Engineering, Planning,
Landscape Architecture
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MILONE & MACBROOM®

June 22, 2017

Ms. Tammy Daugherty
Director - Office of Development and Planning
City of New London
181 State Street
New London, CT 06320

RE: New London Downtown Transportation and Parking Study
MMI #2389-41-08

Dear Ms. Daugherty:

Milone & MacBroom, Inc. is pleased to present this study of transportation and parking needs for downtown New London. We trust that the recommendations in this study will support development and redevelopment in New London through the coming years. We look forward to working with you and the city to implement the recommendations in this study, which will help New London best accommodate increases in transportation demands in ways that support economic growth and livability. If you have any questions or need anything further, please do not hesitate to contact us.

Very truly yours,

MILONE & MACBROOM, INC.

David G. Sullivan, P.E., Associate
Manager of Traffic Engineering

Neil C. Olinski, MS, PTP
Transportation Planner III

Enclosure

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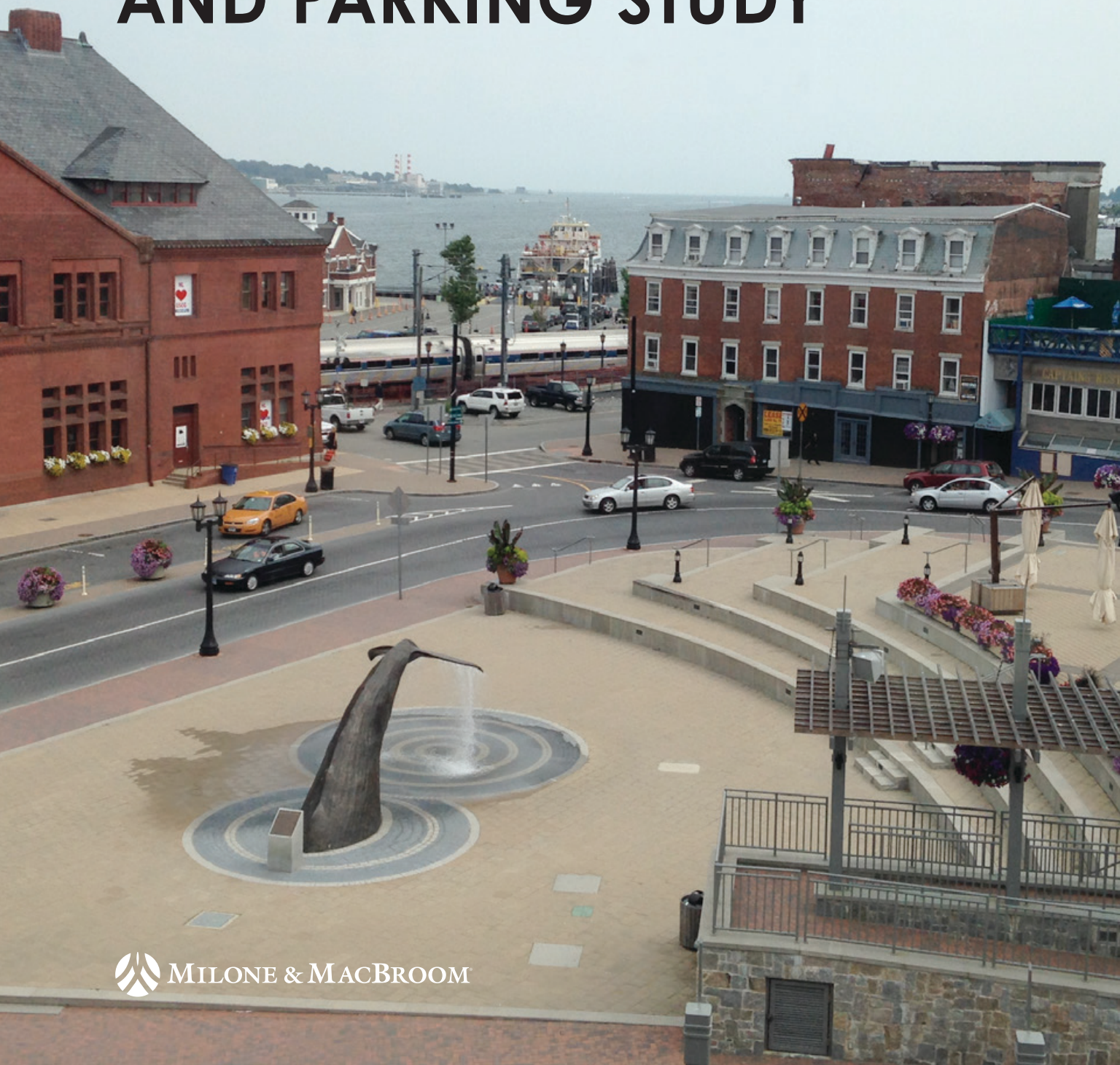
NEW LONDON DOWNTOWN TRANSPORTATION AND PARKING STUDY



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February 2017

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Executive Summary

Milone & MacBroom, Inc. (MMI) has undertaken this study of transportation and parking needs for downtown New London with the goal to develop recommendations and propose improvements that are context-sensitive, multimodal, and that would improve safety and support the economic development of the City.

Study Background

The initial step of this study was to form a concrete background understanding of the City's past and present and its goals for the future. This was achieved through the review of existing planning documents and goals; a cultivated public outreach process; the assessment of currently planned improvements and developments in and around the downtown; as well as by undertaking a business and building inventory to assess current vacancy levels of downtown buildings.

- The planning documents that were reviewed included statewide, regional, and City-centric documents. These included eleven locally focused documents, five regionally focused plans, and three statewide plans. Summarized information from the relevant plan review efforts can be found within Section 2.1.
- The public outreach process for this project collected points of view, opinions, and ideas from New London residents and stakeholders that were pertinent to the City's transportation and parking facilities. A two-tier public outreach process was implemented that included an online survey and a series of stakeholder meetings and open drop-in hours. The results of this outreach process can be found summarized within Section 2.2.
- Already planned improvements and developments in the study area were examined and their potential impacts understood. Planned upcoming developments include the National Coast Guard Museum (NCGM); the pedestrian overpass bridge at Union Station, Water Street and the NCGM; and several private developments. A summary of these projects can be found within Section 2.3.
- The business and building inventory that was conducted can be found in Section 2.4. The goal of this inventory was to understand the potential traffic, transportation, and parking demands that could be associated with re-occupancy of what is currently vacant space within downtown buildings.

Following the background step of this study, the separate components of New London's downtown transportation system were analyzed: non-motorized transportation, public transportation, parking, traffic control signal infrastructure, and vehicular traffic operations. Context-sensitive recommendations were developed to improve walking, bicycling, parking, and traffic in the downtown, and ultimately a plan was developed that includes a recommended conversion of several streets from one-way to two-way traffic.

Non-Motorized Transportation

New London's street network varies greatly in pedestrian and bicyclist safety and accommodation. While some streets and intersections are well suited to meet the needs of active transportation users, others need many safety and aesthetic improvements. As part of this analysis, the downtown was split into seven key areas, three of which were deemed High Priority in need of non-motorized transportation improvements, and four of which were deemed Medium Priority. The most critical recommendations concerning non-motorized transportation in the downtown that have not previously been considered are the following:

- A sidewalk and accompanying ADA infrastructure should be added on the east side of Water Street between the Greyhound/SEAT bus stop area to the intersection of Governor Winthrop Boulevard at Ferry Street.

- A side path and accompanying ADA infrastructure should be added to the east side of Water Street north of Governor Winthrop Boulevard to Winthrop Cove Park.
- The intersection of Water Street and Atlantic Street should be transformed into a fully signalized intersection that forces vehicles to stop when pedestrians have hit the push-button to cross. High-visibility crosswalks should also be installed at each leg of this intersection and the entire intersection be painted, textured, and/or raised as a speed-table.
- Multiple-threat pedestrian crossings (where a crosswalk extends over two or more same-direction vehicle lanes) at unsignalized intersections, mid-block crossings, and intersection approaches without stop-sign control should be removed when possible.
- Curb extensions (bump-outs) should be installed where possible at intersections in the downtown in order to shorten pedestrian crossing distances.
- New high-visibility crosswalks should be installed throughout the downtown.
- A network of shared lane marking (sharrows) should be added to appropriate corridors throughout the downtown to serve bicyclists, particularly on streets that may not have the width for formal bicycle lanes. "Bikes May Use Full Lane" signs should accompany sharrow roadway markings.
- Bicycle lanes are recommended for Governor Winthrop Boulevard to connect the recommended network of sharrows with the recommended side path on Water Street.

Public Transportation

New London is served by a diverse public transportation system (ferries, buses, and rail) that should be relied upon if the downtown is to accommodate new development, redevelopment, and general growth and densification in the future. Understanding potential growth in ridership at the different public transportation modes was also a key step of this study in order to understand the degree to which related automobile use and parking may increase in the downtown. Key findings concerning public transportation in downtown New London were:

- Cross Sound Ferry estimates that their ridership will grow with an additional 3,000 passenger trips made per day (during the summer) in five years. Around two-thirds of these passengers are expected to be Long Island Auto Ferry riders. Block Island Ferry ridership, which notably affects parking in downtown New London, is also projected to grow.
- Cross Sound Ferry has plans to build a new high-speed ferry terminal and increase their number of daily departures/arrivals in order to handle the projected ridership increases.
- Shore Line East estimates that their ridership will grow modestly over the next several years, and that their commuter rail service may be extended east of New London to Westerly, Rhode Island contingent on Connecticut state funding.
- SEAT and Greyhound bus ridership in downtown New London are also projected to modestly increase over the next five years. The pedestrian overpass bridge at Union Station will necessitate that the SEAT and the Greyhound bus stop area adjacent to the station be redesigned and shifted slightly to the north on the east side of Water Street.
- Amtrak has an ambitious vision to improve their rail service along the Northeast Corridor, including the introduction of true high-speed rail. However, much of this is still unknown at the present time, and any full build-out of

high-speed rail service would likely not occur until around 2040 (well beyond the horizon of this downtown study).

Parking

Parking is critical component of any downtown, as it affects how people get to/from and around a place, and it also affects the built environment of the downtown itself. Existing summer-time parking utilization at New London's downtown publicly accessible parking facilities was first analyzed, where it was found that approximately three-quarters of the off-street parking spaces are currently utilized during Saturday afternoons. However, future parking utilization in the downtown is expected to be well over-capacity if new parking demands are added to the downtown in connection with growth in ferry ridership and from new development and redevelopment, if proportions of automobile use remains as is, and if no improvements are made to the downtown's parking system. To accommodate and manage increased future parking demands, the following key recommendations were developed:

- Better utilize existing parking assets in the downtown. This includes:
  - The better use of the Governor Winthrop Garage,
  - The more efficient use of private parking through shared parking and better public access to and use of private parking lots,
  - The modification of City Zoning Regulation minimum parking requirements to allow less private parking, more public/shared parking, and to better align the regulations with city redevelopment goals of infill development and reuse/redevelopment of downtown buildings,
  - The need for better communication of parking information (via the Parking Authority website, by means of communicating real-time parking use at downtown parking facilities, etc.)
- Better manage increases in parking demands in the coming years and create more turnover of prime public parking by strategically charging for parking and upgrading parking equipment.
- Incentivize the use of, and better provide, alternatives to parking and automobile use to/from and within the downtown. Increase the use of trains, buses, walking, and bicycling.
- Add more parking to the downtown public parking supply, specifically near Cross Sound Ferry and the NCGM site, by expanding the Water Street Garage or constructing a new parking facility.

Traffic Signal Infrastructure

Existing traffic signal infrastructure in downtown New London, including pedestrian signal equipment and vehicular traffic control equipment as well as signs and pavement markings, were reviewed and found to be in need of major replacements and upgrades. At-grade railroad crossings were also reviewed and found to need improvements. The following recommendations were developed concerning traffic signal infrastructure in the downtown:

- Upgrade and standardize all traffic signal equipment.
- Standardize operations in terms of pedestrian phases and cycle lengths.
- Centrally locate control of signal operations.
- Include Audio/Accessible Pedestrian Signal (APS) push buttons to meet ADA standards at crossings and update handicap ramps.
- Review programmed preemption timing at the at-grade crossing between Ferry Street and Water Street.
- Add some supplemental signage and enhanced lighting at the two existing at-grade crossings located at either end of South Water Street.

Vehicular Traffic

With many people driving on New London's busy roads daily, the analysis of existing and future traffic demands was a critical aspect of this study. Existing traffic volumes within and through the downtown were reviewed, and increased future traffic associated with growth in ferry and public transportation ridership, as well as from new development and redevelopment, was projected. The traffic analysis in this chapter of the study assumed that the one-way streets in the downtown would remain one-way. (The following chapter analyzed several potential two-

way conversion scenarios.) To accommodate increases in future traffic in the downtown, the following key recommendations were developed that would not be contingent on a two-way conversion of streets and intersections:

- A secondary point of exit from the Water Street Garage should be provided. This additional garage egress should be onto Atlantic Street.
- Huntington Street should be restriped on its southbound approach to the intersection with Governor Winthrop Boulevard to better provide a separate through lane and left turn lane.
- Bank Street should be restriped between Howard Street and Sparyard Street to provide a consistent two through lanes in the eastbound direction and also to extend the left turn lane in the westbound direction in connection with the city initiative to modify lane striping on Howard Street south of Bank Street.
- Traffic control signal timings and phasings should be optimized at all signalized intersections in the downtown. Additionally, the traffic signals along Governor Winthrop Boulevard between Union Street and Ferry Street should operate as a coordinated system.

One-Way to Two-Way Conversion

The concept of converting the one-way streets in downtown New London to allow two-way traffic was thoroughly examined as part of this study. Returning one-way streets to again become two-way would have a number of tradeoffs, but overall has the potential to improve the built environment downtown, making it easier to navigate for motorists and pedestrians alike. The initial scope of the two-way conversion analysis focused on the two main corridors of Bank Street/Water Street and Eugene O'Neill Drive/Green Street between Governor Winthrop Boulevard and Tilley Street. Several potential two-way scenarios were investigated, including a Full Two-Way Conversion Scenario of these streets and a Partial Two-Way Conversion Scenario of portions of these streets. The pros, cons, and key implications of the different potential two-way scenarios that were analyzed in detail are discussed in Section 8.

A Preferred Two-Way Conversion Plan was ultimately developed that included some of the downtown streets as well as a new roadway connection from Eugene O'Neill Drive to Water Street north of Governor Winthrop Boulevard. Upon vetting the several potential two-way conversion scenarios with the City, key stakeholders, and CTDOT, the Preferred Two-Way Conversion Plan was developed to include:

- The conversion of Green Street/Eugene O'Neill Drive from one-way to two-way between Tilley Street and Governor Winthrop Boulevard. One key benefit of this is that it would allow for the improved function of a new secondary egress from the Water Street Garage to Atlantic Street/Eugene O'Neill Drive.
- The conversion of Atlantic Street and Masonic Street from one-way to two-way.
- The construction of the aforementioned new roadway connection that would allow northbound traffic to flow on Eugene O'Neill Drive north of Governor Winthrop Boulevard and then merge with northbound traffic on Water Street south of Crystal Avenue. This will allow the northbound traffic through the downtown, which is heavy during afternoons and at times on weekends, to have a secondary means to access Route 32 that does not include all traffic having to go through the intersection of Water Street at Ferry Street and Governor Winthrop Boulevard.
- Bank Street remaining as one-way between Tilley Street and State Street but with a new cross section that would include a single vehicle travel lane instead of two vehicle lanes. The single travel lane is expected to slow vehicle speeds and improve pedestrian safety by eliminating multiple-threat crossings.

Section 1: Introduction

Downtown New London is a traditional urban center and a major multimodal transportation hub that is on the verge of a potential renaissance. With the expected expansion of the Cross Sound Ferry service, the planned addition of the National Coast Guard Museum (NCGM), as well as other development and redevelopment efforts, there will be an increase not only in the number of people visiting and traveling through downtown New London, but also in the number of people choosing to call Downtown New London their home.

The purpose of this study is to assess both the current conditions and the future needs for multi-modal transportation users in the downtown area, including motorists, pedestrians, bicyclists, and transit riders. Through the process of this study, critical improvements to transportation infrastructure in the downtown area have been identified. These recommended improvements are needed in order to realize the true potential of a vibrant downtown that fosters a culture of growth and innovation, and becomes a place where a diversity of people choose to live, work, and play.

The objectives of this study include:

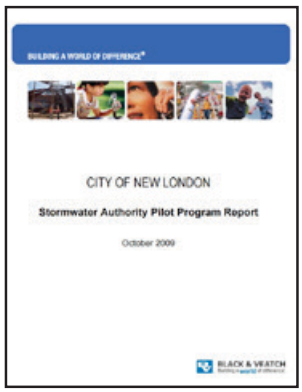
- To assess and plan for current and future needs of motorists and non-motorists.
- To plan for future transportation needs surrounding new development, including the NCGM, Cross Sound Ferry terminal expansion, the Greyhound bus relocation, new Transit Oriented Development (TOD), and other redevelopment initiatives.
- To identify transportation improvements that are context-sensitive, multimodal, and improve safety; that support the economic development of the downtown; that support New London as a unique and important place to Southeast CT and the larger region; and that support other broad goals including sustainability and livability.


S. Water St.
POLICE

Section 2: Background

2.1: Existing/Prior Plan Review

Critical to forming a concrete understanding of the City of New London's past, present, and future was the review of previous planning documents which have an effect on the downtown area. Statewide, regional, and City-centric planning documents were collected and studied. Key information was collected from these documents, and the most important notes are dictated here.



New London Centric

2016: Route 32 Road Safety Audit (RSA)

- State study to improve roadway safety along Route 32 north of downtown in the area of Connecticut College and U.S. Guard Academy

2015: SECCOG Traffic Circulation Study – Downtown New London

- Recommendations for wayfinding signage, complete streets, traffic calming, pedestrian infrastructure, streetscape improvements, and further detailed study.

2014: National Coast Guard Museum Pedestrian Overpass Environmental Impact Evaluation

- Highly relevant and referred to and built upon continually throughout the process.
- Included an analysis of the area's roadway network, existing traffic conditions, safety, parking, and multi-modal transportation, as well as information on the future development of the National Coast Guard Museum and accompanying pedestrian overpass.

2014: SECCOG Parking Supply Study – Downtown New London

- Inventory and recommendation for further study of future parking demands and needs.

2014: CTDOT Schematic Layout/Cost Estimate – New London Transportation Center

- Bus Terminal upgrade and US Coast Guard Museum Elevated Pedestrian Access Report.
- Three phrased concept design of pedestrian overpass and new bus terminal.

2013: Northeast New London Master Plan – Creative Placemaking Pilot Program

- Goals to improve connectivity to Northeast New London and make it a vibrant gateway into the City.
- Recommendations include calls for beautification and placemaking improvements specific to streetscape, pedestrian and bicycle facilities, and Riverside Park.

2011: New London Downtown Action Agenda Update

- Detailed information was included on the existing conditions of many of the City's key streets.
- Goals from this plan included becoming a port of entry and a transportation hub, and increasing safe pedestrian and bicycle mobility throughout the city.

2010: Choices for New London: Neighborhood Planning Strategy

- Recommendations included improvements to streetscape, such as planters, benches, and bicycle racks.

2009 New London Stormwater Authority Pilot Program Report

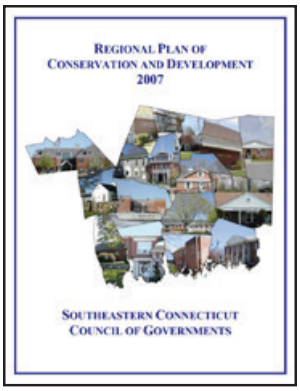
- Included information concerning storm water draining on streets and in parking areas, as well as all relevant policies.

2008 Pedestrian Safety and Access Improvements to the Intermodal Transportation Facility Study

- Recommended to maintain status-quo at the time.

2007 New London Plan of Conservation & Development

- An entire chapter of this report was focused on transportation and circulation in the City with information and recommendations concerning streetscape, pedestrian and bicycle safety and mobility, parking, public transportation, and signage. Recommendations from this plan were considered and built upon during the course of this study.



Regional

2015-2018: SECCOG Transportation Improvement Program

- Four projects for the City of New London were included, but all involved I-95, which is not a focal point for this project.

2011: Southeastern Connecticut Enterprise Region Comprehensive Economic Development Strategy

- Information on population and business growth potential for the City, including occupational clusters.
- Regional transportation and land use information.

2011: SECCOG Land Use Plan

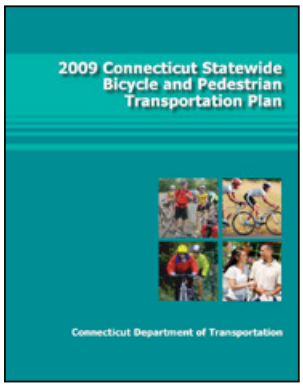
- Information pertaining to the City's land use characteristics and classifications, with notes on density and changes to growth.

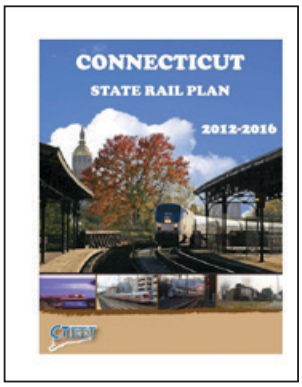
2010: Regional Intermodal Transportation Center Master Plan & Efficiency Study

- Highly applicable study, which included information on existing multi-modal transportation conditions as well as current and future needs.
- Recommendations for upgrades and changes to bus facilities, ferry facilities, traffic at-grade rail crossings, parking facilities, connectivity, information and wayfinding; many of which recommendations from this study will build upon.

2007: SECCOG Regional Plan of Conservation & Development

- Statistics on the region's demographic characteristics including census data as well as income and poverty rates.
- Breakdown of commuter profiles. It is important to note that while the number of commuters who work in New London County but live elsewhere has grown, the number of residents who live and work in the New London County decreased circa 2007.





Statewide

2012-2016: Connecticut State Rail Plan

- Budgetary, ridership and operating statistics from Shore Line East (SLE) and Amtrak.
- Public interest in new train lines, including a New London-Williamantic-Palmer Line.
- Potential for the SLE to continue from New London to connect with the RIDOT/MBTA service.

2009: Connecticut Statewide Bicycle and Pedestrian Transportation Plan

- Guidelines for bicycle infrastructure.
- Statewide bicycle routes.
- No relevant facilities or routes were proposed in the Study Area, but it is important to note that this plan is currently being updated and the 2017 plan may include more relevant recommendations.

2009: Update to Locally Coordinated Public Transit – Human Services Transportation Plan for Connecticut

- Recommendations to revamp the route service in order to provide bus service from the Old Saybrook Train Station and bus routes in East Lyme to New London's Union Station.

2.2: Public Engagement & Surveys

Surveys

Understanding the points of view, opinions, and ideas of New London's residents concerning the future of their transportation network was key to laying the groundwork for this study. In order to capture true and unbiased data from the public regarding current positions and the future hopes for the area, project consultants from MMI employed a two-tier public outreach approach which included both an online survey as well as in-person meetings.

The online survey was administered through the platform SurveyMonkey. Surveys were sent out by the City of New London on Wednesday, July 13th, 2016 to a variety of stakeholders who had been previously identified by the City. Approximately 88 people in total were sent the survey. Recipients covered a wide variety of organizations including the New London municipal organizations and committees, transportation providers, arts

organizations, universities, schools, and business. Responses were checked on Wednesday July 20th, 2016, a week after the survey was originally sent out, and the survey was then resent to all those who had not responded. Prior to closing the survey on Thursday July 28th, 2016, the survey had received 45 responses.

The survey was structured so that each participant took a specific set of questions based on if they identified their organization as a: Transportation Provider, Commercial Business, Tourist Destination, Residential Community, Employer, or City Organization/Advocacy Group. In total, three respondents identified as Transportation Providers, seven identified as Commercial Businesses, two identified as Tourist Destinations, twelve identified as Residential Communities, four identified as Employers, and 17 identified as City Organizations/Advocacy Groups. Transportation Providers, Employers, and City Organizations/Advocacy Groups were each given their own set of unique questions, whereas Commercial Businesses, Tourist Destinations, and Residential Communities all shared a set of questions. All versions of the survey can be seen in Appendix A.

The most important information garnered from the survey was:

- **89% of Commercial Businesses, Tourist Destinations, and Residential Communities anticipate an increase in visitors, patrons, or residents over the next five years**
- **Of all the Commercial Businesses, Tourist Destinations, and Residential Communities, it is estimated that:**
    - **85-90% of visitors, patrons, or residents drive alone to/from their location**
    - **15% or less of visitors, patrons, or residents walk or bike to/from their location**
- **11% of Commercial Businesses, Tourist Destinations, and Residential Communities estimated ~50% of their visitors, patrons, or residents walk or bike to and from their location**
- **33% of Commercial Businesses, Tourist Destinations, and Residential Communities that responded provide on-site or private parking for their visitors, patrons, or residents**
- **On-street, or other City-owned, parking is quoted as being either the main source of parking or the backup parking for when the businesses provided parking is full.**
- **Two out of two employers who took the survey estimated that they would see no change in employees over the next five years.**
- **Common themes expressed include a need for:**
    - **Increased public transit options**
    - **Increased parking time limits for on-street parking**
    - **Increased amounts of parking**
    - **Improved parking management and collaboration between providers**
    - **Improved policies and facilities for pedestrians and bicyclists**

Citizens and advocates of New London discussed plans and ideas with MMI in a casual setting at the local coffee shops of Muddy Waters and Washington Street Coffee House during drop-in hours.

Stakeholder Meetings & Open Hours

Although a survey is a great way to gather feedback from a large group of people, it does not uncover the same amount of valuable information as meeting in person. With this in mind, three representatives from MMI spent the entirety of July 28th, 2016, in New London conducting meetings at a municipal building and holding open hours at local coffee shops. The schedule for the day was as follows:

- 8:00 AM - 9:45 AM at Muddy Waters Cafe, 42 Bank St. #1 (Appointments and Drop-Ins Welcome)
- 10:00 AM - 11:45 AM at Washington Street Coffee House, 13 Washington St. #1 (Appointments and Drop-Ins Welcome)
- 12:00 PM - 4:00 PM at 13 Masonic Street (By Appointment Only)

The open hours were publicized by the City of New London utilizing social media and were included in the information sent to all survey participants. More formal meetings were scheduled by either a personal invitation to a key stakeholder from MMI, or by the stakeholder indicating their interest in an in-person meeting by answering affirmatively to a question regarding their desire to meet on the survey. MMI followed up with each of the people who indicated that they would like to meet to schedule meetings with them either in person or over the phone. A summary of the input received can be seen in Appendix B.

The format of the meetings and open hours was relaxed and informal. At each location, MMI set up a map of the study area as a point of reference. All participants were invited to tell MMI whatever they liked about the project and ask any questions they may have, with the representatives from MMI gently guiding the conversation to stay within the scope of the project as much as possible.

The focus of many conversations held during the meetings with stakeholders discussed the need for an improved multi-modal transportation network throughout the City of New London. These remarks were centered on transit, connections to transit, bicycle infrastructure, and pedestrian infrastructure. Many conversations were centered on the fact that, as a whole, streets in the City of New London are very car centric. Stakeholders stated that they believed the City would benefit from filling in gaps in the sidewalk network; improving ADA accessibility; implementing better pedestrian crossing infrastructure on many key thoroughfares including Bank Street, Water Street, and Eugene O'Neil Drive; and adding bicycle lanes in the downtown. The need for safe pedestrian and bicycle connections to places like Hodges Square, Fort Trumbull, parts of Northern and Southern New London, and nearby colleges and universities was discussed in length.

It was also stated by many stakeholders that connections for bicyclists and pedestrians to transit services should be improved in general throughout the City of New London. Concerning New London's Union Station, stakeholders suggested that a pedestrian overpass or underpass be present for those needing to board the train from the side opposite of downtown, and that better pedestrian crossings be implemented to help train users cross Water Street as the current one is dangerous due to the reluctance of vehicular traffic to stop (even for pedestrians in the crosswalk), as well as the conflict with the train station's vehicular drop-off lane. It was also mentioned that the amenities at and around Union Station are outdated compared to other stops along SLE.

Key stakeholders from New London discussed information unique to their organizations with MMI during more structured appointments held in a municipal conference room.

For connections to the ferry, it was suggested that a solution be found to reduce the conflicts between freight rail, passenger rail, and the ferry passengers as trains often block the paths to the ferry. It was also noted by several stakeholders that the sidewalk on the east side of Water Street should be extended to the north as pedestrians often end up walking on the dirt path or in the street after the sidewalk ends abruptly mid-block.

Many stakeholders mentioned the importance of improving the aesthetics of the City of New London's built environment. Urban beautification techniques that were suggested included creating nicer streetscapes on both main thoroughfares and side streets, adding more greenery to the downtown area, and artistic street painting for crosswalks. The implementation of new public spaces or monuments in key locations near entrances to New London that would clearly be designed to welcome people, known as "gateways," were also mentioned as a needed strategy to help liven New London's urban fabric. Many suggestions did not include specific locations, but potential places included near the train station for those entering the City, and Hodges Square. Wayfinding signage throughout the downtown was also mentioned as a need by many stakeholders. This signage would direct people to the waterfront area, for people exiting the Ferry, and to direct people to State Street and the main business districts.

Meetings and discussions were conducted with the New London Parking Authority (NLPA) to review existing peak parking conditions, the general methodology for studying future parking needs, and possible strategies to address future needs. Each of these aspects were incorporated into the parking section of this study. It was agreed that MMI would undertake an initial independent review of summer parking count data; estimate/analyze future utilization of the downtown parking supply assuming increased demands from the proposed NCGM and increased activity at the Ferry Terminal, as well as from other development; and provide recommendations to address future parking needs. The NLPA, in parallel, is working on a 5-year strategic parking plan for the city. Stakeholder comments about parking included:

- Parking in the downtown needs to be better organized.
- Additional traffic is created by people who are circling around looking for on-street parking.
- Visitors to the downtown have found locating parking challenging.
- There is not necessarily a shortage of parking, but it is hard to find or held in private lots.
- The City's zoning regulations and policies concerning parking should be improved.

Other concerns expressed during the meetings and engagement conversations focused on automobile traffic, the desire to entice people out of their cars, and the need to pull more motorists, particularly ferry users, into downtown to visit. Patrons of the Ferry often exit the site by turning right onto Water Street at the intersection with Governor Winthrop and leave the City without visiting any local businesses or seeing what Downtown New London has to offer. Suggestions to change this behavior included rerouting motorists departing from the Ferry through downtown and converting the one-way streets (Water St. / Bank St. and Eugene O'Neill Dr. / Green St.) to be two-way so that motorists could travel more directly to, and within, the downtown area. It was also suggested that South

Water Street be made two-way or one-way Northbound instead of Southbound. Multiple people expressed desire that at least some of the one-way streets be converted to two-way in order to potentially reduce vehicular speeds, make the area more pedestrian friendly, and increase visitors to the downtown businesses. However, there was concern that a two-way Bank Street could be too narrow for trucks and trash collection. The potential of a one-way to two-way conversation for a number of Downtown New London's streets was addressed in this plan. (Please refer to Section 8.)

Many comments and suggestions expressed to the MMI project staff were also outside of the general scope of this study. While not necessarily transportation specific, these suggestions were important. Ideas included strategies for increasing development and economic opportunities in order for New London to thrive, recommendations concerning low income housing and social equity, suggested events and plans to increase and engage tourists, suggestions for potential local and regional public-private partnerships, as well as changes that could be made to governmental policies concerning things other than transportation, lament about the high cost to redevelop historic downtown buildings to new uses, and the need to make highway or surface street changes further out from the downtown.

2.3: Current Improvements & Developments

There are several developments that are currently proposed for the center of New London. Chief among them is the proposed National Coast Guard Museum (NCGM). The NCGM is to be a four-story, approximately 54,000 square foot building located on the Thames River to the east of the railroad tracks/Union Station and north of City Pier on land that is currently used for parking by Cross Sound Ferry. According to White Oak Associates Museum Planners (2014), the NCGM is being designed to accommodate around 2,470 visitors on a typical summer weekend day, along with 35 staff/volunteers. The NCGM would be open seven days a week with regular hours from 10 a.m. - 5 p.m. It would also likely be open late on some evenings to host events and be open some mornings prior to 10 a.m. for school sessions. It has been estimated that approximately 80 percent of visitors to the NCGM will arrive by automobile typically in groups of 2-3 people per vehicle. The White Oaks study estimated that on peak days there will be a need for approximately 30-35 staff/volunteer parking spaces and just under 300 visitor parking spaces for the NCGM at the busiest times. The majority of these parking demands would likely be handled at the Water Street Parking Garage, with any overflow accommodated at other nearby public parking facilities. The NCGM is anticipated to open in 2020.

The pedestrian overpass bridge that is proposed at Union Station is to also connect directly to the proposed NCGM and the Cross Sound Ferry terminal. . Cross Sound Ferry is noted to be planning an expansion to its terminal facilities to include a new ferry terminal to accommodate increased ridership demands (discussed further in the public transportation section of this report). The need for a pedestrian overpass stems from the fact that the two at grade railroad crossings - at Ferry Street and at State Street - block access to the ferry terminals, and the future NCGM, on the east side of the tracks when trains pass through or are present. Southbound Amtrak trains that are stopped at Union Station also block access to the northbound Amtrak tracks, the Shoreline East tracks and the ferries and NCGM. A pedestrian overpass would address these issues for pedestrian access, connectivity and safety. The outcome of the State EIE and approved by City Council has as the preferred alternative for the pedestrian bridge to also cross Water Street and connect directly to the Water Street Parking garage.

Regardless of whether or not the overpass extends over Water Street, the existing Greyhound bus terminal and loading area will be impacted by the pedestrian overpass. As discussed in Section 4.3 of this report, Greyhound is expected to be moved either just to the north of where it is now on the east side of Water Street or be relocated to the west side of Water Street adjacent to the Water Street Parking Garage.

Other known developments proposed in the center of New London are private developments

that include the development of the urban renewal 'Parcel J' vacant lot, the proposed redevelopment of the St. Mary Star of the Sea School into apartments, and possible expansion of the Garde Arts Center. Parcel J, located at the southwest corner of Bank Street and Howard Street, is currently in the early planning stages of being developed with around 90 dwelling units and 10,000 sq. ft. retail. The Saint Mary Star of the Sea School, as seen in the photo below, is located at the southwest corner of Huntington, Tilley, and Washington Streets. It has recently been granted funding to be converted into approximately 30 apartment units. The Garde Arts Center was approved in the past for a rear expansion of its theatre, which has yet to be done but would necessitate relatively minor modification to the geometry of Governor Winthrop Boulevard between Huntington Street and Meridian Street.

Lastly, there is a notable quantity of vacant building space in downtown New London that could be reoccupied which would place additional traffic, transportation and parking demands on the downtown that are not there now. A downtown building occupancy survey was conducted to better understand this potential.

Saint Mary Star of the Sea School is the subject of a proposal suggesting it be redeveloped into apartments

2.4: Business & Building Inventory

In May 2016 MMI project staff conducted building and business inventories in the Downtown area. MMI created a database containing each of the 230 parcels in the study area based on zoning and assessor data, and field reconnaissance. Building attributes such as leasable area, number of stories, and zoning were used to verify the parcels in the field. For each parcel, total number of commercial and residential units, the number of occupied units, and the vacant and occupied commercial square footage was inventoried. In instances where the number of units could not be determined in the field, they were estimated using the assessor's database. For each occupied commercial unit, the business name and business type were recorded. Building and business data was then uploaded into GIS and aggregated by parcel and city block; city blocks were divided into sections A-H as shown in Figure 2-1.

Figure 2-1: New London Building Inventory Sections

In total there were about 50 building vacancies in the study area. Some of these were multi-floor building vacancies and others only storefront vacancies. Of these vacancies, 26 had private parking on-site, in a nearby lot, or in an adjacent alleyway. The other 24 vacancies were not accompanied by any form of parking and therefore it is assumed that if these vacant properties were to be rejuvenated that they would require the use of the City's public parking resources, either on-street parking or public garage/lot parking. There is also the potential for new vehicular traffic to be generated if the vacancies within the Study Area were occupied by new businesses, retail stores and residents.

In Downtown New London, just over 10% of the total building square footage was found to be vacant. The largest portion of vacancies were found across Sections A, B, and C as seen in Figure 2-1 on the previous page. These sections of the downtown, bordered by the Thames River to the East, Green Street to the west and State Street to the north, cover much of the City's historic building stock. These sections are generally pedestrian-oriented with on-street parking and some parking lots. Many the buildings in Sections A-C are human-scale and mixed-use with ground floor restaurant or retail. Section F also has a notable about of vacancy. Vacancies are much less in Sections D, E and H. Section G was found to have no vacancies at all. Sections D-H are home to many larger office buildings, government buildings, shipyards, and religious properties. Note that since our field work was complete, a handful of vacancies in the downtown have already been re-occupied.

For each of the multi-floor building vacancies and storefront vacancies within the separate downtown sub-areas, projections were made of the likely re-occupancy land use. Table 2-1 below summarizes the estimated likely re-use by size in terms of square footage and number of residential dwelling units. It is estimated that approximately 117,500 square feet of the vacant building space in downtown New London could likely be re-occupied with retail and restaurant uses, 68,000 square feet re-occupied by office uses, and 10,000 square feet by a theater type of use. There is additionally a potential of approximately 105 new apartments that could be located in rehabilitated building space in the downtown. Potential traffic and parking demands that could be generated by these downtown vacancies if they were to be reoccupied were estimated and taken into account in this study's future traffic and parking analyses.

Vacant Property				
Section	**Retail / Restaurant** (Sq. Ft.)	**Office** (Sq. Ft.)	**Theater** (Sq. Ft.)	**Apartments** (Units)
Section A	21,000	8,000	0	15
Section B	41,000	25,000	10,000	70
Section C	25,000	13,000	0	10
Section D	3,000	0	0	10
Section E	3,500	0	0	0
Section F	23,000	22,000	0	0
Section G	0	0	0	0
Section H	1,000	0	0	0
Grand Total	**117,500**	**68,000**	**10,000**	**105**

Table 2-1: Vacant Buildings and Storefronts in the New London Downtown Study Area

Section 3: Non-Motorized Transportation

3.1: Field Assessment

Starr Street is a great example of a beautiful street in New London which falls into the Low Priority category.

Audits of existing conditions pertaining to non-motorized transportation in the study area were performed on Wednesday May 11th, and Tuesday May 12th, 2016. Over the course of those two days, planners from MMI walked the entire study area, surveying infrastructure for bicyclists and pedestrians. The results of the audit focus first on pedestrians improvements, followed by recommendations for the implementation of new bicycle infrastructure.

For the purpose of the assessment, amenities along street segments, and crossing facilities at intersections were recorded separately. Street segment inventories considered the presence of sidewalks (one or both sides), as well as the quality of sidewalks (width, surface conditions, separation from traffic, and accessibility for all users). For intersections, the presence of crossing facilities, whether the facilities were signalized, the quality of the facilities and the accessibility and ease of access for all users was noted. Signage pertaining to specific bicycle and pedestrian routes, such as the New London Healthy Trail System, was also noted.

The entire Study Area was examined and it was found that City of New London has a number of beautiful streets with wide sidewalks and street trees, as well as many intersections with thoughtful pedestrian crossing infrastructure. These types of facilities, considered to be acceptable quality or higher in both condition and design, would fall within the Low Priority Category and are not included in these recommendations. Although some intersections and street segments included in this Low Priority category do have some issues which would benefit from alteration or repair, they are overall able to serve the needs of pedestrians, and do not need any immediate improvements other than routine maintenance and updates due to a change to the surrounding built environment, such as new construction or roadway design.

Other intersections and street segments were graded on their overall existing conditions individually, and then clustered into seven groups by location to formulate comprehensive recommendations that will be easy to implement. These areas were split into priority groups, with three groups being considered High Priority and four groups being considered Medium priority. For more detail, see figure 3-1 on page 18.

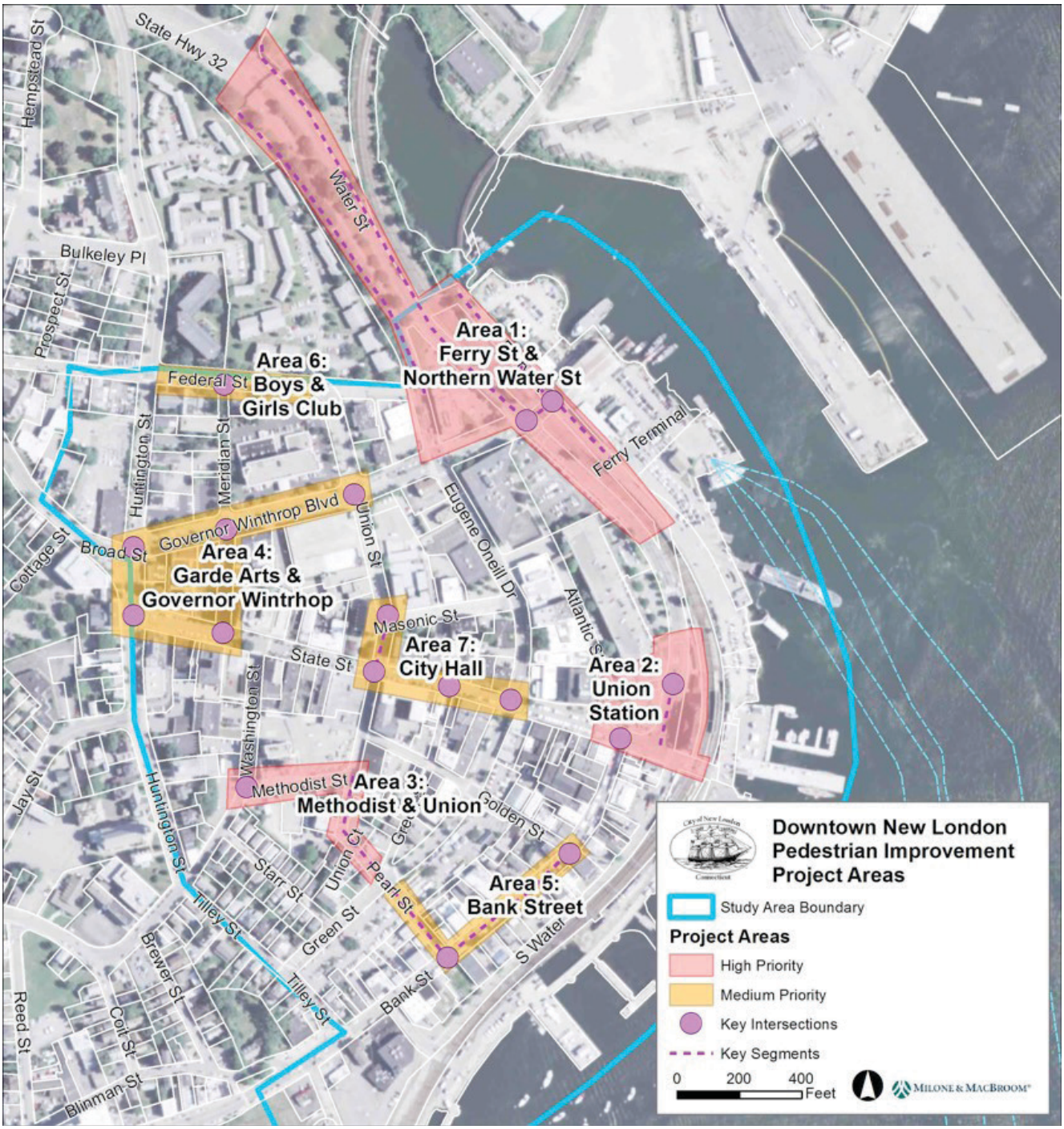


Figure 3-1: Pedestrian Improvement Project Areas

3.2: High Priority Pedestrian Areas

Those intersections and street segments considered to be "Poor" or "Very Poor" in condition and/or design are of the highest priority to be fixed in the near future. These areas currently present potential dangerous situations to pedestrians and bicyclists who pass through them. They often lack adequate pedestrian infrastructure, require improvements to crossing facilities, or do not present necessary accommodations to meet the needs of those whom the Americans with Disabilities Act (ADA) was enacted to protect. New designs and repairs should be applied to these areas as soon as possible.

Area 1: Ferry Street & Northern Water Street

This area is a key gateway to the City of New London. It not only leads motorists to and from the northern parts of the City, and eventually to I-95, but it also provides access to key multi-modal amenities, guiding pedestrians to stops for various transit buses, Union Station, the Water Street Parking Garage, and the Cross Sound Ferry. It is bordered by a large housing development to the west (Winthrop Square Apartments) and the Cross Sound Ferry Terminal to the East.

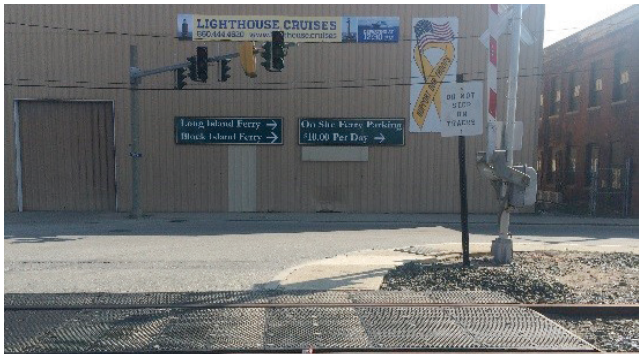
Figure 3-2: Area 1 Pedestrian Improvements

This area is one with many missing links for pedestrians. Although the signalized intersection of Governor Winthrop Boulevard and Water Street provides crossings for pedestrians in two places, it does not provide any facilities for people crossing in the other directions. **It is recommended that a new crosswalk across the east leg of this intersection with the necessary accompanying ADA ramps should be considered in order to connect with any new sidewalks/ paths alongside the east side of Water Street in this area (discussed further below).** It is important that with the crosswalk, ADA amenities be added in order to ensure that all pedestrians are able to access the sidewalk.

Another missing link is found at the adjacent intersection of Governor Winthrop Boulevard and Ferry Street. This area has minimal pedestrian facilities. **It is recommended that a sidewalk along the west side of Ferry St. south of Governor Winthrop Boulevard be added to connect with the ferry terminal, and that a crossing facility and accompanying ADA compliant ramps be implemented when the sidewalks ends close to the Ferry Terminal**. This is an important tourist connection particularly from the Water Street Parking Garage and also the bus stop/train station to the ferry. Safe access for all users is vital. A crosswalk is not suggested across Ferry Street at Governor Winthrop Boulevard as this would negatively affect signal operations and pedestrian safety at this intersection. A marked crossing for pedestrians over the railroad tracks should be added here as well.

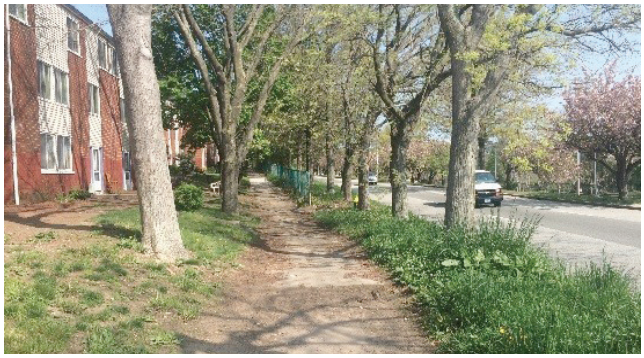
Heading south from the intersection of Governor Winthrop and Water Street, an important connection from the train station and bus stops to the ferry terminals along the east side of Water Street currently lacks a sidewalk. Although signage indicates "no pedestrian traffic" many people walk here daily, as it is one of the most direct routes. **It is recommended that sidewalks and accompanying ADA infrastructure be added to connect from the bus stops to the intersection of Water Street and Governor Winthrop Blvd**. This area is heavily traveled by pedestrians who walk unsafely on the edge of the curb or even in the vehicular right of way. This could be accomplished by narrowing the vehicle travel lanes to gain width for an ADA compliant sidewalk. This could be similarly done along

Governor Winthrop Blvd at Water St



Governor Winthrop Blvd at Ferry St

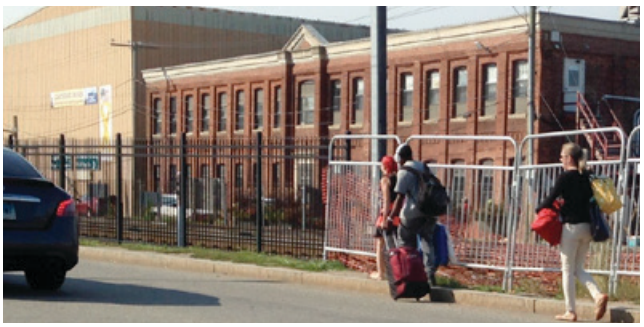
Water St. from Governor Winthrop Blvd to Atlantic St



Eugene O'Neill Dr from the pedestrian bridge to Governor Winthrop Blvd

the east side of Water Street north of Governor Winthrop Boulevard. Many pedestrians traverse this area daily, as crossing to Eugene O'Neill and following that sidewalk to the pedestrian overpass adds significant time and distance. **It is recommended that a sidewalk, or better, a side path, and accompanying ADA compliant ramp be added to the east side of Water Street north of Governor Winthrop Boulevard**. This facility could provide a connection to the network of paths in Winthrop Cove Park.

The segments of street along Eugene O'Neill Drive and Water Street from Governor Winthrop Blvd north to the pedestrian bridge over Eugene O'Neill Drive and Water Street are very important, passing by affordable housing units and providing access to areas north-east of Water Street and Eugene O'Neill Drive. Along Eugene O'Neill Drive a sidewalk exists along the west side, but it is in poor condition and repaving, general maintenance, and lawn care for greenery are needed. Approximately 400 feet north of the intersection with Governor Winthrop Boulevard the sidewalk splits and a piece of it leads out to Eugene O'Neill Drive at a midblock location where no safe crossing could be made. **It is recommended that the pavement connecting the sidewalk to the road here be removed, and that better design and signage is added to indicate that it is unsafe for pedestrians to cross**.



Pedestrians walking along the east side of Water St. between Union Station and Governor Winthrop Blvd

Key Intersections			
Road 1	**Road 2**	**Control**	**Recommendations**
Governor Winthrop Blvd	Water St	Signal	• Add crosswalks • Add ramp to service new side path connection
Governor Winthrop Blvd	Ferry St	Signal	• Update existing ramp to ADA Standards

Key Street Segments			
On Street	**From**	**To**	**Recommendations**
Eugene O'Neill Dr	Governor Winthrop Blvd	Pedestrian Overpass	• A dangerous midblock crossing by the affordable housing to the stairs down to Water Street is often utilized. Indication of crossing needs to be removed, and signage should be added directing people not to cross here • Repair sidewalks
Ferry St	Governor Winthrop Blvd	Ferry Terminal	• Add sidewalk on the west side of Ferry Street between Governor Winthrop Boulevard and Cross Sound/Block Island Ferry • Add a new pedestrian crossing, and accompanying ADA compliant ramp, over the southern end of Ferry St
Water St	Governor Winthrop Blvd	Atlantic St	• Add sidewalk on east side of street to connect bus stops to the intersection of Water Street and Governor Winthrop Blvd
Water St	Governor Winthrop Blvd	Pedestrian Overpass	• Add a new side path
Governor Winthrop Blvd	Water St	Ferry St	• Add an improved pedestrian railroad crossing

Table 3-1: Area 1 Pedestrian Improvements Summary

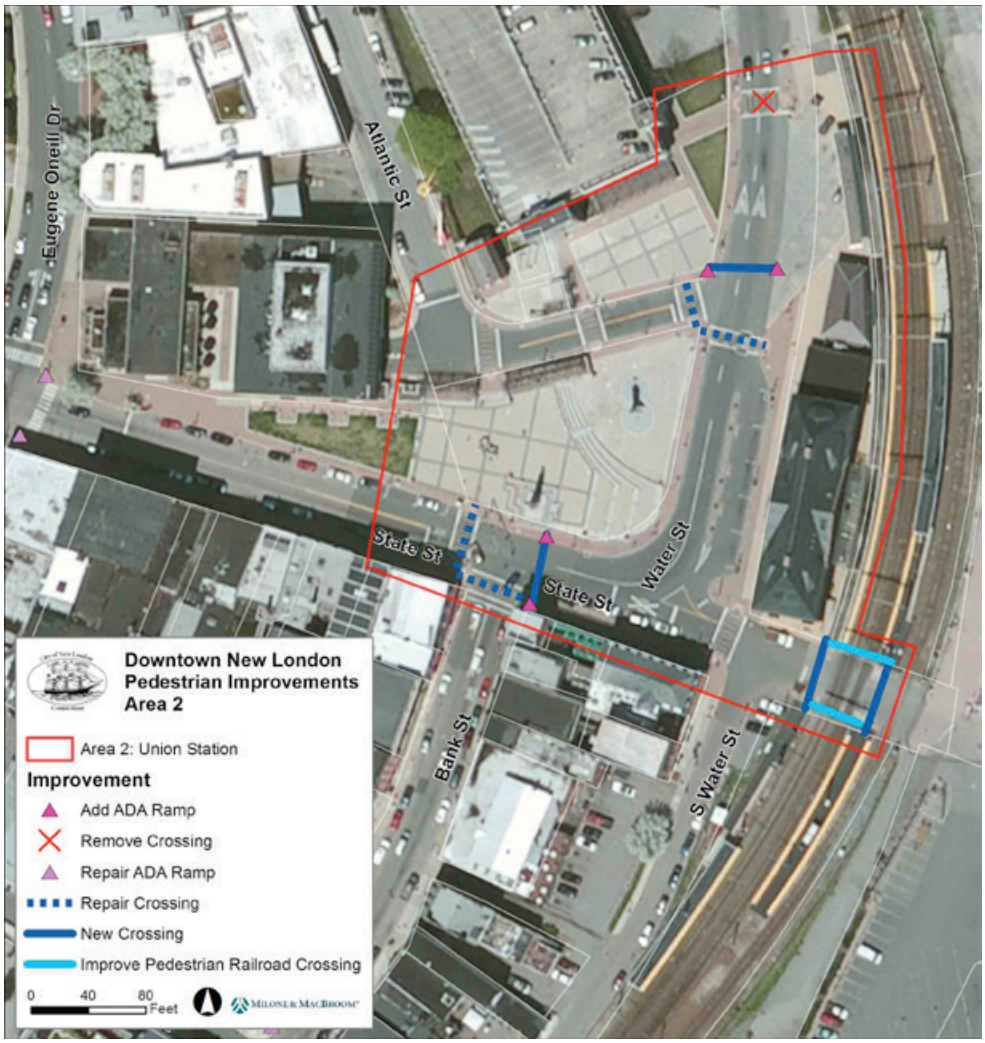


Figure 3-3: Area 2 Pedestrian Improvements

Area 2: Union Station

Area 2: Union Station encompasses one of the City of New London's most important entrances for drivers and multi-modal transportation users alike. Through the public engagement process it was found that this area should be branded as a gateway to the city. Also home to the large Parade Plaza and the iconic Whale Tail Statue, Area 2: Union Station welcomes visitors to the City in a grand way. Sidewalks along street segments in this area are generally found to be okay. However, the crossing facilities at the intersections of Bank Street at State Street, and Water Street at Atlantic Street, are in need of some updates and repairs.

S. Water St. at Atlantic St

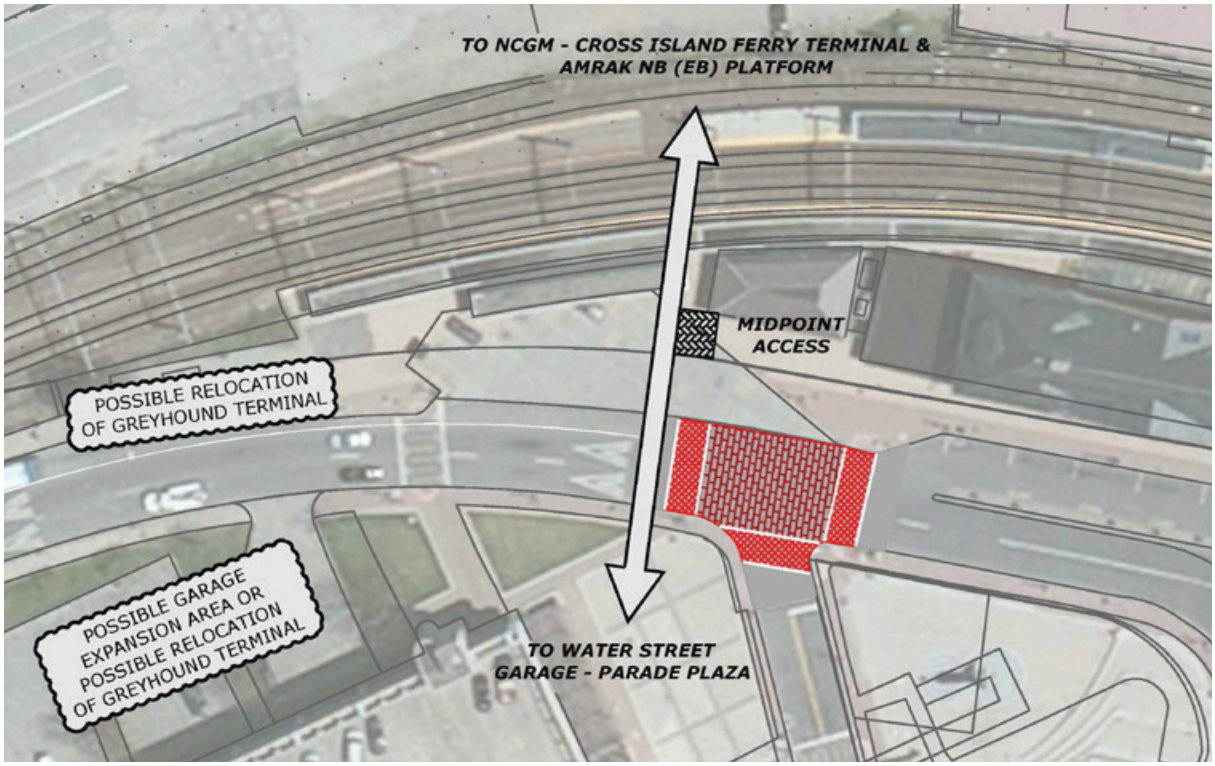


Figure 3-4: Pedestrian Improvements for S. Water St. at Atlantic St.

Although the intersection of Water Street and Atlantic Street includes bright and visible pedestrian signage, as well as push-button activated flashing lights and in-pavement flashers, vehicular traffic is fast and vehicles do not generally stop, slow down, or yield to pedestrians. In fact, when a pedestrian activates the crossing mechanism, they are met with an audible message stating to "cross street with caution, vehicles may not stop".

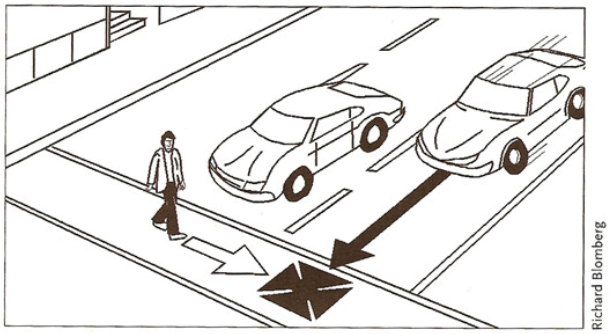
It is recommended that this intersection be transformed into a fully signalized intersection that forces vehicles traveling on Water Street to stop when pedestrians have hit the button to cross, or if vehicles waiting on Atlantic Street have been detected. With a new full signal at this intersection, another crossing can be added to the northern leg of Water Street, and the second crossing currently present to the north can be removed. It is also recommended that the entire intersection be painted, textured and/or raised to cue drivers that this is truly a space for pedestrians. The volume of pedestrians projected here warrants this treatment. See Figure 3-4 above for a conceptual illustration of this plan. Additionally, the pedestrian mid-block crossing found approximately 100 feet north of the intersection should be removed in order to encourage safe crossings at the newly signalized intersection.

It is noted that as part of the development of the National Coast Guard Museum a pedestrian overpass is expected to be built bridging both sides of the railroad tracks, connecting to the museum and ferries, and extending over Water Street in close proximity to this intersection to connect with the Water Street Parking Garage. Although this is the preferred alternative that was recommended in the State EIE and approved by City Council, the at-grade crosswalk in this area should also be improved.

This improvement is particularly important since Water Street currently has two lanes of traffic in the same direction and motorists at this spot start to speed up in anticipation of the highway entrance ahead to the north of Governor Winthrop Boulevard and Crystal Avenue. Uncontrolled or passive traffic control at a midblock pedestrian crossing over two same-direction vehicle travel lanes creates multiple-threat crossing situation, as seen in the image to the right. In a multiple-threat crossing situation, the presence of a vehicle waiting in one lane can block the visibility of the crossing pedestrian to other drivers.

Improvements are also recommended for the State Street at-grade railroad crossing. **It is recommended that the pedestrian crossing over the railroad tracks be improved and allow for ADA accessibility, and that visible crosswalks be implemented across State Street adjacent to the railroad tracks.**

At the intersection of Bank Street and State Street the aging brick crosswalks are now uneven and create a poor environment for ADA patrons, or those pushing baby strollers. **It is recommended that these crossing be upgraded, and that an additional crossing be added to the east side of that intersection to help minimize mid-block and unsafe pedestrian crossings in that area**.



Federal Highway Administration example of a multiple-threat crossing.

Key Intersections			
Road 1	**Road 2**	**Control**	**Recommendations**
Water St	Atlantic St	Stop	• Convert to a full color signalized intersection • Add high visibility crossings and accompanying ADA compliant ramps, including a different texture for the entire intersection
Bank St	State St	Signal	• Repair uneven aging brick crosswalks • Add a new crossing and accompanying ADA compliant ramps to the eastern leg of the intersection
State St	Railroad Crossing	-	• Improve east to west pedestrian railroad crossings • Add north to south pedestrian crossings over State St

Key Street Segments			
On Street	**From**	**To**	**Recommendations**
Water St	Governor Winthrop Blvd	Atlantic St	• Remove the pedestrian mid-block crossing found approximately 100 feet north of Atlantic Street

Table 3-2: Area 2 Pedestrian Improvements Summary

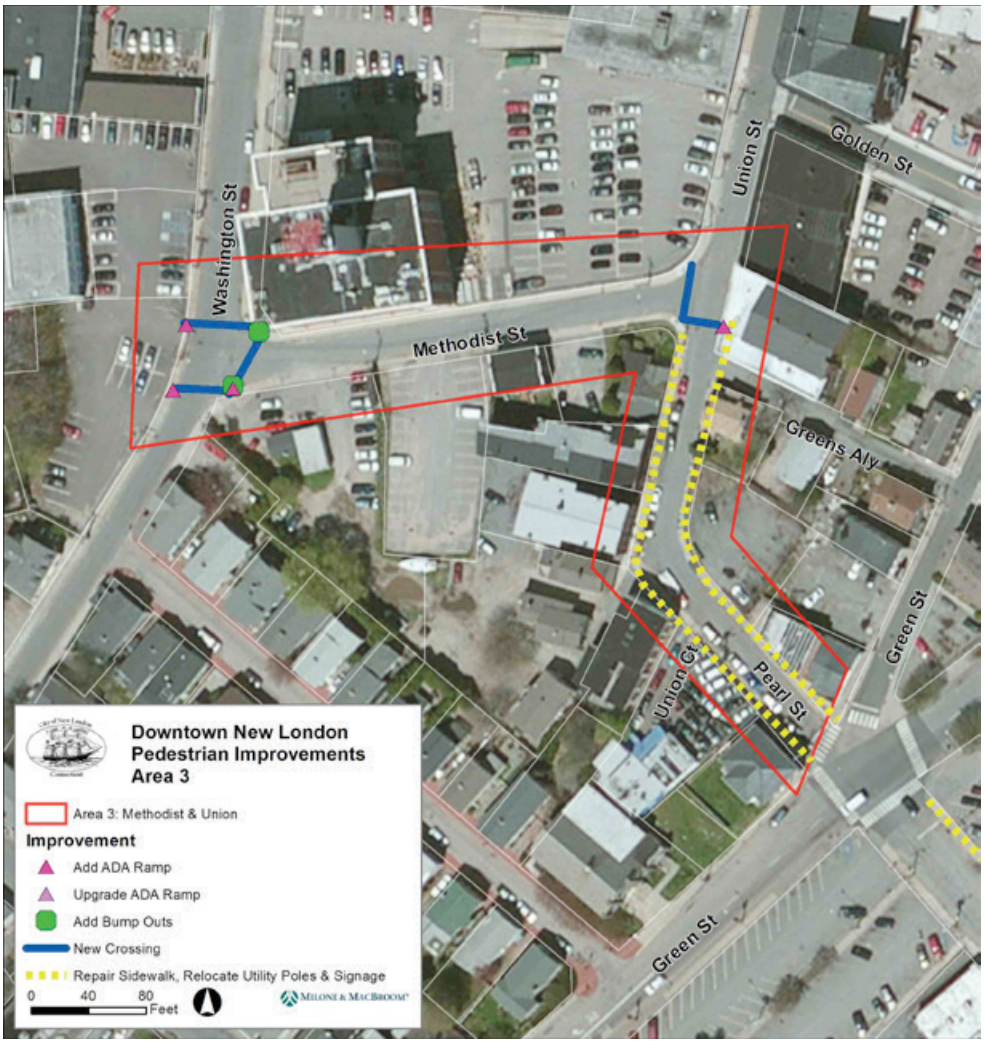


Figure 3-5: Area 3 Pedestrian Improvements

Area 3: Methodist & Union

Traffic along Eugene O'Neill Drive (and as it becomes Green Street) should generally be calmed to slow down for the safety of pedestrians. However, the current built environment is not designed to give those cues to drivers. Likewise Washington Street, which is very wide with no crossing infrastructure when it intersects with Methodist Street, has been designed for travel speeds far higher than appropriate for a downtown pedestrian-centric area. The addition of visible crossings through the implementation of vibrant paint and signage, as well as curb extensions along street corners for pedestrians would help to not only warn cars of the presence of pedestrians, but also naturally slow their speed.

The intersection of Eugene O'Neill Drive / Green Street and Pearl Street is a five-way stop, and includes the very busy vehicular artery of Eugene O'Neill Drive where it becomes Green Street as it heads south through downtown New London. Although paint for crosswalks are present, and ADA ramps are satisfactory, crossing through this intersection feels dangerous as vehicular speeds are fast, drivers are hesitant to slow down and yield to a pedestrian, and the roadway is wide totaling nearly 50 feet at the western crossing over Green Street. It is understood that curb extensions and improved crossing facilities will be implemented at the Eugene O'Neill Drive / Green Street intersections in this area as part of a project to redesign the Eugene O'Neill Drive parking lots. Those will create safer places for pedestrians

to stand while they wait to cross, create better visibility for drivers, as well as shorten the crossing distances.

Nearby, the intersection of Methodist Street and Washington Street is controlled by a stop sign for those approaching from Methodist Street. Wide lanes, and large radii for the turns encourage high vehicular speeds. Visibility for drivers approaching the intersection is also poor due to a curve in the road to the southwest. Currently, there is no crossing infrastructure present at this intersection except for one ADA pedestrian ramp.

It is recommended that painted crosswalks be added along with bright and visible signage indicating to drivers that pedestrians may be crossing and that they need to then yield. ADA ramps must accompany these crossing facilities at both ends. Curb extensions would also be appropriate here along the eastern corners of the intersection. This would not only decrease pedestrian crossing distance and give them a safe place to stand as they wait to cross, but it would also slow vehicles down as they approach the intersection and prepare to turn, as well as signal to drivers that this is a pedestrian area.

At the intersection of Union Street and Methodist Street, two ADA pedestrian ramps exist but there are no crosswalks. **It is recommended that crosswalks be installed both on the Methodist Street leg and Union Street south leg. These crosswalks should be accompanied by a third ADA ramp to the intersection.**

Methodist St. at Washington St.

The stretch of Union Street between Eugene O'Neill Drive and Methodist Street is also recommended for repairs, and it is recommended that sidewalks be repaved and utility poles and signage in the pedestrian right of way be removed. Although sidewalks are present on both sides of the street, the width and quality varies greatly, and the placement of signage and utility poles in the pedestrian right of way makes navigation challenging, especially for the ADA population.

Key Intersections			
Road 1	**Road 2**	**Control**	**Recommendations**
Methodist St	Washington St	Stop	• Add crosswalks and accompanying ADA compliant ramps • Add pedestrian crossing signage • Add curb extensions
Methodist St	Union St	Stop	• Add crosswalks and ADA compliant ramps

Key Street Segments			
On Street	**From**	**To**	**Recommendations**
Union St / Pearl St	Methodist St	Green St	• Relocate utility poles / signs out of the pedestrian right of way with special consideration to ADA needs • Widen sidewalks

Table 3-3: Area 3 Pedestrian Improvements Summary

3.3: Medium Priority Pedestrian Areas

Areas with intersections and street segments considered to be "Satisfactory" in both condition and design fall into the Medium Priority Areas. Improvements to these intersections and street segments should be planned for in the future, but could wait until all High Priority improvements are completed. Although many of these Medium Priority intersections and street segments present issues for pedestrians and lack in esthetics and sense of place, they can currently meet the needs of ADA patrons, and do not place pedestrians into inherently dangerous situations.

Area 4: Garde Arts & Governor Winthrop

The streets encircling the iconic Garde Arts center vary greatly. Both Huntington Street and Governor Winthrop Boulevard are wide thoroughfares designed for heavy volumes and high vehicular speeds, while Meridian Street and State Street are found to on a more human scale. Overall the street segments in the area were found to be satisfactory. However, several recommendations have been made for the intersections found here.

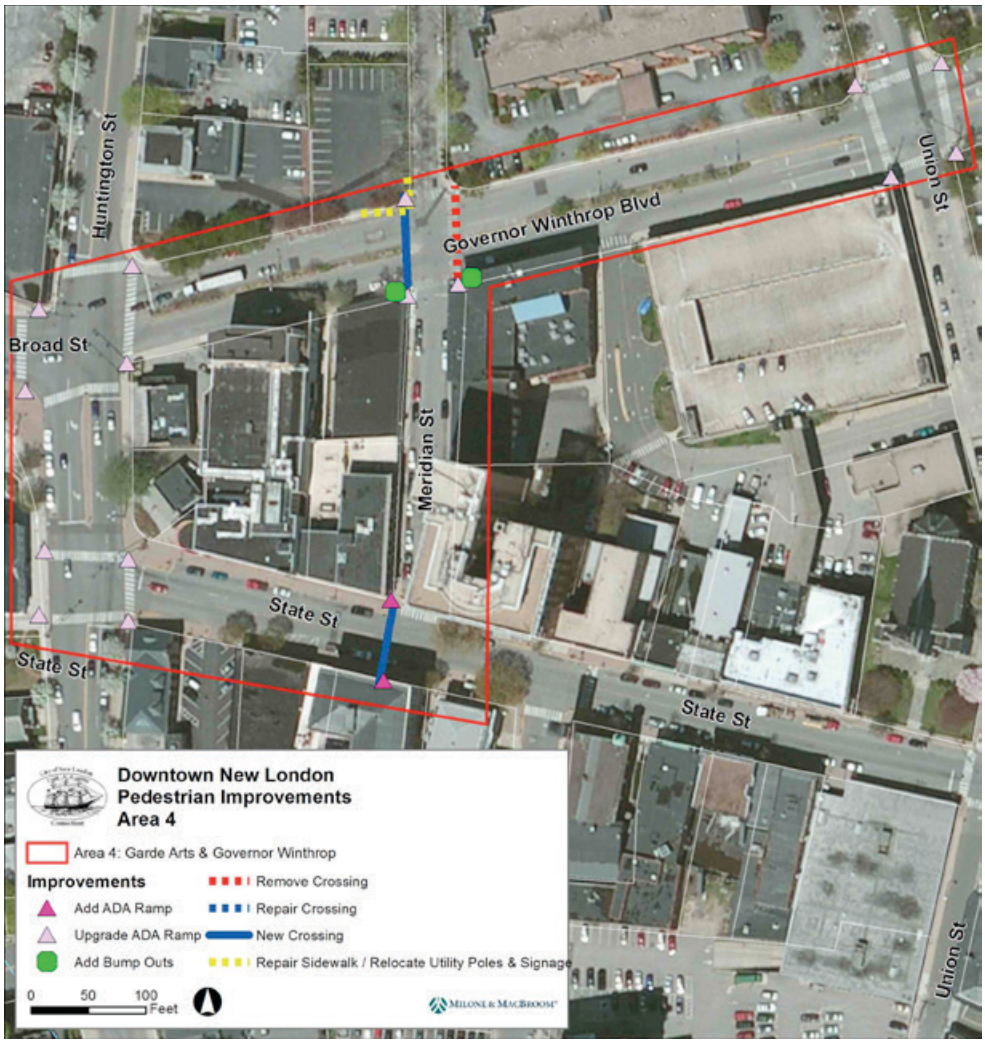


Figure 3-6: Area 4 Pedestrian Improvements

Concerning ADA accessibility, recommendations for the area's two largest intersections were made. **Although crossing infrastructure is present at both the intersection of Huntington Street and Broad Street / Governor Winthrop Boulevard and Huntington Street and State Street, it was found that the current ADA ramps are non-compliant and should be updated. The pedestrian ramps should also be upgraded at the intersection of Governor Winthrop Boulevard at Union Street to ADA standards.**

A new marked pedestrian crossing is recommended over State Street at the intersection with Meridian Street. High visibility pedestrian signage and ADA ramps should be implemented here as necessary. The placement of this crossing will reduce unsafe midblock crossings by providing a place to cross in the 400 feet between the intersections of State/ Washington Streets and Huntington/ State Streets.

Several improvements are recommended for the intersection of Governor Winthrop Boulevard and Meridian Street. **Concerning ADA accessibility, upgrades to the ADA ramps are necessary and light poles and signage should also be relocated out of the pedestrian walkway.** One pole in particular blocks access for those utilizing the ADA ramp at the northwestern corner, preventing people in wheelchairs or with baby strollers from accessing the sidewalk along Governor Winthrop Boulevard.

It is also recommended that the crossing be relocated from the eastern to western sides of the intersection and that curb extensions be added to service these crosswalks. In addition to a painted crosswalk with vibrant signage, there is potential to turn the existing median into a pedestrian refuge to provide a safe place for people to stop halfway through crossing, if needed. Substantial curb extensions can also be placed along the southern side of Governor Winthrop Boulevard in conjunction with the on-street parking to give pedestrians a safe place to wait to cross, as well as decrease the distance which pedestrians must walk in the vehicular right of way.

A pole blocks ADA and pedestrian access at the intersection of Governor Winthrop Blvd. at Meridian St.

Key Intersections			
Road 1	**Road 2**	**Control**	**Recommendations**
Meridian St	Governor Winthrop Blvd	Stop	• Upgrade ramps to meet ADA Standards • Relocate light poles and signage out of pedestrian right of way • Relocate crosswalk to west leg and revise median to serve as a pedestrian refuge • Add curb extensions to service crosswalks on the southern side
Union St	Governor Winthrop Blvd	Signal	• Upgrade ramps to meet ADA Standards
Huntington St	State St	Signal	• Upgrade ramps to meet ADA Standards
Huntington St	Broad St/ Governor Winthrop Blvd	Signal	• Upgrade ramps to meet ADA Standards
State St	Meridian St	Stop	• Add crosswalk across State Street and accompanying ADA compliant ramps

Table 3-4: Area 4 Pedestrian Improvements Summary

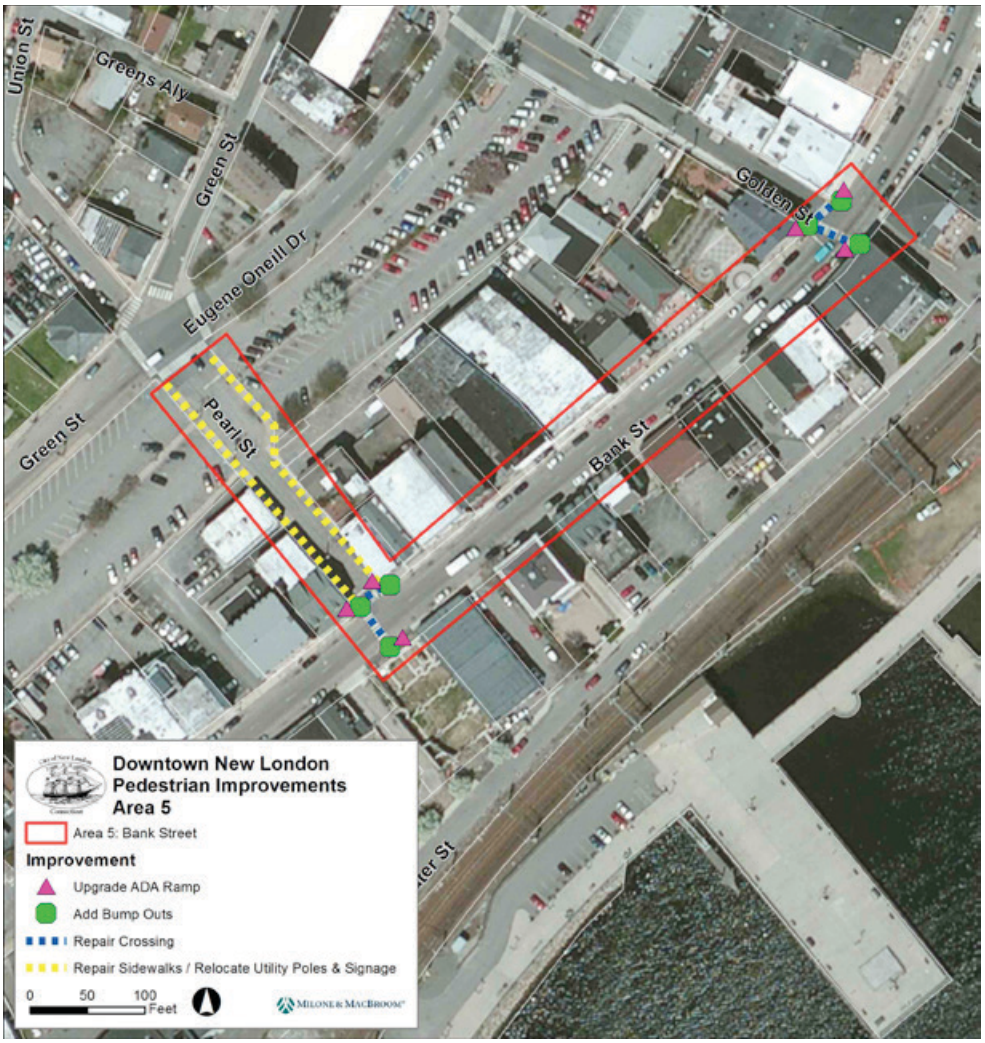


Figure 3-7: Area 5 Pedestrian Improvements

Area 5: Bank Street

Bank Street is one of New London's most human scale streets, lined with shops, restaurants and store fronts. Although there are some vacancies along the street, there is significant potential for it to be a great urban space. Sidewalks line both sides of the street, and crossings are marked. However, drivers are sometimes hesitant to slow down for pedestrians waiting to cross the street and public feedback suggested that New London residents believe the intersections of Pearl Street and Golden Street in particular to be problem areas.

It is recommended that the crossings at these two areas be upgraded to include vibrant and noticeable signage in addition to high visibility crosswalks themselves. The pedestrian ramps


Obstructed Sidewalks along Pearl St.

should be upgraded to ADA standards, and curb extensions are also recommended at these intersections along Bank Street. Although the crossings are not incredibly wide here, these curb extensions will provide a safe place for pedestrians to wait, as well as signaling to drivers to expect pedestrians in the area.

Additionally, many of the sidewalks in Area 5 are in need of repair. **It is recommended that sidewalks along Pearl Street be repaired, and that utility poles and signage be removed from the pedestrian right of way as they currently clutter already narrow sidewalks and create a dangerous environment for pedestrians and a hazard for ADA populations.** An ADA compliant passage should be provided on at least one side of the street.

Bank St. at Pearl St.

Key Intersections			
Road 1	**Road 2**	**Control**	**Recommendations**
Bank St	Pearl St	Stop	• Add curb extensions • Repair crossing facilities and accompanying ADA compliant ramps
Bank St	Golden St	Stop	• Add high visibility pedestrian crossing facilities and accompanying ADA compliant ramps • Add curb extensions • Add pedestrian crossing signage

Key Street Segments			
On Street	**From**	**To**	**Recommendations**
Pearl St	Green St	Bank St	• Relocate signage and utility poles blocking pedestrian right of way • Repave/repair sidewalks

Table 3-5: Area 5 Pedestrian Improvements Summary

Area 6: Boys & Girls Club

Only minimal improvements are recommended for Area 6, but they are important due to the proximity of affordable housing and the Boys and Girls Club. The intersection of Meridian Street and Federal Street is generally safe for pedestrians but lacks marked crossings or an ADA ramp on the northern side. **It is recommended that signed crosswalks with painted on street markings be added. Signage warning drivers of children in the area is also present, but it should be enhanced and does not do enough to provide a safe space for them**. These enhanced crossing facilities would greatly increase safety.


Federal St. at Meridian St.

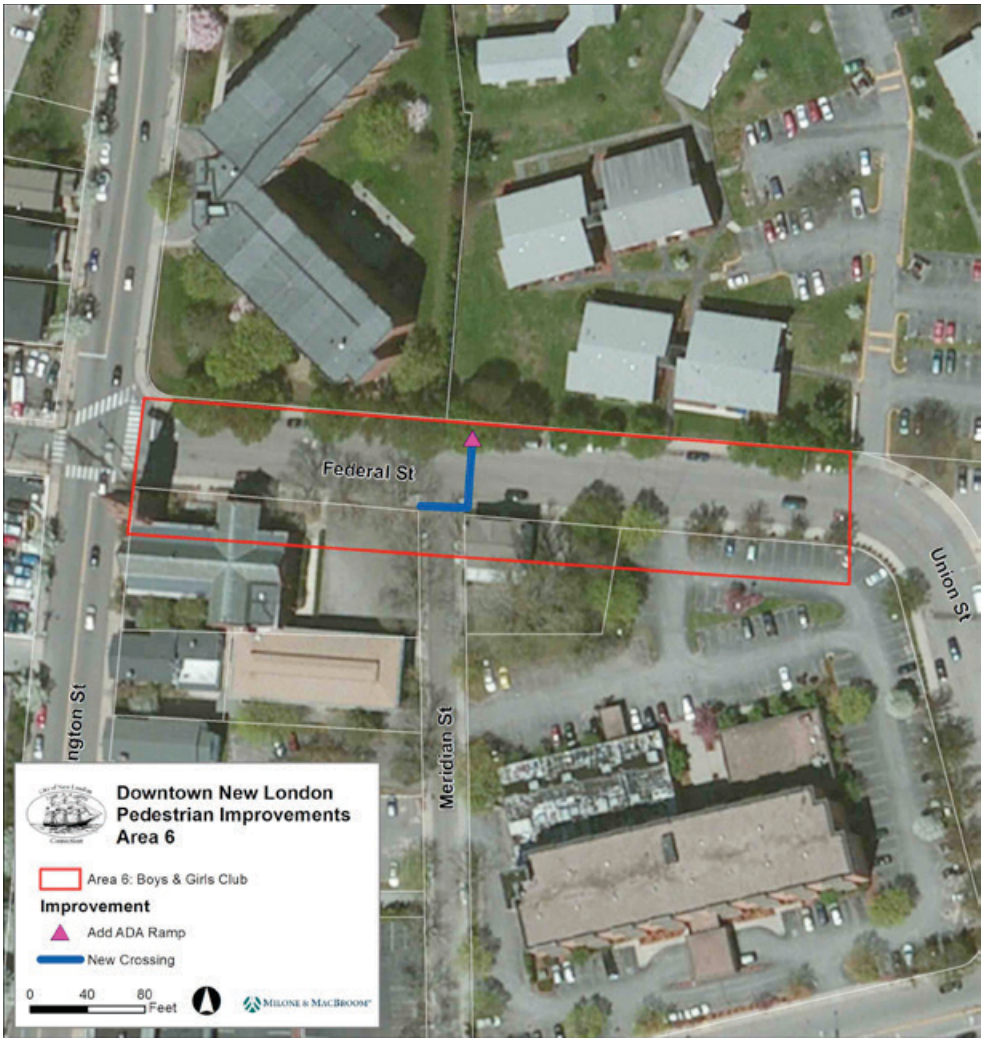


Figure 3-8: Area 6 Pedestrian Improvements

Key Intersections			
Road 1	**Road 2**	**Control**	**Recommendations**
Meridian St	Federal St	Stop	• Add crosswalk across Federal Street • Enhance signage • Install a ramp that meets ADA Standards at the north side of the crossing

Table 3-6: Area 6 Pedestrian Improvements Summary

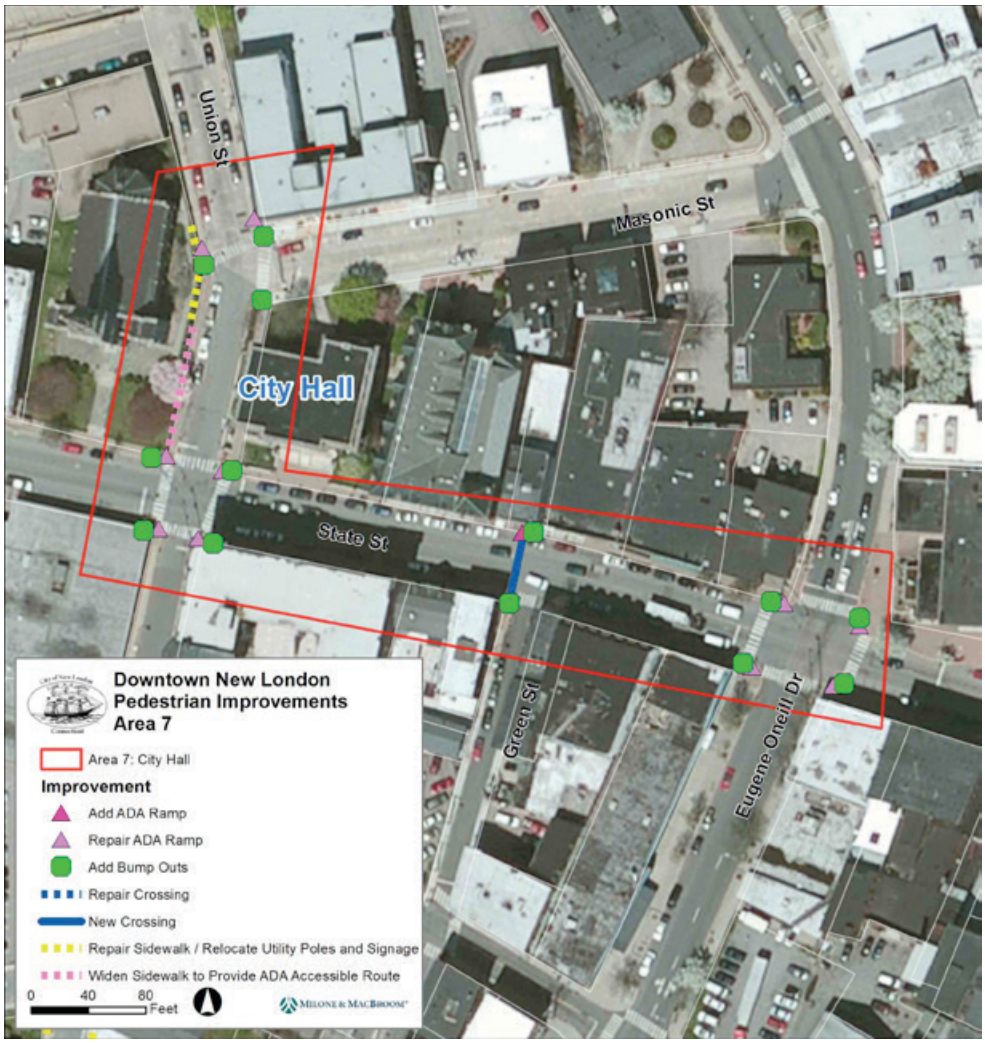


Figure 3-9: Area 7 Pedestrian Improvements

Area 7: City Hall

The City Hall area is located in the center of the Study Area. At the eastern and western ends of Section Seven, the intersections of State Street at Eugene O'Neill Drive and State Street at Union Street are both in need of updated ADA ramps in order to be compliant with current standards. **At the intersection of State Street at Green Street, a signed and painted crossing over State Street is recommended. In conjunction with this crossing, curb extensions and ADA ramps should be built.** A crossing at the intersection here would provide a safe place for people to cross in the 400 feet between the intersections of State Street at Eugene O'Neill Drive and State Street at Union Street where no pedestrian crossings currently exist.

The street segment leading north-south along Union Street is in need of upgrades. Currently the eastern side includes stairs which are obviously prohibitive for ADA populations, and the western side is narrow at only 3.5' wide at points, with utility poles and signage blocking the pedestrian right-of-way and no curb, snow shelf or other separation from traffic. This would make passage for ADA populations challenging. **It is recommended that the sidewalk on the western**

side of Union Street be widened to at least five feet to accommodate ADA users and that poorly located light poles be moved to provide enough space for pedestrians to traverse the street.

The intersection of Union Street and Masonic Street is very wide, a design that naturally increases vehicular speeds and feels unsafe for pedestrians. **It is recommended that the intersection be narrowed by adding curb extensions to each corner in addition to the widening of the west side of Union Street**. This will both provide a safe space for pedestrians as well as decrease vehicular speeds.

Curb extensions and ADA ramp improvements are also recommended at the intersections of Union Street at State Street and Eugene O'Neill Drive at State Street. These improvements will increase pedestrian safety at these busy intersections.

Masonic St. at Union St.

Key Intersections			
Road 1	**Road 2**	**Control**	**Recommendations**
Eugene O'Neill Dr	State St	Signal	• Update ramps to meet ADA Standards • Add curb extensions
State St	Union St	Signal	• Relocate light poles and signage from pedestrian walkways • Update ramps to meet ADA Standards • Add curb extensions
Union St	Masonic St	Stop	• Relocate pole blocking ADA ramp on Masonic Street • Add curb extensions • Update ramps to meet ADA Standards
Green St	State St	None	• Add a signed and painted high visibility pedestrian crossing across State Street and accompanying ADA compliant ramps • Add Curb extensions

Key Street Segments			
On Street	**From**	**To**	**Recommendations**
Union St	Masonic St	State St	• Repair sidewalk and relocate utility poles and signage • Widen sidewalk to provide an ADA accessible route to the West side of Union Street

Table 3-7: Area 7 Pedestrian Improvements Summary

3.4: Bicycle Facility Recommendations

While examining existing conditions for this study, it was found that the City of New London presently lacks infrastructure and amenities that support bicyclists. Currently, no on-road bicycle facilities exist in the study area, signage is limited, and only a few bicycle racks for safe bicycle parking can be found around the downtown area. (See Figure 3-10 for locations). It is imperative to increasing bicycle use in the City that infrastructure and amenities be implemented.

The implementation of thoughtful on-road infrastructure and accompanying improvements for bicycling is key to developing a network of roadways that facilitates safe travel for bicyclists. However, this on road infrastructure should be strategically placed and should be accompanied by bicycle parking, bicycle specific intersection treatments, and signage. Although it is not necessary that every street be a bicycle friendly street when first planning for bicycles, it is vital to success that connectivity be provided to the City's most prominent areas through a network of bicycle friendly corridors.

Figure 3-10:Existing Bicycle Rack Locations

Figure 3-11: Bicycle Facility Recommendations

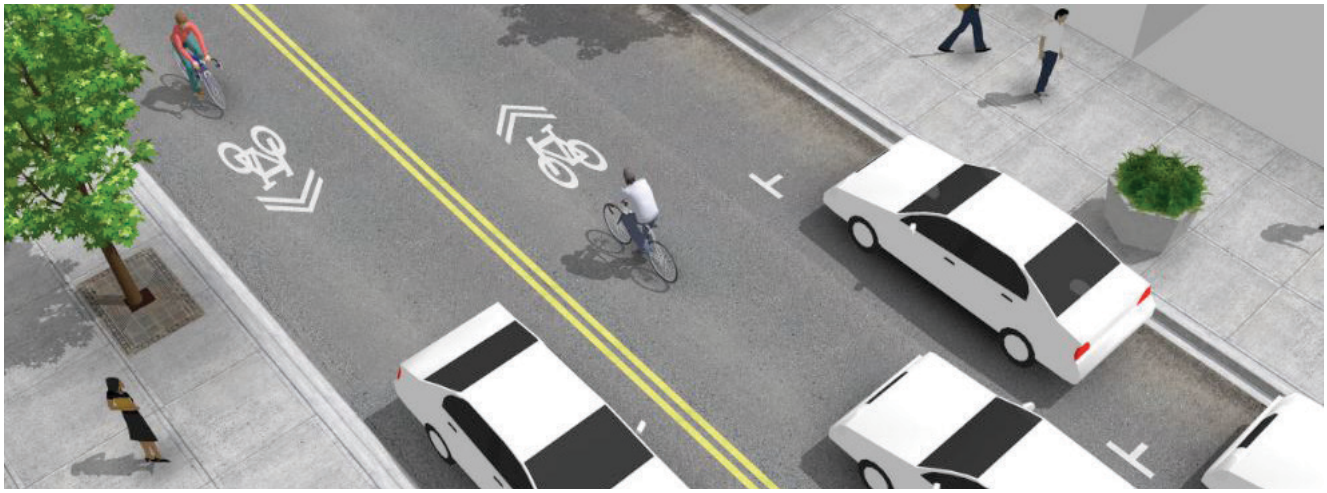
Recommendations specific to bicycle infrastructure, as seen in Figure 3-11, include:

- **Create a network of shared lane markings (sharrows)**, as depicted in the NACTO graphic below, throughout the downtown area. Sharrows are the easiest type of facility to implement and should be placed on low traffic roads where appropriate. This type of facility indicates to the bicyclist and the driver that they are entering into a shared lane environment, and encourages bicyclists to position themselves safely in the lane by indicating the proper path through difficult situations. These markings encourage bicycle riding and increase safety. They are recommended for:
  - Tilley Street from Washington Street to Bank Street
  - Bank Street from Tilley Street to State Street
  - Federal Street, Union Street and Pearl Street
  - Golden Street from Bank Street to Union Street
  - State Street from Huntington Street to Union Station

- **Strategically locate secure bicycle parking throughout the downtown area and in proximity to key destinations.** Partnerships with key business and property owners to locate bicycle racks in front of their properties can aid in achieving this goal.

- **Strategically locate "Bike May Use Full Lane" signs throughout the Study Area, including along all streets with sharrows**. An example of this type of sign can be seen below.

"BIKES MAY USE FULL LANE" signage
Source: National Association of City Transportation Officials (NACTO)

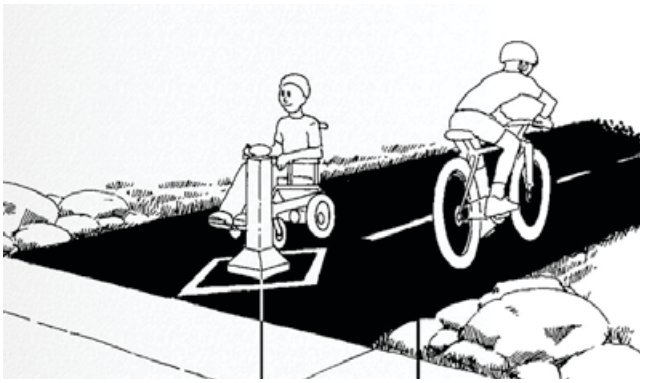


Sharrows implemented along a generic urban corridor
Source: National Association of City Transportation Officials (NACTO)

- **Bicycle Lanes are recommended for Governor Winthrop Boulevard to connect from the network of sharrows to the north and west to the new side path**. These lanes would stretch from the intersection of Governor Winthrop Boulevard at Union Street east to the intersection of Governor Winthrop Boulevard at Water Street.
  - Intersection treatments could include bicycle signal detection, painted bicycle boxes for bicyclists turning left, and dashed paths to continue the bicycle lane through the intersection, should accompany these bicycle lanes at the intersections of Governor Winthrop Boulevard at Water Street, Governor Winthrop Boulevard at Eugene O'Neill Drive, and Governor Winthrop Boulevard at Union Street.

- **A Side Path is recommended for Water Street heading north of Governor Winthrop Boulevard to connect to Winthrop Cove Park**. This facilities would safely accommodate both pedestrians and bicyclists with an adjacent off-road facility along Water Street.

- **Add bicycle wayfinding signage along streets with on-road bicycle facilities.** An example of appropriate signage can be seen in the image below. Wayfinding signage is an important aspect of the bicycle corridor system as it would help users navigate around the City along the safest path.



Examples of bicycle wayfinding signage accompanying a sharrow network (Left), and a Side Path (Right).
Source: National Association of City Transportation Officials (NACTO) (Left), Federal Highway Association (FHWA) (Right)

An example of bicycle lane with accompanying intersection treatments as is recommended for Governor Winthrop Boulevard
Source: National Association of City Transportation Officials (NACTO)

Section 4: Public Transportation

A SEAT Bus travels on Water Street in Downtown New London

One key element related to improving transportation throughout downtown New London is to increase multi-modal mobility with a focus on Public Transportation. The creation of a more robust, efficient and accessible multi-modal transit system can help relieve the roadways' need for additional capacity by decreasing the number of drivers operating single occupancy vehicles to and from the City each day. Additionally, improving transit ridership can help the City achieve multiple related goals including meeting or exceeding environmental and air quality standards, improving public health, increasing overall pedestrian walkability (key for downtown retail), and providing mobility options for residents who cannot drive such as people who are elderly, disabled, or cannot afford to own an automobile.

For the purposes of this study, existing and anticipated transportation service and ridership levels were reviewed for the separate transportation providers in downtown New London. This data was also incorporated into the parking and traffic operations analysis in the subsequent chapter of this study. Transportation providers examined include:

- Cross Sound / Block Island Ferry
- Fisher's Island Ferry
- Shore Line East (regional rail)
- Amtrak
- Greyhound Bus
- Southeast Area Transit District (SEAT) Local/ Regional bus service

4.1: Ferries

The Cross Sound Ferry operates service to Long Island (Orient Point) and Block Island. The Cross Sound Ferry terminal is located between the railroad tracks and the water just northeast of Union Station. Vehicle access to the ferry terminal is located via Ferry Street at the intersection with Water Street and Governor Winthrop Boulevard. Pedestrian access is currently available at this crossing and at the State Street rail crossing just south of Union Station at City Pier.

Cross Sound operates a fleet of auto ferry and passenger-only vessels. These include auto-ferry and passenger-only express (SeaJet) ferry service to Long Island, passenger-only express service to Block Island, and a lighthouse sightseeing cruise. Auto-ferry service is not available to Block Island from New London. The SeaJet service is primarily provided for patrons from Long Island that travel to the Connecticut casinos. A shuttle bus service connects the SeaJet patrons between the Cross Sound terminal and casinos. In total, Cross Sound Ferry on peak summer days operates 35 round trips (35 inbound plus 35 outbound ferry trips) per day. Ferry ridership is generally spread throughout the day.

The Fisher's Island Ferry operates from its terminal located between the railroad tracks and the water just southeast of Union Station. Fisher's Island Ferry operates two auto vessels and runs approximately 15 round trips on peak summer days. As part of this, it handles a notable amount of freight transport between Fisher's Island and the mainland.

Table 4-1 provides a summary of peak summer weekend daily ferry ridership, as well as the projected peak ridership at a 5-year horizon (2021). Cross Sound Ferry estimates that their ridership will continue to grow as it has recently at 4%-5% per year for the next several years. Fisher's Island Ferry did not provide input on their growth projections for the coming years, but based on review of the Regional Intermodal Transportation Center [RITC] Master Plan and Efficiency Study (TranSystems, 2010), it is estimated that their ridership may grow modestly at around 1% per year into the near future.

Service		Number of Daily Passenger Trips (2016)	Estimated Number of Daily Passenger Trips (2021)	Number of New Daily Passenger Trips
Cross Sound Ferry	Long Island Auto Ferry	8,155	10,195	**2,040**
	Sea Jet *	1,130	1,410	**280**
	Block Island Express	2,620	3,275	**655**
	Lighthouse Cruises	230	290	**60**
Fisher's Island Ferry		790 **	830	**40**
			TOTAL	**3,075**

* Connects with casino shuttle bus service
** Estimated based on RITC Study

Table 4-1: Peak Summer Daily Passenger Trips - New London Ferry Services

As shown in Table 4-1, approximately 3,075 new passenger trips are projected at the ferries in Downtown New London in the next five years, with most at the Cross Sound Ferry terminal. New passengers are expected to travel to and from the ferries using a mix of different transportation modes as current passengers do now.

Information on how riders arrive at the ferries was reviewed from the RITC study. This information was agreed by Cross Sound Ferry to be a generally accurate reflection of current conditions. Approximately half of the riders of the Long Island Auto Ferry bring their vehicle on board the vessel. The remaining riders are walk-ons. Figure 4-1 summarizes the general transportation mode split of the walk-on riders of Cross Sound Ferry. As can be seen, only a small percentage of Cross Sound's Long Island Auto Ferry and Sea Jet passengers drive and park an automobile in New London – 28% and 8% respectively. The remaining proportion of passengers are either dropped off or arrive by another mode. The majority of passengers of the Block Island Ferry, 90%, drive and park an automobile in New London. This is similar for Cross Sound's Lighthouse Cruises. For Fisher's Island Ferry, it is estimated based on the RITC study that around 85% of their passengers arrive by automobile and either be dropped off, park and walk-on, or drive-on the ferry. Most riders of the ferries do so in groups. Of the ferry passengers that arrive by automobile and park

Top: Cross Sound Ferry Logo, www.longislandferry.com
Bottom: Block Island Express Logo, www.goblockisland.com

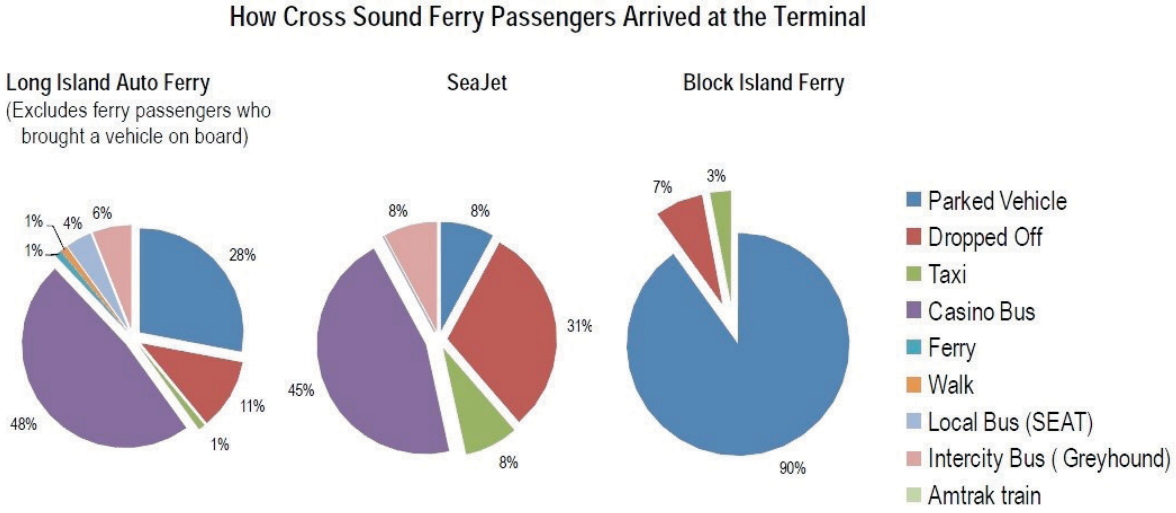


Figure 4-1: Source: Regional Intermodal Transportation Master Plan and Efficiency Study. TranSystems. March 2010.

in New London, the automobile occupancy on average is understood to be around 2.5 people per automobile.

Most ferry passengers that park in New London do so off-site. Cross Sound does have some on-site parking for passengers that fills up early on summer weekends or earlier on Fridays. Once the parking at the ferry terminal is full, drive-and-park ferry passengers park either at the Julian/Mariner Square parking lot or the Water Street Parking Garage. On busy summer days, these facilities are reported to fill up and some ferry passengers need to park at the Governor Winthrop Parking Garage. Fisher's Island Ferry does not have on-site parking. Their passengers typically park at the Water Street Garage or Eugene O'Neill Lots.

Cross Sound Ferry has plans to build a new high-speed ferry terminal to handle their projected increases in ridership and plans to add another auto ferry to its fleet increasing the number of daily departures. This, along with the proposed NCGM, will cause approximately 70 on-site parking spaces at the Cross Sound Terminal to be removed. Additionally, Cross Sound expects to lose approximately 100 on-site parking spaces due to this expected need for more vehicle staging with the increased ridership. The loss of these parking spaces at Cross Sound Ferry will shift these ferry passenger vehicles onto the public parking supply downtown. Lastly, as mentioned earlier, the proposed pedestrian overpass at Union Station that is to connect to the NCGM will directly benefit the ferries by allowing people access over the railroad tracks who today are blocked from doing so when trains are present at the station or are passing through.

4.2: Trains

Train platform at New London Union Station (Left) and New London Union Station as seen from Water St.

Shore Line East and Amtrak stop at New London's Union Station. Constructed in 1887, Union Station is the primary railroad station in southeastern Connecticut. Amtrak's Northeast Regional and Acela Express trains stop in New London on route along the Northeast Corridor between Boston to the north and New York City and points beyond to the south. With Shore Line East, Union Station is the easternmost terminus of the service between New London and New Haven. Three tracks are located at Union Station; two Amtrak tracks are located nearest to Union Station while the third, waterside track is a freight track used by Shoreline East.

Approximately nine northbound and nine southbound Amtrak trains stop in New London on the Northeast Regional route on Saturdays and Sundays. This service also runs during the week with additional trips available on the Acela Express route. Shore Line East operates with approximately 6-9 departing trains and 6-9 arriving trains at Union Station depending on the day of week.

Table 4-2 provides a summary of peak summer daily ridership levels for Amtrak, Shore Line East, and Greyhound Bus (to be discussed below), as well as projected peak ridership at a 5-year horizon (2021) for these modes. Shore Line East

estimates that their ridership will grow annually at around 2% per year for the next several years. Amtrak did not provide input on their growth projections for the coming years, but based on review of the RITC it is estimated that their ridership may grow at around 3% per year into the near future.

As shown in Table 4-2, approximately 170 new trips by rail are projected at the New London's Union Station in the next five years. According to CTDOT, approximately 75% of Shore Line East riders get to/from Union Station by automobile. Based on the RITC study, this percentage may be slightly higher for Amtrak riders. With regard to both Tables 4-1 and 4-2, it is important to note that not all passenger trips represent individual people and that there are some passengers that use more than one mode of public transportation in order to chain together multiple travel legs along a journey. For example, some people take Shore Line East into New London to then board a Ferry.

Shore Line East is noted to have plans for service expansion in the coming years. Contingent on funding, this includes a possible extension of the Shore Line East service to Westerly, RI. New London is currently the easternmost terminus of the Shore Line East line. While this would provide greater commuter rail service along the entire Connecticut coastline, it would also increase the number of times that the Ferry Street at-grade rail crossing would be blocked by rail traffic, highlighting the need for the pedestrian overpass at Union Station. It is also worth noting that plans have also been considered in Rhode Island to extend MBTA service south of Providence to Westerly, which if linked with the Shore Line East expansion would provide a commuter rail option for residents of southern and southeast Connecticut to access the Providence/Boston Metro area.

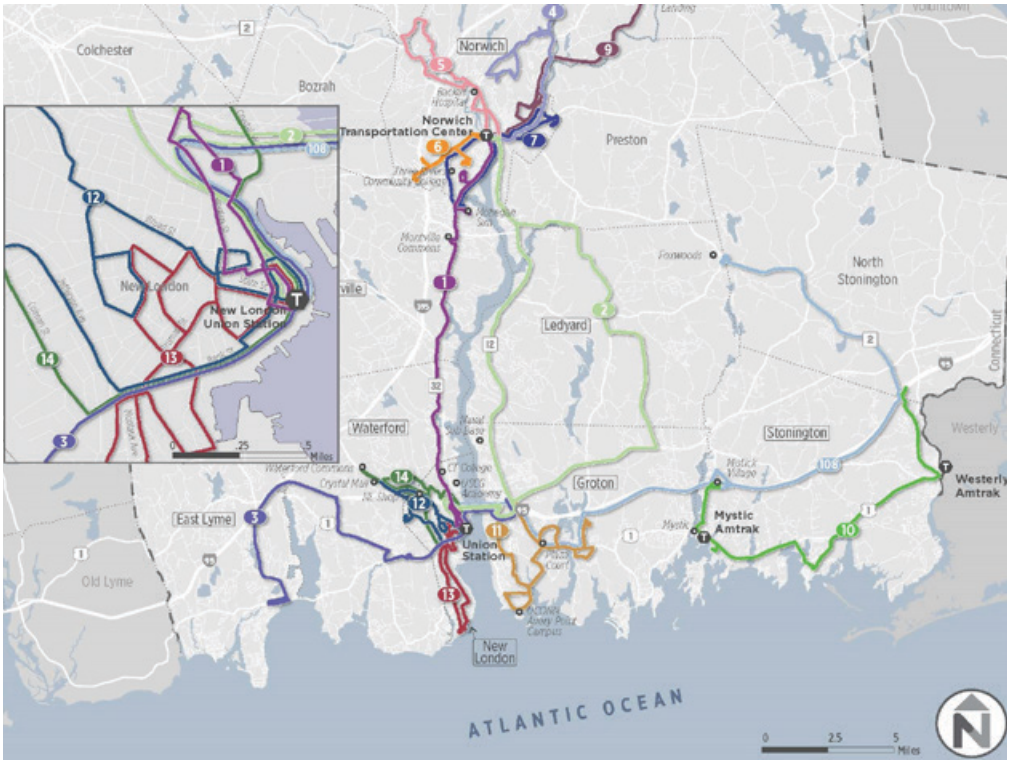
Amtrak has an ambitious vision to improve their rail service along the Northeast Corridor, including the introduction of true high-speed rail. Much of this has a horizon that is well beyond the scope of this study. Amtrak's NextGen vision for the Northeast Corridor would provide a full build-out of high-speed rail service by 2040 and would likely require the construction of dedicated high-speed rail infrastructure. The affect that this would have on New London remains to be seen. In the near term, Amtrak has plans to roll out new trains along the current Northeast Corridor by 2021. Lastly, the potential "Central Corridor" rail line that would extend from New London to Norwich and points north is a future unknown that has not been taken into account in this study.

Map of Amtrak Northeast Regional Route
Source: www.amtrak.com

Service		Number of Daily Passenger Trips (2016)	Estimated Number of Daily Passenger Trips (2021)	Number of New Daily Passenger Trips
Rail	Amtrak	760 *	880	**120**
	Shore Line East	465	515	**50**
Bus	Greyhound Bus	385 *	445	**60**
	SEAT Bus	885	975	**90**
			TOTAL	**320**

Table 4-2: Peak Summer Daily Passenger Trips - Train and Bus Services at New London Union Station
* Estimated based on RITC study

4.3: Buses



SEAT Current System Map
Source: www.seatbus.com

Greyhound bus and the Southeast Area Transit (SEAT) bus service have route stops on the east side of Water Street in the direct vicinity of Union Station. Greyhound is a national bus service. SEAT is a local/regional bus service that serves New London and several surrounding towns. Greyhound leases a small building that is attached to Union Station and uses a bus loading area just to the north. Greyhound representatives in the past have indicated that existing site conditions are logistically challenging and conflict with taxis and pedestrians at the current bus loading area. SEAT buses park curbside along Water Street just north of the Greyhound area.

Greyhound operates approximately two northbound and two southbound bus trips along I-95 that stop in New London on weekdays, and three to four trips in both directions on weekends. SEAT currently operates five regional bus routes and four local New London bus routes that stop on Water Street adjacent to Union Station. The different SEAT bus routes have schedule frequencies with some of around five runs per day and other with up to a dozen runs per day. Headways at peak are generally around one to two hours.

Table 4-2 on the previous page provides a summary of peak summer daily ridership levels for Greyhound in New London and SEAT on/offs at the Water Street transportation center stop, as well as projected peak ridership at a 5-year horizon (2021) for these modes. Greyhound did not provide input on their growth projections for the coming years, but based on review of the RITC it is estimated that their ridership may grow at around 3% per year into the near future. SEAT estimates that their ridership may grow annually at around 2% per year for the next several years.

Approximately 60 new trips by Greyhound bus and 90 new SEAT ons/offs/transfers are projected at the New London's Water Street transportation center in the next five years. Based on the

RITC study, approximately half to two-thirds of Greyhound bus riders get to/from the terminal by automobile (either dropped-off/picked up or drive and park downtown). Note that the projected SEAT ridership increases will translate to very few automobile trips since SEAT has stops throughout New London and no notable percentage of SEAT riders drive to downtown to park and take a SEAT bus. As mentioned above with regard to both Tables 4-1 and 4-2, it is important to note that not all passenger trips represent individual people and that there are some passengers that use more than one mode of public transportation in order to chain together multiple travel legs along a journey. For example, some people ride SEAT to downtown New London to then board a train or greyhound bus.

SEAT completed a study in 2015 that focused on the need to revise their service. SEAT indicates that some revisions to their bus service are expected to be made starting around the summer of 2017. Improvements to SEAT service that would benefit New London could include increased bus frequency, faster service for some routes, and improved fare payment structure. With regard to Greyhound, the construction and location of the pedestrian overpass would require the current Greyhound bus operations to relocate elsewhere. According to the EIE for the pedestrian overpass at Union Station, as well as the RITC study, an optimal relocation spot for Greyhound would be the vacant space in front of the Water Street Garage. However, recent focus on the need for additional parking near the Cross Sound Ferry Terminal and Union Station has highlighted the opportunity to readily expand the Water Street Parking Garage into this area. A second option would be to relocate the Greyhound bus stop to just north of its current location on the east side of Water Street. The SEAT bus area would need to also be relocated somewhat to the north as a result of this option. The entire Water Street transit area will need to be redesigned; not only for possible geometric street realignment and new bus-bay design, but also bus shelters, outdoor waiting area(s), streetscape, etc. Lastly, the City of New London has indicated that other bus carries have recently expressed interest in having a stop in the downtown.

A Bus Waits at the Stop on Water Street

Section 5: Parking

5.1: Existing Parking Conditions

Parking is a critical component of a transportation system not just because it is a prerequisite to allowing automobile travel but because it also affects the layout and physical form of an area such as a downtown. Parking affects if and how people get to/from and around a place, and parking affects how a city looks and feels in terms of its layout and density. The center of New London also serves as a traditional downtown with ferry terminals (both drive-on and walk-on only ferries) and is soon to include a major museum (the NCGM), with the former typically needing modest amounts of parking and the latter two often needing larger quantities of parking at peak times. Furthermore, downtown New London is unique from a transportation perspective in that it is a major multimodal hub with rail and bus services that converge in one place with the ferry terminals and with major parking facilities. The challenge that New London faces is to both preserve the historic fabric of the downtown that makes it what it is while accommodating growth and increased parking demands in a sustainable manner.

This section looks at current conditions of public parking in downtown New London during the peak summer season, provides high-end estimates of future parking demands that could possibly occur in the coming years, and provides recommendations to accommodate and manage future parking demands with the goal of addressing the above-mentioned challenges.

The Water Street Garage as seen from outside New London's Union Station

Existing Infrastructure

There are several off-street parking facilities that are publicly available in downtown New London. These include both structured and surface lot parking, and have a variety of owners/operators, time limits and pricing arrangements. Figure 5-1 shows the locations of these facilities which include:

Water Street Garage

- Approximately 910 regular parking spaces (plus a small adjacent 30-space surface lot)
- City owned and operated by the New London Parking Authority (NLPA)
- Used by the general public, ferry passengers, riders at Union Station, and General Dynamic Electric Boat (EB) employees. EB currently Leases approximately 450 of the parking spaces during the winter and 300 spaces during the summer, and provides an employee shuttle service between the garage, their office facility south of downtown, as well as Groton. In addition to EB, other users have monthly parking permits to park at the Water Street Garage, including the New London Day newspaper and some nearby offices and residents who park there overnight.
- Pricing according to the city's website:
  - Monday - Thursday: $1/hour with a Daily Maximum of $6
  - Friday: $2/hour with a Daily Maximum of $8
  - Saturday, Sunday, and Holidays: $15 per day

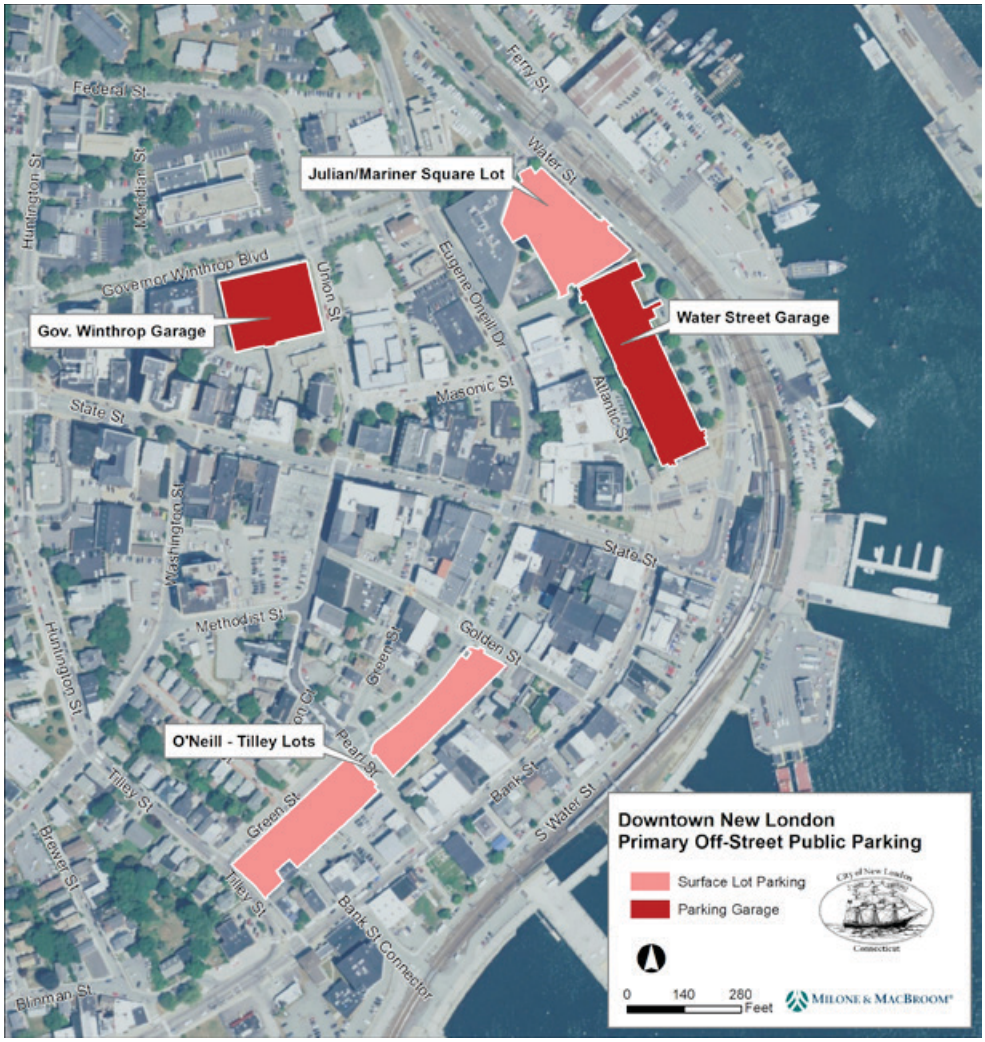


Figure 5-1: Primary Downtown Public Parking

* Julian/Mariner Square Lot only open to the general public from Friday evening to Sunday, and on Holidays

- One-Month Parking: $69
- Multiple-Month Parking: $52 per month

Governor Winthrop Garage

- Approximately 400 parking spaces
- Privately owned and operated
- Used by the general public, the Interdistrict School for Arts and Communication (ISAAC), and by some ferry passengers.
- Pricing according to their website:
  - Hourly rates not available
  - Weekdays: $10 per day
  - 4-Day Weekend (Friday - Monday): $25 Flat rate

O'Neill - Tilley Municipal Parking Lots

- Approximately 201 parking spaces
- City owned and operated by the NLPA
- Used by the general public. Approximately 60 of the spaces are currently reserved by parking permit holders.
- In the process of being resurfaced with driveway and layout changes as part of a beautification/streetscape project.
- Pricing of this parking lot between the hours of 6:00 AM and 8:00 PM began at the end of 2016. The pricing rate schedule for the O'Neill – Tilley municipal lots:
  - 2 Hours: $1.00
  - 3 Hours: $1.50
  - 4 Hours: $2.00
  - 7 Hours: $5.00
  - 12 Hours: $8.00

Julian/Mariner Square Lot

- Approximately 185 parking spaces are available to the public from Friday evening through Sunday and on holidays
- Privately owned
- Operated by the NLPA
- Used largely by ferry passengers during the above mentioned times and by private office employees during the work week
- Pricing can vary by demand, but is generally consistent with the parking fee at Cross Sound Ferry at approximately $10 per day.

On-street parking was not specifically analyzed as part of this study. According to a study produced in 2014 by the Southeastern Connecticut Council of Governments (SECCOG) titled Parking Supply Study – Downtown New London, there are approximately 525 on-street parking spaces in downtown New London, and the majority of these are unpriced spaces with 2-hour or less time limits. More recent inventory by the NLPA indicates that the number of on-street parking spaces is higher, as the on-street parking in some locations is not striped. The SECCOG study also indicates that there is additionally a total of over 1,000 private parking spaces in various lots in the downtown that are not publicly available.

Vehicles are parked on-street along New London's State Street (Top) and Meridian Street (Bottom). On-Street Parking can be found throughout downtown

Existing Parking Demands

Publicly available off-street parking usage was counted in the summers of 2014 and 2016. Spot counts were conducted at separate times of day on Fridays and the weekend. Table 5-1 summarizes this parking count data. For the purpose of this study, the peak numbers of parked vehicles at the separate times of day at each lot or garage were selected and are highlighted in Table 5-1. A more detailed existing parking table can be seen in the Appendix. The following existing peak summer parking demands were found:

- Overall existing off-street parking utilization in downtown New London was found to peak at around three-quarters full (1,261 parked vehicles within 1,696 parking spaces) during Saturday afternoons in the summer.
- Nonetheless, the Water Street Parking Garage was found to peak at around 90 percent utilization and the Julian/Marine Square Lot at essentially 100 percent.
- The O'Neill – Tilley Lots were found to peak at around 69 percent. (Note that these demands occurred in 2014. These lots were also closed during summer 2016).
- The Governor Winthrop Garage was found to only peak at around 34 percent, indicating that this parking facility is an underutilized asset.

Figure 5-2, on the following page, illustrates the different levels of utilization of these parking facilities. Note also that passenger parking at the Cross Sound/Block Island Ferry terminal fills up during the peak summer season.

On-street parking, as mentioned above, was not counted as part of this study. However, the 2014 study by SECCOG found it to peak at around 62 percent in October 2014. It is assumed that peak summer on-street parking is utilized at least at this percent. Private parking was also not counted as part of this study but is anecdotally understood to be underutilized, particularly larger private parking lots.

Mid-week parking demands at the Water Street Parking Garage are also understood to approach capacity during some afternoons-evenings when, similar to Friday afternoons, there is an influx of ferry users (such as those associated with Cross Sound's Lighthouse Cruises) combined with the general downtown parking demands as well as the parking used by EB. Information from the NLPA indicates that some of the parking at the Water Street Garage turns-over three to five times depending on the day of week.

Lastly, it should be noted that the parking counts shown in Table 5-1, below, are spot counts that are unlikely to reflect the 'worse-case' peak parking demands of the recent summers. The NLPA indicates that the Water Street Parking Garage, for instance, peaks at times at 96 percent during weekdays and 98 percent on weekends during the summer season.

Parking Facility	# of Spaces		Summer Friday			Summer Saturday		Summer Sunday
			9am – 12pm	1pm - 4pm	6pm - 9pm	9am – 12pm	1pm - 4pm	9am – 12pm
Water Street Parking Garage	910	Parked Vehicles	566	815	670	681	802	573
		Utilization	*62%*	*90%*	*74%*	*75%*	*88%*	*63%*
Governor Winthrop Parking Garage	400	Parked Vehicles	86	120	126	95	137	85
		Utilization	*22%*	*30%*	*32%*	*24%*	*34%*	*21%*
Julian/Mariner Square Surface Parking	185	Parked Vehicles	89	70	46	117	183	68
		Utilization	*48%*	*38%*	*25%*	*63%*	*99%*	*37%*
O'Neill – Tilley Municipal Lots	201	Parked Vehicles	56	-	122	-	139	73
		Utilization	*28%*	-	*61%*	-	*69%*	*36%*
Total Off-Street Parking	1,696	Parked Vehicles	797	1,005	964	893	1,261	799
		Utilization	*47%*	*67%**	*57%*	*59%**	*74%*	*47%*

* Excludes parking count and parking supply of the O'Neill–Tilley Lots because they were in the process of being refinished at the time.

Table 5-1: Downtown New London - Off-Street Public Parking - Existing Supply and Demand Analysis

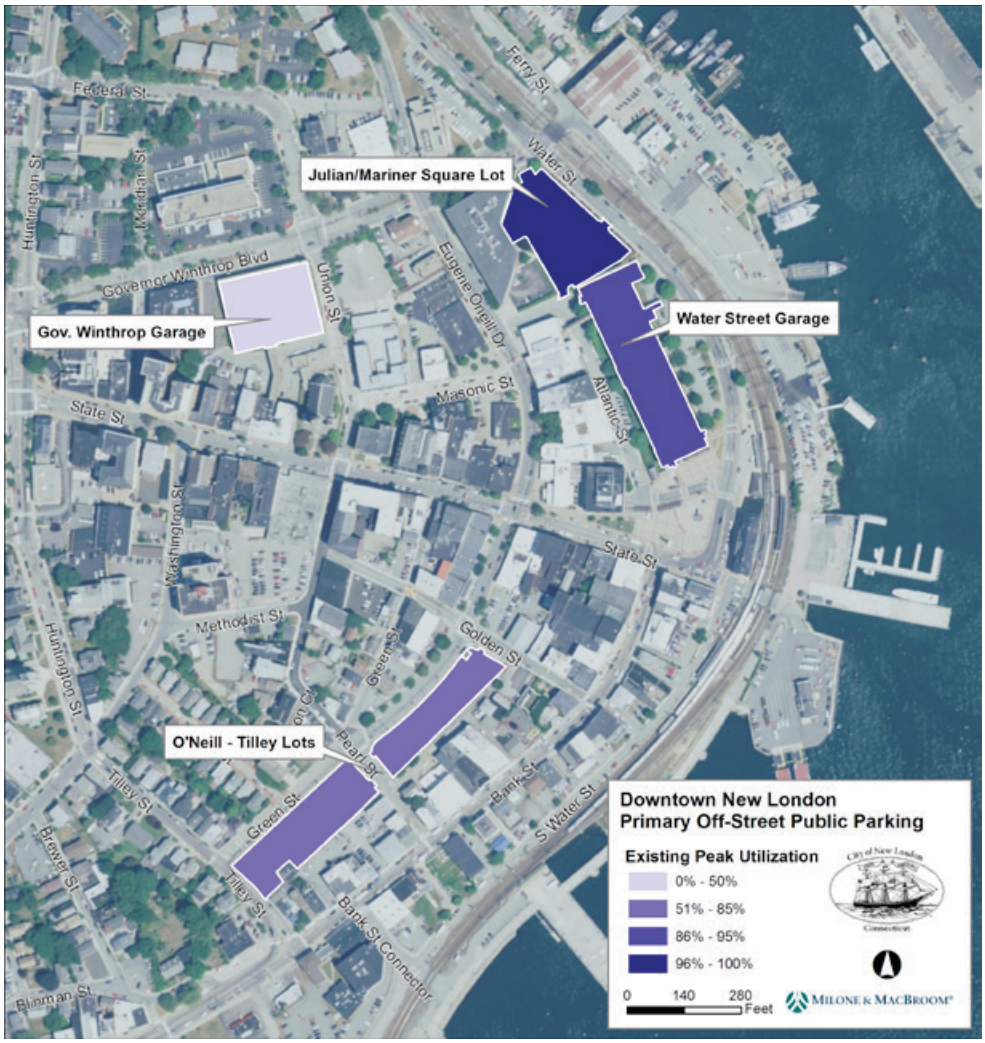


Figure 5-2: Primary Downtown Public Parking - Existing Peak Utilization
* During Summer Weekend Afternoons

5.2: Future Parking Demands

Parking Supply Changes

Over the course of the next several years, it is expected that approximately 170 passenger parking spaces will be lost at the Cross Sound/ Block Island Ferry. These parking spaces are slated to be replaced by the upcoming National Coast Guard Museum (NCGM) as well the pedestrian bridge project, new ferry terminal and associated improvements and new vehicle arrival staging area(s). As mentioned previously, all of these spaces fill up during the summer season. The loss of these parking spaces will in effect shift these ferry passenger vehicles onto the remaining publicly available parking supply.

Projected Future Parking Demands

Several new developments and expansions in ridership, as well as reoccupancy of currently vacant downtown building space, have been taken into account to estimate additional future public parking demands in downtown New London several years from now. These include the following:

- Additional parking that could be generated by the reoccupancy of currently vacant downtown building space associated with a mix of office/commercial/residential/theater space

- Additional parking that could be generated by the proposed NCGM
- Additional parking that could be generated by growth in ridership associated with the following:
    - Cross Sound/Block Island Ferry
    - Shore Line East
    - Amtrak
    - Greyhound
    - SEAT / CT-Transit potential shuttle and/or regional bus service
    - Fisher's Island Ferry

Prior sections of this study include specific information on the quantities, sizes, and ridership numbers associated with the anticipated increases in demands. Table 5-2, below, summarizes the estimated future additional parking demands. Data on peak parking generation and time-of-day variations in parking use published by the Institute of Transportation Engineers (ITE) and the Urban Land Institute (ULI) was consulted to estimate future parking demands that could be generated by the reoccupancy of vacant downtown building space. Estimated future parking demands associated with the proposed NCGM are sourced to the latest available museum planning study produced by White Oak Associated (2014). Information on estimated growth in passenger ridership at the different modes of transportation at the intermodal transportation center was provided and used to estimate future parking demands for those components.

As shown on Table 5-2, future parking utilization in downtown New London with business as usual and with no new additional parking supply would hypothetically be over capacity at around 150 percent. These parking projections are generally based on the current characteristics of New London continuing as they are into the future with all of the above-mentioned projected developments coming to fruition. As parking lots and garages reach capacity, there will be a need to increase the efficiency of the existing parking system, to increasingly manage peak parking demands, and to also likely seek out appropriate ways to increase the supply of parking in downtown New London. The following section provides recommendations accordingly.

	# of Spaces	Summer Friday			Summer Saturday		Summer Sunday
		9am – 12pm	1pm - 4pm	6pm - 9pm	9am – 12pm	1pm - 4pm	9am – 12pm
TOTAL Existing Peak Summer Parking Demands[1]	1,696	797	1,005	964	893	1,261	799
Additional Future Parking Demands (estimated): 2021							
Cross Sound Ferry Parking Demands Shifted to Public System[2]	-	170	170	170	170	170	170
New Cross Sound Ferry Parking Demands associated with Ridership Growth[3]	-	100	200	100	200	300	250
Parking Demands associated with National Coast Guard Museum[3]	-	275	325	150	275	325	275
New Parking Demands: Ridership Growth at FIF, SLE, Amtrak, Greyhound[3]	-	55	75	60	70	80	65
New Parking Demands: reoccupancy of vacant downtown building space[3]	-	220	215	475	135	375	130
TOTAL Future Peak Parked Vehicles	1,696	1,617	1,990	1,919	1,743	2,511	1,689
TOTAL Future Peak Utilization Rate		*95%*	*133%**	*113%*	*117%**	*148%*	*99%*

* Excludes parking count and parking supply of the O'Neill-Tilley Lots because they were being refinished at the time of the existing counts.

(1) See Table 5-1.

(2) Shifting of parking demands: approx. 70 vehicles from the Cross Sound gravel lot where the NCGM is to be built + approx. 100 on-site parking spaces to be converted to ferry staging.

(3) Additional parking demands associated with ridership growth, future developments, and reoccupancy of currently vacant building space.

Table 5-2: Downtown New London - Off-Street Public Parking - Future Supply and Demand Analysis

5.3: Parking Recommendations

Recommendations have been developed that seek to accommodate and manage future parking demands in downtown New London with the goals of both preserving the historic fabric of the downtown that makes it what it is and accommodating growth of the ferry as well as other new developments. The recommendations have been organized into short-term and long-term. The long-term recommendations pertain to the addition of new parking to the downtown. The short-term recommendations have been loosely organized into three general types of recommendations with the goal of managing increases in parking in the meantime until new parking can be built.

Short-Term Recommendations

If all of the future additional parking projections come to fruition, there will almost certainly be a need to provide a new parking facility in downtown New London, particularly in the vicinity of the ferries and NCGM. However, since the addition of a new parking garage would likely take several years to be built, several short-term strategies could be implemented in the meantime to manage increased parking demands and to improve operations.

1. **Improve Efficiency of Existing Assets**

Better utilize the Governor Winthrop Garage as a part of the downtown public parking supply

The Governor Winthrop Garage is understood to not be well utilized because it is reportedly not open regular hours, not always manned, has maintenance needs, and is not priced effectively. The NLPA should look into managing the operations of the Governor Winthrop Garage and addressing maintenance/structural needs through a public-private-partnership, appropriate funding sources and/or grants. Upon addressing these concerns, utilization of the downtown public parking supply on the whole could be improved by transferring the 300 space parking lease (400 spaces in the winter) that EB has at the Water Street Garage to the Governor Winthrop Garage. This would then free up spaces at the Water Street Garage for future parking demands associated with the NCGM and ferry since those land uses are closer to the Water Street Garage.

Improve communication of parking information

The NLPA and the city should improve their website to provide more information such as the number of parking spaces at separate facilities, time limits, pay rates, general time-of-day peaking patterns and/or real-time parking utilization at the separate publicly available garages and lots. Real-time information on the number of parked vehicles at the public garages could be collected through sensors (discussed below) and then fed into the NLPA website, as well as smart-phone apps. The installation of electronic display board(s) at parking garage entrances could similarly inform motorists whether a particular level of the garage is full or how many spaces are available at a given time. This would allow users approaching downtown to more efficiently choose a parking garage or lot that has open parking and avoid wasting time looking for parking in a garage that is already full. This could also lessen the creation of unnecessary traffic caused motorists cruising around looking for available parking.

Governor Winthrop Garage as seen from Union St.

Increase public access to privately held parking

There are some private parking lots in the downtown that appear to often be underutilized. The city should work with property owners of underutilized private parking lots to free up some of their parking that they may not need so that it can be used in the future by the general public. This could be done through the city leasing some of the private parking and/or encouraging owners to make some of their parking available for public use. This occurs currently at the Julian/Mariner Square parking lot, where private office parking is made publicly available as pay parking from Friday evenings through Sundays and on holidays (primarily to Ferry riders). Modifications to the city zoning regulations may be necessary to allow this.

Modify the City Zoning Regulation parking requirements to lead to more efficient use of downtown parking and to better align with the goal of downtown redevelopment

The zoning regulation parking requirements for some land uses are higher than necessary, which can lead to private parking that sits unused. Overabundances of privately held parking in downtowns is an issue. What is needed instead is for the parking to be more readily accessible, more efficiently used, and shared between different properties, land uses, and motorists. The regulations should be updated to rightsize the minimum parking requirements, to more readily encourage shared parking, and to include alternatives to having to provide private off-street parking such as allowing developers and land owners instead to pay a fee-in lieu of providing private off-street parking and/or to lease public parking from the NLPA through parking permits. Many cities with vibrant downtown areas (such as South Norwalk, Connecticut and Northampton, Massachusetts) have fee-in lieu provisions included in their zoning regulations/ordinances.

Central publicly available parking facilities and fewer small private parking lots should be the goal for the downtown. There are several positives associated with centralized parking facilities, including that they can be better managed by the city, they foster a 'park-once' environment with increased foot traffic between land uses and along city streets past storefronts (improved vibrancy), and can lead to more efficient/denser use of downtown land (small private parking lots could be infilled/replaced with new development).

Minimum parking requirements that are too high can also discourage new development or redevelopment due to the costs associated with having to build parking and/or providing land for parking. This is counter to the efforts to redevelop downtown New London. An example of the City's minimum parking requirements being too high are the requirements for parking associated with apartments. Multiple family dwellings are required to provide 1.5 parking spaces for one-bedroom units and 2.0 parking spaces for two-or-more-bedroom units. These parking requirements are high, especially considering that the downtown is served by multiple modes of transportation. While the regulations do in some cases allow for waiver/reduction from the minimum parking requirements, this is only allowed by Special Permit from the Planning and Zoning Commission which is also a hurdle for new development.

2. Better Manage Demands

Strategically charge for parking to manage anticipated future increases parking demand

Pricing, which can be paired with modifications to time limits and improved enforcement, is a tool that is often implemented or increased systematically with the objective to create more turn-over of parking spaces. On-street parking in front of commercial businesses, for example, can be some of the most sought after parking in a downtown because it is often the most conveniently located parking relative to one's destination. To best serve the businesses, these parking spaces should turn-over often enough

that each individual space can be used by multiple patrons over a given period of time. However, unpriced or underpriced on-street parking can suffer from a lack of turn-over where fewer patrons are able to utilize that parking over the same period of time. Another way to think of this is in terms of supply and demand. When demand for a certain resource (such as prime on-street parking) exceeds the supply of that resource, charging is typically used as a tool to better manage demand (such as creating more turnover) for that resource. Furthermore, most customers value saving time finding available prime parking over having to pay at a parking meter.

Pricing can also influence people to more efficiently choose how they travel. This is especially relevant in downtowns and areas where there are multiple options to get around/to/from - such is the case in downtown New London with the availability of rail and bus and the realistic option to walk and bike.

The key to pricing is that it be reasonably appropriate to the consumer. Pricing could differ by length of stay, time of day, and time of year as appropriate. For example, what is known as demand-based pricing could be implemented, where would be lower rates in the off season so users are not unduly burdened during the winter when the ferry is less busy and overall downtown parking demands are lower. Pricing could also differ from one block to the next such that areas with higher parking demands and areas with lower demands be priced accordingly. Pricing could be adjusted when needed to maintain what is considered to be an optimal level of parking utilization, which is generally 85% – 90% utilization of the parking supply.

Upgrade equipment to improve operations and allow for better management of parking

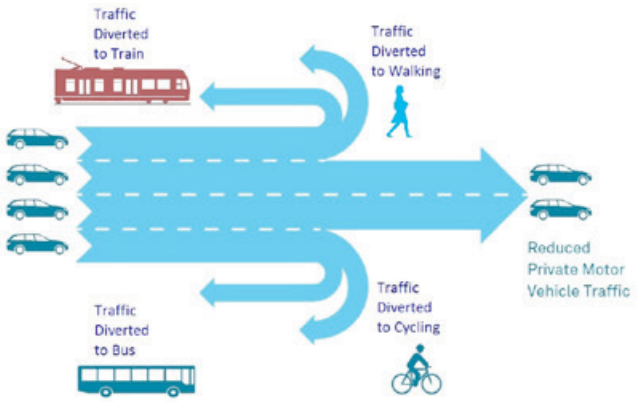
As mentioned above, sensors at parking garage entrances/exits could be installed to track how many vehicles are parked and how many parking spaces are available at a given time. This information could be fed into a database run by the city or a third party and displayed via electronic display boards at garage entrances, on the NLPA website, as smart-phone apps, etc. Integration with smart phone technology could also be done to allow for motorists to pay for parking on their phones.

Physical payment infrastructure should be upgraded. The addition of pay-on-foot kiosks to the parking garages should be investigated – either in addition to or instead of the pay-at-exit system. This could potentially help to speed up garage egress at peak times (such as after the ferry arrives) since motorists would be able to already pay their parking fee before getting in their vehicle and driving to the exit gate. Garage personnel would nonetheless be necessary to address situations when consumers have difficulties at the exit gate so that excessive backups do not occur. At surface lots and on-street parking, multi-space pay stations (such as pay-by-license plate) could be installed in the future when it becomes cost effective to charge for parking at those locations.

3. Provide and Encourage Alternatives to Parking and Automobile Use

Increase the use of other modes of transportation such as train, bus, walking, and biking

People should be encouraged to travel to/from New London by train or bus instead of by driving (particularly single-occupant automobile use) and parking. Providing



Images Based on: Global Street Design Guide, *National Association of City Transportation Officials, Global Designing Cities Initiative. 2016*

information to people about the convenience, potential time savings, and cost savings of train travel could be one way to do this. For example, information comparing out-of-pocket costs of using the train to get to the ferry versus driving and parking to get to the ferry could be presented on the Cross Sound/Block Island Ferry website, NCGM website, and the city's website. Increased use of car-sharing and ride sharing services should be encouraged in New London. Bike sharing, bicycle amenities, and pedestrian/bicycle-friendly design should be increased where possible in the center of New London. Moreover, as mentioned above, out-of-pocket pricing is a key variable that influences a person's choice of which transportation mode to take.

Long-Term Recommendations

As mentioned above, if all of the future additional parking projections come to fruition, there will likely be a need to provide a new parking facility in downtown New London particularly in the vicinity of the ferries and NCGM. This would be in addition to the short-term recommendations described above. The following long-term recommendations are made to this end.

4. **Add More Parking to the Downtown Public Parking Supply**

   - **Investigate an expansion of the Water Street Garage.** Initial input from the NLPA is that an expansion of the Water Street Garage could yield around 350-400 new parking spaces and may include some ground floor commercial space. Review should be made as to what effect this may have on the potential relocation of the Greyhound Bus terminal.

   - **Alternatively, expansion of the Governor Winthrop Parking Garage or a new parking garage somewhere near the Cross Sound/Block Island Ferry terminal could be considered.** Any new parking facility should likely be built with around 500 parking spaces. Site selection would be important and should not require tearing down any buildings worthy of historic preservation or the tearing down of which would negatively alter the downtown urban fabric. This new parking should be in the form of a garage so that it does not have an extensive footprint, should take the place of a vacant or underutilized lot, and should include some amount of street-level/storefront commercial space.

5.4: Parking Summary

Future parking utilization in downtown New London with business as usual and with no new additional parking supply could hypothetically be over capacity at peak times during the summer by around 150 percent. In other words, the public parking could be short in the future during the busiest times of the summer by upwards of 800-850 parking spaces. However, there are several strategies and recommendations that should be put in place that mitigate this. Through the addition of new public parking (around 350 new spaces), use of what is now private parking (say around 250 spaces), and zoning and management strategies to shift automobile demands to other modes of transportation (say around 250 vehicles), the potential future parking-shortage issue could be avoided.

Section 6: Traffic Signal Infrastructure

Traffic signal equipment on Ferry Street near the entrance to the Cross Sound Ferry facilities.

6.1: Existing Conditions

A field reconnaissance and inventory was undertaken within the downtown study area of existing traffic signal equipment, including pedestrian signal equipment, intersection traffic control signs and pavement markings and other intersection elements. As part of the field reconnaissance, characteristics that were checked included signal equipment condition, conformance to Americans with Disabilities Act (ADA) standards, availability and condition of pedestrian and bicycle features, signs, and pavement markings as well as signal operational sequencing and timing.

Traffic signal equipment was examined for its age, conformance to the latest standards of the governing jurisdiction and the Manual of Uniform Traffic Control Devices (MUTCD) safety guidelines, proper positioning, and aesthetics such as matching equipment colors at each intersection and to neighboring locations. Pedestrian needs require that the latest ADA guidelines and standards are met such as ramp slopes and texture, pedestrian push button location, and accessibility. Signing and pavement markings were examined for age and "wear and tear." Positioning of signs and pavement markings was examined to assess if they are guiding the user in an appropriate manner. Retroreflectivity was examined as this is important for proper visibility of signs and pavement markings. Additionally, signal timing and sequencing operations were observed to understand if the signals are running in an efficient and safe manner and to determine if modifications should be made for improvement.

The following is a description of the existing infrastructure conditions and recommendations.

Signalized Intersections

The downtown signalized intersections were field examined/inventoried. It was found that the signalized intersections in the downtown require major equipment replacement due to their condition and age and because the existing signal equipment does not meet the current standards of CTDOT or the MUTCD. This includes the following list of signal upgrades:

- New vehicle detection by means of video or loop detection
- New controllers, which should be located outside of clear zones
- Communication/interconnection equipment to enhance mobility through multiple signals
- Optical preemption for emergency/fire service vehicles so that they can reach their destination quickly and safely
- New mast arms positioned in a fashion to provide far-side signal heads
- Fix-mounted signal heads with 12" L.E.D. lenses and backplates with retroreflective borders
- New countdown pedestrian signal heads
- Audio/Accessible Pedestrian Signal (APS) pedestrian push buttons with proper positioning to meet ADA standards

Audio/APS signal upgrades have been requested by the public at specific downtown intersections as well as at intersections outside of the downtown including along Williams Street and Hempstead Street and Bank Street at Colman Street.

Many of the pedestrian ramps in the study area should also be updated to meet current ADA standards, with the exception of the intersection of Bank and State Streets. Pedestrian ramps should be positioned so that they are perpendicular to traffic. Please see Section 3 – Non-Motorized Transportation for further discussion on improvements for pedestrians in the study area.

Infrastructure for bicyclists was also examined and is nonexistent at intersections in the downtown area. Intersection bicycle features that should be considered include bicycle signal detection, painted bike boxes, bike lanes, shared lane markings (sharrows), as well as appropriate signing and bicycle wayfinding. Please see Section 3 – Non-Motorized Transportation for further discussion on improvements for bicyclists in the study area.

A traffic signal turns green at the intersection of Bank St. and State St.

Signs and pavement markings throughout the downtown need to be updated as many are worn. Replacement of the existing signing and pavement markings will improve the mobility and safety for all modes of transportation.

At-Grade Railroad Street Crossings

At-grade railroad street crossings that exist in the downtown were examined at the following locations:

- Ferry Street east of Water Street and Governor Winthrop Boulevard
- State Street east of South Water Street at the driveway to Fishers Island Ferry
- Bank Street connector and east of South Water Street

These at-grade crossings have active traffic control through the use of automatic gates that physically block vehicle travel lanes and have flashing lights.

The Ferry Street at-grade crossing is located in between the signalized intersections of Ferry Street at the Cross Sound Ferry driveway and Ferry Street at Water Street and Governor Winthrop Boulevard. The traffic signal equipment and the at-grade railroad gate control equipment are

At-Grade Railroad Street Crossing at Bank St. Connector east of South Water St.

interconnected at this location with railroad preemption in place to ensure that the separate traffic control devices work in unison with one another and provide safe movements for vehicles and pedestrians. The traffic control equipment at the Ferry Street at-grade crossing is in need of being replaced. When this location is upgraded, it is imperative to review the preemption timing to ensure that the proper parameters and design vehicle are still valid for the existing timings that are in place.

The two locations adjacent to South Water Street are in close proximity to unsignalized intersections where concerns include vehicle storage distances that are short and lack signing, pavement markings, and illumination. The at-grade crossing at the driveway to Fisher's Island Ferry east of South Water Street and State Street should be improved with increased lighting, particularly since this is a heavy pedestrian area next to Union Station, City Pier, and the ferries. Additional signage should also be installed, such as "DO NOT STOP ON TRACKS."

The at-grade crossing at the Bank Street connector east of South Water Street should be improved with additional signage and pavement markings on the South Water Street approach, including railroad advance warning signs and the addition of the railroad crossing symbol pavement marking. New signage reading "DO NOT STOP ON TRACKS" should be installed for motorists exiting the pier. There is also a missing light fixture on the light standard pole at the south side of the Bank Street connector west of the tracks.

At both of the at-grade rail crossings adjacent to South Water Street, there is concern about the short vehicle queue storage length between nearby unsignalized intersections and the rail tracks. Vehicles waiting to turning out of the Bank Street connector to Bank Street, for example, must not queue back onto the railroad tracks. Per the MUTCD, consideration should be given to signalizing the intersections of the Bank Street connector/Bank Street and South Water Street/State Street/Water Street to insure that when a train approaches it preempts a signal at these intersections and clears out any vehicles that might be queued on the rail tracks. While this may not currently be an issue, it must be further investigated, particularly if traffic volumes increase in the future or if nearby streets in the Downtown are to be converted from one-way to two-way flow.

6.2: Traffic Signal Recommendations

A summary table of the signal equipment field conditions inventory can be seen in Table 6-1, and a more detailed table can be found in Appendix D. The following are recommendations associated with traffic signal equipment and operations, ADA accessibility, and safety:

- **Upgrade and standardize all traffic signal equipment.**
- **Standardize operations in terms of pedestrian phases and cycle lengths.** Some interconnection of sets of closely spaced signals would be beneficial (such as on Governor Winthrop Boulevard).
- **Centrally locate control of signal operations** in order to help address the various peak conditions that the downtown experiences.
- **Include Audio/APS push buttons to meet ADA standards at crossings and update handicap ramps.** Nearly all handicap ramps and other pedestrian accommodations are outdated.
- **Review programmed preemption timing at the at-grade crossing between Ferry Street and Water Street.**
- **Add some supplemental signage and enhanced lighting at the two existing at-grade crossings located at either end of South Water Street.** Should changes to traffic flow occur, such as Bank Street at Water Street becoming a two-way streets, the residual impact on safety of the three at-grade rail crossings needs to be studied.

SIGNAL EQUIPMENT FIELD CONDITIONS

INTERSECTION	Operation	Sequence & Timing	Intersection Geometry	Parking Allowed Adjacent to Intersection	Pedestrian Features	Pedestrian Ramps	Bicycle Features	Equipment Replacement Needed	Signage and Pavement Markings
Broad St / Governor Winthrop Blvd at Huntington St	🟡	○	🟡	🟡	🔴	🔴	🔴	🔴	🔴
Huntington St at State St	🟡	🟡	🟡	🟡	🔴	🔴	🔴	🔴	🟡
Tilley St at Green St	🔴	○	🔴	🟡	🔴	🔴	🔴	🔴	🔴
Tilley St at Bank St	🟡	○	🟡	🟡	🔴	🔴	🔴	🔴	🔴
Governor Winthrop Blvd at Eugene O'Neill Dr	🟡	○	🔴	🟢	🔴	🟡	🔴	🔴	🟡
Governor Winthrop Blvd at Union St	🟡	○	🟢	🟢	🔴	🔴	🔴	🔴	🟡
Governor Winthrop Blvd at Water St / Ferry St	🔴	🔴	🟢	🟢	🔴	🔴	🔴	🔴	🔴
Bank St at State St	🟡	○	🟢	🟡	🟡	🟢	🔴	🔴	🟡
Eugene O'Neill Dr at State St	🟡	○	🟢	🟢	🔴	🔴	🔴	🔴	🟡
Union St at State St	🟡	○	🟢	🟢	🔴	🔴	🔴	🔴	🟡
Water St Mid-Block Crossing (North of Atlantic St)	🟢	🔵	🟢	🟢	🟢	🟢	🔴	🟡	🟡
Water St Mid-Block Crossing (South of Atlantic St)	🟡	🔵	🟢	🟢	🟢	🟢	🔴	🟡	🟡

- 🔴 - Does not meet standards, In need of immediate replacement/mitigation
- 🟡 - Barely meets standards, replacement/ mitigation desired
- 🟢 - Fully Compliant - No changes needed
- 🔵 - Not applicable
- ○ - Further information / Data required

Table 6-1: Summary Table of signal equipment field conditions

Section 7: Vehicular Traffic

Vehicular traffic as seen on State St.

Vehicular traffic as seen on Bank St.

The downtown study area accommodates a flow of traffic generated by a multitude of residential, commercial, and institutional destinations both internally and externally. The downtown study area also accommodates heavy through traffic, between Interstate 95 and Electric Boat, U.S. Route 1, area educational institutions, U.S. Coast Guard facilities, and the ferry terminals.

This section of the study looks at the potential increase in vehicle and pedestrian traffic over the next several years generated by new development growth and increased vibrancy in the downtown; the impact these increases would have on the current system of intersections and streets; and identifies improvements that would be necessary to accommodate the traffic demand increases.

7.1: Existing Vehicular Demands

Existing traffic volume data was collected by the Connecticut Department of Transportation for areas within and adjacent to the study area as well as by the New London Department of Public Works. Manual vehicle turning movement and pedestrian counts were performed by MMI at study intersections in late July and August of 2014 for the weekday AM and PM, and Saturday Mid-day peak hours. Supplemental manual vehicle turning movement and pedestrian counts were also performed by MMI during these same peak periods in August of 2016.

The 2016 supplemental manual count volumes were generally lower than the 2014 counts, so where applicable the higher volumes were used. Peak hour periods varied slightly across the study area. To be conservative, the highest traffic volumes from each individual intersection were used for the analysis of each time of day study period. The network's vehicular volumes were then adjusted to balance between intersections to form the summer weekday AM, PM, and Saturday mid-day baseline conditions which can be found in Appendix E Figures 7-1, 7-2 and 7-3, respectively. These baseline traffic volumes were submitted to the Connecticut Department of Transportation Bureau of Policy and Planning for review and concurrence.

A heavy traffic flow trend can be seen in the southbound direction along Eugene O'Neill Drive in the AM peak period, with significant volumes

filtering toward the ferry and/or Water Street Parking garage. The remaining southbound volumes trend toward Howard Street or continue south along Bank Street in the AM peak period.

An even heavier traffic flow trend can be seen in the northbound direction along the Bank Street / Water Street route and in the northbound direction along Huntington Street in the PM peak period. The weekday PM peak period yielded the least amount of ferry traffic.

The Saturday mid-day peak period reflects a more balanced distribution of traffic between the north- and southbound directions, with higher volumes utilizing the ferry access compared to the other peak periods.

7.2: Future Vehicular Demands

Future vehicle traffic and pedestrian volumes were developed by taking into account an ambient growth rate, adding new traffic associated with transportation providers' future ridership projections, adding new traffic from area developments, and the addition of existing building vacancy projections assuming these building spaces become reoccupied.

The 2016 baseline vehicle traffic volumes were projected to 2021 using a 0.4% annual growth rate. Although review of the 2016 traffic count data compared to earlier years reveals some decline in volumes for most of the study area, this growth rate was used at the direction of the Connecticut Department of Transportation to be conservative.

Transportation providers were contacted for 2021 projections of ridership. This data was tabulated, converted to vehicle and pedestrian trips, and routed through the downtown to and from their respective facilities.

Developments that are anticipated to open by 2021 include the National Coast Guard Museum, St. Mary's residential redevelopment, and the Parcel J development. Trip generation estimates for developments were made, and the corresponding vehicular traffic patterns were estimated to/from and throughout the study area respective to each development's location.

Future traffic associated with re-occupancy of the study area's vacancies in retail, office, theater, and residential build space were also estimated based on industry data trip rates.

Vehicular traffic distribution patterns throughout the study area associated with the additional future traffic volumes were established based in part on reviewing the latest "Journey to Work" data available from the United States Census Bureau, as well as the larger parking facilities throughout the downtown study area and proposed development sites as applicable. At the direction of the Connecticut Department of Transportation, a credit of 20 percent was also used to account for some trips that will be made by transit use, walking, or biking in the downtown and near the intermodal transit center. It is important to note that this future traffic analysis did not include the addition of potential new secondary exit driveways from the Water Street Garage.

The sum total of the projected vehicular traffic volumes for the weekday AM, weekday PM, and Saturday mid-day peak periods can be seen in Appendix E, Figures 7-4, 7-5, and 7-6, respectively. These future traffic volumes were submitted and approved by the Connecticut Department of Transportation Bureau of Policy and Planning.

Similarly, baseline pedestrian volumes were projected to 2021 using an annual growth rate and supplemented with individual projections associated with the anticipated developments and transit ridership growth. The sum total of pedestrian volumes projections were included in the roadway capacity analyses.

7.3: Future Capacity / Level of Service Analysis

Existing signal plans were collected from the Connecticut Department of Transportation and the City of New London. Field investigation was also performed in late July 2016 to evaluate existing signal timing operations. A SYNCHRO computer model was developed for the study area road network under the existing traffic signal operations using future vehicle and pedestrian traffic volumes. The modeled study intersections were evaluated by means of Highway Capacity Manual analysis techniques, using Synchro software as well as through simulation using

SimTraffic software. Levels of Service (LOS) were then determined, which are qualitative measures of the efficiency of operations in terms of delay and inconvenience to motorists. A description of LOS designations, A through F, is given in Appendix F. LOS A describes operations with very low average control delay per vehicle while LOS F describes operations with long average delays.

Tables that summarize the findings of the capacity analyses for the future traffic volume weekday AM, weekday PM, and Saturday mid-day peak hours can also be found in Appendix F. The intersections of Water Street at Ferry Street/ Governor Winthrop Boulevard, Eugene O'Neill Drive at Governor Winthrop Boulevard, and Water Street at the Water Street Parking Garage exit are expected to experience the most delay in all peak hour periods, with the intersections of Huntington Street at Broad Street/Governor Winthrop Boulevard, Huntington Street at State Street, and Bank Street at Howard Street/Blinman Street worsening in the weekday PM and Saturday mid-day peak hours.

The capacity analysis model was then adjusted to optimize the overall intersection cycle lengths and movement timings, assuming the existing traffic signal equipment infrastructure phasing and travel directions would remain in place. The resulting overall LOS values can be seen in Table 7-1 below. More detailed LOS values can be found in the appendix.

Overall, minor improvements are needed at the intersections of Water Street at Ferry Street/ Governor Winthrop Boulevard, Eugene O'Neill Drive at Governor Winthrop Boulevard, Water Street at the Water Street Parking Garage exit, Huntington Street at Broad Street/Governor Winthrop Boulevard, and Huntington Street at State Street. These intersections would still experience notable delays for several vehicle movements under this scenario with only optimizing the signal timings.

The traffic model was investigated for even further improvement possibilities by means of more significant geometric phasing and equipment improvements to the intersections including

Overall Intersection LOS Results (AM / PM / SATURDAY)			
Intersection	**No Improvements**	**With Optimized Signal Timings Only**	**With Geometric Improvements and/or Signal Equipment Adjustments**
Blinman St at Bank St	B / C / C	B / C / C	B / C / C
Bank St at Sparyard St	A / A / A	A / A / A	A / A / A
Bank St at Tilley St	A / A / A	A / A / A	A / A / A
Tilley St at Green St	A / B / A	A / B / B	B / B / B
Bank St at State St	A / A / A	A / A / A	A / A / A
Water St at Atlantic St	-	-	B / B / A
Water St at Governor Winthrop Blvd	D / F / F	C / D / D	C / D / C
Ferry St at Governor Winthrop Blvd	D / B / E	B / C / C	A / B / A
Water St / Eugene O'Neill Dr at Crystal Ave	A / A / A	A / A / A	A / A / A
Eugene O'Neill Dr at State St	B / B / C	B / B / C	B / B / C
Eugene O'Neill Dr at Governor Winthrop Blvd	D / C / C	C / C / C	C / C / C
Union St at State St	B / B / B	B / B / B	B / B / B
Union St at Governor Winthrop Blvd	C / C / C	C / C / C	C / B / B
Huntington St at State St	B / B / B	A / B / B	A / C / B
Governor Winthrop Blvd / Broad St at Huntington St	C / C / C	B / C / C	C / C / C

Table 7-1: Overall Intersection LOS Results

lane marking revisions, lane additions, on-street parking modifications, traffic signal equipment upgrades and additions, and operational signal phasing adjustments. The resulting capacity analyses LOS values can be seen in tables found in Appendix F in the "Additionally with Geometric Improvements and/or Signal Equipment Adjustments" columns. A handful of vehicular movements could be expected to operate with either LOS E or LOS F at times during summer peak hour:

- Left turn from Pearl Street to Bank Street (could be improved if made All-Way Stop)
- Left turn from Water Street Garage to Water Street (could be improved with the addition of a driveway exit onto Atlantic Street)

7.4: Recommended Vehicular Roadway Improvements

For the purpose of this study, vehicular related roadway improvements were divided into two areas, Concept C-1 – Governor Winthrop Boulevard (Figure 7-4 as seen on page 63) and Concept C-2 – Bank Street and Tilley Street (Figure 7-4 as seen on page 66). For both Concept Areas the implementation of all signal improvement measures (new signal equipment, revised signal phasing and timings, lane-use modifications and geometric improvements), and multi-modal improvements, which were identified in other sections of this report is assumed.

It is important to note that while Level of Service (LOS) designations are a good measure for vehicular planning and engineering, they are indicative of delay and inconvenience to motorists alone, and ignore factors which are relevant to other roadway users, such as bicyclists, pedestrians, and transit riders. Therefor, these measures should be taken with appropriate caution when planning for multi-modal transportation systems. Additionally, the traffic volumes in these analyses are reflective of peak summer conditions, and therefor for much of the rest of the year the traffic conditions will be less busy than depicted here.

Concept C-1:

For the Concept C-1 – Governor Winthrop Boulevard Area, **it is recommended that revisions be made to pavement and vehicular lane markings, that bike lanes be added on key corridors, that modifications be made to on-street parking, that pedestrian infrastructure be implemented in several designated locations, and that modifications be made to traffic signal and railroad signal equipment**. A visualization of these improvements can be seen on Concept Plan C-1. The following are key recommendations for intersections and street segments in the area.

Governor Winthrop Boulevard at Huntington Street

It is important to note that without modifications to the existing geometric and traffic signal operations at the intersection of Huntington Street and Governor Winthrop Boulevard, it is projected that southbound vehicles turning left will experience significant delays. Therefore, **it is recommended that the southbound left turn lane be lengthened**. In order to achieve this, the through lane will need to be realigned through the intersection, resulting in the elimination of three to five on-street parking spaces on the west side of Huntington Street.

In order to partially offset the parking space loss, and to improve pedestrian accessibility in general, **it is recommended that a stairway leading to**

Intersections of Governor Winthrop Blvd. at Eugene O'Neill Dr within the Concept C-1 area

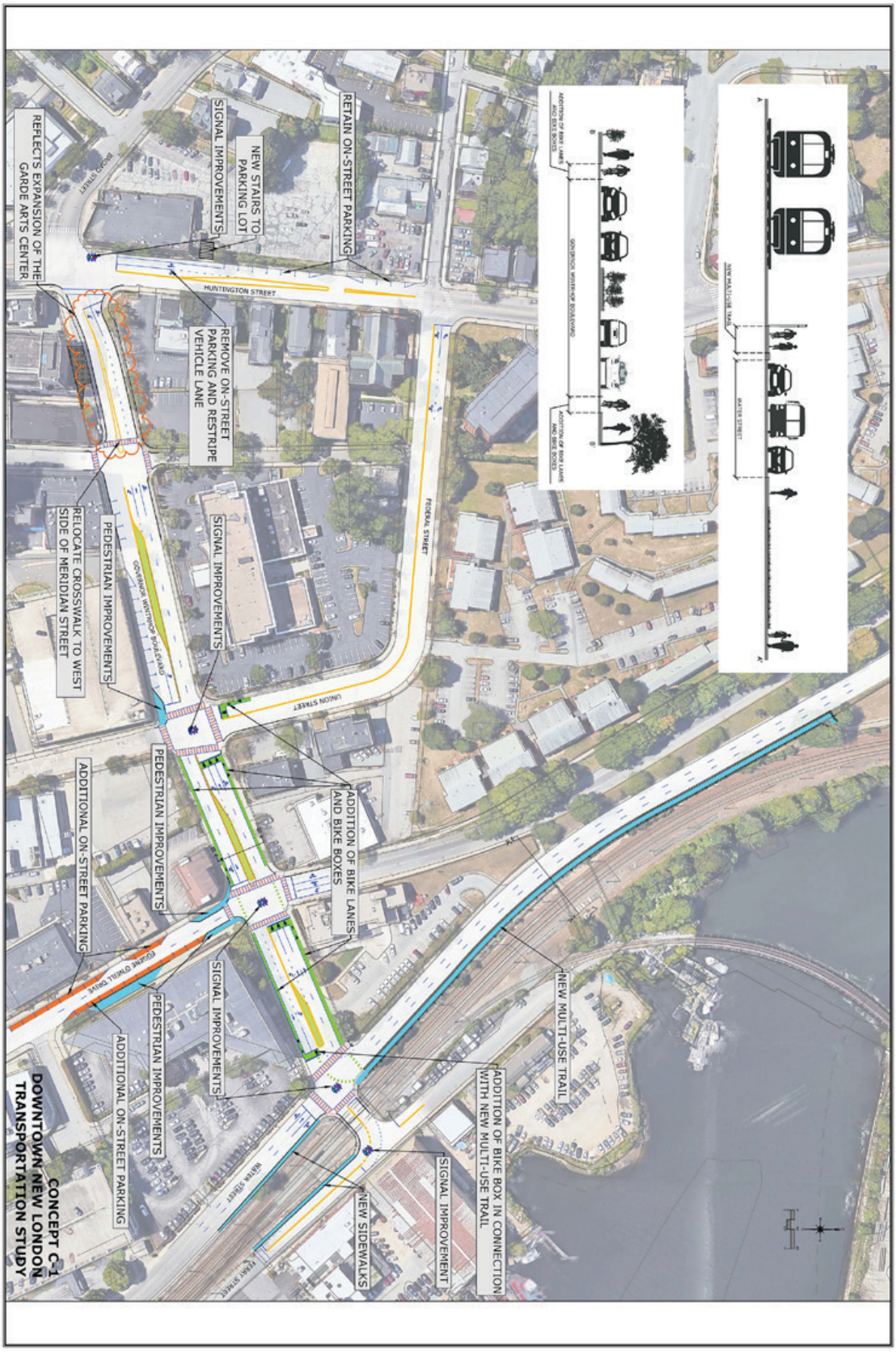


Figure 7-3: Concept C-1 - Governor Winthrop Boulevard

the adjacent surface parking adjacent to the northwest corner of the intersection should be implemented. It is also suggested that alterations be made to the traffic signal equipment, movement phasing and timings, and cycle lengths.

Governor Winthrop Boulevard from Huntington Street to Ferry Street

To improve the delays and queue lengths anticipated to affect traffic during peak times, as well safety concerns at the intersection with Water Street / Ferry Street, geometric and traffic signal improvements should be considered. **Recommendations include the implementation of new continuous sidewalks along Water and Ferry Street, a new side path on Water Street, bike lanes on both sides of Governor Winthrop Boulevard, and bike boxes at critical movements within intersections**. As mentioned earlier, Governor Winthrop Boulevard is an important link to other bike initiatives providing access from out-of-downtown locations.

Furthermore, the signals on Governor Winthrop Boulevard from Union Street to Water Street should be interconnected as a coordinated system and some on-street parking on the westbound side should be removed to allow the addition of a second through lane for continuity through the corridor.

Governor Winthrop Boulevard at Water Street/ Ferry Street

This location was studied in great detail from both an analytical perspective as well as observations of the intersection between ferry operations and northbound Water Street traffic. As passenger cars arrive for departing ferries, the inbound traffic from Governor Winthrop Blvd is metered through signal timing so that the flow of inbound traffic does not queue over the railroad tracks. Arriving ferries and the departure of vehicles into the city is controlled by extending the Ferry Street phase to accommodate large platoons of traffic exiting the ferry. The extension of the cycle, and operations on Water Street, quickly normalize under these conditions.

Based on this delicate balance of efficiency and safety any significant changes to the operations here should be tabled until notable changes, and/or increases in the balance of traffic being served, have materialized. For example, an additional left turn lane on Governor Winthrop Boulevard was considered. This improvement would result in the unintended consequence of a shortened percentage of the cycle dedicated to exiting ferry traffic by the inclusion of a new phase, as well as potentially providing too much green time for entering Ferry traffic per cycle resulting in undesirable queues over the railroad tracks. These operational concerns should be made more deliberately as conditions change and not in anticipation of those changes.

There is, however, the ability to improve pavement markings to reflect actual lane use on Governor Winthrop Boulevard, improve accommodations for pedestrians and bicyclists, better guide left turning traffic from Governor Winthrop Boulevard to Water Street, and upgrade the old traffic control signal infrastructure as discussed in Section 6.

Intersections of Governor Winthrop Blvd. at Union St. within the Concept C-1 area

Figure 7-1 (Left) and 7-2 (Right) depict present and potential future conditions with recommended improvements, respectively, along Eugene O'Neill Dr south of Governor Winthrop Blvd
Source: New London Department of Public Works

Lastly, The northern leg of Ferry Street should be changed from signalization to stop sign control. This will remove the current conflict with eastbound traffic phasing and essentially reinforce the way motorists operate there today. (Changes are illustrated on Concept C-1).

Eugene O'Neill Drive from State Street to Governor Winthrop Boulevard

In order to increase pedestrian safety, crossings throughout Eugene O'Neill Drive should be shortened. This can be done by implementing corner curb extensions on the south leg at Eugene O'Neill Drive at Governor Winthrop Boulevard, and removing a vehicle lane. These improvements will also help to better define the vehicular movements along Eugene O'Neill Drive and allow for additional on-street parking. Above, Figure 7-1 depicts current conditions, while Figure 7-2, which was provided by the Department of Public Works, visualizes what these improvements might look like if implemented along Eugene O'Neill Drive south of Governor Winthrop Boulevard.

Concept C-2:

Proposed improvements on Bank Street between Howard Street and Pearl Street, and on Tilley Street between Bank Street and Green Street include pavement marking revisions, lane configuration and channelization island modifications, corner curb extension installations, on-street parking space modifications, and traffic signal equipment improvements. Without improvements, operations in this area are expected to be poor for some movements during peak hours.

Physical improvements can also be made to increase safety and better accommodate pedestrians. Removing a handful of on-street parking spaces in the eastbound direction on Bank Street will improve continuity between Howard Street and Sparyard Street. This would entail relocating the midblock crosswalk to the signalized intersection at Sparyard Street, which will provide pedestrians a safer opportunity to cross with push button activation rather than the existing unsignalized pedestrian crossing at the east end of Blinman Street near Brewer Street.

Adjusting the shape of the channelizing island at Bank Street and Tilley Street will better define the vehicular paths headed southbound toward Howard Street and provide a larger pedestrian refuge area. The addition of corner curb extensions on corners at Howard Street, Green Street, Bank Street, and at Pearl Street will also provide shorter pedestrian crossings and better defines vehicular movement through these intersections.

Looking southwest along Bank St. from the intersection of Bank St. at Tilley St. within the Concept C-2 area

Figure 7-4: Concept C-2 - Bank Street and Tilley Street

Section 8: One-Way to Two-Way Conversion Analysis

Converting the one-way streets in downtown New London to serve two-way vehicular traffic is not a new idea for the City. This concept has been considered for years and was revisited as part of this study with the intention of analyzing whether all, or some, of the downtown's one-way streets could be readily converted to two-way corridors in a way that would still readily accommodate the needs of the large variety of motorists navigating the area daily. Figure 8-1 illustrates the present one-way street network between Tilley Street and Governor Winthrop Boulevard in downtown New London.

8.1: Considerations for Two-Way Conversion

Converting vehicular traffic in downtown New London from one way to two way would come with many potential benefits. Such a change has the potential to improve the built environment downtown, making it easier to navigate by motorists and pedestrians alike. Visiting drivers unfamiliar with the current street grid would be less confused and be able to move directly to their destination. The nature of the two-way street network would reduce vehicular speeds through natural traffic calming, which would increase safety for pedestrians and bicyclists. Case studies have shown that two-way conversion can improve livability by increasing property values, reducing vehicular collisions, and creating overall calmer and safer streets. Simply put, two-way streets in downtown settings (typically with one lane in each direction), when compared to multilane one-way streets, are often more welcoming for people to spend time on, shop on, dine on, and live on.

Specific to this project's study area, this change has the potential to disperse northbound and

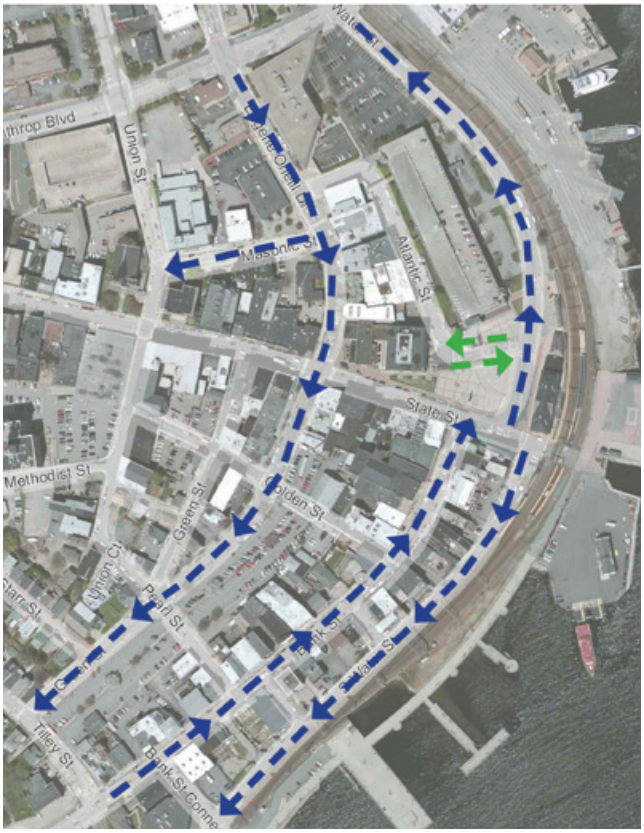


Figure 8-1: Current Downtown New London Network of One-Way Streets

southbound traffic across more routes through the downtown, helping to eliminate the feel of a vehicular thoroughfare currently present on Water Street and Eugene O'Neill Drive. The two-way network would allow for more direct routing to destinations in the study area and potentially improve exposure for downtown business and storefronts by increasing visibility and accessibility for motorists.

It should also be noted, however, that a conversion of New London's downtown grid from one way to two way could also have some potential drawbacks such as increasing

vehicle queueing at intersections and frustration for some drivers and commuters through the downtown. Thus, there will be some tradeoffs in converting one-way streets to two way. Some motorists who perceive or experience increased delays may decide to travel through surrounding neighborhoods instead of through the downtown. Traffic control revisions at affected intersections would be necessary as well as some geometric alterations. Since many of the traffic control signals in the downtown are old and in need of replacement, any upgrades to traffic signals and changes to two way should take place together. Some on-street parking may also need to be removed, which to a small extent would reduce convenient parking in some areas.

8.2: Two-Way Conversion Analysis

The scope of this two-way conversion analysis focused on the two main corridors of Bank Street/ Water Street and Eugene O'Neill Drive/Green Street between Governor Winthrop Boulevard and Tilley Street. Several potential two-way scenarios were investigated. Three of the scenarios were analyzed in detail, one of which was determined by the City and key stakeholders to be the preferred two-way scenario. The full two-way conversion scenario would be the conversion of these corridors to two way in their entirety. The partial two-way conversion scenario would include the conversion of these corridors to two way between Tilley Street and State Street. The preferred two-way scenario would include the conversion of Green Street/ Eugene O'Neill Drive to two way from Tilley Street to north of Governor Winthrop Boulevard and a restriping of Bank Street. Future traffic operations were analyzed under the two-way conversion scenarios for the summertime weekday a.m., weekday p.m., and weekend Saturday midday peak-hour conditions. Potential implications and required modifications for each scenario were considered and are included in this report.

In order to analyze how streets that are currently one way would operate as two-way streets, the degree to which motorists would potentially reroute as a result of a two-way conversion were estimated. It was assumed that only minor curbing changes and no extensive widening of existing roads would be implemented in the center of the downtown to achieve the two-way scenarios since downtown New London is largely built out with buildings fronting directly on sidewalks and streets in many areas. The one exception to this would be a crossover roadway for northbound traffic from Eugene O'Neill Drive to Water Street

Overall Intersection LOS Results (AM / PM / SATURDAY) Peak Hours			
Intersection	**Full Two-Way Conversion**	**Partial Two-Way Conversion**	**Preferred Two-Way Conversion**
Bank St at Tilley St	A / A / A	A / B / A	A / A / A
Tilley St at Green St	B / C / B	B / B / B	B / B / B
Bank St at State St	B / B / B	C / C / C	A / A / A
S. Water St at State St	unsignalized	B / B / B	Unsignalized
Water St at Atlantic St	B / C / B	A / B / A	A / B / A
Water St at Governor Winthrop Blvd	C / F / E	C / D / C	C / C / C
Ferry St at Governor Winthrop Blvd	A / A / A	A / B / A	A / A / A
Eugene O'Neill Dr at Governor Winthrop Blvd	D / D / C	C / C / C	D / C / C
Eugene O'Neill Dr at State St	B / C / C	C / C / C	B / B / B

Table 8-1: Overall Intersection LOS Results

Potential Benefits of Converting One-Way Streets to Two-Way Streets in Urban Areas:

- Allows for less circuitous and more direct routing to/from some destinations
- Businesses and storefronts would gain increased exposure and visibility
- Improved safety and pedestrian comfort:
  - Overall traffic speeds would be reduced
  - Reduces multiple-threat pedestrian crossings (two-lane one-way streets)
- Creates a more inviting pedestrian environment that could lead to increased foot traffic, stimulate business activity, and increase property values

north of Governor Winthrop Boulevard and the police station under the preferred two-way scenario.

Future traffic volume rerouting estimates made for the two-way conversion scenarios can be found in Appendix E in Figures 8-1 through 8-18. Applicable intersection capacity and Level of Service (LOS) analyses summary tables for each of these scenarios can be seen in Table 8-1 below with full details found in Appendix F.

Full Two-Way Conversion Scenario

The possibility of converting the entirety of the Bank Street/Water Street and Eugene O'Neill Drive/Green Street corridors to serve two-way traffic between Tilley Street and Governor Winthrop Boulevard was examined first. Figure 8-2 schematically depicts this scenario.

It was found that a full conversion of these corridors from one way to two way would have several implications, some of which were found to be detrimental to the overall function of New London's downtown grid and larger transportation system. Figure 8-3 along with Tables 8.2 and 8.3 summarize the key implications of the full two-way conversion scenario on the downtown. All improvements recommended in Sections 3, 6, and 7 to intersections and street segments not associated with the two-way conversion analysis would still be considered for implementation in this scenario.

From an operational standpoint, if the full two-way conversion scenario were implemented, **several vehicular movements could be expected to operate with either LOS E or F at times during one or more summer peak hours.** Those expected to operate poorly within the full two-way conversion scenario include the following:

- **Exit from the Water Street Garage to Water Street** (this could be improved with additional driveway exit(s) from the garage such as to Atlantic Street from the western side of the structure)
- **Eastbound left turn from Governor Winthrop Boulevard to Water Street** (caused by rerouted left-turning vehicles)

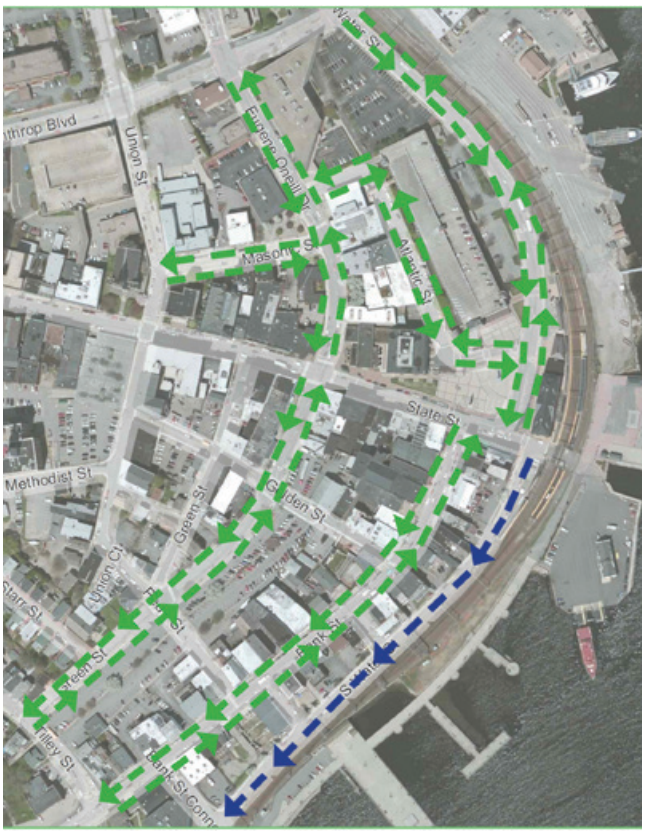


Figure 8-2: Full Two-Way Conversion Scenario

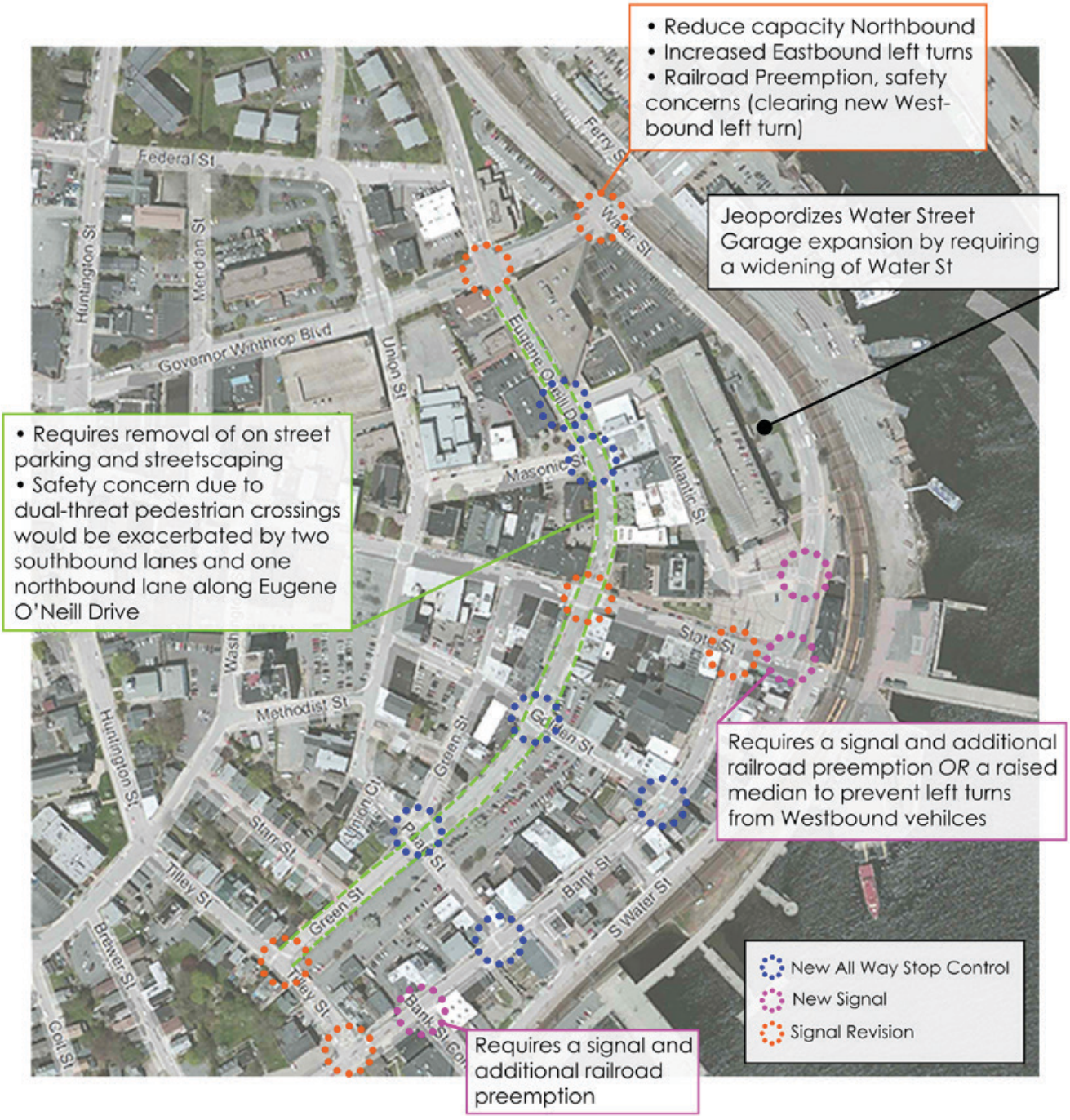


Figure 8-3: Full Two-Way Conversion Scenario - Key Implications

- **Northbound Water Street movements at the intersection with Governor Winthrop Boulevard/Ferry Street** (reduced capacity northbound causes this poor operational condition)

The full two-way conversion scenario was deemed to be an unattractive option for several additional reasons. **First,** a notable amount of northbound traffic, particularly during the afternoon commute, is likely to reroute along Eugene O'Neill Drive in order to avoid slower moving Bank Street. This would create at the intersection of Eugene O'Neill Drive and Governor Winthrop Boulevard a lengthy queue of vehicles turning right onto Governor Winthrop Boulevard and then left onto Water Street at the signal with Ferry Street. The negative consequences of this are exacerbated by the fact that the eastbound approach of Governor Winthrop Boulevard at Water Street/Ferry Street is the main entrance to Cross Sound Ferry, so any notable addition of turning traffic to this approach is undesirable.

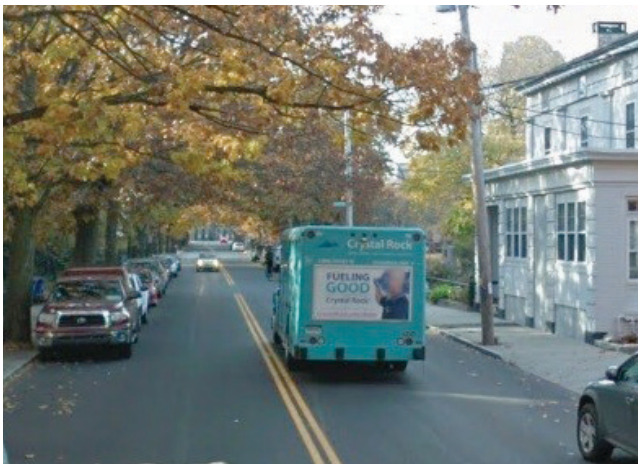
Second, any widening of Water Street along the frontage of the Water Street Parking Garage to allow two-way traffic would jeopardize the potential to expand the garage in the future.

Third, and perhaps most important, an undesirable and unsafe railroad preemption clearance issue would be created from new westbound left turns exiting from Ferry Street directly to Water Street at the intersection with Governor Winthrop Boulevard.

Fourth, it should be noted that at its current width, Bank Street can only accommodate two-way traffic while maintaining space for on-street parking on both sides if the vehicular travel lanes are ±10 feet, leaving room for 7- to 8-foot curbside parking spaces. Although this cross section is tight, it is not unprecedented. A couple of examples showcasing downtown corridors where similar cross sections function well can be seen in the photos below.

Fifth, trash collection and deliveries could also present potential complications with such a narrow cross section on Bank Street. However, with a few thoughtful mitigations, this issue could be resolved. For buildings along the eastern side, trash collection and deliveries should take place at their rears along South Water Street when possible. For businesses along the western side, trash collection and deliveries should happen along their rears in the parking facilities adjacent to Green Street and/or on the side streets of Golden Street and Pearl Street. This is not always possible and relies on adherence by the vendors.

It was found that some of these conditions could be avoided or improved by continuing to service one-way vehicular traffic on certain portions of the streets while still converting other streets capable of successfully servicing two-way traffic. Several partial two-way conversion scenarios were examined, two of which are elaborated upon next.



Route 141 in Easthampton, Massachusetts (Left) and Chapel Street in New Haven, Connecticut (Right) are successful corridors with similar narrow cross sections (+/- 10 ft lanes with on street parking) as would be required along Bank Street to facilitate two-way traffic in both the Full and Partial Two-Way Conversion Scenarios

Intersections	
Intersection	**Key Implications**
Governor Winthrop Blvd at Water St / Ferry Street	• Poor LOS • Railroad Preemption Concern is Created • Traffic Signal Revisions Needed
State St at Water St / Fisher's Island Ferry Drwy	• Geometric Improvements Needed to Restrict Turns • Railroad Preemption Upgrade Needed
Bank St at Bank St Connector	• New Traffic Signal Needed • Railroad Preemption Upgrade Needed
Eugene O'Neill Dr at State St	• Traffic Signal Revisions Needed
Eugene O'Neill Dr at Governor Winthrop Blvd	• Traffic Signal Revisions Needed
Green St at Tilley St	• Traffic Signal Revisions Needed
Bank St at Tilley St	• Traffic Signal Revisions Needed
Bank St at State St	• Traffic Signal Revisions Needed
Water St at Atlantic St	• New Traffic Signal Needed

Table 8-2: Full Two-Way Conversion Scenario - Key Implications for Intersections

Street Segments	
Street Segment	**Key Implications**
Water St from State St to Governor Winthrop Blvd	• Widening required along the frontage of the Water Street Parking Garage
Eugene O'Neill Dr / Green St from Gov. Winthrop Blvd to Tilley St	• Removal of some on-street parking and bumpouts likely
Bank St from Tilley St to State St	• Removal of some on-street parking • Narrow vehicular travel lanes (+/- 10' width)

Table 8-3: Full Two-Way Conversion Scenario - Key Implications Summary for Street Segments

Partial Two-Way Conversion Scenario

Several partial two-way conversion scenarios were investigated in order to mitigate the concerns identified with the full two-way conversion scenario. Different potential scenarios were studied including maintaining one-way northbound traffic on Water Street between the Water Street Parking Garage and Ferry Street/ Governor Winthrop Boulevard, maintaining one-way northbound traffic on the entirety of Water Street north of State Street, reversing South Water Street to service one-way northbound instead of one-way southbound traffic, and maintaining one-way southbound traffic on Eugene O'Neill Drive. Ultimately, a partial two-way scenario was developed that addressed many of the concerns identified with the full two-way conversation scenario while still staying within the confines between Governor Winthrop Boulevard and Tilley Street. This partial two-way conversion scenario (depicted in Figure 8-4) facilitated many of changes in the full two-way conversion scenario with the following three key alterations:

- Maintaining one-way northbound traffic on Water Street north of State Street
- Maintaining one-way southbound traffic on Eugene O'Neill Drive north of State Street
- Reversing the flow of South Water Street to be one way northbound

Figure 8-5 along with Tables 8.4 and 8.5 summarize the key implications of the partial two-way conversion scenario on the downtown. As was the case with the full two-way conversion scenario, all improvements recommended in Sections 3, 6, and 7 to intersections and street segments not associated with the two-way conversion analysis would still be considered for implementation in conjunction with the partial two-way conversion Scenario. Concept C-3 (Figure 8-6, page 76) conceptually illustrates the roadway improvements that would be associated with the partial two-way conversion scenario.

Figure 8-4: Partial Two-Way Conversion Scenario

In the partial two-way conversion scenario, it was found that with the implementation of the outlined mitigations, some of the operational concerns identified under the full two-way conversion scenario could be eliminated. The exceptions would include the exit from the Water Street Garage to Water Street, which would still operate poorly during peak times if no secondary egress from the garage is implemented as well as operations at the intersection of Governor Winthrop Boulevard at Water Street/Ferry Street, which would still operate poorly at times.

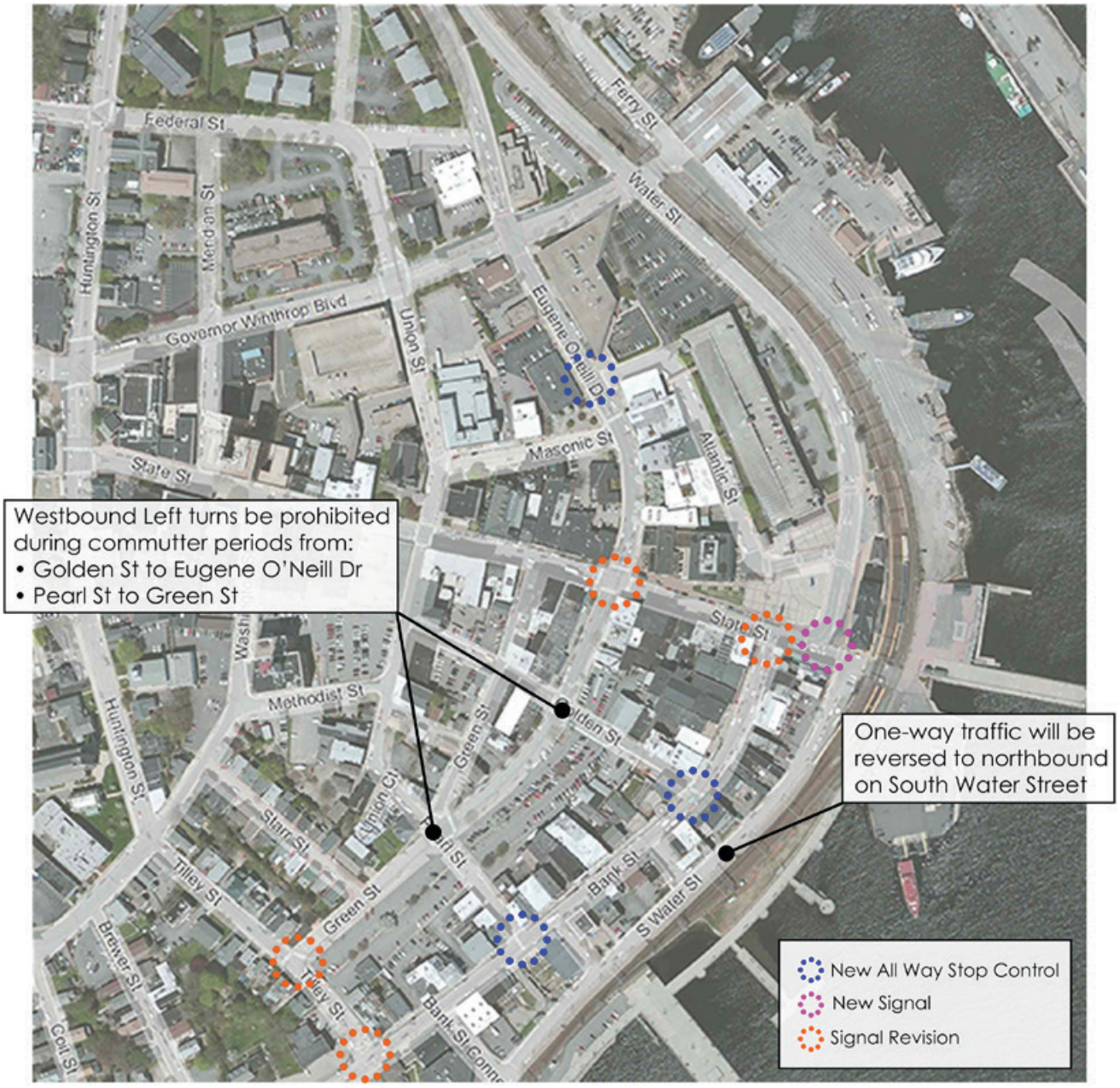


Figure 8-5: Partial Two-Way Conversion Scenario - Key Implications

Intersections	
Intersection	**Key Implications**
Eugene O'Neill Dr at State St	• Traffic Signal Revisions Needed
Green St at Tilley St	• Traffic Signal Revisions Needed
Bank St at Green St	• Traffic Signal Revisions Needed
Bank St at State St and Water St / Fisher's Island Ferry	• Traffic Signal Revisions Needed • New Signal at South Water Street • Geometric Improvements

Table 8-4: Partial Two-Way Conversion Scenario - Key Implications Summary for Intersections

Street Segments	
On Street	**Key Implications**
Eugene O'Neill Dr / Green St from State St to Tilley St	• Left turns from some side streets should be prohibited during peak hours
Bank St from State St to Tilley St	• Removal of some on-street parking • Narrow Vehicular Travel Lanes (+/- 10' width)

Table 8-5: Partial Two-Way Conversion Scenario - Key Implications Summary for Street Segments

Preferred Two-Way Conversion Scenario

The full two-way conversion and partial two-way conversion Scenarios were reviewed and vetted by the City's Steering Committee for this study. It was ultimately determined that the following lingering concerns existed:

- The two-way Bank Street cross section could result in the potential for unwanted disruption to traffic flow. Specifically, any vehicle stoppage (e.g., deliveries, parking in or departing from on-street parking spaces, left turns) could stall traffic. Therefore, the tightness of 10-foot travel lanes with on-street parking was considered undesirable.
- One of the objectives of the two-way conversion was to better distribute traffic, but in fact, Water Street northbound from State Street would still be a primary route out of the City without full conversion of Eugene O'Neill Drive. Furthermore, all of the heavy traffic northbound during peak hours along Eugene O'Neill Drive and Water Street would still make its way back to flow through the intersection of Governor Winthrop Boulevard at Water Street/Ferry Street.

With these in mind, it was discussed whether an extension of the two-way concept for Eugene O'Neill Drive north of Governor Winthrop Boulevard to Crystal Avenue could be considered. Also under consideration was to keep Bank Street as one way, albeit with a single lane and with the addition of sharrows and door zones to improve mobility for bicyclists. South Water Street would also remain one-way southbound. This network concept for one-way

Figure 8-6: Concept C-3

and two-way streets is schematically shown in Figure 8-7. Tables 8.6 and 8.7 summarize the key implications of the preferred two-way conversion scenario. This scenario would address essentially all major concerns associated with the full and partial two-way scenarios.

The key to this preferred concept would be the ability for northbound downtown traffic to have a secondary route toward the Crystal Avenue intersection without having to all flow through the Governor Winthrop Boulevard at Water Street/ Ferry Street intersection. Users of the Water Street Garage, with a new rear exit to Atlantic Street, for example, would benefit by not all having to exit to Water Street and through the signal at Ferry Street and Governor Winthrop Boulevard. One of the three lanes southbound on Eugene O'Neill Drive would become a northbound lane. This lane would traverse the median north of the police station and ultimately merge with northbound Water Street traffic.

Maintaining Bank Street as a one-way road north of Tilley Street with only one vehicle lane was determined to be the appropriate way to provide additional amenities for bicyclists and pedestrians, to address speeding concerns, and to provide a more comfortable distance between on-street parking and vehicle traffic. Observations have shown that for much of this stretch of Bank Street the two current lanes are generally only both used during commuter periods. At those times, many motorists travel Bank Street at higher than desired speeds, and pedestrian safety is diminished by existing multi-threat crossing conditions, creating an environment that is not conducive to a lively downtown. A street view image depicting what the Bank Street cross section would look like in the future is shown in Figure 8-8 on page 79 of this report.

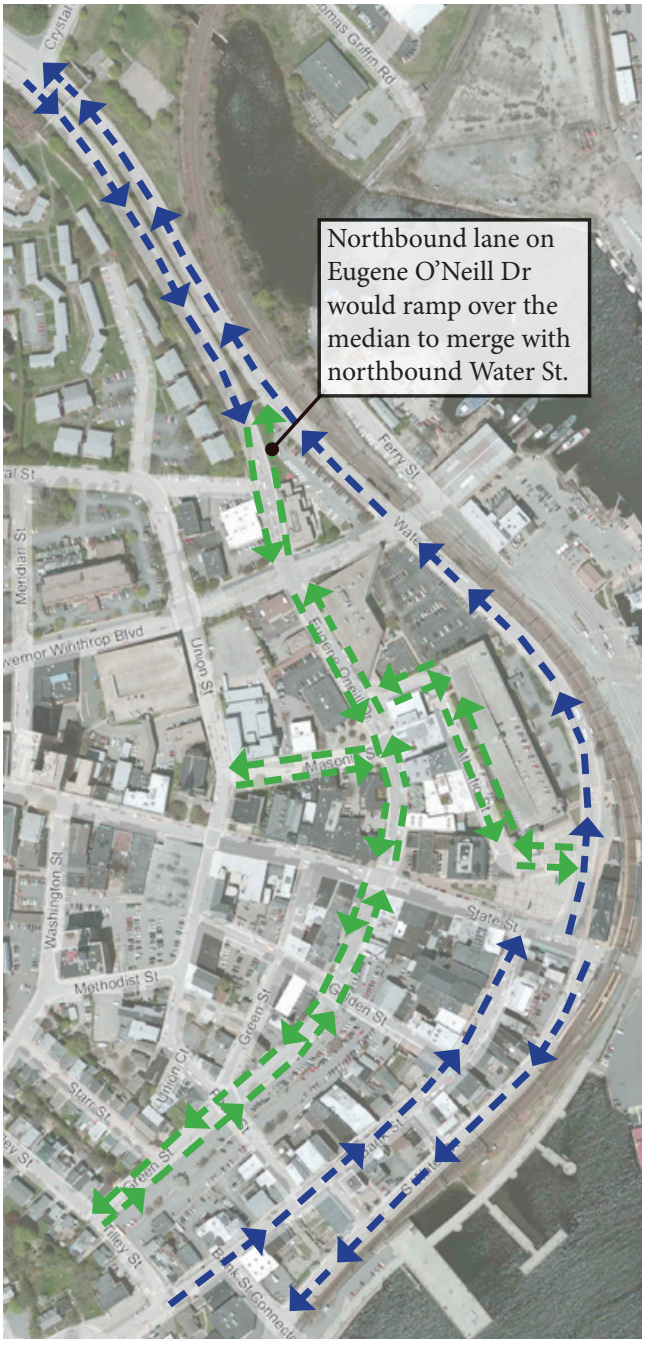


Figure 8-7: Further Two-Way Conversion Considerations

Intersections	
Intersection	**Key Implications**
Eugene O'Neill Dr at Gov. Winthrop Blvd	• Traffic Signal Revisions Needed
Eugene O'Neill Dr at State St	• Traffic Signal Revisions Needed
Green St at Tilley St	• Traffic Signal Revisions Needed

Table 8-6: Preferred Two-Way Conversion Scenario - Key Implications Summary for Intersections

Street Segments	
On Street	**Key Implications**
Eugene O'Neill Drive north of Gov. Winthrop Blvd	• Restripe for northbound vehicle lane and new crossover ramp to merge northbound Water Street
Eugene O'Neill Dr from Gov. Winthrop Blvd to State St	• Removal of some on-street parking
Eugene O'Neill Dr / Green St from State St to Tilley St	• Left turns from some side streets should be prohibited during peak hours
Bank St from State St to Tilley St	• Restripe for single northbound vehicle lane with door-zone shoulder areas

Table 8-7: Preferred Two-Way Conversion Scenario - Key Implications Summary for Street Segments

8.3: Two-Way Conversion Summary

The conversion of one-way streets to become two way was investigated in terms of implications, anticipated operations, impacts to infrastructure, and signal modifications that would be necessary. A change to two-way streets could bring numerous benefits to downtown New London, including better travel routing for motorists, increased pedestrian comfort, slower vehicle speeds, improved safety, and economic improvements.

The initial full two-way conversion scenario, which included the complete conversion of Bank Street/Water Street and Eugene O'Neill Drive/ Green Street from Governor Winthrop Boulevard to Tilley Street to service two-way vehicular traffic, resulted in several operational concerns, including poor LOS and issues related to railroad preemption at several locations during one or more peak hours.

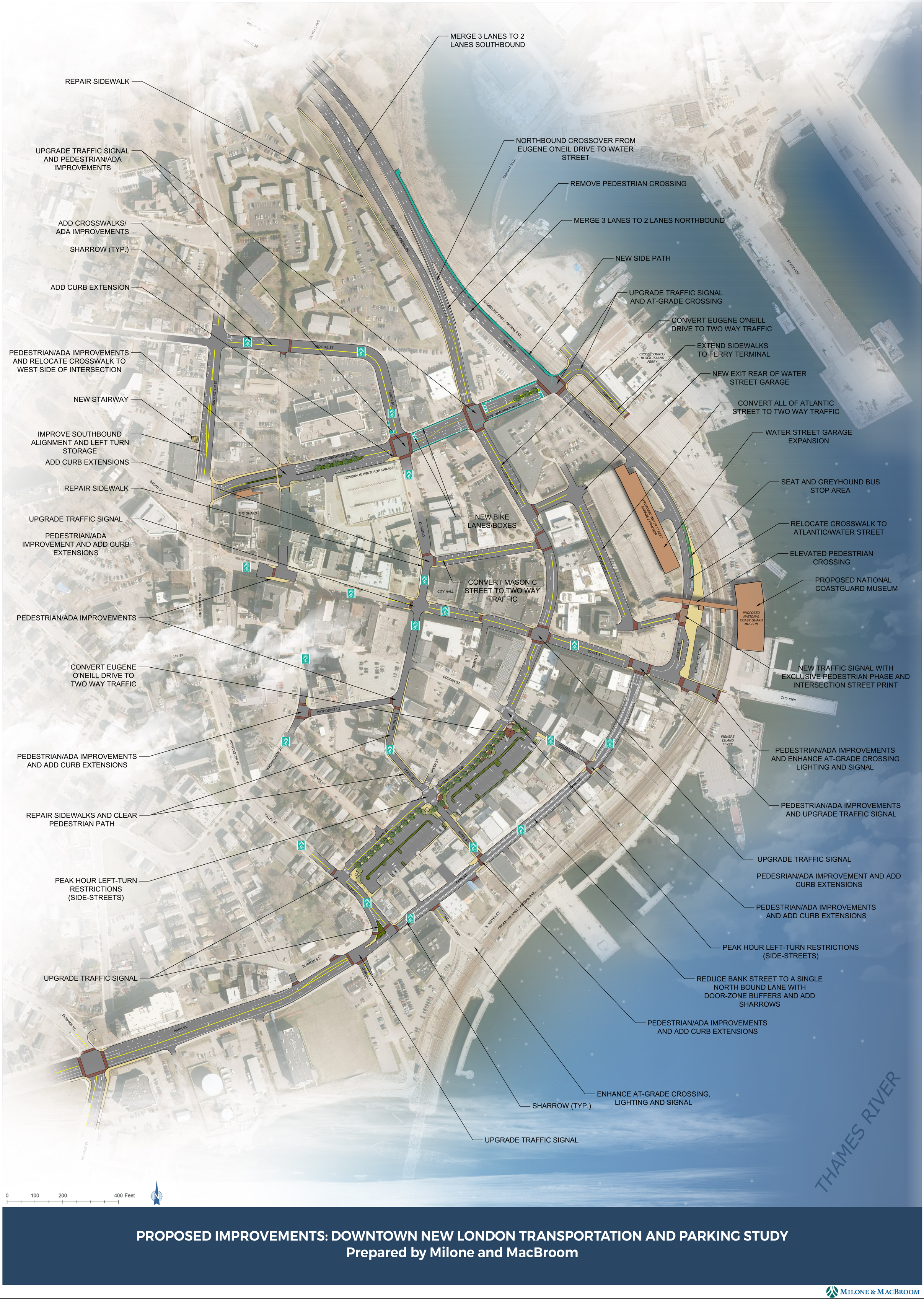
Selective modifications resulted in a scenario with two-way conversion only between State Street and Tilley Street. The concerns identified under the full two-way conversion were largely eliminated under this partial two-way conversion scenario. However, the exit from the Water Street Garage onto Water Street remained to be an operational concern. Plans to provide additional egress from the west side of the garage onto Eugene O'Neill Drive would likely result in acceptable operations.

Vetting of the full and partial concepts resulted in concern over the narrow travel lanes on Bank Street and the desire to provide a new means of heading north via Eugene O'Neill Drive in order to relieve Water Street, particularly at its intersection with Governor Winthrop Boulevard. This would entail Eugene O'Neill Drive becoming two way for much of its length with a northbound lane that would ultimately merge with Water Street south of Crystal Avenue. A preferred two-way conversion scenario was developed based on this, which would also include Bank Street remaining one way but with a new single vehicular travel lane allowing for the inclusion of a number of complete streets improvements including to sharrows for bicyclists. Bank Street would feature one lane of one-way traffic with a much friendlier cross section.

Downtown Transportation Master Plan

Enclosed with this study is a master plan sheet of downtown New London that illustrates the roadway restriping and the new northbound crossover ramp from Eugene O'Neill Drive to Water Street north of Governor Winthrop Boulevard that is associated with the preferred two-way conversion scenario. Also shown are all of the pedestrian and bicyclists improvements identified in this study that would fit in with the preferred two-way conversion scenario; callouts where intersection signal upgrades/ improvements are necessary; and the likely footprints of the Water Street Parking Garage expansion, the future National Coast Guard Museum, and the pedestrian overpass bridge at Union Station that is to connect with the garage and museum south of Cross Sound Ferry. This master plan of the downtown can serve as the foundation moving forward to bring these transportation improvements, which have been identified and vetted through this study, to fruition. The next steps subsequent to this study are to secure funding to develop final design plans for the improvements and to construct the improvements.

Figure 8-8: Photo Simulation of Bank Street



PROPOSED IMPROVEMENTS: DOWNTOWN NEW LONDON TRANSPORTATION AND PARKING STUDY

Prepared by Milone and MacBroom

MILONE & MACBROOM

APPENDIX

A

Online Surveys

New London Downtown Transportation Study

MILONE & MACBROOM

This survey is being given as part of a transportation study for the City of New London. The goal of the study is to address future transportation needs and improvements in the Downtown Area. The data collected in this survey will contribute to the outcome of the study. Please answer the questions to the best of your ability. Numbers can be rounded.

We will be in Downtown New London on Thursday, July 28th from 8:00am until 4:00pm. Contact us to schedule a formal appointment from 12:00pm - 4:00pm, or drop by with no appointment during the morning:

8:00 AM - 9:45 AM at Muddy Waters Cafe, 42 Bank St. #1 (Drop-In's Welcome)
10:00 AM - 11:45 AM at Washington Street Coffee House, 13 Washington St. #1 (Drop-In's Welcome)
12:00 PM - 4:00 PM at 13 Masonic Street (By Appointment Only)

Please feel free to come by and discuss this project with us. To schedule an in person meeting, or for additional information, you can contact Anna Stokes by e-mail at AStokes@mminc.com or by phone at (203)271-1773.

* 1. Name

* 2. Affiliation

* 3. E-Mail

* 4. Phone Number

* 5. Are you a:

- Transportation Provider
- Commercial Business
- Tourist Destination
- Residential Community
- Employer
- City Organization/Advocacy Group

Transportation Providers

6. Please provide the following ridership estimates:

Average daily ridership:

Peak summer daily ridership:

Time of summer peak hour(s):

7. What overall ridership change do you expect for your service over the next five years?

- ○ No Change
- ○ Increase
- ○ Decrease

If increase or decrease, please estimate the % change:

8. Please estimate the percent of users that travel to/from your service using the following modes (percents should add up to 100%):

Drive

Bus

Train

Bike/Walk

Other Modes/Additional Notes:

9. Do you have any plans for service changes or expansions in the next five years? If so, please elaborate.

- ○ No
- ○ Yes, please elaborate:

10. Do you provide parking for users of your service?

- ◯ No
- ◯ Yes, we provide free parking
- ◯ Yes, we charge for parking
- ◯ If either "Yes" response, how many parking spaces do you provide onsite for users of your particular services?

11. If your parking becomes full, or if you do not provide onsite parking, where do motorists using your service usually park?

12. Are there any other things about your transportation service that you believe this study would benefit from knowing?

Commercial Business/Tourist Destination/Residential Community

13. Please estimate the percent of visitors/patrons/residents that travel to/from your location using the following modes (percents should add up to 100%):

Drive	
Bus	
Train	
Bike/Walk	
Other Modes/Additional Notes:	

14. Do you expect any significant change in the number of visitors/patrons/residents to your site over the next five years?

- ○ No Change
- ○ Increase
- ○ Decrease

If increase or decrease, please estimate the % change:

15. Please provide the following estimates:

Average number of daily visitors/patrons:	
Peak summer daily visitors/patrons:	
Time of summer peak hour:	

16. Do you provide parking at your site for your visitors/patrons/residents?

- ○ No
- ○ Yes, we provide free parking
- ○ Yes, we charge for parking
- ○ If either "Yes" response, how many parking spaces do you provide onsite for users of your visitors/patrons/residents/employees?

17. If your parking becomes full, or if you do not provide onsite parking, where do people (visitors, patrons, employees, residents, etc) who drove to your site usually park?

18. Are there any other things about your business that you believe this study would benefit from knowing?

Employers

19. How many employees do you have onsite at your busiest shift?

20. Please indicate the normal on-site work hours for your employees:

- ( ) Workers report for a standard workday (8am to 5pm or similar)
- ( ) Workers report in shifts, of which the busiest is:

21. Please estimate the percent of employees that travel to/from your location by the following modes (percents should add up to 100%):

Drive alone	
Carpool	
Bus	
Train	
Bike/Walk	
Other Modes/Additional Notes:	

22. Do you expect any significant change in your number of employees over the next five years?

- ( ) No Change
- ( ) Increase
- ( ) Decrease

If increase or decrease, please estimate the % change:

23. Do you provide parking at your site for your employees?

- ◯ No
- ◯ Yes, we provide free parking
- ◯ Yes, we charge for parking
- ◯ If either "Yes" response, how many parking spaces do you provide onsite for users of your employees/visitors?

24. If your parking becomes full, or if you do not provide onsite parking, where do people (employees, visitors, patrons) going to your site usually park?

25. Are there any other things about your business that you believe this study would benefit from knowing?

City Organization/Advocacy Group

26. Please describe your organization:

27. What is your role in transportation and/or parking in Downtown New London?

28. What goals do you have concerning the future of transportation and parking in Downtown New London?

29. Would you be interested in meeting with us in person on _____ when we will in Downtown New London?

- ( ) Yes, please contact me to schedule an appointment
- ( ) No

APPENDIX

B

Public Input Notes

New London Downtown Transportation Study

MILONE & MACBROOM

Public Input Notes
New London Downtown Transportation Study

Bicycle and Pedestrian Connectivity

- Bicycle and Pedestrian Connections to Northern New London *(Charlie Duffy)*
- Bicycle and Pedestrian Connections to Southern New London (including Fort Trumbull development) *(Charlie Duffy)*
- Railroad bridge from waterfront to Fort Trumbull should include a bicycle and pedestrian access path *(Tony Sheridan, Chamber of Commerce)*
- North parts of downtown are very disconnected *(Vinnie, Arts Park)*
- Bicycle and Pedestrian Connections to Hodges Square, which is only ¾ of a mile outside of the downtown area but general inaccessible unless you're in a car *(Ronna Stuller, PZ Commission)*
- Huntington and Williams could be used to provide connections from colleges to downtown, they're ~¾ of a mile but feel really disconnected *(Ronna Stuller, PZ Commission)*
- Northern Downtown New London is inaccessible for bicycles and pedestrians *(Stephanie Gregerman, CT Commuter Rail Council)*

Bike Infrastructure

- Bike lane on Howard St. *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- Need for bicycle infrastructure throughout downtown *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- There is a growing Segway tour and rental business in downtown which would benefit from bicycle infrastructure as well *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- New London is a good City to bike in, there should be a bicycle share or bicycle rental program *(Susan, co-owner of Muddy Waters Café)*
- There should be a plan for winter maintenance of bicycle infrastructure *(Art Costa, TVSCI)*
- More bike infrastructure needed Downtown *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*

Pedestrian Infrastructure

- Pedestrian Overpass to cross Eugene O'Neill Drive to Low Income Housing is slated to be rebuilt *(Charlie Duffy)*
- Water Street pedestrian connection to bus stops (north side) *(Charlie Duffy)*
- Improved pedestrian crossing infrastructure on Bank Street *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- Improved pedestrian crossing infrastructure on Starr Street *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- There are many sidewalk gaps on Eugene O'Neil and Green Street that need to be fixed. Many of these are supposedly slated to be redone *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- Accommodations for pedestrians on side streets are just as critical as on the main thoroughfares *(Tim Hanslet, Former Public Works Director)*
- The current streetscape is very car centric *(Art Costa, TVSCI)*

- Broad, Gov. Winthrop, State & Huntington all have a blindside for pedestrians, and cars drive too fast on them *(Stephanie Gregerman, CT Commuter Rail Council)*
- One-way streets increase vehicular speeds and make the environment worse for pedestrians *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*
- Corner of Eugene O'Neil and Golden is very unsafe for pedestrians *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*
- ADA needs to be improved throughout the city *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*
- Crossings on Eugene O'Neill are challenging *(Stephanie Gregerman, CT Commuter Rail Council)*

Signage & Gateways

- Pedestrian signage is needed, especially to show the connection to the waterfront park and City Pier *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- The City of New London needs a gateway welcoming people (for all users: bicycles, pedestrians, vehicles, etc) *(Reid Burdick, City Council)*
- New London needs better Gateways *(Vinnie, Arts Park)*
- Better directional signage is needed throughout the downtown area *(New Hammond, Economic Development Director)*
- Hodges Square should be seen as a major gateway into the City *(Art Costa, TVSCI)*
- A pedestrian gateway is needed by the train station *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*
- Better signage is needed for all, but especially pedestrians *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*
- Need for better signage directing people to State Street after the Ferry *(Cross Sound Ferry)*

Beautification

- Side streets need nicer and more inviting streetscapes *(Tim Hanslet, Former Public Works Director)*
- Artistic street painting for crosswalks could liven up streets *(Tim Hanslet, Former Public Works Director)*
- More greenery could help attract for pedestrians and people in general to the downtown area *(Art Costa, TVSCI)*

Ferry

- People drive out of ferry turn right, speed out of town. The design does not influence people to linger or spend time in New London *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- Design of streets moves people to and from the ferry without showing them anything else seen in New London. Vehicles should be reverted to go through Downtown *(Reid Burdick, City Council)*
- Ferry traffic should be diverted into downtown *(Vinnie, Arts Park)*
- Freight trains block rail crossings sometimes en route to Ferry *(Cross Sound Ferry)*

Train

- Bridge across tracks at the station is needed for pedestrians *(Tony Sheridan, Chamber of Commerce)*

- Train is a great asset to New London, but due to the outdated amenities, Old Saybrook is becoming the area hub *(Tony Sheridan, Chamber of Commerce)*
- Better pedestrian access, and a better crossing, to train station in New London could help ridership numbers *(Stephanie Gregerman, CT Commuter Rail Council)*
- SLE ridership has gone down recently correlated with gas prices reduction *(Tim Hanslet, Former Public Works Director)*
- Ridership on the Shoe Line East has been on a steady decline, with New London being the only station to see an increase in 2015*(Stephanie Gregerman, CT Commuter Rail Council)*
- Mode to mode connections really need to be improved *(Stephanie Gregerman, CT Commuter Rail Council)*
- Crosswalk near train station conflicts with the drop-off lane *(Stephanie Gregerman, CT Commuter Rail Council)*
- Train station is a huge asset to the city as it brings people downtown, but we need them to stay downtown *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*
- Freight trains block rail crossings sometimes *(Cross Sound Ferry)*

Development & Economic Opportunities

- Port area has a real opportunity for future development *(Charlie Duffy)*
- Potential for development on State Pier Road *(Charlie Duffy)*
- New London has all the ingredients to be a real central hub but needs change in order to encourage development *(Tony Sheridan, Chamber of Commerce)*
- This is not just about transportation – we need redevelopment *(Tony Sheridan, Chamber of Commerce)*

Parking

- Suburban residents working in, or visiting, downtown have trouble parking *(Tony Sheridan, Chamber of Commerce)*
- There is plenty of parking around, however private parking lots sit empty and underused while others are over flowing *(Tim Hanslet, Former Public Works Director)*
- Regulations concerning minimum parking requirements need to be changed in order to help the city increase density *(Tim Hanslet, Former Public Works Director)*
- Parking pay scales should be examined as a form of parking management *(Tim Hanslet, Former Public Works Director)*
- Minimum parking requirements hurt development *(Ronna Stuller, PZ Commission)*
- On weekends the vibrant bar and restaurant community makes parking can a big challenge *(Ned Hammond, Economic Development Director)*
- People parallel parking, or circling looking for street parking, can cause a lot of traffic on the roads *(Ned Hammond, Economic Development Director)*
- The community has a reluctance to pay for parking and to park in parking garages *(Ned Hammond, Economic Development Director)*
- There is not necessarily a shortage of parking, but parking can be hard to find especially for those visiting from out of town *(Ned Hammond, Economic Development Director)*
- Sufficient parking exists, but needs better access and distribution *(Stephanie Gregerman, CT Commuter Rail Council)*
- Parking in the City isn't well organized *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*

- Parking is a challenge for staff and families trying to get to the ISAAC School *(Christine Pemberton, ISAAC School)*
- Parking is available in the area, but is inaccessible due to complicated city policies and zoning regulations *(Christine Pemberton, ISAAC School)*
- Parking time limits are too tight, many are just 30 minutes *(Christine Pemberton, ISAAC School)*
- Need for real-time parking info, need to be able to book parking *(Cross Sound Ferry)*

Housing & Social Equity

- Crystal Avenue Development "Crystal Towers" is slated to be torn down *(Charlie Duffy)*
- Large concentration of Low Income residents warps the New London economy *(Tony Sheridan, Chamber of Commerce)*
- Mohenkin Hotel on State Street, one of the City's grandest buildings, is Section 8 housing *(Tony Sheridan, Chamber of Commerce)*
- Electric Boat is worried about housing for future employees as they grow and expand, empty buildings around downtown need to be redevelopment into hip housing for young workers *(Tony Sheridan, Chamber of Commerce)*
- The cost to convert existing historic buildings to apartments is very high, but is being done some places around downtown *(Ned Hammond, Economic Development Director)*
- New London has a very practical need for bikes as transportation for their low-income residents *(Art Costa, TVSCI)*

Traffic

- There is a need for a vehicle turn around by Ferry Street (people often end up here on accident) *(Barbara Neff – Waterfront Coordinator, Downtown Business Association)*
- Cars don't stop for pedestrians on Bank Street *(Reid Burdick, City Council)*
- Bottlenecks often happen on Route 213, Ocean Ave./Montauk/Bank/Route 1 *(Joshua Freeman, Downtown business owner, Waterfront ZBA)*
- A ramp is needed to get on SB I-95 directly from Williams new Hodgkin Square and Huntington Street *(Joshua Freeman, Downtown business owner, Waterfront ZBA)*
- Jay St. east bound to Huntington Street needs a better traffic design *(Joshua Freeman, Downtown business owner, Waterfront ZBA)*
- Traffic should be designed in a way that gets people from out of town to visit/stop downtown *(Joshua Freeman, Downtown business owner, Waterfront ZBA)*
- There needs to be more direct access to I-95 SB *(Joshua Freeman, Downtown business owner, Waterfront ZBA)*
- In the Frontage Rd. area of Route 85 extend the weave area/get people on/off further apart *(Joshua Freeman, Downtown business owner, Waterfront ZBA)*
- Traffic design could benefit from the implementation of roundabouts *(Joshua Freeman, Downtown business owner, Waterfront ZBA)*
- A better two-way street network would encourage more people to stay and spend time in downtown *(Tony Sheridan, Chamber of Commerce)*
- Current traffic pattern is designed to just be a highway in, highway out *(Vinnie, Arts Park)*
- Water Street & Bank Street should be two-way *(Vinnie, Arts Park)*
- Union St., Green St. should potentially be two-way *(Vinnie, Arts Park)*
- Trucks and trash collectors could cause issues on Bank Street is the street were two-way because cars couldn't move around them as easily *(Ned Hammond, Economic Development Director)*

- Traffic needs to be spread out instead of all directed onto the same roads *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*
- Whole traffic system throughout the City should be examined *(Aundre Bumgardner, NL Rep in State Legislature, Transportation Committee)*

Tourism

- 1.4 million coming & going from the ferries but very few of them linger or spend money in downtown New London *(Reid Burdick, City Council)*
- People going to the ferry should be encourages to shop by being directed down State Street *(Joshua Freeman, Downtown business owner, Waterfront ZBA)*
- There should be more events on the waterfront/City Pier like markets and car shows *(Susan, co-owner of Muddy Waters Café)*

Policy & Partnerships

- Regional Government and collaboration among leaders is key *(Tony Sheridan, Chamber of Commerce)*
- State property tax system needs involvement from local and regional government *(Tony Sheridan, Chamber of Commerce)*
- Changes are needed for parking regulations and zoning requirements in order to encourage denser development *(Tim Hanslet, Former Public Works Director)*
- Coastal Resiliency needs to be planned for *(Art Costa, TVSCI)*
- Partnerships should be formed between bicycle groups and downtown restaurants, coffee shops, etc. *(Art Costa, TVSCI)*
- CTDOT currently has no plans to help New London as far as trains are concerned *(Stephanie Gregerman, CT Commuter Rail Council)*
- Uber is trying to get more cars on the road in Eastern CT *(Stephanie Gregerman, CT Commuter Rail Council)*

History & Past Studies

- 2014 presentation/study was done on Eugene O'Neill & Water Street. It suggested a reduction to two lanes each with wide sidewalks and on-street parking *(Tim Hanslet, Former Public Works Director)*
- Counts have been done on Eugene O'Neill and Water Street *(Tim Hanslet, Former Public Works Director)*
- The POCD will be updated this year, so there is a potential for collaboration *(Ronna Stuller, PZ Commission)*
- 1928 Swan Study *(Tim Hanslet, Former Public Works Director)*
- Upper State Street used to be a walking mall called Captains Walk *(Ned Hammond, Economic Development Director)*
- The Vista Walkway was a multi-use path designed to connect Union Station to Connecticut College *(Ned Hammond, Economic Development Director)*
- Master Plan for Hodges Village, which includes complete streets as part of the plan, can be found at hodgessquare.com *(Art Costa, TVSCI)*
- CT DOT surveyed train riders on the Shore Line East *(Stephanie Gregerman, CT Commuter Rail Council)*

APPENDIX

C

Off-Street Public Parking Counts

New London Downtown Transportation Study

MILONE & MACBROOM

Downtown New London - Off-Street Public Parking - EXISTING Supply and Demand Analysis

Parking Facility:	Number of Parking Spaces	Number of Parked Vehicles						
		Date	Summer Friday			Summer Saturday		Summer Sunday
			mid-morning	afternoon	evening	mid-morning	afternoon	mid-morning
			9am - noon	1pm - 4pm	6pm - 9pm	9am - noon	1pm - 4pm	9am - noon
Water Street Parking Garage	910	July. 26, 2014					748	
		July. 27, 2014						573
		Aug. 1, 2014	566		531			
		July. 30, 2016				681	802	
		Aug. 5, 2016		798	663			
		Aug. 6, 2016					688	
		Aug. 12, 2016		815	670			
		PEAK	**566**	**815**	**670**	**681**	**802**	**573**
		Utilization	*62%*	*90%*	*74%*	*75%*	*88%*	*63%*
Governor Winthrop Parking Garage	400	July. 26, 2014					101	
		Aug. 1, 2014	86		96			
		Aug. 3, 2014						85
		July. 30, 2016				95	91	
		Aug. 5, 2016		120	126			
		Aug. 6, 2016					137	
		PEAK	**86**	**120**	**126**	**95**	**137**	**85**
		Utilization	*22%*	*30%*	*32%*	*24%*	*34%*	*21%*
Julian/Mariner Square Surface Parking	185	July. 26, 2014					149	
		July. 27, 2014						68
		Aug. 1, 2014	89		46			
		July. 30, 2016				117	183	
		Aug. 5, 2016		69	23			
		Aug. 6, 2016					95	
		Aug. 12, 2016		70	23			
		PEAK	**89**	**70**	**46**	**117**	**183**	**68**
		Utilization	*48%*	*38%*	*25%*	*63%*	*99%*	*37%*
O'Neill - Tilley Municipal Lots	201	July. 26, 2014					139	
		July. 27, 2014						73
		Aug. 1, 2014	56		122			
		PEAK	**56**	**NA**	**122**	**NA**	**139**	**73**
		Utilization	*28%*	*NA*	*61%*	*NA*	*69%*	*36%*
TOTAL PEAK PARKING UTILIZATION	**1,696**		**797**	**1,005**	**964**	**893**	**1,261**	**799**
			47%	***67%*** *	***57%***	***60%*** *	***74%***	***47%***

Notes: * Excludes parking count and parking supply of the O'Neill-Tilley Lots because they were in the process of being refinished in 2016.

APPENDIX

D

Field Conditions Inventory – Signal Equipment

New London Downtown Transportation Study

MILONE & MACBROOM

FIELD CONDITIONS INVENTORY of TRAFFIC SIGNAL EQUIPMENT

Downtown New London, Connecticut

Spring 2016

Location	Ped Crossing	Mast Arms / Span Poles	ADA ramps	Pedestrian Signal Heads	Traffic Signal Heads	Controller Location	Pre-emption	Signs and Pavement Markings	Additional Comments
Broad St / Gov. Winthrop / Huntington	N/A	Two mast arms at this location, painted black, decorative bases. Near side heads for Huntington Street (Route 641). Minimal overhead wires on the west side of Huntington Street. The mast arms do not meet the current CTDOT standards.	No detectable warning strips, one corner includes an apex ramp. Ramps do not meet current standards. Northwest corner will be challenging for grading and building location.	Look to be incandescent heads, push buttons do not meet current ADA standards for location to ramp. No countdown display, not current standard. Assume timing should be updated. Equipment doesn't match.	No retro-reflective back plates, appear to be LED not all heads are 12 inches. Mismatching equipment.	Good location newer cabinet.	Does not exist at this location	Limited lane use signs, worn markings	Mis-matched equipment, no current standards, northwest corner to be challenging for ADA requirements and grading of ramps. Replace signal equipment, utilize mast arms for street signing - wayfinding. Tree trimming
Huntington / State	N/A	Two mast arms at this location, painted black, decorative bases. Near side heads for Huntington State Street. Minimal overhead wires crossing Huntington Street. The mast arms do not meet the current CTDOT standards.	No detectable warning strips, two corners include apex ramps, east side of Huntington Street. Ramps do not meet current standards.	Look to be incandescent heads, push buttons do not meet current ADA standards for location to ramp. No countdown display, not current standard. Assume timing should be updated. Equipment doesn't match.	No retro-reflective back plates, appear to be LED.	Controlled by Broad Street / Governor Winthrop / Huntington location	Pre-emption Detector exists	Limited lane use signs, worn markings	Mis-matched equipment, no current standards. Replace signal equipment, utilize mast arms for street signing -wayfinding.
Tilley / Green	N/A	Two mast arms at this location both located on the near side of the Tilley Street approaches and do not appear to position the heads 40' from the stop bar. Not up to the current dot standards. The shafts are concrete and there is a street light on the north most mast arm. Overhead utilities existing on the eastern side of Tilley Street.	No detectable warning strips, do not meet current Ada standards, apex ramp on the northeast corner.	Do not exist.	No retro-reflective back plates, appear to be incandescent, all heads are 8 inches. Signal heads are not fix-mounted. Green Street approach does not have two signal heads that are overhead.	Controlled by Tilley / Bank	Does not exist at this location	Striped as a double right but only one lane to enter, left onto Tilley SB seems to have worn out painted island, the stop bar should be moved back. Signs are old and should be replaced.	Replace signal if warranted, revise lane configuration on Green Street, suggest a bump out. The city should consider revising the pavement markings ASAP to avoid any issues.
Tilley / Bank	N/A	Three mast arms at this location, two of which include street lights. A fourth mast arm is located in front of the fire house west of Tilley Street. Signal heads for Tilley Street are positioned very close to the approaches stop bar. The mast arms do not meet the current standards and have concrete shafts.	No detectable warning strips, do not meet current Ada standards, apex ramp on the northeast corner.	Do not exist.	No retro-reflective back plates, appear to be incandescent, most of the heads are 8 inches. Signal heads are not fix-mounted.	Location could be improved.	Does not exist at this location, but there is a mast arm for the fire house - possible plunge button in the fire house.	Non-standard arrows, lane markings and lane use signs.	Replace signal equipment to meet the current conditions.
Governor Winthrop / Eugene O'Neil	N/A	Mast Arms are poorly positioned for approaches, and do not provide the signal head to be at 40' from the stop bar for the Eugene O'Neil approach and Governor Winthrop westbound approach. Concrete shafts and do not meet current CTDOT standards.	This location includes relatively newer ADA ramps with painted textured crosswalks and detectable warning strips. The ramps still do not meet the current ADA standards such as the warning strips being perpendicular to the roadway.	Push buttons do not meet current ADA standards for location to ramp. No countdown display, not current standard.	No retro-reflective back plates and most of the heads are 8 inches. Signal heads are not fix-mounted.	Controller appears to be in a good location	Does not exist at this location	Non-standard arrows, lane use signs would be a improvement to this location	Replace signal equipment to meet the current conditions.
Governor Winthrop / Union	N/A	Mast Arms are poorly positioned for approaches, and do not provide the signal head to be at 40' from the stop bars. Concrete shafts and do not meet current CTDOT standards.	Ramps need to be updated to meet the current ADA standards, existing conditions include apex ramps, no detectible warning strips at all ramps, etc.	Push buttons do not meet current ADA standards for location to ramp. No countdown display, not current standard.	No retro-reflective back plates and most of the heads are 8 inches. Signal heads are not fix-mounted.	Controller by Governor Winthrop / Eugene O'Neil	Does not exist at this location	Non-standard arrows, lane use signs would be a improvement to this location	Replace signal equipment to meet the current conditions.
Governor Winthrop / Water / Ferry	N/A	Mast Arms are poorly positioned for approaches, and do not provide the signal head to be at 40' from the stop bars. Concrete shafts and do not meet current CTDOT standards.	No ramps on ferry street side, ramps have been recently updated on Water Street side of tracks but do not meet current ADA standards.	Walk / Don't walk wording not symbols, no countdown	No retro-reflective back plates and most of the heads are 8 inches.	Controller appears to be in a good location	Does not exist at this location	Pavement markings are worn and require more R.R. crossing applications (Water Street.)	Replace signal equipment, obtain a force account, borings will be required underneath the tracks. Possible keep pedestrians away from tracks if another location to cross is created. Timing at signal does not represent what is on the plans. Phasing mayhave been adjusted.
Bank / State	N/A	One mast arm, painted but peeling badly. Does not meet current CTDOT standards	Appear to meet ADA standards	Not countdown signal heads, pedestrian push buttons do not meet current ADA standards	No retro-reflective back plates and most of the heads are 8 inches. Signal heads are not fix-mounted.	Controller appears to be in a good location, but it would be better suited back from the curb.	Does not exist at this location	Decorative crosswalks, pavement markings are relatively new.	Replace signal equipment to meet the current conditions.
Eugene O'Neil / State	N/A	Two mast arms at this location, painted black, decorative bases. Near side heads for State Street (westbound). The mast arms do not meet the current CTDOT standards.	No detectable warning strips	No countdown signal heads, pedestrian push buttons do not meet current ADA standards	No retro-reflective back plates and most of the heads are 8 inches. Signal heads are not fix-mounted.	Controller appears to be in a good location.	Does not exist at this location	Stripping is in good condtiion, signs need to be replaced, pedestrian push crossing sign should be removed.	Replace signal equipment to meet the current conditions.
Union / State	N/A	Two mast arms at this location, painted black, decorative bases. Near side heads for Union and State Street (westbound). The mast arms do not meet the current CTDOT standards.	No detectable warning strips, do not meet current ADA standards, apex ramp on all corners.	Push buttons do not meet current ADA standards for location to ramp. No countdown display, not current standard.	No retro-reflective back plates and most of the heads are 8 inches. Signal heads are not fix-mounted.	controller by State / Eugene O'Neil	Does not exist at this location	Stripping could be redone,	Very narrow sidewalks, parking on both sides, replace signal equipment.
Mid-Block Crossings along Water St. Northern Location	In pavement warning system, with side-mounted flashing beacon (built-in sign) on right-hand side. Inconsistent signing, decorative crosswalk not very visible.	N/A	Appear to meet ADA standards	N/A	N/A	On pedestal	N/A	Sign color is inconsistent, advanced signs are different than signs at crossing.	In pavement warning system is hard to see, there are no signs indicating to yield or stop to pedestrians.
Mid-Block Crossings along Water St. Southern Location	In pavement warning system, with side-mounted flashing beacon (built-in sign) on right-hand side. Inconsistent signing, decorative crosswalk not very visible.	N/A	Appear to meet ADA standards	N/A	N/A	On pedestal	N/A	Sign color is inconsistent, advanced signs are different than signs at crossing.	In pavement warning system is hard to see, there are no signs indicating to yield or stop to pedestrians.

MILONE & MACBROOM

APPENDIX

E

Peak Hour Traffic Volume Figures

New London Downtown Transportation Study

MILONE & MACBROOM

BASELINE TRAFFIC VOLUMES

WEEKDAY AM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= PEDESTRIAN CROSS WALK
(0) = PEDESTRIAN VOLUME

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 7-1

MMI# 2389-41

BASELINE TRAFFIC VOLUMES

WEEKDAY PM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= PEDESTRIAN CROSS WALK
(0) = PEDESTRIAN VOLUME

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 7-2

MMI# 2389-41

BASELINE TRAFFIC VOLUMES

WEEKEND SATURDAY MID-DAY PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= PEDESTRIAN CROSS WALK
(0) = PEDESTRIAN VOLUME

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 7-3

MMI# 2389-41

FUTURE TRAFFIC VOLUMES
WEEKDAY AM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 7-4

SCHEMATIC

MMI# 2389-41

FUTURE TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 7-5

SCHEMATIC

MMI# 2389-41

FUTURE TRAFFIC VOLUMES

WEEKEND SATURDAY MID-DAY PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 7-6

SCHEMATIC

MMI# 2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED
FULL TWO-WAY SCENARIO - WEEKDAY AM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-1

2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED

FULL TWO-WAY SCENARIO - WEEKDAY PM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-2

2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED

FULL TWO-WAY SCENARIO - WEEKEND SATURDAY MID PEAK HOUR

LEGEND:

= CONVERT TO TWO-WAY

SCHEMATIC

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-3

2389-41

FULL TWO-WAY SCENARIO TRAFFIC VOLUMES
WEEKDAY AM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-4

2389-41

FULL TWO-WAY SCENARIO TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-5

2389-41

FULL TWO-WAY SCENARIO TRAFFIC VOLUMES
WEEKEND SATURDAY MID-DAY PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-6

2389-41

PARTIAL ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED
SCENARIO (D) - WEEKDAY AM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY
= REVERSE DIRECTION

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-7

2389-41

PARTIAL ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED
SCENARIO (D) - WEEKDAY PM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-8

2389-41

PARTIAL ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED
SCENARIO (D) - WEEKEND SATURDAY MID-DAY PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-9

2389-41

PARTIAL TWO-WAY SCENARIO (D) TRAFFIC VOLUMES
WEEKDAY AM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY
= REVERSE DIRECTION

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-10

2389-41

PARTIAL TWO-WAY SCENARIO (D) TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY
= REVERSE DIRECTION

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-11

2389-41

PARTIAL TWO-WAY SCENARIO (D) TRAFFIC VOLUMES
WEEKEND SATURDAY MID-DAY PEAK HOUR

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

LEGEND:
= CONVERT TO TWO-WAY
= REVERSE DIRECTION

SCHEMATIC

MILONE & MACBROOM, Inc.

FIGURE 8-12

2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED
PREFERRED SCENARIO - WEEKDAY AM PEAK HOUR

LEGEND: = CONVERT TO TWO-WAY

SCHEMATIC

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-13

2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED
PREFERRED SCENARIO - WEEKDAY PM PEAK HOUR

LEGEND:
= CONVERT TO TWO-WAY

SCHEMATIC

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-14

2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES RE-ROUTED
PREFERRED SCENARIO - WEEKEND SATURDAY MID-DAY PEAK HOUR

LEGEND: = CONVERT TO TWO-WAY

SCHEMATIC

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-15

2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES
PREFERRED SCENARIO - WEEKDAY AM PEAK HOUR

LEGEND: = CONVERT TO TWO-WAY

SCHEMATIC

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-16

2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES
PREFERRED SCENARIO - WEEKDAY PM PEAK HOUR

LEGEND: = CONVERT TO TWO-WAY

SCHEMATIC

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-17

2389-41

ONE-WAY TO TWO-WAY TRAFFIC VOLUMES
PREFERRED SCENARIO - WEEKEND SATURDAY MID-DAY PEAK HOUR

LEGEND: = CONVERT TO TWO-WAY

SCHEMATIC

DOWNTOWN TRANSPORTATION STUDY
New London, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 8-18

2389-41

APPENDIX

F

Intersection Level of Service Descriptions

and

Capacity Analysis Summary Tables

New London Downtown Transportation Study

MILONE & MACBROOM

LEVEL OF SERVICE

FOR

SIGNALIZED INTERSECTIONS

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions: in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-min analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group. The criteria are given below.

LEVEL-OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS	
LEVEL OF SERVICE	**AVERAGE CONTROL DELAY (sec/veh)**
A	≤ 10
B	> 10 AND ≤ 20
C	> 20 AND ≤ 35
D	> 35 AND ≤ 55
E	> 55 AND ≤ 80
F	> 80

Specific descriptions of each LOS for signalized intersections are provided below:

Level of Service A describes operations with very low control delay, up to 10 s/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

Level of Service B describes operations with delay greater than 10 and up to 20 s/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

Level of Service C describes operations with control delay greater than 20 and up to 35 s/veh. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

Level of Service D describes operations with control delay greater than 35 and up to 55 s/veh. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operations with control delay greater than 55 and up to 80 s/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

Level of Service F describes operations with control delay in excess of 80 s/veh. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

Reference: Highway Capacity Manual 2000, Transportation Research Board, 2000.

LEVEL OF SERVICE

FOR

UNSIGNALIZED INTERSECTIONS

ALL-WAY STOP-CONTROL (AWSC)

The criteria for AWSC intersections have different threshold values than do those for signalized intersections primarily because drivers expect different levels of performance from distinct types of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an AWSC intersection. Thus a higher level of control delay is acceptable at a signalized intersection for the same LOS. The level-of-service criteria are given below.

LEVEL-OF SERVICE CRITERIA FOR AWSC INTERSECTIONS	
LEVEL OF SERVICE	**CONTROL DELAY (s/veh)**
A	**$\leq$ 10**
B	**> 10 AND $\leq$ 15**
C	**> 15 AND $\leq$ 25**
D	**> 25 AND $\leq$ 35**
E	**> 35 AND $\leq$ 50**
F	**> 50**

Reference: Highway Capacity Manual 2000, Transportation Research Board, 2000.

LEVEL OF SERVICE
FOR TWO-WAY
STOP SIGN CONTROLLED INTERSECTIONS

The level of service for a TWSC (two-way stop controlled) intersection is determined by the computed or measured control delay and is defined for each minor movement. Level of service is not defined for the intersection as a whole. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. LOS criteria are given in the Table**.** LOS criteria are given below:

LEVEL-OF SERVICE CRITERIA FOR TWSC INTERSECTIONS	
LEVEL OF SERVICE	**AVERAGE CONTROL DELAY (s/veh)**
A	**≤ 10**
B	**> 10 AND ≤ 15**
C	**> 15 AND ≤ 25**
D	**> 25 AND ≤ 35**
E	**> 35 AND ≤ 50**
F	**> 50**

Reference: Highway Capacity Manual 2000, Transportation Research Board, 2000.

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
Howard/Blinman/Bank	*(Signalized)*						
	Overall	**B**	**B**	**B**	**B**	**B**	**B**
Bank	EBL	C	C	B	B	B	B
Bank	EBT+R	C	B	C	C	C	C
Bank	WBL	C (DBL)	C (DBL)	B (SINGLE)	B (SINGLE)	C (SINGLE)	C (SINGLE)
Bank	WBT+R	B	B	A (DBL THRU + RT)	A (DBL THRU + RT)	B (DBL THRU + RT)	B (DBL THRU + RT)
Howard	NBL+T	C	C	C	C	C	C
Howard	NBR	A	A	A	A	A	A
Blinman	SBL+T	C	C	C	C	C	D
Blinman	SBR	A	A	A	A	A	A
Bank/Sparyard	*(Signalized)*						
	Overall	**A**	**A**	**A**	**A**	**A**	**A**
Bank	EBT+R	A	A	A	A	A	A
Bank	WBL+T	A	A	A	A	A	A
Sparyard	NBL+R	C	C	C	C	C	C
Bank/Tilley	*(Signalized)*						
	Overall	**A**	**A**	**A**	**A**	**A**	**A**
Bank	EBL+T	A	A	A	-	A	-
Bank	EBL	-	-	-	A	-	A
Bank	EBT	-	-	-	A	-	A
Bank	WBT+R	-	-	-	B	C	-
Tilley	SBL	D	C	C	C	C	C
Tilley	SBR	A	A	A	A	B	A
Tilley/Green	*(Signalized)*						
	Overall	**A**	**B**	**B**	**B**	**B**	**B**
Tilley	SEBT	C	C	C	-	-	-
Tilley	SEBL+T	-	-	-	C	C	C
Tilley	NWBT	C	C	B	-	-	C
Tilley	NWBR	-	-	-	-	-	B
Bank	NWBT+R	-	-	-	B	A	-
Green	SWBL	A	A	B	B	-	-
Green	SWBR	A	A	A	A	-	-
Green	SWBL+R	-	-	-	-	B	A
Bank/Pearl	*(Unsignalized)*						
Bank	NEBL+T	A	A	A	C	A	A
Pearl	SEBL	B	B	B	A	A	B
Bank	SWBT+R	-	-	-	A	A	-
Bank/Golden	*(Unsignalized)*						
Bank	NEBL+T	A	A	A	A	-	-
Bank	SWBT+R	-	-	-	A	-	-
Bank/State	*(Signalized)*						
	Overall	**A**	**A**	**A**	**B**	**C**	**A**
State	EBT	B	B	B	-	-	B
State	EBT+R	-	-	-	D	C	-
State	WBL+T	-	-	-	C	-	-
Bank	NBL+R	A	A	A	B	B	A
Bank	NBR	A	A	A	A	A	A
Water/S.State		*(Unsignalized)*	*(Unsignalized)*	*(Unsignalized)*	*(Unsignalized)*	*(Signalized)*	*(Unsignalized)*
	Overall	**-**	**-**	**-**	**-**	**B**	**-**
State	EBL	-	-	-	-	A	-
State	EBL+T	-	-	-	-	A	-
S. State	WBR	-	-	-	-	A	-
S. Water	NBT+R	-	-	-	-	B	-

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
Water/Atlantic		*(Unsignalized)*	*(Unsignalized)*	*(Signalized)*	*(Signalized)*	*(Signalized)*	*(Signalized)*
	Overall	**-**	**-**	**B**	**B**	**A**	**A**
Atlantic	EBL	C	C	C	-	D	C
Atlantic	EBL+R	-	-	-	D	-	-
Water	NBL+T	A	A	B	A	A	A
Water	SBT+R	-	-	-	B	-	-
Water/Parking Garage	*(Unsignalized)*						
Parking Access	EBL	E	E	E	E	C	B
Water	NBL+T	A	A	A	A	A	A
Water/Governor	*(Signalized)*						
	Overall	**D**	**C**	**C**	**C**	**C**	**C**
Governor	EBL	C	C	B	C	B	B
Governor	EBL+T	F	D	-	-	-	-
Governor	EBT+R	-	-	-	B	-	-
Governor	EBT	-	-	C	-	B	C
Governor	WBT+R	A	A	A	-	A	A
Governor	WBL+T+R	-	-	-	A	-	-
Water	NBL+T+R	C	C	D	D	D	D
Ferry/Governor	*(Signalized)*						
	Overall	**D**	**B**	**A**	**A**	**A**	**A**
Governor	EBL	D	D	D	D	D	-
Governor	EBR	D	B	A	A	A	A
Ferry	NBL+T	D	C	B	B	B	A
Ferry	SBT+R	B	B	STOP CONTROL	STOP CONTROL	STOP CONTROL	STOP CONTROL
Water/EO/Crystal	*(Signalized)*						
	Overall	**A**	**A**	**A**	**A**	**A**	**A**
Crystal	WBL	C	B	B	B	B	C
Crystal	WBR	B	A	A	B	A	A
Water	NBT+R	A	A	A	A	A	A
Eugene O'Neill	SBL	C	B	B	B	B	C
Eugene O'Neill	SBT	A	A	A	A	A	A
EO/Green/Pearl	*(Unsignalized)*						
	Overall	**-**	**-**	**-**	**B**	**-**	**-**
Pearl	SEBT+R	B	B	B	-	-	-
Pearl	SEBL+T+R	-	-	-	A	C	C
Pearl	NWBL	B	B	B	-	-	-
Pearl	NWBL+R	-	-	-	A	(RESTRICT LEFT TURN)	(RESTRICT LEFT TURN)
Pearl	NWBR	-	-	-	-	A	A
Eugene O'Neill	SWBL+T	-	-	-	B	A	A
Eugene O'Neill	SWBT	-	-	-	C	-	-
Green	NEBT+R	-	-	-	B	-	-
EO/Golden	*(Unsignalized)*						
	Overall	**-**	**-**	**-**	**B**	**-**	**-**
Golden	EBT+R	C	C	C	-	C	-
Golden	EBL+T+R	-	-	-	A	-	D
Golden	WBL+T	C	C	C	-	(RESTRICT LEFT TURN)	(RESTRICT LEFT TURN)
Golden	WBL+T+R	-	-	-	A	-	-
Golden	WBT+R	-	-	-	-	D	D
Eugene O'Neill	SBL+T+R	A	A	A	-	A	A
Eugene O'Neill	SBL+T	-	-	-	C	-	-
Eugene O'Neill	SBT+R	-	-	-	B	-	-
Eugene O'Neill	NBL+T+R	-	-	-	B	A	A

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
EO/State	*(Signalized)*						
	Overall	**B**	**B**	**B**	**B**	**C**	**B**
State	EBL	-	-	-	-	-	C
State	EBT+R	B	B	B	-	D	C
State	EBL+T+R	-	-	-	C	-	-
State	WBL	-	-	-	-	-	C
State	WBT+R	-	-	-	-	-	C
State	WBL+T	C	B	B	-	D	-
State	WBL+T+R	-	-	-	C	-	-
Eugene O'Neill	SBL+T+R	B	B	B	B	-	-
Eugene O'Neill	SBL	-	-	-	-	A	A
Eugene O'Neill	SBT+R	-	-	-	-	C	B
Eugene O'Neill	NBL	-	-	-	-	-	C
Eugene O'Neill	NBT+R	-	-	-	-	-	C
Eugene O'Neill	NBL+T+R	-	-	-	C	-	-
Eugene O'Neill	NBL+R	-	-	-	-	A	-
EO/Governor	*(Signalized)*						
	Overall	**D**	**C**	**C**	**D**	**C**	**C**
Governor	EBL	-	-	-	-	-	C
Governor	EBT+R	B	C	C	C	C	C (DBL THRU)
Governor	WBL	C	C	D	C	D	D
Governor	WBT	C	C	C (DBL THRU)	C (DBL THRU)	D (DBL THRU)	D (DBL THRU+RT)
Eugene O'Neill	SBL+T+R	-	-	-	-	-	C (DBL THRU)
Eugene O'Neill	SBL	C	B	B	C	B	-
Eugene O'Neill	SBT+R	E	C	C	D	C	-
Eugene O'Neill	NBL+T+R	-	-	-	-	-	D
Eugene O'Neill	NBL+R	-	-	-	A	-	-
Union/State	*(Signalized)*						
	Overall	**B**	**B**	**B**	**B**	**B**	**B**
State	EBL	-	-	-	-	-	
State	EBL+T+R	B	B	B	B	B	B
State	WBL+T+R	B	B	B	B	B	B
Union	NBL+T+R	B	B	B	B	B	B
Union	SBL+T+R	B	B	B	B	B	B
Union/Governor	*(Signalized)*						
	Overall	**C**	**C**	**C**	**C**	**B**	**B**
Governor	EBL	B	C	B	B	A	A
Governor	EBT+R	C	C	B (SNGL THRU + RT)	B (SNGL THRU + RT)	B (SNGL THRU + RT)	B (SNGL THRU + RT)
Governor	WBL	C	C	B	C	A	B
Governor	WBT	D	C	B (DBL THRU + RT)	C (DBL THRU + RT)	A (DBL THRU + RT)	B (DBL THRU + RT)
Governor	WBR	A	A	-	-	-	-
Union	NBL+T+R	C	C	C	C	C	C
Union	SBL+T	E	D	-	-	-	-
Union	SBR	A	A	-	-	-	-
Union	SBL+T+R	-	-	D	D	D	D
Huntington/State	*(Signalized)*						
	Overall	**B**	**A**	**A**	**B**	**B**	**B**
State	WBL	D	C	C	C	D	D
State	WBR	D	C	D	D	D	E
Huntington	NBT+R	B	B	B	B	B	C
Huntington	SBL	A	A	A	A	A	A
Huntington	SBT	A	A	A	A	A	A
Broad/ Governor/ Huntington	*(Signalized)*						
	Overall	**C**	**B**	**C**	**C**	**C**	**C**
Broad	EBL+T	C	C	D	D	D	D
Broad	EBR	C	C	C	C	C	D
Governor	WBL	C	C	C	C	D	D
Governor	WBT+R	C	C	C	C	C	D
Huntington	NBL	A	A	A	A	A	A
Huntington	NBT+R	A	A	A	A	B	B
Huntington	SBL	C	C	C	C	C	C
Huntington	SBT+R	C	B	C	C	D	D

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
Howard/Blinman/Bank	*(Signalized)*						
	Overall	**C**	**C**	**C**	**C**	**C**	**C**
Bank	EBL	E	D	B	B	B	B
Bank	EBT+R	D	C	C	C	C	D
Bank	WBL	D	C	C (SINGLE)	C	C (SINGLE)	C (SINGLE)
Bank	WBT+R	C	C	B (DBL THRU + RT)	B	B (DBL THRU + RT)	B (DBL THRU + RT)
Howard	NBL+T	D	D	D	D	D	D
Howard	NBR	A	A	A	A	A	A
Blinman	SBL+T	D	C	D	D	D	D
Blinman	SBR	A	A	A	A	A	A
Bank/Sparyard	*(Signalized)*						
	Overall	**A**	**A**	**A**	**A**	**B**	**B**
Bank	EBT+R	A	B	B	B	B	B
Bank	WBL+T	A	A	A	A	A	A
Sparyard	NBL+R	C	C	C	D	C	C
Bank/Tilley	*(Signalized)*						
	Overall	**A**	**A**	**A**	**A**	**B**	**A**
Bank	EBL+T	A	A	A	-	B	-
Bank	EBL	-	-	-	A	-	A
Bank	EBT	-	-	-	A	-	A
Bank	WBT+R	-	-	-	B	C	-
Tilley	SBL	D	C	C	D	C	C
Tilley	SBR	A	A	A	A	B	A
Tilley/Green	*(Signalized)*						
	Overall	**B**	**B**	**B**	**C**	**B**	**B**
Tilley	SEBT	D	C	C	-	-	-
Tilley	SEBL+T	-	-	-	C	C	D
Tilley	NWBT	C	C	C	-	-	B
Tilley	NWBR	-	-	-	-	-	B
Bank	NWBT+R	-	-	-	C	B	-
Green	SWBL	A	A	B	B	-	-
Green	SWBR	A	A	A	A	-	-
Green	SWBL+R	-	-	-	-	B	B
Bank/Pearl	*(Unsignalized)*						
Bank	NEBL+T	A	A	A	F	C	A
Pearl	SEBL	F	F	F	B	B	E
Bank	SWBT+R	-	-	-	B	A	-
Bank/Golden	*(Unsignalized)*						
Bank	NEBL+T	A	A	A	A	-	-
Bank	SWBT+R	-	-	-	A	-	-
Bank/State	*(Signalized)*						
	Overall	**A**	**A**	**A**	**B**	**C**	**A**
State	EBT	C	B	B	-	-	-
State	EBT+R	-	-	-	D	D	B
State	WBL+T	-	-	-	C	-	-
Bank	NBL+R	A	A	A	B	B	A
Bank	NBR	A	A	A	B	A	A
Water/S.State		*(Unsignalized)*	*(Unsignalized)*	*(Unsignalized)*	*(Unsignalized)*	*(Signalized)*	*(Unsignalized)*
	Overall	**-**	**-**	**-**	**-**	**B**	**-**
State	EBL	-	-	-	-	A	-
State	EBL+T	-	-	-	-	A	-
S. State	WBR	-	-	-	-	A	-
S. Water	NBT+R	-	-	-	-	C	-

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
Water/Atlantic		*(Unsignalized)*	*(Unsignalized)*	*(Signalized)*	*(Signalized)*	*(Signalized)*	*(Signalized)*
	Overall	**-**	**-**	**B**	**C**	**B**	**B**
Atlantic	EBL	E	E	C	-	D	C
Atlantic	EBL+R	-	-	-	D	-	-
Water	NBL+T	A	A	B	B	B	A
Water	SBT+R	-	-	-	C	-	-
Water/Parking Garage	*(Unsignalized)*						
Parking Access	EBL	F	F	F	F	F	C
Water	NBL+T	A	A	A	A	A	A
Water/Governor	*(Signalized)*						
	Overall	**F**	**D**	**D**	**F**	**D**	**C**
Governor	EBL	D	D	D	F	D	C
Governor	EBL+T	F	F	-	-	-	-
Governor	EBT+R	-	-	-	B	-	-
Governor	EBT	-	-	B	-	B	C
Governor	WBT+R	A	A	A	-	A	A
Governor	WBL+T+R	-	-	-	A	-	-
Water	NBL+T+R	F	C	D	F	D	C
Ferry/Governor	*(Signalized)*						
	Overall	**B**	**C**	**A**	**A**	**B**	**A**
Governor	EBL	D	C	C	D	D	-
Governor	EBR	A	B	A	A	A	A
Ferry	NBL+T	C	D	B	B	B	B
Ferry	SBT+R	B	B	STOP CONTROL	STOP CONTROL	STOP CONTROL	STOP CONTROL
Water/EO/Crystal	*(Signalized)*						
	Overall	**A**	**A**	**A**	**A**	**A**	**A**
Crystal	WBL	C	C	C	C	B	C
Crystal	WBR	C	B	B	B	B	B
Water	NBT+R	A	A	A	A	B	A
Eugene O'Neill	SBL	C	C	C	C	C	C
Eugene O'Neill	SBT	A	A	A	A	A	A
EO/Green/Pearl	*(Unsignalized)*						
	Overall	**-**	**-**	**-**	**C**	**-**	**-**
Pearl	SEBT+R	C	C	C	-	-	-
Pearl	SEBL+T+R	-	-	-	B	C	D
Pearl	NWBL	C	C	C	-	-	-
Pearl	NWBL+R	-	-	-	B	(RESTRICT LEFT TURN)	(RESTRICT LEFT TURN)
Pearl	NWBR	-	-	-	-	A	-
Eugene O'Neill	SWBL+T	A	A	A	B	A	A
Eugene O'Neill	SWBT	-	-	-	C	-	-
Green	NEBT+R	-	-	-	C	-	-
EO/Golden	*(Unsignalized)*						
	Overall	**-**	**-**	**-**	**B**	**-**	**-**
Golden	EBT+R	C	C	C	-	D	-
Golden	EBL+T+R	-	-	-	A	-	F
Golden	WBL+T	C	C	C	-	(RESTRICT LEFT TURN)	(RESTRICT LEFT TURN)
Golden	WBL+T+R	-	-	-	A	-	-
Golden	WBT+R	-	-	-	-	D	-
Eugene O'Neill	SBL+T+R	A	A	A	-	A	A
Eugene O'Neill	SBL+T	-	-	-	B	-	-
Eugene O'Neill	SBT+R	-	-	-	B	-	-
Eugene O'Neill	NBL+T+R	-	-	-	C	A	B

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
EO/State	*(Signalized)*						
	Overall	**B**	**B**	**B**	**C**	**C**	**C**
State	EBL	-	-	-	-	-	C
State	EBT+R	B	B	B	-	D	C
State	EBL+T+R	-	-	-	D	-	-
State	WBL	-	-	-	-	-	C
State	WBT+R	-	-	-	-	-	C
State	WBL+T	C	C	C	-	D	-
State	WBL+T+R	-	-	-	D	-	-
Eugene O'Neill	SBL+T+R	B	B	B	B	-	-
Eugene O'Neill	SBL	-	-	-	-	A	A
Eugene O'Neill	SBT+R	-	-	-	-	C	B
Eugene O'Neill	NBL	-	-	-	-	-	C
Eugene O'Neill	NBT+R	-	-	-	-	-	C
Eugene O'Neill	NBL+T+R	-	-	-	C	-	-
Eugene O'Neill	NBL+R	-	-	-	-	B	-
EO/Governor	*(Signalized)*						
	Overall	**C**	**C**	**C**	**D**	**C**	**C**
Governor	EBL	-	-	-	-	-	D
Governor	EBT+R	C	C	C	C	C	B
Governor	WBL	C	C	B	C	C	D
Governor	WBT	C	B	B (DBL THRU)	C (DBL THRU)	B (DBL THRU)	D (DBL THRU+RT)
Eugene O'Neill	SBL+T+R	-	-	-	-	-	C (DBL THRU)
Eugene O'Neill	SBL	B	B	C	E	B	-
Eugene O'Neill	SBT+R	C	C	C	D	C	-
Eugene O'Neill	NBL+T+R	-	-	-	-	-	D
Eugene O'Neill	NBL+R	-	-	-	A	-	-
Union/State	*(Signalized)*						
	Overall	**B**	**B**	**B**	**B**	**B**	**B**
State	EBL+T+R	B	B	B	B	B	B
State	WBL+T+R	B	B	B	B	B	B
Union	NBL+T+R	B	B	B	B	B	B
Union	SBL+T+R	B	B	B	B	B	B
Union/Governor	*(Signalized)*						
	Overall	**C**	**C**	**B**	**B**	**B**	**B**
Governor	EBL	B	C	A	A	A	A
Governor	EBT+R	C	B	B (SNGL THRU + RT)	B (SNGL THRU + RT)	B (SNGL THRU + RT)	B (SNGL THRU + RT)
Governor	WBL	C	C	B	A	A	A
Governor	WBT	D	C	A (DBL THRU + RT)	A (DBL THRU + RT)	A (DBL THRU + RT)	A (DBL THRU + RT)
Governor	WBR	A	A	-	-	-	-
Union	NBL+T+R	D	C	D	D	D	D
Union	SBL+T	C	C	-	-	-	-
Union	SBR	A	A	-	-	-	-
Union	SBL+T+R	-	-	D	D	D	D
Huntington/State	*(Signalized)*						
	Overall	**B**	**B**	**C**	**C**	**C**	**C**
State	WBL	D	C	D	D	D	D
State	WBR	D	D	D	D	D	E
Huntington	NBT+R	C	C	C	C	C	C
Huntington	SBL	A	B	A	A	A	A
Huntington	SBT	A	A	A	A	A	A
Broad/ Governor/ Huntington	*(Signalized)*						
	Overall	**C**	**C**	**C**	**C**	**C**	**C**
Broad	EBL+T	D	D	D	D	D	D
Broad	EBR	D	D	D	D	D	D
Governor	WBL	D	E	D	D	D	E
Governor	WBT+R	D	D	D	D	D	D
Huntington	NBL	A	A	A	A	A	A
Huntington	NBT+R	A	B	C	C	C	C
Huntington	SBL	F	F	D	D	D	D
Huntington	SBT+R	C	C	D	D	D	D

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
Howard/Blinman/Bank	*(Signalized)*						
	Overall	**C**	**C**	**B**	**B**	**B**	**B**
Bank	EBL	D	D	B	B	B	B
Bank	EBT+R	C	C	C	C	C	C
Bank	WBL	C	C	B (SINGLE)	B	B (SINGLE)	B (SINGLE)
Bank	WBT+R	C	B	B (DBL THRU + RT)	B	B (DBL THRU + RT)	B (DBL THRU + RT)
Howard	NBL+T	C	C	C	C	D	D
Howard	NBR	A	A	A	A	A	A
Blinman	SBL+T	C	C	C	C	C	C
Blinman	SBR	A	A	A	A	A	A
Bank/Sparyard	*(Signalized)*						
	Overall	**A**	**A**	**A**	**A**	**A**	**A**
Bank	EBT+R	A	A	B	A	A	A
Bank	WBL+T	A	A	A	A	A	A
Sparyard	NBL+R	C	C	C	C	C	C
Bank/Tilley	*(Signalized)*						
	Overall	**A**	**A**	**A**	**A**	**A**	**A**
Bank	EBL+T	A	A	A	-	A	-
Bank	EBL	-	-	-	A	-	A
Bank	EBT	-	-	-	A	-	A
Bank	WBT+R	-	-	-	B	C	-
Tilley	SBL	D	C	C	C	C	C
Tilley	SBR	A	A	A	A	A	A
Tilley/Green	*(Signalized)*						
	Overall	**A**	**B**	**B**	**B**	**B**	**B**
Tilley	SEBT	D	C	C	-	-	-
Tilley	SEBL+T	-	-	-	C	C	C
Tilley	NWBT	C	C	B	-	-	C
Tilley	NBR	-	-	-	-	-	B
Bank	NWBT+R	-	-	-	B	B	-
Green	SWBL	A	A	B	A	-	-
Green	SWBR	A	A	A	A	-	-
Green	SWBL+R	-	-	-	-	B	B
Bank/Pearl	*(Unsignalized)*						
Bank	NEBL+T	A	A	A	D	B	A
Pearl	SEBL	D	D	D	B	A	C
Bank	SWBT+R	-	-	-	A	A	-
Bank/Golden	*(Unsignalized)*						
Bank	NEBL+T	A	A	A	A	-	-
Bank	SWBT+R	-	-	-	A	-	-
Bank/State	*(Signalized)*						
	Overall	**A**	**A**	**A**	**B**	**C**	**A**
State	EBT	B	B	B	-	-	B
State	EBT+R	-	-	-	D	D	-
State	WBL+T	-	-	-	D	-	-
Bank	NBL+R	A	A	A	B	C	A
Bank	NBR	A	A	A	A	A	A
Water/S.State		*(Unsignalized)*	*(Unsignalized)*	*(Unsignalized)*	*(Unsignalized)*	*(Signalized)*	*(Unsignalized)*
	Overall	**-**	**-**	**-**	**-**	**B**	**-**
State	EBL	-	-	-	-	A	-
State	EBL+T	-	-	-	-	A	-
S. State	WBR	-	-	-	-	A	-
S. Water	NBT+R	-	-	-	-	C	-

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
Water/Atlantic	*(Unsignalized)*	*(Unsignalized)*	*(Unsignalized)*	*(Signalized)*	*(Signalized)*	*(Signalized)*	*(Signalized)*
Overall	**-**	**-**	**A**	**B**	**A**	**A**
Atlantic	EBL	C	C	C	-	D	C
Atlantic	EBL+R	-	-	-	D	-	-
Water	NBL+T	A	A	A	A	A	A
Water	SBT+R	-	-	-	B	-	-
Water/Parking Garage	*(Unsignalized)*						
Parking Access	EBL	F	F	F	F	E	C
Water	NBL+T	A	A	A	A	A	A
Water/Governor	*(Signalized)*						
Overall	**F**	**D**	**C**	**E**	**C**	**C**
Governor	EBL	D	C	C	F	C	B
Governor	EBL+T	F	F	-	-	-	-
Governor	EBT+R	-	-	-	B	-	-
Governor	EBT	-	-	B	-	B	C
Governor	WBT+R	A	A	A	-	A	A
Governor	WBL+T+R	-	-	-	A	-	-
Water	NBL+T+R	D	D	C	E	C	D
Ferry/Governor	*(Signalized)*						
Overall	**E**	**C**	**A**	**A**	**A**	**A**
Governor	EBL	D	D	C	D	C	-
Governor	EBR	E	B	A	A	A	A
Ferry	NBL+T	E	D	B	B	B	A
Ferry	SBT+R	B	B	STOP CONTROL	STOP CONTROL	STOP CONTROL	STOP CONTROL
Water/EO/Crystal	*(Signalized)*						
Overall	**A**	**A**	**A**	**A**	**A**	**A**
Crystal	WBL	C	B	B	B	B	C
Crystal	WBR	C	B	B	B	B	B
Water	NBT+R	A	A	A	A	A	A
Eugene O'Neill	SBL	C	B	B	B	B	C
Eugene O'Neill	SBT	A	A	A	A	A	A
EO/Green/Pearl	*(Unsignalized)*						
Overall	**-**	**-**	**-**	**B**	**-**	**-**
Pearl	SEBT+R	B	B	B	-	-	-
Pearl	SEBL+T+R	-	-	-	A	C	C
Pearl	NWBL	C	C	C	-	-	-
Pearl	NWBL+R	-	-	-	A	(RESTRICT LEFT TURN)	(RESTRICT LEFT TURN)
Pearl	NWBR	-	-	-	-	A	B
Eugene O'Neill	SWBL+T	A	A	A	B	A	A
Eugene O'Neill	SWBT	-	-	-	B	-	-
Green	NEBT+R	-	-	-	B	-	-
EO/Golden	*(Unsignalized)*						
Overall	**-**	**-**	**-**	**B**	**-**	**-**
Golden	EBT+R	C	C	C	-	C	-
Golden	EBL+T+R	-	-	-	A	-	D
Golden	WBL+T	C	C	C	-	(RESTRICT LEFT TURN)	(RESTRICT LEFT TURN)
Golden	WBL+T+R	-	-	-	A	-	-
Golden	WBT+R	-	-	-	-	D	D
Eugene O'Neill	SBL+T+R	A	A	A	-	A	A
Eugene O'Neill	SBL+T	-	-	-	C	-	-
Eugene O'Neill	SBT+R	-	-	-	B	-	-
Eugene O'Neill	NBL+T+R	-	-	-	B	A	A

		SYNCHRO 9.0 LOS RESULTS					
		ONE-WAY ANALYSIS			TWO-WAY ANALYSIS		
		No Improvements	With Signal Timing Changes Only	Additionally with Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements	Full Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Partial Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)	Preferred Two-Way Conversion (With Signal Phasing Changes, Lane Changes, and/or Signal Equipment Improvements)
EO/State	*(Signalized)*						
	Overall	**C**	**C**	**C**	**C**	**C**	**C**
State	EBL	-	-	-	-	-	C
State	EBT+R	C	C	C	-	D	C
State	EBL+T+R	-	-	-	D	-	-
State	WBL	-	-	-	-	-	C
State	WBT+R	-	-	-	-	-	D
State	WBL+T	C	C	C	-	D	-
State	WBL+T+R	-	-	-	D	-	-
Eugene O'Neill	SBL+T+R	B	B	B	B	-	-
Eugene O'Neill	SBL	-	-	-	-	B	A
Eugene O'Neill	SBT+R	-	-	-	-	D	B
Eugene O'Neill	NBL	-	-	-	-	-	C
Eugene O'Neill	NBT+R	-	-	-	-	-	D
Eugene O'Neill	NBL+T+R	-	-	-	C	-	-
Eugene O'Neill	NBL+R	-	-	-	-	A	-
EO/Governor	*(Signalized)*						
	Overall	**C**	**C**	**C**	**C**	**C**	**C**
Governor	EBL	-	-	-	-	-	D
Governor	EBT+R	C	C	B	C	C	B (DBL THRU)
Governor	WBL	D	C	C	C	C	D
Governor	WBT	C	B	B (DBL THRU)	B	B (DBL THRU)	C (DBL THRU+RT)
Eugene O'Neill	SBL+T+R	-	-	-	-	-	C (DBL THRU)
Eugene O'Neill	SBL	B	B	C	C	C	-
Eugene O'Neill	SBT+R	C	C	C	C	C	-
Eugene O'Neill	NBL+T+R	-	-	-	-	-	D
Eugene O'Neill	NBL+R	-	-	-	A	-	-
Union/State	*(Signalized)*						
	Overall	**B**	**B**	**B**	**B**	**B**	**B**
State	EBL+T+R	B	B	B	B	B	B
State	WBL+T+R	B	B	B	A	B	B
Union	NBL+T+R	B	B	B	B	B	B
Union	SBL+T+R	B	B	B	B	B	B
Union/Governor	*(Signalized)*						
	Overall	**C**	**C**	**B**	**B**	**B**	**B**
Governor	EBL	B	C	A	A	A	A
Governor	EBT+R	C	B	C (SNGL THRU + RT)	B (SNGL THRU + RT)	B (SNGL THRU + RT)	B (SNGL THRU + RT)
Governor	WBL	C	C	A	A	A	A
Governor	WBT	D	C	A (DBL THRU + RT)	A (DBL THRU + RT)	A (DBL THRU + RT)	A (DBL THRU + RT)
Governor	WBR	A	A	-	-	-	-
Union	NBL+T+R	C	C	C	D	D	D
Union	SBL+T	D	C	-	-	-	-
Union	SBR	A	A	-	-	-	-
Union	SBL+T+R	-	-	D	D	D	D
Huntington/State	*(Signalized)*						
	Overall	**B**	**B**	**B**	**B**	**B**	**B**
State	WBL	D	C	D	C	D	D
State	WBR	D	C	D	D	D	E
Huntington	NBT+R	C	B	C	B	C	C
Huntington	SBL	A	A	A	A	A	A
Huntington	SBT	A	A	A	A	A	A
Broad/ Governor/ Huntington	*(Signalized)*						
	Overall	**C**	**C**	**C**	**C**	**C**	**C**
Broad	EBL+T	D	C	D	D	D	D
Broad	EBR	D	C	C	C	C	D
Governor	WBL	D	C	D	C	D	D
Governor	WBT+R	D	C	C	C	C	D
Huntington	NBL	A	A	A	A	A	A
Huntington	NBT+R	A	A	B	B	A	B
Huntington	SBL	C	C	C	C	D	C
Huntington	SBT+R	C	C	D	C	D	D