roadway as well.

While a complete street embraces many common elements, each application is unique and the features selected reflect the land use, needs and characteristics of the area.
Chapter 2: Complete Streets Policy

Vision

The city of Bridgeport recognizes the challenges it is facing in the consumption of non-renewable energy resources, emission of greenhouse gases and mitigation of environmental threats. To meet these challenges and transform the city into a thriving, sustainable community, the city is implementing policies and actions in the next decade to improve the quality of life, social equity, and economic competitiveness of the city’s residents, workers, and visitors.

The Complete Streets Policy is one action strategy that the city will put into practice to achieve its sustainability goals and fight climate change. Roadways will be converted to accommodate all users, not just automobiles, and make the street environment more livable. Implementation of Complete Streets will reduce energy consumption, greenhouse gas emissions and driving, while enhancing mobility and safety for all. It will establish a transit first policy, encourage walking and promote bicycling for transportation, recreation, exercise and quality of life. Instead of a continuous uninterrupted hardscape, permeable paving material, landscaping, bio-swales, street trees and rain gardens will be used to manage and reduce storm water runoff, the urban heat island effect and build up of auto-related pollutants and contribute to a more comfortable and visually interesting environment.

Key elements of the “Complete Streets Program” include:

- Bicycle facilities – bicycle routes and lanes, signage, bicycle racks, appropriate pavement markings and symbols;
- Bus features and amenities – bus pull-outs, shelters, clear and accessible paths;
- Pedestrian enhancements – crosswalks, pedestrian signal enhancements, curb ramps, and sidewalks;
- Traffic calming actions – using textured material, intersection bump-outs, curb extensions, center refuge islands, and raised intersection tables;
Chapter 2: Complete Streets Policy

Preamble

The city of Bridgeport shall provide for the needs of drivers, public transportation vehicles and patrons, bicyclists, and pedestrians of all ages and abilities in all planning, programming, design, construction, reconstruction, retrofit, operations, and maintenance activities and products related to all public roads and streets. The city shall view all transportation improvement actions and projects as opportunities to improve safety, access, and mobility for all travelers and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system.

The Complete Streets Policy for the city of Bridgeport is developed to provide guidance for its residents, decision makers, planners, transportation engineers, designers and private developers to ensure multi-modal and sustainable elements are considered and incorporated into all transportation improvement projects and actions and make sure safe access and use is provided to all users and that the streets and roads work for drivers, transit patrons, pedestrians, bicyclists, as well as for older persons, children and people with disabilities. And, travelers of all ages and abilities can move safely along and across a network of complete streets.

• Streetscape environment – appropriate urban trees, landscaping, bio-swales and rain gardens, permeable paving material, and buffers between the street and sidewalk to dramatically alter the “atmosphere” of the street environment;

• ADA compliant features – curb ramps, detectable tactile cues and warnings, accessible pedestrian signals, and longer walk intervals;

• On-street parking treatments – delineated parking spaces and curb/sidewalk bump-outs; and

• Access management actions – driveway consolidations, modifications and closures.

Complete Streets concept plan: before situation (left photo) and after concept (right photo).
Chapter 2: Complete Streets Policy

Jurisdiction and Coverage

The Complete Streets Policy shall apply to any new construction, reconstruction, rehabilitation, retrofit, maintenance or other alteration and repair of any street, road, bridge or other portion of the transportation system under the jurisdiction of the city of Bridgeport, and will include project planning, development, scoping and design activities. The city of Bridgeport shall work with the Connecticut Department of Transportation in applying Complete Streets principles and concepts to highways and roads under the control, ownership and jurisdiction of the State.

Goals and Objectives

The goal of the Complete Streets Policy is to ensure roadways complement and enhance the surrounding land use and neighborhood character and accommodate all users, including drivers, bicyclists, pedestrians, transit patrons, older persons, children, and persons with mobility impairments. The specific goals are:

1. To protect and preserve the environment of the city of Bridgeport by reducing the emission of greenhouse gases, reducing the consumption of non-renewable energy resources, and controlling and managing stormwater run-off.
2. To make the neighborhoods of the city of Bridgeport more vibrant and livable.
3. To expand opportunities for bicyclists and pedestrians throughout the city.
4. To implement and promote a “transit first” policy.
5. To make the roadway and street environment safer and more inviting by reducing the frequency and severity of vehicular, bicylce, and pedestrian-related accidents.
6. To improve and enhance the health and physical fitness of the city’s residents; by providing more safe and convenient opportunities for bicycling and walking and encouraging all to bicycle and walk.
7. To improve and revitalize the local economy by providing high quality recreational and multi-modal facilities and providing non-motorize means of transportation.

Guiding Principles

It is recognized that each Complete Street project is unique and it is important for the action to be sensitive to the context of neighborhood. In order to create strong, livable neighborhoods, the following principles shall guide the development of Complete Streets projects:

1. Shall be suitable and appropriate to the function and context of the transportation facility;
2. Shall be sensitive to the neighborhood context and cognizant of the neighborhood needs;
3. Shall be flexible in project design to ensure that all users have basic safe access and use;
4. Shall be considered a comprehensive, integrated and interconnected transportation network that allows all users to choose between different modes of travel; and
5. Shall be consistent and compatible with the city’s Plan of Conservation and Development and the BGreen 2020 Sustainability Plan.

Elements

To ensure that Complete Streets projects accommodate all modes of travel and all users, while still providing flexibility to allow designers to tailor the project to unique circumstances, the planning and design shall adhere to the guidelines and principles included in the AASHTO Guide for the Development of Bicycle Facilities and Guide for Planning, Design and Operation of Pedestrian Facilities, the Americans with Disabilities Act Accessibility Guidelines and shall consider the following elements:

1. Bicycle facilities, including designating bicycle routes, installing bicycle lanes, installing “Share the Road” signs, providing bicycle racks and adding appropriate pavement markings, such as sharrows, bike lane symbols and
shoulder edge lines;
2. Bus features and amenities, including constructing bus pull-outs, installing shelters with ample room for boarding and alighting, ensuring bus stops and shelters are well connected to the pedestrian network and there is a clear path to and from the bus stop, and coordinating with transit officials so that their operating needs are adequately considered and incorporated into the design;
3. Pedestrian enhancements, including installing crosswalks, upgrading pedestrian signal equipment and timing such as countdown clocks and providing a Leading Pedestrian Interval (LPI), constructing curb ramps that meet ADA standards, and providing sidewalks that are well maintained, meet width needs and are interconnected;
4. Traffic calming actions, including using textured material at crosswalks, bumping-out intersection curbs to shorten the walk distance, installing center refuge islands, and installing raised intersection tables;
5. Streetscape environment, including planting urban appropriate trees, landscaping, installing bio-swales and rain gardens, using permeable paving material, such as concrete pavers and porous asphalt, and providing a buffer between the street and sidewalk;
6. ADA compliant features, including curb ramps, detectable tactile cues and warnings, accessible pedestrian signals that emit audible sounds, have a locator tone at the pushbutton or use vibrotactile devices, and increasing the walk time to accommodate persons with disabilities;
7. On-street parking treatments, including designated spaces delineated by a unique pavement treatment (textured material, concrete pavers) and curb/sidewalk bump-outs; and
8. Access management actions to manage and control ingress/egress at commercial driveways, including consolidations, reduction in the number, closures, modifying allowed movements, and incorporating good sidewalk design across driveways.

Exceptions

While the goal of the Complete Streets Policy is to convert roadways to be more inviting and accommodating to all users, it is recognized that it is not feasible nor practical to implement a complete streets action on all streets and roads in the city of Bridgeport. Exceptions to or exemptions from the policy shall be determined only upon the completion of a detailed planning and engineering analysis that documents with supporting data the costs and constraints that indicate the basis for the decision to not comply with the Complete Streets Policy. The decision to except or exempt a roadway from the Policy shall be approved by the Mayor.

Implementation

To oversee and ensure implementation of the Complete Streets Policy, the city of Bridgeport will establish a task force or commission comprised of representatives appointed by the Mayor and City Council and include bicycle, pedestrian and transit advocates. The Task Force will:

1. Restructure procedures for accommodating all users on every transportation improvement project.
2. Develop new design policies and guidelines for transportation improvement projects that consider and accommodate all users.
3. Institute new methods for assessing performance of Complete Streets and compliance with the Policy.
4. Be responsible and accountable for overseeing the planning, design and construction of complete streets projects and receiving and reviewing status reports from city departments on progress in implementing the Complete Streets Policy.
3 Bicycle & Pedestrian Safety & Accident Assessment

The city of Bridgeport is the largest city in Connecticut and the center of the Greater Bridgeport planning region. It is crossed by Interstate Route 95 (I-95), the Route 8/25 Expressway and several other important state and local highways, including US Route 1, Route 127, Route 130 and Main Street. The intensity of land development, higher traffic volumes and the numerous conflict points present challenges to anyone who walks or rides a bicycle through the city.

The city of Bridgeport is the largest city in population in Connecticut with a 2010 population of 144,229 persons. The cities of New Haven, Hartford and Stamford are the next largest cities with populations of 129,779, 124,775 and 122,643 persons, respectively. Data for smaller cities were also collected and assessed. These smaller cities range in size (based on population) from 73,206 persons for New Britain to 85,603 persons for Norwalk. Waterbury is somewhat in between with a population of 110,366 persons. While the population size varies, these cities have similar characteristics in that they all have well defined city centers with a mix of commercial, office and retail uses that encourage walking. In addition, an interstate highway and other major state routes pass through each of these cities.

Bicycle and pedestrian accident experience was compared between Bridgeport and the other larger cities to determine the incidence and rates in Bridgeport are typical of other urban areas. The intent was to determine if the accident experience, and especially the level of accidents involving pedestrians, is higher than other large urban areas of Connecticut, accident data for all crashes and those involving a bicyclist or pedestrian were tabulated. Data for the state as a whole were also tabulated. The data were extracted from the traffic accident record database compiled by the Connecticut Department of Transportation (ConnDOT) and represent the accident experience recorded in 2004 and 2005.
Based the ConnDOT accident database, about 80,665 motor vehicle accidents occurred on Connecticut’s roads and highways each year. Roughly 27% occurred in the eight largest cities, as defined above. The most accidents were recorded in New Haven followed by Bridgeport and Hartford. Although these are the three largest cities and it would be expected that they would experience the most accidents, the highest accident rate per 100,000 in population was recorded for New Haven, while the second highest was calculated for Danbury, with a population of slightly more than 80,000.

Collisions involving bicyclists and pedestrians represent a relatively small proportion of all motor vehicle accidents. Of the total vehicle accidents per year – 80,665 accidents – about 678 accidents (involved a collision with a bicyclist. This is less than one percent of the total statewide. Pedestrians were involved in more accidents than bicyclists with 1,005 pedestrian-related accidents per year, accounting for about 1.2% of the total. The highest number of bicycle-related accidents occurred in Bridgeport and New Haven suggesting than population size is determining factor. However, bicycle accidents in Hartford and Stamford were about half the total recorded in the other two large cities. Pedestrian accidents were also more represented in large cities. One-third of pedestrian accidents were recorded in Bridgeport, Hartford and New Haven. This suggests pedestrian exposure to higher volumes of traffic, with wider streets contributes to the number of pedestrian accidents. The result

<table>
<thead>
<tr>
<th>City</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridgeport</td>
<td>144,229</td>
</tr>
<tr>
<td>Danbury</td>
<td>80,893</td>
</tr>
<tr>
<td>Hartford</td>
<td>124,775</td>
</tr>
<tr>
<td>New Britain</td>
<td>73,206</td>
</tr>
<tr>
<td>New Haven</td>
<td>129,779</td>
</tr>
<tr>
<td>Norwalk</td>
<td>85,603</td>
</tr>
<tr>
<td>Stamford</td>
<td>122,643</td>
</tr>
<tr>
<td>Waterbury</td>
<td>110,366</td>
</tr>
<tr>
<td>Statewide</td>
<td>3,574,097</td>
</tr>
</tbody>
</table>

Source: 2010 Census
also suggest that the reason more pedestrian accidents happen in large cities is that, because of the land use patterns and presence of well-defined urban centers, more people walk.

The higher incidence rates for bicycle and pedestrian accidents in the larger cities are also reflected in the accident rates per 100,000 in population. Statewide, the bicyclist accident rate was 19.9 accidents for every 100,000 people. For accidents involving a pedestrian, the rate was 29.5 accidents per 100,000 in population. The comparable rates for the large cities were substantially higher than the statewide rate. For Bridgeport and New Haven the bicycle rates were 47.3 and 54.2 accidents per 100,000 in population, respectively, over double the statewide rate. The rates for the other cities included in the comparison were much closer to the state rate, ranging between 22.7 and 28.0 accidents per 100,000 in population, with the higher rate recorded for the city of New Britain. Even though Hartford is the second largest city in Connecticut, its bicycle accident rate was more similar to the medium-sized cities and almost half the rate of Bridgeport and more than half the rate of New Haven.

The comparison of pedestrian accidents rates showed a similar pattern. The largest cities had rates of 91.8 for New Haven, 85.8 for Hartford and 81.7 for Bridgeport. All rates were roughly three times greater than the statewide average. High pedestrian accidents rates were recorded in New Britain, Stamford and Waterbury, while the rates for Danbury and Norwalk were more similar to the state average.

What makes bicycle and pedestrian safety an important issue is the fact that these accidents almost always result in an injury, and in many cases a debilitating injury, and young people are more likely to be involved in the accident and are much more susceptible to incurring a severe injury. Data indicate that about 300 people die each year in Connecticut in a motor vehicle accident. Of this number, 38 are pedestrians (12.5%) and four are bicyclists (1.2%). These numbers illustrate a fatality rate much higher than expected and indicate that pedestrians and bicyclists are vulnerable to serious injury when involved in an accident.

A more in-depth assessment of bicycle and pedestrian accident experience was completed for Bridgeport. The data from 2004 and 2005 were averaged to represent an annualized bicycle accident experience and tabulated by various characteristics to ascertain any prevailing factors that contribute to the incidence of bicycle accidents. In addition, the accident records were geocoded and plotted on a city map. This spatial assessment was completed to determine if there were any concentrations of bicycle accidents at a particular location or along a specific corridor or type of corridor that would be classified as high hazard hot spot.

### Comparison of Motor Vehicle Accidents to Bicycle & Pedestrian Accidents

#### Selected Large Cities in Connecticut

<table>
<thead>
<tr>
<th>City</th>
<th>Average Total Motor Vehicle Accidents</th>
<th>Accidents Per 100,000 Population</th>
<th>Average Number Bicycle Accidents</th>
<th>Bicycle Accidents Per 100,000 Population</th>
<th>Average Number Pedestrian Accidents</th>
<th>Pedestrian Accidents Per 100,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridgeport</td>
<td>3,477</td>
<td>2,492</td>
<td>66</td>
<td>47.3</td>
<td>114</td>
<td>81.7</td>
</tr>
<tr>
<td>Danbury</td>
<td>2,269</td>
<td>3,031</td>
<td>17</td>
<td>22.7</td>
<td>29</td>
<td>38.8</td>
</tr>
<tr>
<td>Hartford</td>
<td>3,441</td>
<td>2,772</td>
<td>33</td>
<td>26.2</td>
<td>107</td>
<td>85.8</td>
</tr>
<tr>
<td>New Britain</td>
<td>1,172</td>
<td>1,638</td>
<td>20</td>
<td>28.0</td>
<td>36</td>
<td>50.3</td>
</tr>
<tr>
<td>New Haven</td>
<td>4,173</td>
<td>3,376</td>
<td>67</td>
<td>54.2</td>
<td>114</td>
<td>91.8</td>
</tr>
<tr>
<td>Norwalk</td>
<td>2,430</td>
<td>2,929</td>
<td>19</td>
<td>22.9</td>
<td>29</td>
<td>34.4</td>
</tr>
<tr>
<td>Stamford</td>
<td>2,380</td>
<td>2,033</td>
<td>30</td>
<td>25.6</td>
<td>72</td>
<td>61.1</td>
</tr>
<tr>
<td>Waterbury</td>
<td>2,540</td>
<td>2,368</td>
<td>25</td>
<td>23.3</td>
<td>69</td>
<td>63.9</td>
</tr>
<tr>
<td>Statewide</td>
<td>80,665</td>
<td>2,369</td>
<td>678</td>
<td>19.9</td>
<td>1,005</td>
<td>29.5</td>
</tr>
</tbody>
</table>

*Source: Accident Record Database, 2004 and 2005, obtained from ConnDOT.*
The spatial distribution of bicycle and pedestrian accidents are illustrated in the map below and on the following page.

**Location of Bicycle Accidents, Bridgeport**

![Map showing location of bicycle accidents in Bridgeport](image-url)
Chapter 3: Bicycle & Pedestrian Safety

Location of Pedestrian Accidents
Bridgeport

Pedestrian Accidents
● Accident Location
Unlike motor vehicle accidents, these types of accidents tend to be spread out throughout a community and identification of hotspots is less apparent. However, bicycle accidents more often occurred along a higher class road, either an arterial or collector. The spatial pattern for pedestrian accidents indicates concentrations along Main Street between Summit Street and US Route 1, Route 127 (East Main Street), Madison Avenue from Wayne Street to Taft Avenue and in the Downtown area.

The distribution of bicycle and pedestrian accidents in Bridgeport showed a concentration of accidents occurring on or near arterial streets with about 47.3% and 56.5% of the total, respectively. About one-third of the bicycle accidents occurred on a local street and about 26.8% of the pedestrian accidents. These are relatively occurrences given the traffic characteristics on local streets.

Bicycles are considered a vehicle and the accident records provide information on the type of collision between the motor vehicle and bicycle, collision types were defined by direction and maneuvers of the involved vehicles.

The most common type was an “angle” accident where the bicyclist and motorist were both traveling straight in intersecting

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Bicycle Accidents Percent</th>
<th>Bicycle Accidents Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>33.1%</td>
<td>26.8%</td>
</tr>
<tr>
<td>Collector</td>
<td>19.5%</td>
<td>17.5%</td>
</tr>
<tr>
<td>Minor Arterial</td>
<td>32.3%</td>
<td>39.0%</td>
</tr>
<tr>
<td>Principal Arterial</td>
<td>15.0%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Expressway</td>
<td>0.0%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

![Bicycle Accident Type Chart]

![Distribution of Bicycle & Pedestrian Accidents in Bridgeport by Road Type]

![Bicyclist and Motorist Collision Types Diagram]
paths. This collision type occurs most often at an intersection with both vehicles moving through the intersection. About 48.9% of all bicycle accidents in the Bridgeport were classified as an “angle” type collision. “Turning” types of accidents were also prevalent, accounting for about 32.3% of the total, and involve at least one vehicle making a turn, either in the same direction, opposite direction or intersecting direction as the other vehicle. These typically occur along mid-block sections, away from an intersection. This type accounted for 10.6% of the bicycle accidents in Bridgeport over the two year period.

This distribution of collision types was also reflected in the maneuvers of vehicles and bicycles at the time of the accident. About 81.2% of all bicyclists were traveling straight while roughly 61.3% of the motor vehicles were going straight. While 32.3% of the accidents were turning collisions, they most often involved a bicycle going straight and the motor vehicle turning. Only 3.0% of the bicyclists were turning at the time of the accident whereas 24.1% of the motor vehicles were making a turn. All of the bicyclists that were making a turn made it from the proper lane.

Pedestrian accidents occur in several different ways and not categorized the same as bicycle accidents. Pedestrian accidents most often occur when a pedestrian is attempting to cross a street or while walking along the side of the road. The Federal Highway Administration (FHWA) has defined 12 common crash types.
involving pedestrians relating to vehicle and pedestrian maneuvers at the time of the accident. The typology includes such categories as dashing or darting out into the street, crossing a street, mid-block situations, walking along the street and playing in the street.

This typology was used to identify pedestrian accident types in Bridgeport. The most prevalent pedestrian accident type in Bridgeport was when the pedestrian was attempting to cross at an intersection, either signalized or unsignalized, or being struck by a vehicle that was turning right or left from the proper lane. About 43.6% of all pedestrians accidents were classified as these types. The next most common type of accident was the dart/dash, accounting for 20.2% of all pedestrian accidents. Other types included the multiple threat category, walking or playing in the road, or walking along the road.

The responding officer to an accident determines the person who was at fault for the accident. While sometimes this is difficult to judge and is based on the officer’s experience, often there are clear indicators as to who was responsible for causing the accidents. For bicycle accidents, the bicyclist was more often determined to be at fault for the accident than the driver of the motor vehicle. The bicyclist was at fault in 66.9% of the accidents, while the driver was found to be responsible in only 33.1% of the accidents. The opposite pattern was recorded for pedestrian accidents. The pedestrian was found to be at fault in only 39.9% of the accidents, while the driver of the vehicle was cited as responsible for 60.1%.

The determination of who was at fault for the accident is based on factors that contributed to it. The determination of fault often correlates to various contributing factors and the actions of the operator of the offending vehicle. The list of possible contributing factors is fairly long, but, for bicycle and pedestrian accidents, there are several common causes. The most common factor that contributed to a bicycle accident was either the driver or bicyclist failing to grant the right of way. The bicyclist or driver vio-
lating a traffic control device at an intersection was also common contributing factor. Because bicycles are considered a vehicle and are required to travel in the same direction as motor-vehicle traffic, bicyclists traveling against traffic are generally cited as being on the wrong side of the road when they are involved in an accident. This factor accounted for about 10.5% of the bicycle accidents.

For pedestrian accidents, the unsafe use of the highway by a pedestrian was the often cited factor, accounting for 37.3% of the total. Failure to grant the right of way or violation of a traffic control device were also often cited as contributing factors.

The age of the bicyclists and pedestrians was recorded in the accident reports and sorted and grouped into six age cohorts. Younger persons were over-represented in bicyclist-related accidents as about 43.6% of the bicyclists were 16 years old and younger. The 22-to-60 year old cohort accounted for approximately 33.8% of the accidents, and this latter cohort spans substantially more years. However, the quantity of riders is substantially higher when the rider is below the age of 40. Only about 1.5% of the bicycle accidents involved a rider who was over 60 years of age.

For pedestrian-related accidents, younger persons were less represented than for bicycle accidents. While 26.8% of the pedestrian accidents involved someone under the age of 16 years old, walkers between the ages of 22-and-40 years old accounted for roughly 44.4% of the accidents. Older person, over the age of 60 years old, were over-represented in the distribution, being involved in 10.5% of the accidents.

One of the main reasons for assessing bicycle and pedestrian safety and identifying actions to reduce vehicle collisions is the fact that these types of accidents almost always result in an injury, many that are serious and require transfer to a hospital.
The data indicated that about 93.2% of bicyclists involved in a collision with a motor vehicle sustained some injury. Fortunately, none of the accidents resulted in a fatality and almost all resulted in a non-serious injury; however, about 7.5% were incapacitating and required transport to a hospital. About 36.1% required some medical attention at the scene. No injuries were recorded for only about 6.8% of the bicycle accidents.

The severity of pedestrian injuries showed a similar pattern, as the majority of the accidents resulted in only minor (44.2%) or visible, but non-incapacitating (38.2%), injuries. However, almost twice as many pedestrian accidents required emergency treatment at a hospital and two deaths were reported.
To a varying extent, bicycles will be ridden on all roadways where they are permitted; therefore, the most common bikeway is a shared roadway facility. Because of this, all roads that are open to bicyclists should incorporate design treatments that will enhance bicycle riding qualities. It is not necessary to specifically designate roads as bicycle routes or provide bicycle lanes. Rather, all roadways should be maintained and upgraded to ensure bicycle travel can occur safely and conveniently.

The type of accommodation depends on the type of road and characteristics of traffic. On low volume, residential streets, bicyclists can easily become integrated with the few vehicles on the road and may not require any separation. The road is a shared-space used by vehicles, bicyclists and pedestrians. At the other end of the road system, special treatments are necessary and greater separation is required to accommodate bicyclists on higher-volume, higher-speed arterials.

Bicyclists can be grouped into one of three categories ranging from young children to the *advanced bicyclist*. In between are *basic bicyclists* who represent the average adult rider. Because of their abilities, *advanced bicyclists* can best be and more easily accommodated on existing roads with the proper accommodations. They are generally able to operate within the road’s right-of-way and under most traffic conditions; have confidence in riding with traffic and do not feel in danger or perceive a safety hazard. This group of riders prefers the freedom of choice to decide how to complete their bicycle trip as well as the directness and speed advantages of using higher class roads. Route choice is much more a function of where the bicyclist is going and less dependent on road characteristics. Their trip lengths also tend to be much longer than the *basic bicyclist*. 
Because only about 5% of the bicycling public is considered an **advanced bicyclist**, special attention must be given to the needs of both basic bicyclists and children. The design treatments needed to enhance both groups’ bicycling enjoyment are similar. Bicyclists classified in these groups are generally less confident of their ability to ride in traffic and feel unsafe riding on higher volume and higher speed roads. They prefer low volume, low speed roads or designated bicycle facilities with well-defined separation from motorized vehicles. **Basic bicyclists** tend to have trip lengths of between two and five miles, while children typically confine their riding to their home neighborhood and do not often venture beyond familiar areas. For these reasons, these riders are best served by a network of neighborhood streets and designated bicycle facilities.

The adopted design approach reflects the **design bicyclist**, that is, what type of rider is the facility designed for, the type of facility and actions needed to make the roads more user friendly to bicyclists. The minimum operating space of a bicyclist, based on their profile, is assumed to be about 40 inches, resulting in a minimum width for a bicycle facility of four feet. The vertical clearance from any overhead obstructions should be at least 100 inches or a little more than eight feet.

The need to implement specific design treatments depends on the traffic characteristics of the adjacent roadway. High traffic volumes and operating speeds represent greater potential risk from passing motorized vehicles and create an uncomfortable feeling. Generally, the higher the traffic volume and speed, the greater need to implement more extensive design treatments to accommodate **basic bicyclists**. Children and young bicyclists should avoid these roads altogether.
Chapter 4: Bicycle Facilities Design Approach

There are basically three types of bicycle facilities: shared roadway; bicycle lanes and shared-use paths. Shared roadway facilities and bicycle lanes are located on-the-road and either share space with motorized vehicles or provided an exclusive space along the edge of the road. Shared use paths are specialized, off-road facilities on a separate right-of-way that accommodate multiple users.

Shared Roadway Facilities:
Provide the minimum level of route designation and separation from motorized vehicles. Bicyclists share the road with motorized traffic and are carried in the same direction of traffic. No special treatments are made at intersections or where there is on-street parking. These facilities are either unmarked or signed with a standard bicycle route sign along both sides of the road. There are three Shared Roadway applications:

1. **Paved Shoulder:** The bicyclist uses the shoulder area of the same lane as motorized vehicles. At least four feet needs to be provided along the curb; five feet is need if traffic volumes or speed are high. These facilities generally do not require special signing or markings and are acceptable on lower volume, lower speed roads. Signing and markings should be considered if the road is being used to connect to another special bicycle facility. This type of shared roadway facility is the most common bicycle facility.

2. **Wide Curb Lane:** The bicyclist uses the curb edge of the outside travel lane and shares the road with vehicles. The lane must be at least 14 feet wide; 15 feet if higher volumes are present. The wider lane width can accommodate both motorized vehicles and bicycles in the same lane without reducing the capacity of the roadway. Also motorists would not have to move into an adjacent lane when passing a bicyclist. This type of facility is more appropriate along low speed, low volume roads. When speed and volumes are high, they do not provide sufficient separation and comfort level to basic bicyclists. The following diagram illustrates the typical layout of a wide curb lane bicycle facility.

3. **Shoulder Bicycle Route:** The bicyclist uses the paved portion of the road to the right of the edge line same as a paved shoulder facility. Again, the shoulder lane provides some level of separation between traffic and bicycles because of the edge line. The shoulder lane is designated as a bicycle route and appropriate signing and pavement markings are installed. The minimum width of a bike route is four feet but it increases to five feet if a guard rail or curbing are present. With travel lanes typically a minimum of 12 feet wide,

Source: Connecticut Bicycle and Pedestrian Plan, Bicycle and Pedestrian Design Toolbox

![Diagram of bicycle facilities](image-url)
Chapter 4: Bicycle Facilities Design Approach

a candidate roadway needs to be at least 32 feet wide to accommodate a bicycle route. The following diagram illustrates the typical layout of a shoulder bicycle route.

**Bicycle lanes:** A bike lane is defined as the portion of the road specifically designated by striping and signing for preferential and/or exclusive use by bicyclists. They are always one-way facilities and carry bicycles in the same direction as adjacent traffic lanes. Two-way bicycle lanes are unacceptable because they promote riding against the flow of traffic. On two-way roads, bike lanes are installed along both sides and both directions. Because they provide a more predictable movement for bicycles and motorized vehicles, as well as, a greater degree of separation, bike lanes are more acceptable to basic bicyclists. The minimum width of a bicycle lane is four feet, but if guard rails or curbing are present, the width needs to be increased to at least five feet. Additional width is desirable in urban areas, where traffic speeds are greater and there are more potential conflicts. On-street parking presents bicyclists with several special problems. Where on-street parking is permitted and designated, the bike lane needs to be located between the travel lane and the designated parking spaces. Parking is prohibited in a designated bicycle lane, so a clear designation for each use must be installed. If the on-street parking is not designated by pavement markings, a minimum 11-foot wide lane needs to be provided to accommodate the combined bike and parking lane. The bike lane portion of the space would be placed between the travel lane and parking area. At intersections, the striping and signage needs to encourage positioning bicyclists in the proper lane whether to go straight, turn left or turn right. The following diagram illustrates the typical layout of a road with a designated bike lane, with and without adjacent on-street parking.

**Shared-use path:** These facilities are referred to as shared-use paths because they are used by more than just bicyclists. Users include bicyclists, walkers, in-line skaters, persons in wheelchairs, and strollers. A shared use path is physically separated from the road and follows an independent right-of-way. Two-way flow is provided and one-way sections are typically not allowed.
although short one-way section may be acceptable as long as they are clearly designated, strictly enforced and limited to areas where it is absolutely necessary. Although these paths provide a low stress and safe area and a place where novice riders and children are separated from motorized vehicles, the mix and volume of users often creates a challenging environment with a variety of potential conflicts. Care and attention needs to be given to the design and user rules need to be established and enforced. Also, speed limits may need to be set to ensure that the speed differential between users is not excessive.

Shared use paths are the highest form of facility and, as such, require special design considerations. The guidelines developed by AASHTO (Guide for the Development of Bicycle Facilities) should be used and followed when designing these paths. Although sound engineering judgment may allow some flexibility in the design, the guidelines provide a good starting point for trail design. The following are the basic design guidelines:

1. Under most circumstances, the desired minimum width of a shared-use path is 10 feet. An eight-foot width is adequate in some cases, but, given the variety and number of users, the narrower width is generally not adequate to accommodate all users safely, especially when heavy use is expected.

2. Good separation (minimum of five feet) should be provided between the path and the road. Aligning the path immediately adjacent to the roadway is not recommended because it can create operating and safety problems. However, if a path is located along the roadway, a sufficient buffer needs to be or a suitable and distinct physical divider needs to be installed, if the buffer is less than five feet. The divider needs to be at least 54 inches high and cannot restrict the sight lines at intersections.
3. A two-foot graded shoulder should be provided on both sides, with a three-foot clear area between the edge of the trail and fixed objects adjacent to the path. The shoulder area provides a refuge for pedestrians.

4. The path should avoid frequent intersections with streets, because path-street intersections require special treatments, destroy momentum and trail continuity, and increase conflicts.

5. The vertical clearance along the path should be at least eight feet.

6. Other design considerations for a shared-use path include the design speed of the bicyclist (a minimum design...
speed of 20 mph should be assumed for paved trails and 15 mph for unpaved surfaces), horizontal alignment or curvature of the path (the minimum radius at a design speed of 20 mph is 100 feet), grade (maximum slope should be less than 5% for paved trails and 3% for unpaved surfaces; greater grades are acceptable for short sections), stopping sight distances and road crossing and intersection treatments (curved approaches to slow bicyclists; bollards to prevent motor vehicle access; location of crossing).

7. Adequate signing and marking on shared use paths are essential design elements and are important to properly warn and inform users about regulatory requirements, alert users about potential conflicts and changing conditions, and direct and guide users along the path. Pavement marking may be installed to define proper travel paths (center lines) and obstacles or obstructions in the path. In all cases, signs and pavement markings need to conform to the Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD provides recommendations on the type, style, size and location of appropriate signs and pavement markings, as well as acceptable traffic control devices.

8. Structures along the path should be the same width as the path plus two feet of clear area on either side of the path. Bridges to be built for the exclusive use by bicyclists and other trail users can be designed to pedestrian load standards. Railings, fences or barriers should be installed on both side of the structure and be at least 54 inches in height.

9. Shared use paths are generally used by more than just bicyclists; however, access by any motorized vehicles, other than authorized maintenance, emergency and patrol vehicles, should be prohibited and restricted. Lockable/removable gates or barriers should be installed at intersection crossings, but they should be spaced to allow bicycles to enter without stopping or dismounting.

10. Accessibility of shared-use paths is always a important consideration and the design of a path needs to ensure the trail is as accessible to persons

Example of a shared-use path in the Greater Bridgeport planning region – an urban section in Bridgeport along Housatonic Avenue.
in wheelchairs and those with other impairments as much as practical. Although it may not be feasible or possible to ensure that the trails are 100% ADA accessible over its entire length, an ADA-accessible route needs to be provided from parking area to the beginning of the trail and sections near and at the trailhead should be ADA compliant and signed and marked as such. It is also recommended that shared-use trails be rated based on a standardized difficulty assessment related to accessibility. This would allow users to decide for themselves whether or not they could use the trail.

Sidewalks are not considered acceptable for use by most bicyclists and designating a sidewalk as a bicycle facility is not a satisfactory policy. Sidewalks are designed for pedestrians and for their speed and maneuverability. The higher speeds of bicycles cannot be safely accommodated on sidewalks. The co-mingling of pedestrians and bicyclists can result in conflicts; sudden changes in direction by pedestrians leave bicyclists little time to react and pedestrian are sometimes uncertain where on-coming bicyclists are going. Also bicyclists on sidewalks are not readily visible to motorists and when they enter the roadway right-of-way, they will be approaching traffic from an unexpected direction. Fixed objects located on sidewalks such as utility poles, sign posts, and newspaper vending machine also pose a hazard. The use of sidewalks for bicycle use is acceptable for short sections and in certain exceptional situations where no alternatives are feasible. One acceptable occurrence is over narrow bridges; however, to reduce potential conflicts, bicyclists should be required to dismount and walk their bicycles.

Despite these inherent conflicts, state law does not specifically prohibit bicyclists from riding on sidewalks; instead, laws require bicyclists to yield to pedestrians on a sidewalk and emit an audible signal when overtaking them. Municipalities, however, do have the right to enact ordinances to prohibit the operation of bicycles on sidewalks. Many communities have done so, but the restriction is rarely enforced.

The use of sidewalks by young children may also be acceptable and reasonable, especially as they are beginning to learn how to ride. At a young age, these beginning bicyclists ride at slow speeds comparable to a pedestrian and they often ride under adult supervision. Also many parents feel that their children are safer on a sidewalk as opposed to sharing the road with motorized traffic. However, the question is at what age should children be encouraged to use the road instead of the sidewalk. A key to this is providing safe and proper bicycle facilities, either on-the-road or as separate path.
Figure 13-1
| Schools Map

Source: BFJ Planning

Note: This map does not include the proposed high school math and science magnet school, as this school is proposed to be located outside of Bridgeport.
Walking is the most common form and mode of transportation. Every trip, at some point involves walking, whether it is from a parking lot to the entrance of a building, walking to and from a bus stop, or walking to the train platform. Despite this, it is often the least emphasized mode of travel when it comes to providing convenient, safe and adequate facilities. Pedestrian walkways, when provided, are often not built to a high design standard, not maintained properly, cluttered with fixed objects (mail boxes, sign posts, trees, newspaper boxes, etc), and not accessible to persons with a mobility impairment. It is the responsibility of municipal governments to provide pedestrian facilities where appropriate and needed.

Road design standards, with the emphasis on moving traffic and vehicular safety, and commercial development patterns have made the street environment an intimidating place for pedestrians. People feel insecure walking along high speed, multi-lane arterials and are reluctant to cross these roadways even when crosswalks are available. Strip commercial patterns worsen the sense of insecurity with multiple and closely spaced driveways and minimal pedestrian friendly connections. Each development assumes customers will drive, so the emphasis is on providing parking space and not with accommodating walking.

Pedestrian safety is a concern in many communities. As traffic speeds have increased, pedestrians are more vulnerable. Data have shown that the higher the traffic speed, the higher the probability that a pedestrian will be killed or seriously injured if involved in an accident. In addition, the higher speed alone increases the possibility of a pedestrian being hit, because of the longer braking distances and limited reaction time.
Well-designed pedestrian facilities create a more walkable environment, where pedestrians feel safe and secure and adjacent traffic is not perceived as intimidating. It should be assumed that people would walk if provided a safe environment. Studies have shown that walking rates in different neighborhoods in the same city are directly related to the quality of the pedestrian system.

Pedestrian facilities are separated areas specifically for pedestrian use and are intended to provide safe area for people travel between destinations. The most common pedestrian facility is a sidewalk; and the characteristics that most ensure use are continuity and interconnectedness. A well designed sidewalk network is one that provides continuous paths with no gaps that connect where walkers want to go.

While sidewalks are the main thoroughfare for walkers, there are many other pedestrian features that enhance the safety and attractiveness of the area and encourage people to walk. These include:

- Pedestrian activated signals to provide protection while crossing;
- Well marked and visible crosswalks;
- Buffers between the street and the sidewalk;
- Curb ramps; and
- Signing.

To function properly, sidewalks must be of an adequate size, have a smooth and stable surface and provide adequate space for pedestrians to move freely and easily without impediments. Of critical importance is for the sidewalks to be well maintained. Cracks in the pavement or heaves in the surface creates trip hazards and can lead to falls and injuries.

The design of a sidewalk depends on its location and function. In less urban and commercial areas, a three-foot wide sidewalk may be sufficient. However, where high pedestrian traffic is expected, a minimum width of five feet should be provided. Wider sidewalks should
be installed in areas near schools, transit stops or other areas with high concentration of pedestrians. A 4-to-6-foot buffer should be provided between the street and the sidewalk.

In downtown areas, the sidewalk area needs to consider adjacent buildings and other amenities that may be placed in the area. In addition to a five-foot pedestrian zone, an additional three feet should be provided as a frontage zone along the building-sidewalk edge. This zone provides space for opening of doors with intruding into the pedestrian zone. On the street side, a two-to-four-foot zone should be reserved for tree plantings, street furniture, sign posts and other items. This zone provides separation between where people are walking and fixed objects.

Pedestrian signals are special devices connected to traffic control signals that alert pedestrians to when it is appropriate to cross a street. In conjunction with the traffic control signal, the pedestrian signal provides either an exclusive crossing phase when all traffic is stopped or a concurrent phase. The latter situation allows pedestrians to cross while the opposing vehicle traffic has a green light and intersecting traffic is stopped by a red light. The pedestrian phase is timed to allow sufficient time for pedestrians to cross the street. Often the red phase is extended when the pedestrian signal is activated to ensure adequate crossing and clearance intervals. In areas where there is a heavy concentration of the elderly or children, more walk time should be provided.

The installation of pedestrian signals must comply with the requirements and guidelines in the Manual on Uniform Traffic Control Devices (MUTCD). Indications of WALK/DON’T WALK should use the international pedestrian symbols. Enhancements should include countdown signals that indicate the time remaining in the walk/clearance phase and audible messaging to aid persons with vision impairments. Push buttons should be placed in easy reach of all users.

Marked crosswalks are an effective method for improving safety and reducing accidents. Crosswalks indicate the preferred locations for pedestrians to cross a street and provide warning to motorists to expect pedestrians. Typically, crosswalks are installed at intersections controlled by either stop signs or a traffic control signal. Mid-block locations are acceptable when warranted by high pedestrian activity.

Crosswalk lines need to be white and be at least six feet wide. For added visibility, it is recommended that the area of the crosswalk be marked with white lines at a 90-degree angle to the line of the crosswalk flow (that is, parallel to the flow of traffic). The transverse line across street can be omitted. Material needs to be visible, non-slippery and not cause a tripping hazard. As part of a complete streets concept, a tactile material should be used, such as, concrete pavers or stamped concrete. In either case, the markings must be well maintained to function properly.
To accommodate handicapped accessible travel, curb ramps should be installed at all intersections. The ramps provide a gentle slope from the height of the sidewalk to the surface of the road. Tactile material should be added to provide non-visible cues that the walker is about to enter to roadway. The ramps need to be at least 36 inches wide and should be provided for each crosswalk as opposed to one large one. This layout aligns the sight-impaired pedestrian in the proper direction.

A more involved approach to pedestrian safety is the implementation of a traffic calming measures. The techniques involve physical changes to the roadway to alter driver behavior, reduce travel speeds and provide enhanced protection for pedestrians. The following types of enhancements are suggested for consideration:

**Curb extensions (bottom left):** Curb extensions or bump-outs extend the sidewalk or curb line out into the parking lane and reduces the effective street width. They significantly improve pedestrian crossings by reducing crossing distance, visually and physically narrowing the roadway, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street.

**Raised Islands (next page, bottom left):** Raised islands are placed in the center of the street at intersections or mid-block to help protect crossing pedestrians from motor vehicles and allow pedestrians to deal with only one direction of traffic at a time by enabling them to stop partway across the street and wait for an adequate gap in traffic before crossing the second half of the street. Often advanced warning signs and flashing lights are installed in conjunction with the raised island. Landscaping could be placed in the median as long as it does not restrict sight lines.

**Raised Crossing (next page top left):** A raised pedestrian crossing is essentially a speed table (a wide speed hump) with a flat portion the width of a crosswalk, usually 10-to-15 feet. Gentle sloping ramps about six feet wide are placed on either side of the raised crossing. This allows traffic to comfortably cross at 25 mph. The raised crossing elevates the crosswalk to the height of the sidewalk and is designed to encourage motorists to yield to pedestrians.

layout for curb extensions with defined parking bays (left) & Curb Ramp (right), Source: Connecticut Bicycle and Pedestrian Plan, Bicycle and Pedestrian Design Toolbox
Raised Intersection (top right): A raised intersection is essentially a raised pedestrian crossing that extends across the entire intersection. Construction involves providing ramps on each vehicle approach, which elevates the entire intersection to the level of the sidewalk. Crosswalks are elevated as part of the treatment.

On-Street Parking Enhancements (bottom right): On-street parking can narrow the effective crossing width of a road, provide a buffer between traffic and pedestrians and foster a more vibrant pedestrian commercial environment. However, it can create a visual barrier between traffic and crossing pedestrians.

To mitigate this issue, on-street parking area can be defined and delineated with the use of a different surface material and by installing curb extensions. The curb extensions define where pedestrians should cross and effectively reduces the walk distance. On-street parking bays need to be setback from the intersection and approaches to crosswalks.
Green Infrastructure Elements

The concept of complete streets focuses primarily on making the street environment more accommodating to all travelers by all modes of transportation. However, also equally important and a key element of this concept is the enhancement of the area beyond the travelway. These enhancements include various landscaping and streetscape features to make the street more interesting and aesthetically pleasing. The landscaping elements are also referred to as “green” infrastructure.

Green infrastructure is an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly. The purpose is to control water flow before it enters the drainage system, thereby, allowing groundwater recharge, reducing inflow and reducing the occurrence of combined and sanitary sewer overflows. These elements can also help control runoff and storm water flows from large storm events. This will reduce the potential for area wide flooding.

Typical elements included as green infrastructure include:

**Storm Water Planter:** A storm water planter is a small, contained vegetated area that collects and treats storm water using bioretention. They typically contain native, hydrophilic flowers, grasses, shrubs and trees. Treated storm water is either infiltrated into the ground or discharged into a traditional storm water drainage system. The planters are relatively small and do not require a large amount of space. However, they need periodic maintenance, including weeding, plant replacement, cleaning inflow and outflow pipes, watering during dry periods and removing litter. The cost of a storm water planter is about $15 per square foot.
Tree Boxes: Urban trees provide shade and enhance the aesthetics of the roadway, but they are also effective in reducing and filtering storm water. A tree box is a special application that is designed to capture and filter runoff before it is discharged into the storm sewer system. Most urban trees are planted in the sidewalk area and no additional elements are provided. A tree box application includes planting trees in a container, intercepting and capturing runoff from the street before it reaches the catch basin, and amended mulch and soil designed to filter pollutants from the runoff. Tree boxes are more expensive than typical tree planting but are substantially more effective in reducing runoff.
Rain Garden: A rain garden is a small garden specially designed by plant selection and composition of soil and base material to handle the extreme flows and nutrient concentrations of stormwater runoff. The garden is located near the source of runoff and is positioned to intercept runoff before it enters the drainage system. The intent is to reduce infiltration and improve water quality. While construction is similar to any other garden, the excavation of a rain garden is deeper and how water is delivered to the garden is a critical factor. Typically, they are built in a natural depression. If not then the runoff needs to be physically diverted to the rain garden. The rain garden needs to be properly maintained and the pipes leading into and from the garden need to inspected and cleaned of any natural debris. The cost is variable and depends on the size, location and plant material.

Bio-swales: A bio-swale is a gently sloping depression along the length of the roadway, planted with dense vegetation or grass. The intent is to treat stormwater runoff from rooftops, streets, and parking lots before it enters the drainage system. As the runoff flows along the length of the swale, the vegetation slows and filters it and allows it to infiltrate into the ground. The bio-swale looks like a typical landscaped area, but it is typically lined to convey runoff to the drainage system or other outlet. The bio-swale needs to be well maintained and periodically clean and cleared of sediment, weeds.
and litter. The cost is variable and depends on the size, location and plant material.

**Permeable Pavement:** This green infrastructure element involves using a porous material instead of a non-pervious asphalt or concrete. Examples include pre-cast concrete pavers, permeable asphalt or concrete, and turf block. The common feature of these surface materials is that they allow storm water to infiltrate through the top layer and recharge ground water, thereby, reducing runoff. The permeable pavement can handle heavy loads and is suitable for vehicle traffic areas, such as surface parking lots, on-street parking lanes, sidewalks, and crosswalks. Concrete pavers consist of small, brick-sized blocks arranged in an interlocking grid pattern. Gaps between the pavers allow water to flow into the ground and the base and sub-base material provides good drainage. Pervious asphalt consists of coarse stone aggregate and asphalt binder, with very little fine aggregate, and has a similar look to conventional asphalt. Water percolates through the small voids left in the finished asphalt. The base and sub-base consists of a thick layer of gravel, absent of fine aggregates, to allow water to drain thoroughly. It is generally deeper and more complex than the base and sub-base supporting a typical asphalt surface. A drainage layer may be necessary if the water cannot be readily absorbed in the sub-soil layer. The most applicable site is one that is relatively level and the filtration layer must be at least four feet above the water table. The surface of either the concrete pavers or permeable asphalt needs to be well maintained to function properly and attain an adequate useful life. The surface needs to be swept or vacuumed periodically to prevent sediments from clogging the voids in the material, which will reduce the effectiveness of the permeable material. Turf blocks consist of concrete blocks arranged with large spaces filled with soil and planted with grasses or hearty ground cover. Like a regular lawn, turf block areas need to be mowed, raked and reseeded.
Green Streets

Combining green infrastructure with bicycle, pedestrian and traffic calming elements create “green” streets. A “green” street uses natural systems to reduce storm water flow, improve water quality, reduce urban heating, enhance pedestrian safety, reduce carbon footprints, and beautify neighborhoods. Through various combinations of plants and soils, these objectives can be met on different types of roads in a variety of settings. The following are examples of how various Complete Street features and strategies can be employed to effectuate a fundamental change in the way a street looks, feels and is used.

![Diagram of green streets](Image)

Permeable paving material installed in the parking lane converts impervious areas to provide storm water to infiltrate into the ground. Storm water runoff is reduced without any loss of parking and the aesthetic qualities of the concrete pavers gives the illusion that the road has been narrowed, thereby, reducing travel speeds.

Bio-swales are long, shallow vegetated depressions, with a slight longitudinal slope that allows runoff flow through the swale and infiltrate the ground. Sediments and pollutants settle out as the storm water flows through the swale.

Along commercial streets, the bio-swale and rain gardens are replaced by a series of stormwater planters. The planters serve the same function but are smaller and fit better in the commercial environment. The sidewalk area can be surfaced with a permeable material and a bicycle facility provided.

In this example, permeable pavers or asphalt is placed along the parking lane to convert it from an impervious surface. Stormwater curb extensions define the parking spaces provide additional runoff retention. Again, bicycle lanes can be installed to further expand opportunities.
Transit Priority Treatments

Too often there is a disconnect between road design and transit operations planning. Buses are often just simply accommodated on the road – buses pull over to the side of the road to pick-up and drop-off passengers and bus stops are designated by a lone post in the grass with no sidewalks, curb ramps or shelter. Crossing a street to catch a bus can be hazardous and, even where crosswalks are provided, barriers and obstructions exist that prevent bus riders from conveniently accessing the bus stop.

Because buses travel on the road, operations are delayed by congestion and the need to merge back into traffic after a stop further slows service. Stop-and-go bus service increases travel times and discourages people from using transit.

The intent of a complete streets policy, as defined above, is to accommodate all travelers using a variety of modes. The operating needs of buses are critical elements of that policy. Transit priority treatments will ensure access to buses is enhanced and not hindered by road design. Typical transit priority actions include the following:

Road design not only affects pedestrian and bicyclist perception of the road environment and their willingness to walk or ride a bicycle, but it is also out of sync with the needs of people using bus service. While buses rely on roads for their operation, road design that does not consider the needs of bus operations slows service, creates an unsafe environment for riders and discourages from using public transportation.
Transit Signal Priority: This action modifies the normal operation of a traffic signal to accommodate better service for transit vehicles. These systems are different than traffic signal preemption in that the normal timing and phasing plan is not interrupted. Instead, bus priority is provided passively or actively. A passive system is based on coordinating timing plans based on the schedule and speed of buses traveling in the corridor, instead of the speed of traffic. Active systems use detectors or wireless communications to sense and approaching bus and provide priority after a pre-programmed off-set. The detector is located upstream of the signal location and a projection is made as to when the bus is expected to arrive at the intersection. The signal timing plan is adjusted accordingly; the green time is advanced to allow the bus to move through the intersection or extended to ensure a green indication is provided when the bus arrives. The intent of this action is to achieve greater schedule adherence and reduce travel times. Passengers will be provided more reliable service.

**Bus Stop Design:** All bus trips begin and end with a walk trip and the bus stop is the defined interface point at which the mode of travel shifts from walking to bus rider. Road design dictates how buses stop to pick-up and drop-off passengers as well as the safety of passengers traveling to and from the bus location. Typically, a bus simply moves to the side of the road at a designated bus stop and traffic behind the bus either stops and waits for the bus to move or moves around the bus. Alighting passengers either cross behind the bus and cannot see opposing traffic or cross in front of the bus and cannot see on-coming traffic. To incorporate bus stop design as part of a complete streets approach to a road environment, the following actions considered:

1. **Bus Bays:** Construct designated areas along the curb where buses can pull off of the travel lane and safely pick-up and discharge passengers. The bus bays would be defined by cub-cuts and curb extensions to define the area. The curb extensions would also provide an area for passengers to wait to cross the road.

2. **Bus Stop Areas:** To ensure bus stops are accessible in a safe and convenient manner, remove all barriers and obstructions from the area and provide a smooth surface free of debris.

3. **Bus Stop Shelters:** Install shelters to provide protection from the elements while waiting for a bus. The shelters can provide benches and space for displaying information about service.

4. **Accessible Paths:** While service to an area may be good, it will not be used if there is not a well-defined and accessible path from the residential neighborhood to the bus stop location. A well-defined, and barrier-free, sidewalk to and from the bus stop will improve access to transit, encourage more to use it and reduce reliance on more costly forms of transportation, especially for persons with mobility impairments.
5. **Bus Stop Signs:** Designating bus stops with a lone, non-descript post is not sufficiently visible to attract riders or encourage use. Signs need to adequately display route and service information, as well as the logo of the operator.

**Bus Lanes:** A bus lane is a traffic lane on a surface street reserved for the exclusive use of buses intended to help buses pass congested traffic. The bus lane can be located along the curb or in the median of the road. Curbside bus lanes often experience problems with enforcement and become congestion with non-bus users, such as illegally parked vehicles and right-turning vehicles. Median bus lanes operate at a higher level of service and do not encounter many of the problems of curbside lanes. However, conflicts with left turning vehicles are an issue and all passengers must cross the street. The bus lanes offer the opportunity for buses to by-pass queued vehicles to avoid congestion and delay. The bus lane can be combined with signal priority systems by providing the lane an advance green phase to allow the bus to move before other vehicle traffic.

Bus priority treatments can be combined with green infrastructure and complete streets elements to further enhancement to road environment.
9 Neighborhood Revitalization Zones

As an important step in the development of a citywide bicycle and pedestrian plan, a review of all currently available Neighborhood Revitalization Zone (NRZ) plans was completed. This section includes the findings contained within the NRZ plans for:

- Black Rock
- West Side/West End
- East End
- South End
- Hollow

The reviews were conducted to identify all existing information addressing the neighborhood need for alternative transportation options. This analysis serves as a review of the local perceptions of system efficiency and provides information to guide further inspection of those areas in need.

9.1 Black Rock NRZ Plan

The Black Rock Neighborhood Revitalization Zone Plan exposes several attributes impacting the development of a local bike and pedestrian network. The majority of issues expressed in this plan pertain to the condition of the existing infrastructure, primarily focusing on the abundance of litter and the lack of lighting along sidewalks and transportation corridors. Although there are significant impediments created by the existing urban form, the community uses this plan to express an urgent need for bicycle and pedestrian facilities. Additional sections of the NRZ plan outline specific projects the community feels will improve their overall mobility. The following information breaks down some key information expressed within the plan, with the intent of providing a basis for the successful integration of the Black Rock community with other neighborhoods in the City of Bridgeport.
Neighborhood Gateways

The most common theme throughout the Black Rock NRZ plan calls for the establishment of neighborhood gateways. The establishment of neighborhood gateways can offer bicyclists and pedestrians an enhanced level of navigation through the establishment of such spatial indicators. The Black Rock community identified three key gateways into the Black Rock Neighborhood to include:

• Fairfield Avenue at Interstate 95
• Fairfield Avenue at the Ash Creek Bridge
• Brewster Street at Canfield Avenue

The plan specifically recommends the installation of signage, structures, and additional landscaping designed to communicate a clear delineation between Black Rock and other neighborhoods in Bridgeport. These ideas are consistent with complete streets elements.

Pedestrian Improvements

The community identified unkempt sidewalks, overflowing garbage receptacles, and overgrown plants and trees along Fairfield Avenue as an emerging issue for pedestrian activity. High rates of speed along Fairfield Avenue have been identified as a contributing factor to making the streets unfriendly to pedestrian activity.

With regard to specific improvements, the Black Rock NRZ plan requested investigating the potential for a footbridge across Ash Creek at the foot of Fox Street. The footbridge would provide direct and scenic pedestrian access to Fairfield from the neighborhood and link it with the new Fairfield Metro Center rail station. Additional pedestrian bridge improvements were considered over Cedar Creek west of Captain’s Cove marina to connect Black Rock to the West Side Neighborhood.

Bicycle Enhancements

The Black Rock NRZ describes a few projects to better enable bicycle access within the neighborhood. The first recommendation is to create a bike route that begins at Ash Creek, loops around St. Mary’s by the Sea, through the historic district, and ends at the West End neighborhood. The proposed route would encompass a proposed waterfront linear park.

Such improvements could enhance bicycle mobility and access within the neighborhood, and offer a starting point for cyclists looking to connect to the regional bicycle network. As an additional part of the NRZ planning effort, a shoreline bicycle path that would link up to east and west trails has been introduced. This path would be delineated in the streets though signage, street painting and at some point could have its own dedicated facility. The path would allow a safe passage along the neighborhood’s popular and scenic coast. Specific routing was not described in the NRZ plan, but the suggested improvements offer insight into what the residents would like to see established in their neighborhood. Other suggested improvements included the installation of bike racks at locations along the path, as well as near points of interest along Fairfield Avenue and Brewster Street.

9.2 West Side & West End NRZ Plan

The Neighborhood Revitalization Zone plan developed for the West Side/West End Neighborhood highlights the presence of highly defined commercial corridors as assets to be utilized in future improvements. The neighborhood plan delineated those streets with the highest assessed value, and seeks to capitalize upon the premier properties along those routes. This plan additionally identified those issues impeding the expansion of the local economy, and presented needed improvements to the infrastructure along business corridors.

The West Side/West End Neighborhood identified Bishop Avenue and Howard Avenue as the most valuable streets in terms of assessed value, due to their combination of commercial and industrial uses. Fairfield Avenue, Iranistan Avenue, Park Avenue, North Avenue (US Route 1), State Street, and Clinton Avenue are streets that are primary commercial corridors of value. Laurel Street, Maplewood Avenue, Beechwood Avenue, and Norman Street have been identified as streets with especially high residential value. To sustain and improve the value of these areas, the NRZ plan recommended that bicycle and pedestrian improvements be made to promote...
connections between these areas. By reinforcing the local status of these streets the West Side/West End neighborhood can further develop as an attraction along the regional multi-modal transportation network.

The plan also identified aspects of neighborhood business corridors, including strong local access to public transportation. Valuable commercial assets were identified along State Street, Fairfield Avenue, Clinton Avenue, Industrial District, Railroad Avenue, Dewey Avenue, and Park Avenue. Despite the strength of these local features issues related to infrastructure include: sidewalks not being properly maintained due to an abundance of litter, a need for corridor lighting, the presence of uneven and broken sidewalks/roadways and curbing, inconsistent street cleaning, and street flooding.

The NRZ plan further specifies the type and location of needed infrastructure improvements. The map at right identifies target areas to prioritize improvements to sidewalks, sewers, lighting, and signalization. It has been extracted from the NRZ plan document.

The community noted that entrances or gateways into the neighborhood are not visibly defined due to missing or broken fountains and signage, as well as, the lack of consistent signage. The West Side/West End neighborhood recommended the establishment of the following five gateways into the neighborhood:

- At the intersection of North Avenue and Park Avenue at the northern point;
- At the intersection of Clinton Avenue and North Avenue at the northern border;
• At the intersection of Park Avenue, Fairfield Avenue and State Street on the eastern side;
• At the Interstate 95 on- and off-ramps for Fairfield Avenue on the southwest corner of the neighborhood; and
• At the Interstate 95 on- and off-ramps at Wordin Avenue on the southwest corner of the neighborhood.

The development of gateway signage at these specific locations will offer residents of the West Side/West End area established delineation points between other Bridgeport neighborhoods. These improvements would provide motorists and pedestrians a reference point between the various locations in the city and ultimately further establish the presence and identity of the West Side/ West End neighborhood.

9.3 East End NRZ Plan

The draft East End Neighborhood Revitalization Plan suggested improvements to the existing bicycle and pedestrian-oriented infrastructure and highlighted various projects throughout the community to improve economic conditions and the overall quality of life for its residents. The neighborhood voiced interest for the following pedestrian improvement projects:

• Seaview Avenue Walking Trail: The community expressed a need for a trail connection from the Yellow Trail Mill Pond to Pleasure Beach and the development of a pedestrian bridge to provide access to Pleasure Beach;
• Central Avenue: The neighborhood identified this corridor for the installation of sidewalks, stop signs, and paving rehabilitation, particularly south of Orange Street;
• Elevated walkway at Johnson’s Creek Park: The NRZ plan recommended an elevated walkway around Johnson’s Creek to provide public access to the waterfront. The city has identified three agencies requiring permits for the construction of the walkway; and
• Improvements to street lighting, landscaping, and signage along Stratford Avenue.

In addition to the suggested pedestrian improvements, the community believes the Seaview Avenue corridor represents an untapped revenue source for the community, and could serve as a gateway to the East End. The residents further noted that new sidewalks and trees were installed along Newfield Avenue in 2000 and should be capitalized upon.

9.4 South End NRZ Plan

The South End Neighborhood Revitalization Plan offers a comprehensive approach to the integration of bicycle and pedestrian facilities. The neighborhood has worked with city staff to identify numerous land use and transportation objectives, aimed at establishing the South End of Bridgeport as a destination unto itself. The NRZ plan approached this goal through the identification of multiple gateways into the community and suggested various alternatives for the integration of bicycle and pedestrian improvements.

The NRZ seeks to institute a streetscape and façade program to beautify and re-invigorate business and provide pedestrians and bicyclists an enjoyable experience within the community. The NRZ plan recommended instituting gateways along:

• Park Avenue at State Street;
• Park Avenue at the I-95 and Railroad overpasses;
• Park Avenue at the Perry Arch;
• Lafayette Street at the I-95 underpass;
• Seaside Avenue and Marina Village;
• The sports field and Concert Shell;
• Broad Street at I-95 underpass;
• Trolley Stop at Broad Street;
• Pedestrian Walkway under I-95 and the railroad tracks.

The plan did not specify the desired type of construction for the recommended gateways.

Bikeway Network

As identified in the South End NRZ plan, Seaside Park has the potential to offer one of the more scenic bikeways along the Connecticut shoreline. The South End NRZ recommended the completion of the pedestrian and bicycle path along the former Berkshire railroad spur line in downtown Bridgeport.
Chapter 9: Neighborhood Revitalization Zones

The path currently extends from the downtown to US Route 1 (North Avenue). A connection to the South End would dramatically improve non-motorized access within the city. Additional recommendations of the South End NRZ included the creation of loops within Seaside Park for more casual use. Other larger scale connections were suggested to connect downtown, the East Coast Greenway, Harbor Yard, the Port Jefferson Ferry, and the Black Rock neighborhood to the west.

**Pedestrian Safety**

South End streets have been identified as providing inadequate accessibility and protection for non-vehicular movement. Pedestrians and bicycle riders must traverse sidewalks that are in disrepair with poorly or unmarked crossing designations. The South End NRZ plan encouraged residents to petition the State and the City to better demarcate crosswalks, provide needed lighting and signage and ensure that the pedestrian crossings are visible and acknowledged by passing motorists. It was recommended that sidewalks should be built on either side of the street and sufficient wide to support student and residential pedestrians.

The NRZ plan found that, presently, areas with the fewest marked crosswalks are those with the densest population. The plan recommended that all streets surrounding Marina Village and Seaside Village should be reviewed, including streets in the area of the Lofts at Lafayette Street, Hanover Street, Cottage Street Lewis Street and Black Rock Avenue.

### 9.5 Hollow NRZ Plan

The Hollow Neighborhood Revitalization Plan is divided into the three sections: Physical Development, Social Issues, and Image/Public Safety. Each section identified the issues associated with the subject and was followed by a list of strategically formulated goals to address those concerns. Apart from improvements to street lighting contained in the section regarding Image/Public Safety, the issues directly involving pedestrian activity were primarily contained within the Physical Development section. In addition, long and short-term priorities were identified to serve as a guideline for project implementation.

The community attributed the poor conditions of streets and sidewalks to heavy usage by the high population density and a “historical lack of dedicated City Council support for the neighborhood to lobby for City Services and improvements.” Additional concern was expressed regarding the presence of numerous multi-family homes and the lack of definitive off-street parking requirements. The NRZ plan provided an Infrastructure Improvement Strategy identifying the need for sidewalks in various areas including: Madison Avenue, Harral Avenue, Frank Street along the portion where bus service is provided, Pequonnock Street and Coleman Street. The plan recommended proposed corridors be constructed with ornamental lighting and partial brick sidewalks. Local residents felt proper emphasis needs to be placed on maintenance, such as tree-trimming.

The NRZ plan also identified a few short-term goals, including: the monitoring of zoning applications (off-street parking, setbacks, and landscaping requirements) and improvements to lighting for parks and streets. The long-term goals identified by this neighborhood included the development of multi-purpose recreational facilities and adding walking police patrols to improve safety.

### 9.6 Conclusion

One common theme seen throughout the NRZ plans is an overwhelming desire for a sense of place. Each plan references the need to delineate their neighborhood from other parts of the city, typically through the creation of “gateways”. Although each neighborhood has a different opinion of what a gateway should be, a general description suggests some type of landmark feature leading visitors to strategically designed business district. As such, it is recommended that the city adopt a thematic method of establishing neighborhood identities and gateways.

The following map shows the locations of gateways recommended by in the NRZ plans. The locations are concentrated in Black Rock, West End/West Side and South End because the respective NRZ plans included recommendations for their placement. As part of the city-wide complete streets plan, it is recommended that the installations of gateways be limited to key areas and used as a way to creating a sense of place in the neighborhood. The too frequent use of a gateway will detract from its intended purpose.
Suitability Analyses: Railroad Avenue & Park Avenue

In an effort to improve the bicycle and pedestrian environment within the City of Bridgeport, GBRPA conducted initial suitability analyses of Railroad Avenue and Park Avenue for the installation of bicycle lanes. These routes were identified during discussions with city staff at Complete Streets Advisory Committee meetings. They were selected based on relatively wide road widths and proximity to local attractors.

The evaluations assessed the potential for bi-directional bike lanes:

- Along Park Avenue from Seaside Park to Old Town Road; and
- Along Railroad Avenue from the East Coast Greenway at Fairfield Avenue to Main Street.

Although various challenges have been identified along both corridors, it has been determined that the provision of multi-modal facilities along Park Avenue and Railroad Avenue would be appropriate and dramatically improve the conditions of pedestrian and bicycle facilities within the City of Bridgeport.

In addition to the Park Avenue and Railroad Avenue corridors, the Advisory Committee in consultation with representatives from the University of Bridgeport, identified the possibility of constructing a shared-use trail and installing complete streets elements along the frontage of the University extending from Seaside Park to the I-95 overpass along Park Avenue and between Park Avenue and Broad Street along Atlantic Avenue. The project would dramatically improve access and mobility along this section of Park Avenue for both students and Bridgeport residents.
10.1 Railroad Avenue Existing Conditions

Railroad Avenue extends from Fairfield Avenue to Main Street, where it continues into the Water Street Dock ferry terminal area. It is divided by the elevated viaduct of the New Haven main rail line. One-way traffic flow is maintained on each side of the viaduct. At one time, Railroad Avenue was a main artery into the downtown area and provided access to the industries located in the area. Changes in land use patterns have reduced the importance of Railroad Avenue as a main artery. Despite this, it is functionally classified as an urban minor arterial to South Avenue and as an urban collector to Main Street.

Travel along Railroad Avenue presents a relatively static pattern. The traffic volume remains low throughout the day, with the higher volumes recorded closer to the on-off ramps of Interstate 95 and at the intersection of Park Avenue. Based on traffic counts available from ConnDOT, the Average Daily Traffic (ADT) volume for Railroad Avenue is roughly 1,600 vehicles per day. This coupled with the continual provision of a low speed limit (25 mph) portray Railroad Avenue as a relatively safe location for the integration of bicycle traffic.

Vehicles often utilize Railroad Avenue as either a connector between local roads and I-95. This tends to increase the propensity for turning movements, a factor that often becomes dangerous for non-motorized travelers. The general lack of development along Railroad Avenue contributes to the low volume pattern along the corridor; however, this also presents other safety challenges which will be described later in this report. Additionally, the road width is substantially large due to the one-way nature experienced by both directions of Railroad Avenue. All of these characteristics provide a strong foundation for the integration of one-directional bike lane facilities and have the potential to create a highly accessible east/west route across Bridgeport.

![Map of Railroad Avenue - City of Bridgeport]
Chapter 10: Suitability Analyses

Preliminary Issues & Constraints

Intersection Crossing Points

One concern regarding the provision of dedicated bicycle facilities along Railroad Avenue is the abundance of intersection crossing points. The roadway crosses roughly 15 intersections, depending on the direction of travel. Several are intersections with a high volume road serving as primary north/south travel route and traffic signals are present at nine locations.

The primary issue relates to the proximity of the elevated rail viaduct. At the intersections, the rail over pass extends between the east- and westbound sections of Railroad Avenue. Although the crossings are at a 90 degree angle, the over pass and abutments dramatically limit the sightlines for on-coming traffic for potential route users. Bicyclists must rely on the provision of signalization since they would be unaware of oncoming traffic until they are practically in the intersection.

However, travel along Railroad Avenue is compromised by intense signalization. The timing and phasing plans for these intersections favors cross street traffic and the detectors do not sense the presence of a bicycle. This dramatically increases travel time and will necessitate the bicyclist to wait a long time for the signal to change or induce the ride to violate the signal indication.

Road Condition

Another aspect that deserves attention is the existing condition of Railroad Avenue, particularly travelling westbound. The road maintains a high level of horizontal undulation due to the presence of potholes and inconsistent patch repairs. This could also prove detrimental to the attraction of cyclists, who find bumpy road more difficult to manage. In order to make travel along this portion of the route a safe and comfortable experience, the road would need to be repaved in a consistent manner. Conversely, the eastbound portion of Railroad Avenue has been recently paved to a high standard. A wide shoulder area has been provided and the paving material is consistent and the surface quality is good. Despite the good quality of the pavement, debris, especially glass, was noted along the eastbound portion of the route. To function as a bicycle facility, the road surface needs to be cleaned and maintained.

Parking Restrictions

Generally, on-street parking is allowed along both sides of Railroad Avenue on the curb side of the road. Although parking is sparse along the majority of the route, there are several areas where parking has been explicitly striped. This could hinder the consistent provision of bike facilities such as bike lanes. Parking is not allowed in a bike lane and a separate parking lane would need to be provided in those areas. Signage and striping would have to be provided to differentiate the areas designated for parking or bicyclist activity.

Perception of Safety

One of the most apparent characteristics of Railroad Avenue is its relative isolation. Although the lack of commercial and residential activity contributes to the low volume experienced along the roadway, non-motorized travelers often feel safest when other people are around. Furthermore, the provision of lighting along the road is fairly intermittent and can detract users in the later evening hours. Enhanced street lighting along the corridor has the potential to increase the perception of safety. This will provide users a feeling of “eyes on the street” and make riders more visible and ultimately safer.

Suitability & Capability

Existing Road Width

Both directions of Railroad Avenue benefit from a one-way lane configuration. With a large road width for one way travel, the integration of a six foot wide bike lane is a definite possibility. The eastbound portion of the couplet is improved with shoulder striping on both sides of the travel lane. The right shoulder area is roughly five feet wide, and has the potential to utilize most of the existing striping if designated as a bike route. This may be the most appropriate option considering parking is not currently restricted, and it seems the adjacent commercial properties typically utilize some portions of the road for parking (primarily in the section between Wordin Avenue and Broad Street). The westbound side of Railroad Avenue does not have much in the way of existing striping, apart from some sections delineating a small shoulder area between the travel lane and railroad platform. Parking typically occurs along the right side of the road, but most likely due to a lack of land use activity, parked cars are seldom present.
Directness

Railroad Avenue has the potential to serve as a feeder route to other bicycle routes within the city, offering more direct connections to important activity centers. The proposed route spans from Fairfield Avenue to Main Street and would intersect with the Park Avenue corridor, also being evaluated for bicycle and pedestrian improvements. This could enhance the linkage to important attraction points within the city including: Seaside Park, University of Bridgeport, Downtown Bridgeport, Water Street Dock, various schools and parks, the Discovery Museum, Sacred Heart University, and other important residential and commercial centers. Often the most direct route will be the most used route, and providing an east/west connection between important north/south routes within the city can serve as a foundation for future bicycle and pedestrian enhancements.

Conclusion

Providing dedicated bike “lane” facilities along the entire length of Railroad Avenue has the potential to dramatically improve the bicycle orientation of the city, but would require that certain issues be addressed. The existing road width, one-way travel configuration and the need for an east/west connection to other multi-modal facilities make the route a strong candidate for improvements to the local bicycle network. Adversely, a high number of signalized intersection crossing points, poor road conditions and lack of parking restrictions could detract from bicyclist use. Although the rules of the road require bicyclists to adhere to signal restrictions, such expectations may be lofty considering the routes prolonged signal timing and adjacency to alternative routes.

Despite any inherent drawbacks of this route, an initial commitment to developing this area will make the city more bicycle and pedestrian friendly. Although a variety of bicycle facility types may be required along the route, Railroad Avenue is a feasible option to serve as an east and westbound linkage between future improvements to the bicycle and pedestrian environment in the City of Bridgeport.

10.2 Park Avenue Existing Conditions

Park Avenue is a main, north-south artery through Bridgeport, extending north beyond city’s border into Trumbull and Easton, and ending at Seaside Park in the city’s South End. Travel along Park Avenue presents a dynamic mixture of travel patterns. It serves both local and regional travelers, providing direct access to adjacent land uses and connections with numerous east-west streets. The cross section varies along its route, ranging between two-and four travel lanes. Turn lanes are present at several intersections. Over its length, there are 23 traffic signals.

Traffic volumes range between 15,000-and-20,000 vehicles per day with peak hours occurring from 8 am to 10 am in the morning and from 3 pm to 6 pm in the evening.

Travel along the southern portion of the road, beginning at Seaside Park and extending to South Avenue, is influenced by the University of Bridgeport. This section maintains a nicely landscaped esplanade feature coupled with on-street parking. Although these treatments effectively narrow the road and calm traffic they could pose a challenge to the implementation of dedicated bike lanes. Continuing north along Park Avenue, the short distance between intersections starting at South Avenue and continuing to North Avenue (US Route 1) establish the potential for a high level of conflict between non-motorized travel and vehicular activity. The area north of North Avenue to Westfield Avenue maintains a one travel lane in each direction configuration, complete with a wide shoulder area. The section from Westfield Avenue to Queen Street changes into a four lane road. The road then reverts to the two lane configuration after Queen Street, continuing with this cross section to Old Town Road. The road conditions travelling southbound exemplify a similar pattern, with the most notable differences occurring between the one to two lane conversion points.

Preliminary Issues & Constraints

Intersection Crossing Points

A principle concern regarding the provision of dedicated bicycle lanes along the entire stretch of Park Avenue is the abundance of intersections along corridor, especially in the southern portion. Specifically, the span of intersections between South
Avenue and Washington Avenue demonstrate a high volume of traffic, with a majority of vehicles engaging in some form of turning movement. When coupled with the natural “tightness” of the area, the accommodation of additional “hardscape” features becomes more difficult. Certain treatments can be implemented to decrease the safety risks associated with such conflict, but the best option may be to provide a bypass bicycle “route” for this area.

Despite the fact that this section of Park Avenue may be less than optimal for bicycle travel, it is an area that has the potential to benefit greatly from improvements to pedestrian facilities. During multiple test rides, it was noted that these intersections experience a high volume of pedestrian traffic. This is not too surprising considering the large sidewalk areas and the presence of painted crosswalks. Future enhancements could further establish this area as a strong pedestrian corridor, thereby improving the walkability and livability for all residents.

### Topography

Another concern exposed through the survey of Park Avenue is topography. The southern portion of Park Avenue is relatively flat, with a moderate incline as you travel one-to-two miles north from Seaside Park. The greatest slopes begin around North Avenue and continue to undulate as you progress toward Sacred Heart University. The following graph shows increases in elevation starting at Seaside Park to Old Town Road.

Although topographical concerns may not influence moderate-to-advanced bicyclists, bicycle planning efforts seek to provide facilities that can accommodate a varying level of user ability. Compensation for the advanced cyclist orientation of this route could come through the identification of alternative routing to provide a more level riding surface for less experienced riders. One possible methodology of directing less experienced users could come through the development of a tiered route system, to identify routes based on rider ability (similar to those levels found on ski slopes).

### Travel Speeds

The posted speed limit along Park Avenue is typically 25 mph with posted increases in the northern portion of the route varying between 30-and-35 mph. Although such speed would be optimal for the incorporation of bicycle and pedestrian traffic, the actual flow of traffic often travels at higher speeds. In effort to provide a fair representation of the existing conditions along Park Avenue, multiple test runs of the route were conducted. During these sessions, a hand held GPS tracking unit was used to determine the free flow speeds experienced along the corridor. Two north/south travel runs were conducted in the mid-day hours to identify an average travel speed, outside the morning and evening commute periods. The results of the survey are shown below:

Although staff had anticipated the flow of traffic to maintain travel speeds in excess of the posted levels, the results of the survey proved otherwise. Travel speeds along the corridor hung loosely around the posted speed limit, with the greatest variance
occuring in the northern portion of the route. Data collection along the southern portion of the route was significantly impacted by the presence of signalized intersections, but anecdotally maintained an overall tone of acceptable travel speed.

The following maps provide visual data of the travel speed survey results. Typical travel speed analysis would utilize the color red to indicate a low travel speed, since vehicular travel often relies upon a higher speed of travel to communicate system efficiency. This standard has been adapted to communicate those segments most appropriate for non-motorized activity where the color red represents a high speed of travel, indicating those facilities that are more dangerous for cyclists or pedestrians.

**Suitability & Capability**

**Directness**

The direct nature of Park Avenue is one of its strongest attributes when evaluating the integration of enhancements to area bicycle and pedestrian facilities. The route spans the entire length of the city from north to south and maintains logical destination termini. The corridor directly links important attraction points within the city including: Seaside Park, University of Bridgeport, Downtown Bridgeport, various schools and parks, the Discovery Museum, Sacred Heart University, and other important residential and commercial centers. Often the most direct route will be the most used route, and providing such a direct connection between important locations within the city can serve as a foundation for future bicycle and pedestrian enhancements.

**Posted Speed**

Another quality aspect of Park Avenue is the continual provision of a relatively low speed limit. The majority of the route maintains a speed limit of 25 mph, primarily south of North Avenue. This speed limit only varies between 30-and-35 mph in the northern section of the route and couples higher travel speeds with increased road widths. Although previous data shows variance in excess of posted speeds, the provision of dedicated bike facilities has the potential to curb such speed infraction by calming traffic, as narrower road widths would be created to provide space for the incorporation of bike lanes.

**Existing Road Width**

Park Avenue provides an acceptable road width for the accommodation of a bike lane, primarily in the section north of North Avenue. The width along the northern portion of the route varies in certain areas due to the alternation between one or two travel lanes and routine deviance between areas allowing on-street parking.

Although the road is similarly wide in the southern portion of the route, existing features utilize lane capacity. While the provision of landscaped esplanades and sidewalk treatments are appropriate features to accommodate the pedestrian orientation of the area around the University of Bridgeport, they make the integration of bicycle traffic challenging.
Chapter 10: Suitability Analyses

Travel Speed: NB Park Avenue - Flow of Traffic

Average MPH
- < 10
- 10 - 20
- 20 - 30
- 30 - 40

Control Points

[Map showing travel speed along NB Park Avenue with legend for average MPH speed ranges]
Chapter 10: Suitability Analyses

Travel Speed: SB Park Avenue - Flow of Traffic

Average MPH
- < 10
- 10 - 20
- 20 - 30
- 30 - 40
- Control Points

Distance: 0 1
Miles

Legend:
- This map is intended for general planning purposes only.
- Source: Connecticut Department of Transportation.
- Image credit: CT DOT
- Date: November 12, 2010
Additionally, on-street parking occupies space that would most typically be used for the continuation of bike facilities.

**Conclusion**

Providing dedicated bike “lane” facilities along the entire length of Park Avenue has the potential to dramatically improve the bicycle orientation of the city, but the project will require that certain issues be addressed. The direct nature of the route, the low posted speed, and the expanse of the existing road width make the route a prime candidate for hardscape improvements to the local bicycle network. Adversely, a high number of intersection crossing points (particularly along the southern portion of the route), dramatic modulations in route topography, and a higher than posted travel speed present issues that could hinder use even for advanced cyclists.

Despite any inherent drawbacks of this route, an initial commitment to developing this area will make the city of Bridgeport more bicycle and pedestrian friendly. Although different modes may be best accommodated at certain points along the route, Park Avenue is a feasible option to serve as a cornerstone of future citywide improvements to the bicycle and pedestrian environment.

**10.3 University of Bridgeport Project Area**

Site visits were conducted to determine improvements necessary for the accommodation of a shared-use trail facility along the frontage of University of Bridgeport with the findings detailed as follows.

**Design Considerations**

AASHTO design guidelines indicate the preferred minimum width of a bi-directional shared-use trail is 10 feet. A five-foot buffer from a vehicular travel lane is required unless a barrier is installed between the vehicle lane and the trail. Based on several site visits, the western side of Park Avenue was determined to be the most appropriate location for a bi-directional path. Although this configuration would require bicyclists and pedestrians to cross Park Avenue to access the main campus, this side of the street offers the wider width and minimal obstructive features.

The eastern side of Park Avenue maintains adequate frontage directly abutting the main University campus, but becomes relatively inconsistent with regards to width as the traveler progresses either toward Seaside Park or the I-95 over pass. The eastern portion is currently improved with sidewalk facilities and an approximately three-foot bio-swale accommodating many large trees. To construct a shared-use trail along the entire eastern side of Park Avenue to AASHTO standards would require significant encroachment into neighboring property frontage, or the removal of mature trees.

The western side of Park Avenue across from the campus maintains a relatively consistent sidewalk width. It could accommodate the construction of a 10-foot wide shared-use facility. The primary issues facing construction include the presence of multiple crossing points and utility boxes in the path of pedestrian travel. Despite these considerations, site visits noted a large proportion of bicyclists and pedestrians utilizing the western sidewalk.

Ultimately the provision of a bi-directional shared-use facility along Park Avenue is a realistic option. It would not impact the provision of on-street parking and effectively utilize expansive sidewalk widths. The western portion of the road consistently maintains a usable sidewalk width, and offers a direct connection to Seaside Park. The eastern portion of the road provides a more direct connection to the main University of Bridgeport campus, but would require significant expansion of neighboring sidewalk facilities.

**Regional Applicability**

A bi-directional shared-use facility along Park Avenue would be consistent with regional efforts to construct the Housatonic Railroad Trail (HRT). The HRT is a regional shared-use trail that is planned as a continuous trail from the Long Island Sound and Downtown Bridgeport to the Monroe-Newtown town line. Connections could be constructed to link the HRT and the Park Avenue trail to facilitate non-motorized movement from the downtown area to the South End and Black Rock neighborhoods. Construction of a shared-use trail facility along Park Avenue connecting Railroad Avenue to Seaside Park would be a dramatic step toward the realization of a seamless multi-modal connection from the Newtown town line to the Long Island Sound.
Findings & Recommendations

The principle objective of the “complete streets” planning effort is to establish a framework for the city of Bridgeport for planning, designing and implementing actions to effectuate a fundamental change in the way roadways are perceived, used and function. Road design typically considers only the needs of motorized vehicles and little attention is paid to other travelers within the street environment. Roads are viewed as the domain of automobiles and the efficient movement of cars is the number priority.

The “complete streets” concept changes the way the city views the road environment and balances the needs of all travelers regardless of mode. All are accommodated; and, in the process, the community as a whole is enhanced and becomes a more vital place to live and work. These actions are a critical part of a sustainable community. Benefits of a “complete streets” approach to road design are:

• Encourages walking and enhances pedestrian safety;
• Reduces the amount of impervious surface and helps recharge ground water;
• Reduces greenhouse gas emissions;
• Reduces and filters storm water run-off, manages drainage from large rain events and reduces amount of pollutants entering nearby water bodies;
• Provides a sense of place, improves quality of life and enhances neighborhood character; and
• Mitigates urban impacts on water resources and quality.
This plan presents a range of actions to improve and enhance the street environment. While the concept is referred to as “complete streets,” it is not necessary to implement every possible option in each situation. Every “complete street” project is different and it is imperative that the proposed actions address specific concerns of the area’s residents and are consistent with the character of the neighborhood. For this reason, it is important to develop and establish a well thought out and explicit “complete streets” process. Establishing a process will avoid implementing inappropriate measures and will ensure sufficient planning is conducted to determine existing conditions and problems and identify the actions that will mitigate and alleviate the problems.

While a full-scale conversion of the road environment may be appropriate in some areas, the “complete streets” projects are scalable and actions can be designed that are cost effective and can result in substantial benefit. This tiered approach will allow improvements to be implemented in a timely manner and prevent delays in advancing projects that may become cost prohibitive. Tier 1 Actions are low-to-moderate cost projects with limited design requirements and straightforward implementation. Tier 2 Actions require specific design plans and layout and implementation requires more effort. Costs will be moderate. Tier 3 Actions are more completed and will require a high investment by the city. The projects in this category will require full design plans and survey, and construction is more extensive.

The following projects are intended to accommodate all travelers and convert key transportation corridors into “Complete Streets”. The city will be better able to achieve its sustainability and livability goals through implementation of the suggested actions. The scope of the enhancements ranges from pedestrian and bicycle improvements to creating green streets. In several cases the projects offer specific recommendations, while for many the actions are illustrative. Overall, the objectives of the plan are to:

- Enhance bicycle and pedestrian mobility throughout neighborhoods in Bridgeport;
- Develop a comprehensive bicycle and pedestrian network that provides direct connections between activity centers including transit hubs, employment, commercial and recreational facilities;
- Provide safe, sustainable and livable neighborhoods and redefine the street environment in a manner that is sensitive to the needs of each community; and
- Enhance the street environment, reduce storm water runoff and filter pollutants by installing green infrastructure along city streets and making such actions integral parts of street design.

- The following provides an overview of the suggested actions for the city to consider. The projects listed by order of magnitude and complexity.

### Ordinances & Regulations

The city prepared a sustainability plan (BGreen 2020) and adopted a process to foster implementation of green projects, polices and infrastructure. The process relies on a public-private partnership and five subcommittees. While this approach to implementing actions is crucial and recognizes the comprehensive nature of sustainability, it is equally vital to consider adopting ordinances and regulations ensure the process is carried into the future.

Codifying the process will ensure sufficient planning is conducted to determine existing conditions and problems and identify the actions that will mitigate and alleviate the issues. The objectives are to:

- Provide program vision, guidelines and consistency;
- Provide a political and technical framework for planning, assessment and decision making; and
- Require implementation of green infrastructure as part of land use decisions and approvals.

Specific zoning and subdivision regulations that should be modified to require implementation of green infrastructure include:
• Adopt a “Complete Streets” Policy;
• Develop and adopt design guidelines for green infrastructure – storm water planters, rain gardens, tree boxes, and bio-swales;
• Develop and adopt design guidelines for the use and application of permeable pavement material in parking lots, for the parking lane on city streets and for sidewalks;
• Revise zoning regulations and subdivision guidelines to require developers to install green infrastructure as part of the design approval process;

Bicycle Facilities

Tier 1 Actions: Bicycle Routes – Implementation is limited to installing signs and applying pavement markings and symbols on the road; design consists of field evaluations to ensure route is viable (in terms of width and road condition) and there are no safety hazards. Costs are low:

1. Pavement markings ≈ $0.40 per linear foot
2. Bike symbols ≈ $100 per application
3. Signs ≈ $100 per installation

Tier 2 Actions: Bicycle Lanes – Implementation is more involved and may require the removal, relocation or re-designation of on-street parking; design plans are required to show how the lanes will be installed and how they will be aligned through intersections. Costs are low-to-moderate; require more on-road symbols and special treatments at intersections.

Tier 3 Actions: Multi-use Trails – Require a separate right-of-way that may need to be purchased; design requirements much more involved and 40-scale plans need to be prepared and construction activities are substantial. Costs are high; about $1.0 million per mile.

Specific Actions

Bicycle Lanes:

1. Install bicycle lanes along Park Avenue from Old Town Road to Seaside Park; includes pavement markings along both sides of the road to designate lanes and symbols at regular intervals. The bike lanes would be five feet wide. Dashed lines would be provided at bus stop locations to permit buses to pull over to the curb. Bike boxes would be installed at major signalized intersections

2. Install bicycle lanes along Railroad Avenue between Bostwick Avenue and Park Avenue; includes pavement markings along both the eastbound and westbound sections of Railroad Avenue divided by the New Haven rail line. Bike lane symbols would be installed at regular intervals. The eastbound bike lane may need to be discontinued in the vicinity of Marina Village.

Bicycle Routes:

Designate bicycle routes to provide intra- and inter-city connections. It is recognized that various neighborhood loop bicycle systems have been suggested in NRZ plans; these may not be included in the city-wide network, but they are an integral part of the city’s efforts to accommodate all travelers and should be designated at the appropriate level. Bicycle route designations would be marked by edge line pavement markings that provide four-to-five of lane width and standard bike route signs. Along narrow road sections and where appropriate, sharrows would be installed on the road.

Specific bicycle routes include the following:

1. Black Rock-West End-South End Neighborhoods: Extending from Fairfield Avenue to Seaside Park via Gilman Street, Eames Boulevard, Grovers Avenue, Brewster Street, Ellsworth Street, Yacht Street, Saint Stephens Road, Wordin Avenue, Railroad Avenue and Iranistan Avenue. Railroad Avenue as described above would consist of bicycle lanes and would extend the route to Park Avenue and connect with the recommended bicycle lanes along that road. This route connects and provides access to St. Mary’s by the Sea and Captain’s Cove marina, as well as Seaside Park.

2. East Side and East End Neighborhoods: Extending from downtown to Pleasure Beach via Stratford Avenue and Seaview Avenue. The section on Stratford Avenue along the frontage of the Steelpointe Harbor project between Kossuth Street and
Waterview Avenue will consist of bicycle lanes.

3. North Bridgeport – Enterprise Zone – East Side: From Beardsley Park to the Housatonic Railroad Trail via Noble Avenue, Berkshire Avenue and North Washington Avenue. This section will serve as a connector and link between the Beardsley Park and Housatonic Avenue sections of the HRT. The route along Noble Avenue would be continued to Barnum Avenue to make a connection with the East Coast Greenway.


5. North End: Along Old Town Road to Madison Avenue and south to Lincoln Boulevard via Arlington Street. A connection to the HRT along Housatonic Avenue would be established by designating a spur bike route from Madison Avenue along Fairview Avenue to Gurdon Street to French Street to Hudson Street. A connection to the HRT along Housatonic Avenue would be established by designating a spur bike route from Madison Avenue along Fairview Avenue to Gurdon Street to French Street to Hudson Street.

6. North End – Reservoir Whiskey Hill: From Fairfield town line at Wilson Street and Park Avenue to the HRT via Queen Street, Stoehrs Place, Renzy Avenue, Platt Street, Reservoir Avenue, Trumbull Avenue and Old Town Road. From Old Town Road, the route would turn onto Quarry Road to Trumbull Road, where it would connect with the HRT. This alignment would avoid the Old Town Road, Route 127 (White Plains Road) and Route 8 intersection, a complex and high volume location.

7. East Coast Greenway: The ECG is a planned bicycle and pedestrian route from Maine to Florida. While the goal is to locate the ECG on separate rights-of-way, temporary on-road route designations have been identified. Through Bridgeport, the ECG has been designated on Barnum Avenue from the Stratford town line to Kosuth Street and along Route 130 – Stratford Avenue, Fairfield Avenue and State Street – and Commerce Drive to Fairfield. The ECG as it runs through Bridgeport is included in this plan.

**Multi-use Trail:**

1. Housatonic Railroad Trail: The HRT is a planned multi-use trail that begins in Downtown Bridgeport and extends to the Monroe-Newtown town line. The completion of the HRT is included in the Bridgeport Complete Streets Plan. An existing section of the HRT extends between about Stratford Avenue to US Route 1 (North Avenue) along the east side of Housatonic Avenue. The trail was built on the rail bed of the Berkshire spur of the Housatonic railroad. The planned extension of the HRT will construct a multi-use path through Beardsley Park, beginning in Trumbull and including the rehabilitation of the Trumbull Road bridge over the Pequonnock River. A gap in the HRT exists between Beardsley Park at Crown Street and US Route 1 (North Avenue). While this gap is only about one mile long, it passes through a highly developed area and there are a number of constraining factors that severely limit possible trail alignments. In the interim, it is recommended that an on-road connection be designated along Noble Avenue, Berkshire Avenue and North Washington Avenue to the HRT along Housatonic Avenue. From downtown, the trail will continue along the Waterfront Park through the Water Street Dock to Main Street and Seaside Park. These actions require the construction and extension of the Waterfront Park between Stratford Avenue and the dock and designation of the trail through the ferry terminal area. The alignment would follow the ferry access road and along Broad Street to Seaside Park.

2. Housatonic Railroad Trail – Signage: A section of the HRT extends along the east side of Housatonic Avenue; however, there currently is no signage that designates this section as part of the HRT or informs users that it is a multi-use trail. In addition, a short segment of the trail was effectively lost when the new bus terminal was constructed. The trail in front the terminal was replaced by a wide concrete sidewalk, but there is a discontinuity in the trail in this area and a lack of any
trail markings or signage. The HRT needs to be formally re-established in the vicinity of the bus terminal and signage installed. This 1.1-mile section is lined with a series of decorative light posts at a 50-to-75 foot interval. The light posts have standards attached for hanging banners and flags. It is recommended that as an alternative to installing the street mounted directional signs that banners be hung from the light posts. In addition, a gateway sign and information kiosk should be installed at the start of this section.

3. Steelpointe Harbor Project: As part of the redevelopment of the Steel Point peninsula, Stratford Avenue will be widened and reconstructed and a 3,000-foot pedestrian and bicycle promenade will be constructed along the project’s waterfront. The road reconstruction will follow a complete streets approach and include bicycle lanes. The bike lane concept should be extended along Stratford Avenue to provide a bicycle and pedestrian link to the downtown area and extended to Seaview Avenue.

4. Pleasure Beach: The bicycle and pedestrian path from the Steelpointe projects would be extended southward along Seaview Avenue to closed Pleasure Beach Bridge. Pleasure Beach is the west end of a barrier beach that is connected to Stratford. While the replacement of the bridge to Pleasure Beach is not likely in the near term, the city is pursuing operation of a water taxi service to provide access to Pleasure Beach from the mainland. It is recommended that a multi-use trail be constructed in Pleasure Beach, starting at the water taxi dock to Stratford and Long Beach.

Pedestrian Facilities

**Tier 1 Actions: Crosswalks** – Implementation is limited to applying pavement markings and signs at intersections; design consists of field evaluations to ensure proper application; costs are low; about $1,000 per crosswalk.

**Tier 2 Actions: Curb extensions, pedestrian signals and on-street parking treatments** – Implementation is more involved and may require the removal, relocation or redesignation of on-street parking; design plans are required for treatment and show how it will be installed. Costs are moderate:
1. Raised crosswalk ≈ $10,000 per location
2. Curb extensions ≈ $20,000 per corner
3. Pedestrian signals ≈ $10,000 per installation

**Tier 3 Actions: Raised intersection, speed tables and sidewalks** – Design requirements much more involved and 40-scale plans need to be prepared and construction activities are substantial. Costs are high:
1. Raised intersection ≈ $100,000 per location
2. Speed tables ≈ $150,000 per corner

3. Sidewalks ≈ $150,000 per mile

**Specific Actions:**

**Crosswalks:** Pedestrian activity in Bridgeport is highest in the downtown area. The combination of dense development, proximity of attractions and activities, high employment levels and residential apartments foster walking. Crosswalks and pedestrian signals have been installed at most intersections; however, the general condition of pavement markings is poor with the markings badly faded in many locations. Utility cuts have also damaged crosswalk markings and they have not been repaired. As part of the complete streets program the city should:
1. Repair and repaint all badly faded crosswalks and maintain crosswalks in a state-of-good-repair;
2. Install proper signage to inform walkers where to cross and to encourage them use the crosswalk;
3. Use a visible, tactile and permeable material for designating crosswalks;
4. Trim tree branches and other vegetation that obscures visibility of pedestrian crossing signage; and
5. Require utility companies to repair crosswalk markings and the full width of the road when work disturbs or damages any portion of the crosswalk.

**Curb Extensions and On-Street Parking Treatments:** Curb extensions extend the sidewalk or curb line out into the parking lane and reduce the effective
street width. They should be installed as part of a comprehensive program to define on-street parking areas and in conjunction with a complete streets project. Specific locations need to be identified through an engineering evaluation but prime candidates include:

1. Throughout the downtown area;
2. East Main Street south of Noble Avenue;
3. Madison Avenue from about Wayne Street to Wheeler Avenue;
4. Capitol Avenue from Park Avenue to Main Street.

**Pedestrian Signals:** Many signalized intersections throughout the city have pedestrian-control signals that allow pedestrians to receive exclusive or extended time to walk across an intersection. However, several pedestrian-control signals have been damaged (symbols not illuminated, broken buttons, missing signs, misaligned heads) or do not appear to be functioning. And, few pedestrians were observed activating the pedestrian-control signal button and waiting for exclusive pedestrian phase. Enhancement and proper maintenance of the pedestrian signals is recommended to ensure safety:

1. Replace existing pedestrian signals with newer signals that comply with the most recent guidelines of the MUTCD;
2. Provide sufficient time at signalized intersections to allow pedestrians to safely cross a street;
3. Install countdown signals to inform pedestrian how much time remains on the walk phase;
4. Install a “leading pedestrian interval” (LPI) at concurrent signal locations that provide a lead time to pedestrians to begin crossing before vehicles are provided with a green indication;
5. Consider converting exclusive pedestrian phases with concurrent operation that allow pedestrians to cross concurrently with traffic on the adjacent street;
6. Install proper signage and pedestrian pushbuttons at locations convenient for pedestrians and where they should cross;
7. Provide quick response or feedback to pedestrians should be programmed into the system after they activate the signal push button;
8. Install traffic signal enhancements including automatic pedestrian detectors, providing larger traffic signal heads to ensure visibility, and placing signals so that motorists do not anticipate the green.

**Sidewalks:** The city has an extensive network of sidewalks that allow pedestrians to walk safely separate from the road. However, as is the case with other pedestrian features, the existing sidewalks suffer from neglect and poor maintenance. Many along prime walking areas have uneven surface quality and require rehabilitation. To encourage and support walking, it is necessary to build and provide sidewalks and other types of pedestrian pathways that provide continuous, safe and convenient connections between residential areas and schools, shopping and businesses.

1. Repair and rehabilitate sidewalks and maintain in a state of good repair;
2. Ensure connectivity of sidewalk networks by closing gaps and extending walkways to link with other nearby sidewalks;
3. Install curb ramps to provide access between the sidewalk and roadway for people using wheelchairs, strollers,
1. walkers, crutches, handcarts, bicycles, and also for pedestrians with mobility impairments who have trouble stepping up and down high curbs; and

4. Cut and trim tree branches to maintain at least an eight-foot vertical clearance.

**Walkways:** Several NRZ plans recommend development of separate walking trails for their respective neighborhoods. Two key suggestions are included in this plan:

1. **Seaview Avenue Walking Trail – East End:** The proposed trail would be located along the east side of the Yellow Mill Pond and continue along Seaview Avenue to connect with Pleasure Beach. Included in the concept is the construction of an elevated walkway along Johnson’s Creek. The concept should be expanded to include a similar walkway on the west side of the Yellow Mill Pond in the East Side neighborhood. This section would connect with the Steelpointe Harbor project and provide a continuous loop around the channel;

2. **Ash Creek Pedestrian Bridge:** This action recommends the construction of a pedestrian bridge and walkway to connect the Black Rock neighborhood of Bridgeport with the new Metro-North rail station at the Fairfield Metro Center development in Fairfield. Pedestrian access to the new rail station area is constrained, unsafe and limited to walking along Brewster Street and across the narrow, vehicle bridge over the Ash Creek. The pedestrian bridge would provide a safe and convenient path for residents of the Black Rock neighborhood to walk to the new Fairfield Metro Center rail station without having to travel along an uninviting Brewster Street.

**Green Infrastructure**

**Tier 1 Actions:** Storm water planters and tree boxes – Planters and boxes are relatively small (two-to-three feet wide and 10-to-15 feet long) and installed along road sections to reduce the hard-scape area or as part of curb extensions. Design consists of field evaluations to ensure proper
application and connection of the storm water drainage system; costs are relatively low:

1. Storm water planters ≈ $15 per square foot
2. Tree boxes ≈ $12,000 per installation

**Tier 2 Actions:** Rain gardens and bio-swales – Design and implementation are more involved, require more consideration about location and occupy larger spaces. Costs are moderate:

1. Rain gardens ≈ $20 per square foot
2. Bio-swales ≈ $50 per linear foot

**Tier 3 Actions:** Permeable pavement – Design requirements much more involved and 40-scale plans need to be prepared and construction activities are substantial and require special attention to base and sub-base creation. Costs for permeable are about 25% higher than regular asphalt and about $25 per square foot for concrete pavers.

**Specific Actions:**

**Storm Water Planters and Tree Boxes:** These elements function to reduce and control storm water and filter runoff before entering the drainage systems. They should be installed as part of a comprehensive storm water management program and programs that reduce the frequency of sanitary overflow events. Specific locations need to be identified through an engineering evaluation and installation needs to follow appropriate guidelines and standards to ensure maximum effectiveness. Given the relative low cost and ease of installation, a wide application throughout the city is recommended.

**Rain Gardens:** Rain gardens require more involved design and siting consideration than storm water planters that can be installed in a smaller area. This treatment is especially applicable where there exists a large hardscape area near and in the vicinity of Long Island Sound or the Pequonnock River. Specific locations need to be identified through an engineering evaluation and installation needs to follow appropriate design guidelines and standards to ensure maximum effectiveness. Candidate locations include:

1. Bridgeport City Hall area – install rain garden and water filtration feature next to parking lot and to filter runoff from the roof;
2. People’s United Bank Headquarters parcel on Main Street in downtown – install rain gardens in the expansive hardscape plaza along Main Street south of State Street; and
3. Along Water Street under the pedestrian walkway between the rail station and bus terminal – install rain gardens and water filtration features; tie-in adjacent storm water drains and catch basins to capture and filter runoff from Water Street.

**Permeable Pavement:** Permeable pavement allows runoff to filter through the surface and permeate into the underlying soil instead of being carried to the drainage system and discharged directly to a receiving water body or river. The installation of permeable pavement requires proper formation of the base and sub-base and special attention to maintenance. These factors make the cost of this material higher than regular asphalt. However, the higher costs are somewhat offset by the benefits of reducing runoff and managing storm water. While there is some debate requiring the use of permeable pavement for road surfaces, studies have demonstrated the material is effective for use in parking areas, on access driveways and other low volume areas. Specific locations need to be identified through an engineering evaluation and installation needs to fol-
low appropriate design guidelines and standards to ensure maximum effectiveness. Candidate applications include:

1. Use and install permeable asphalt along parking lanes on various downtown streets, including Main Street, John Street, Broad Street and Lafayette Boulevard;

2. Replace concrete sidewalks with a concrete pavers;

3. Replace and resurface the Ferry Access Road using a permeable pavement as a demonstration project;

4. Replace impervious asphalt parking lot surfaces with permeable material in downtown Bridgeport as demonstration projects, including the city hall parking lot, the rail commuter lot under I-95, the parking lots in and around the Harbor Yard sports complex, and the parking areas at the Water Street Dock – requires the full depth replacement of sub-base and base material to provide for proper drainage. Locations also need to consider water table depth.

**Green Streets & Complete Streets**

**Tier 1 Actions:** Combination of various low cost actions – Implementation and costs variable and depend on the elements included in the project and extent of proposed work.

**Tier 2 Actions:** Combination of various moderate cost actions – Implementation and costs variable and depend on the elements included in the project and extent of proposed work.

**Tier 3 Actions:** Comprehensive reconfiguration of the road environment and includes installation of several elements – Implementation variable; costs relatively high.

**Specific Actions:**

**Green Streets/Complete Streets:** As described and recommended above, various green infrastructure elements can be installed at various locations throughout the city without substantial change to the roadway itself. Implementing green infrastructure elements in combination with changes to the roadway converts the road environment from one dominated by the automobile to one that accommodates all travelers, regardless of mode. A wide range of elements can be considered and not all need to be installed for the street to be enhanced to a “complete street.” Specific actions are based on identified needs and objectives of the surrounding neighborhood and the traveling public. An engineering evaluation based on a “context sensitive solutions” approach needs to be completed for candidate streets. Installation needs to follow appropriate design guidelines and standards to ensure maximum effectiveness. Candidate locations include:

1. State Street: Covert State Street from Fairfield Avenue to Main Street into an enhanced green street, including installation of concrete paver sidewalks, storm water planters and tree boxes. Curb extensions would be added at signalized intersections and new visible, tactile crosswalks would be installed. On-street parking areas will also be defined using the curb extensions and parking lanes will be re-surfaced with permeable asphalt. As part of this transformation, State Street would be converted from a one-way street to two-way operation;

2. State Street Round-about: As part of the conversion of State Street as a “complete street,” the intersection with Fairfield Avenue, Commerce Drive (formerly State Street Extension) and Dewey Street should be reconstructed as a modern round-about. The current layout and orientation of the intersection is somewhat awkward and does not form a standard four legged intersection with 90-degree angles. Commerce Drive intersects with the west leg of Fairfield Avenue before the junction with State Street. The round-about concept will realign the streets to make both vehicular and pedestrian flow more efficient and reduce potential conflicts;

3. Stratford Avenue: As part of the Steelpointe Harbor project, Stratford Avenue will be reconstructed and widened. A “complete streets” design standard will be followed. The new roadway will provide wide sidewalks for various activities, use of concrete pavers or other permeable material, bike lanes, bus bays and enhanced shelters, and
landscaping, such as, rain gardens, tree boxes and bio-swales.

4. Lincoln Boulevard: The curb-to-curb width can accommodate four travel lanes on on-street parking. It provides access to Central High School and serves as the ending of the annual Barnum Festival parade. However, there is a need to reduce the width of Lincoln Boulevard and to better accommodate travel and make it more in character with the surrounding neighborhood. Several options are being considered, including:
   a. Installing a wide landscaped median and providing one travel lane in each direction;
   b. Installing a narrower median and providing designated bicycle lanes;
   c. Installing a wide median and providing a trail down the center of the median; and
   d. Extending the curb line on both sides of the road toward the center and providing a larger landscaped buffer and defined on-street parking along the curb line.

5. Atlantic Street/University of Bridgeport: Install complete street elements along a section of Atlantic Street through the UB campus. Elements include new sidewalks with permeable material, visible and tactile crosswalks, raised pedestrian table and rain gardens and tree boxes.

6. Capitol Avenue: Implement enhanced streetscape elements from Brooklawn Avenue to Main Street, including installation of concrete paver sidewalks, rain gardens and tree boxes. Curb bump-outs would be added at signalized intersections and new visible, tactile sidewalks would be installed. On-street parking spaces would be defined using curb extensions.

Downtown Urban Enhancement Program: This program is intended to enhance and make connections between the Intermodal Transportation Center and the adjacent downtown. These connections will be made physically, aesthetically and functionally and will promote non-motorized modes, foster mobility, facilitate access to multi-modal transportation.
Chapter 11: Findings & Recommendations

Complete Streets Project Concept Locations

Legend
- Gateway
- Pedestrian Bridge

Designation
- Bike Lanes
- Bike Route
- Complete Street
- Multi Use Trail
- Pedestrian Walkway
Chapter 11: Findings & Recommendations

Complete Streets Plan, 2011

modes and enhance the aesthetic, visual, physical environment in and around the downtown area. Specific actions include:

1. Develop, design and implement a comprehensive sign program for identification, information and wayfinding;

2. Install static and dynamic information kiosks at the rail station, bus terminal and ferry terminal;

3. Develop and implement a real-time, dynamic traveler information system for the ITC facilities for bus, rail and ferry services, including delay information, arrivals and departures;

4. Develop, design and implement decorative lighting within the downtown area that complements and supplements existing efforts and illuminates, accentuates and highlights key facilities;

5. Streetscaping and landscaping enhancements along Water Street, Main Street, North and South Frontage Roads, State Street, John Street and Fairfield Avenue;

6. Complete and construct a harbor walk along the Pequonnock River and Bridgeport Harbor;

7. Create a pedestrian friendly and inviting linkage along Main Street, Water Street and Broad Street from the Transit Garage and Harbor Yard Arena area and the ITC, and install lighting that makes these spaces more appealing and less uninviting;

8. Construct a bio-swale and weeping wall along Water Street under the I-95 over pass to capture and filtrate runoff from the interstate;

9. Improve and enhance the existing rail under pass leading to the Water Street Dock;

10. Install new fencing along the surface parking lot under I-95 and reconstruct and reconfigure the diverge area between Water Street and North Frontage Road, add new sidewalks, provide handicapped parking spaces and install a more accessible connection with the rail station;

11. Refurbish and renovate the existing rail station building;

12. Install artwork on large expanses of concrete walls; and

13. Develop and create bicycle access paths to the ITC district, such as bicycle routes, lanes and separate trails radiating east, west, north and south, and install decorative, functional and distinctive bicycle.

Main Street Green Street Demonstration Project: Main Street extends from the Trumbull town line to Seaside Park in a north-south orientation. It is main commercial artery in the city and is the primary access into the downtown. Traffic along Main Street is relatively high, carrying in excess of 20,000 vehicles per day in the north end. It is also a heavily used local bus corridor with 46 daily bus trips. Streetscape enhancements and green infrastructure elements were installed along Main Street in the north end. Elements include storm water planters, concrete paver sidewalks and curb extensions to define on-street parking.

The downtown area is a high profile location with numerous office buildings, street level retail and emerging residential developments. It is also the transportation hub of the region with a commuter rail station, local bus terminal and ferry terminal. Main Street through the downtown is 40 feet wide, provides on-street parking spaces and accommodates local bus services. Because of these characteristic, there is an opportunity to reposition Main Street as a “green street” to demonstrate the potential opportunities and effectiveness of green infrastructure. The project would extend from Congress Street to the Harbor Yard sports complex. Specific actions include:

1. Construct curb extensions at key intersections – at Congress Street, Golden Hill Street, Fairfield Avenue, John Street, State Street and North Frontage Road;

2. Install storm water planters in the curb extension areas;

3. Replace tree plantings with properly designed tree boxes connected to the storm drainage system;

4. Install new, visible tactile crosswalks;

5. Define on-street parking spaces with the curb extensions and permeable pavement material; and

6. Install bus bays for GBT Route 8 buses.
Gateways: Through the use of distinctive signage and landscaping, gateways would be used to provide visual cues that the traveler is entering a unique neighborhood. The style, scope and size of gateways are highly variable and depend on the character of the neighborhood and the theme that is to be communicated. Gateways require substantial public input and architectural and engineering design to ensure they are located properly and convey the appropriate message. Based on the suggestions included in the NRZ plans as well as field work conducted for this plan, gateways should be considered at the following locations:

1. Fairfield Avenue at Ash Creek – Black Rock neighborhood;
2. State Street and Fairfield Avenue – West End neighborhood; this would also involve the installation of a modern round-about at the intersection;
3. At the Park Avenue, North Avenue (US Route 1) and Pequonnock Street intersection – West End and Hollow neighborhoods;
4. At Main Street and Old Town Road intersection – North End neighborhood;
5. At Park Avenue and Old Town Road intersection – North End neighborhood;
6. At Huntington Turnpike and Broadbridge Road intersection – North Bridgeport neighborhood;
7. At Park Avenue, State Street, Fairfield Avenue and John Street – Downtown Village District;
8. At Main Street, East Washington Avenue and Catherine Street – Downtown Village District;
9. At East Main Street and Boston Avenue (US Route 1) – North Bridgeport and East Side; and
10. At Stratford Avenue (Route 130 EB) and Connecticut Avenue (Route 130 WB).

Various complete streets concepts are located in the map on the opposite page.

Transit Priority & Enhancements

Tier 1 Actions: Bus stop enhancements – Implementation and costs variable and depend on the elements included; costs relatively low and could be accommodated under existing projects and programs.

1. Bus shelters = $15,000 per location
2. Benches = $7,000 per location
3. Bus stop signs = $500 per installation

Tier 2 Actions: Signal priority – Design more substantial and implementation requires modification of traffic signals and installation of receivers and detectors. Costs are moderate: = $15,000 per location.

Tier 3 Actions: Bus lanes and queue jumpers – Design substantial and requires reconstruction or reconfiguration of roadway; implementation costs variable depending on project scope.

Specific Actions:

Transit Enhancements: The GBT provides extensive service through the city and maintains about 40 shelters and substantially more bus stops (=1,400). Stops are typically designated by a sign that includes the GBT logo and indicates the routes serving the location. Various enhancements to these facilities should be implemented, including:

1. Replace old and worn-out bus shelters with state-of-the-art shelters;
2. Ensure accessible path to and from the stops;
3. Install bus bays at high boarding stops and integrate curb extensions and access paths with the stops;

Downtown Bus Terminal:
The new bus terminal was opened in August, 2007. It is located at the intersection of Water Street and Stratford Avenue, about 900 feet from its former site and two blocks from the Main Street commercial corridor of downtown. The new location poses several safety concerns for pedestrians wanting to access the terminal, primarily having to cross a five-lane road. In addition, while a crosswalk and pedestrian signal is located the adjacent intersection, the entrance to the terminal is offset from the intersection and most bus riders will cross at a more mid-block, and unprotected, location instead of using the designated crosswalk. To improve and enhance Water Street in front of the bus terminal and provide a pedestrian friendly connection to the downtown area and crossing of Water Street, the
following actions to should be implemented:

1. Reconfigure the lane arrangement along Water by reducing the number of lanes and eliminating the exclusive left turn lane; I
2. Install a raised island to provide a pedestrian refuge;
3. Create a bus bay for the bus stop on southbound Water Street at Fairfield Avenue; and
4. Install a raise table along the frontage of the terminal and surface with visible, tactile material.

**Transit Priority:** Since buses travel on the same roads as other motorized traffic, operations are susceptible to unanticipated delays because of congestion and receiving a red light at signalized intersection. These conditions adversely impact travel times and schedule adherence and create reliability issues with patrons. Buses can be provided priority along major travel corridors to reduce potential delays and improve schedule adherence. Two corridors are recommended for implementation of pilot transit signal priority systems:

1. Main Street from Old Town Road to downtown – GBT Route 8; and
2. Stratford Avenue (Route 130 EB), Connecticut Avenue (Route 130 WB), State Street and Fairfield Avenue – GBT Coastal Link.

The proposed systems would use detectors or wireless communications to sense and approaching bus and provide priority after a pre-programmed offset.

Various transit enhancements concepts are located in the map on the following page.
Transit Priority Project
Concept Locations

Legend
- Gateway
- Pedestrian Bridge
- Transit Priority