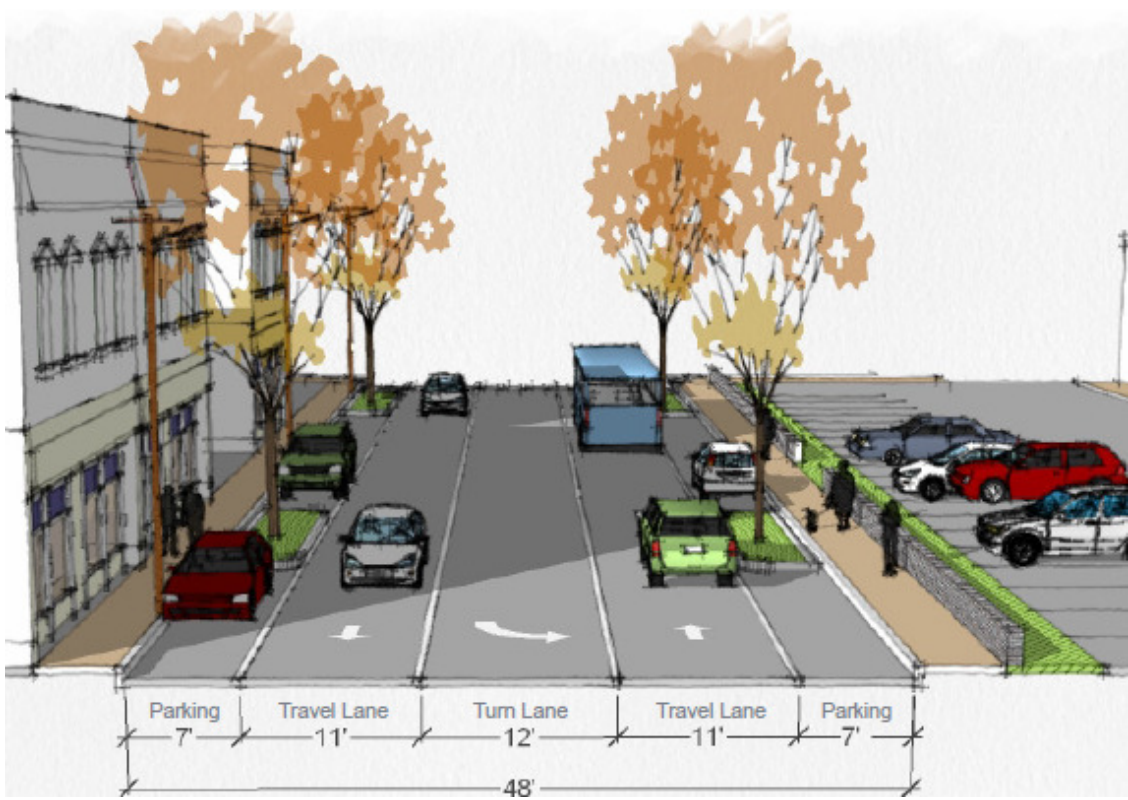




# US Route 1

# Greenwich/Stamford Operational Improvements Study

# Volume Three: Future Conditions and Implementation Plan

## October 2011



URBAN ENGINEERS Formulating Excellence

SWRPA

# Table of Contents – US Route 1 Greenwich/Stamford Operational Improvements Study

## VOLUME 3: Future Conditions and Implementation Plan



## Appendices

# Table of Contents – US Route 1 Greenwich/Stamford Operational Improvements Study

## VOLUME 1: Existing Conditions

## Appendices

# Table of Contents – US Route 1 Greenwich/Stamford Operational Improvements Study

## VOLUME 2: Public Involvement



## Appendices

# Introduction

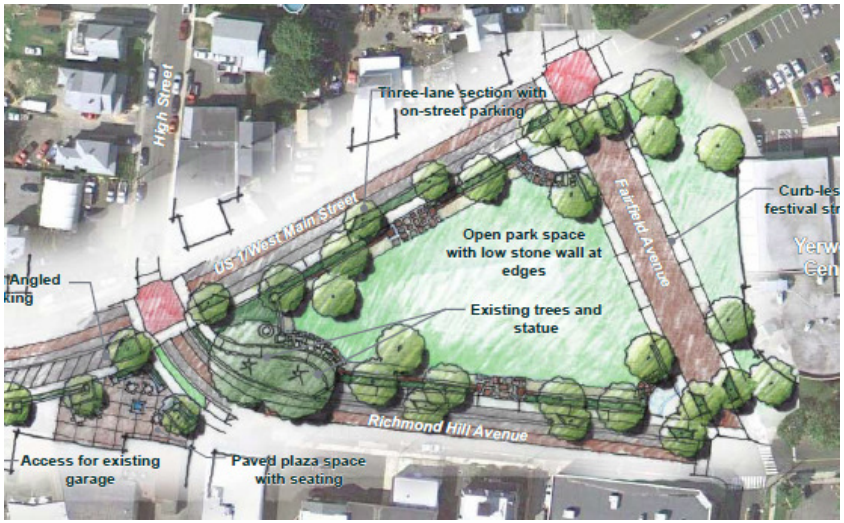
## 1.1 Introduction

The third volume of the US Route 1 Greenwich/Stamford Operational Improvements Study focuses on the Future Conditions Operational Analysis and an Implementation Plan for the Route 1 corridor. Anticipated future conditions were tested using the traffic simulation model developed during the existing conditions assessment phase of the project. The intent of this final phase of the project was to present an implementation plan of recommended improvements, that are feasible and reasonable and have community support for each section of the corridor.

***Section 2: Future Conditions Operational Analysis*** includes a summary of the development of Design volumes, the No Build analysis, and the Build analysis. The Design volumes are used for the No Build and Build operations analyses. Results are provided in summary tables with details in the appendices.

***Section 3: Evaluation Matrix and the Implementation Plan*** include analysis and prioritization of the design concepts from an implementation perspective. The evaluation matrix identifies the strengths and weaknesses of each proposed concept based on four categories: benefits, impacts, traffic analysis and implementation. The evaluation matrix identifies a next step for each concept. The implementation plan organizes and prioritizes the concepts

The purpose of the study and the proposed implementation plan is to develop a community supported, coordinated plan to improve traffic operations on Route 1, improve pedestrian safety, manage access, accommodate transit and enhance the corridor's economic potential.




*Project Purpose and Objectives:*

- *Enhance operations of Route 1 Corridor,*
- *Improve safety for all users,*
- *Support economic development,*
- *Actively involve stakeholders,*
- *Develop a short and long term operational Improvements Plan.*

# Future Conditions Operational Analysis

## 2.1 Future Conditions Methodology

Design traffic volumes were developed for use in the analysis of future traffic conditions for the study corridor. The Design Volumes were developed using multiple sets of available data including 2007 intersection turning movement counts, 2008 ConnDOT Automatic Traffic Recorder (ATR) counts, 2010 intersection turning movement counts and anticipated development information. The process used to develop the traffic volumes is outlines below and in ***Figure 2.1***.

**STEP 1**: Existing Volumes - 2010 turning movement counts were combined with 2007 counts conducted by DKS Associates (see ***Volume 1: Section 7.1*** for detailed description).

**STEP 2**: Base Volumes – Existing Volumes were combined with 2008 ConnDOT ATR counts. The balancing effort was a conservative approach where Existing Volumes were utilized unless 2008 ConnDOT counts showed higher volumes. This procedure was developed in coordination with ConnDOT, at a meeting held on August 4th, 2010 (see ***Appendix A*** for meeting notes). In locations where 2008 ConnDOT counts were higher, the surrounding intersections were balanced upwards distributing the excess volume based on 2010 turning movement split percentages. In Stamford, the Existing Volumes were generally higher than the 2008 ConnDOT counts; therefore, no adjustments were necessary. See ***Appendix A*** for a memorandum with a detailed explanation of the Base Volumes development titled *Base Traffic Volumes*, and Base Volume figures.

**STEP 3**: Design Volumes - Investigation into proposed developments within the study area was conducted and site generated volumes were added to the Base Volumes to create the Design Volumes. ***Appendix A*** contains information on the proposed developments in the project area. These Design Volumes (see ***Appendix A***) will be used to conduct the No Build and Build alternatives analysis. Examples of the difference between the existing traffic volumes and design traffic volumes are provided in ***Table 2.1***. A more comprehensive comparison of traffic volumes is included in ***Appendix A***.

***Table 2.1: Sample Traffic Volume Comparison***

| Peak | Intersecting Street | Direction | Existing Volume | Design Volume | % Increase |
|---|---|---|---|---|---|
| AM | Indian Field Dr | NB | 701 | 854 | 22 |
| | Edgewood St | SB | 739 | 822 | 11 |
| MID | Old Church St | NB | 788 | 851 | 8 |
| | Maple Ave | SB | 945 | 1065 | 13 |
| PM | Overlook Dr | NB | 1250 | 1350 | 8 |

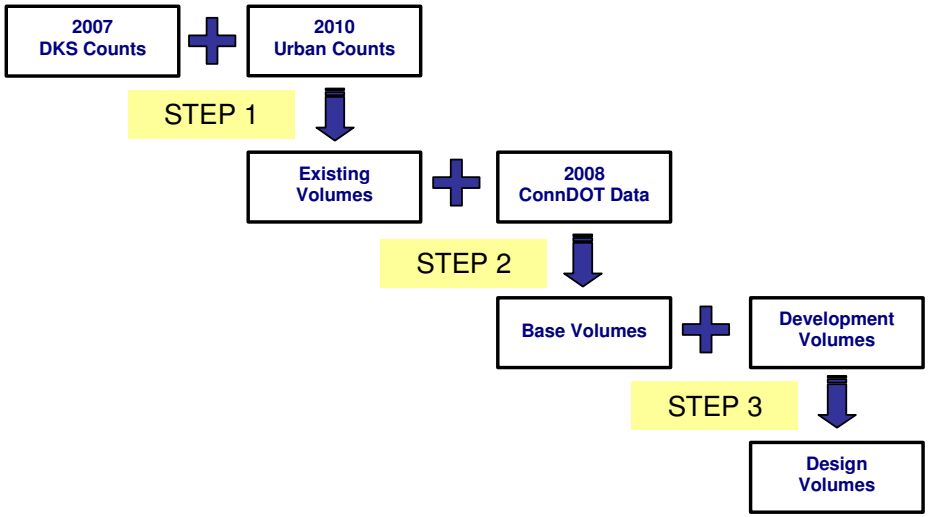



***Figure 2.1: Future Traffic Volumes Development Steps***

## 2.2 No Build Conditions Operational Analysis

The Existing conditions simulation model, developed and calibrated during Phase 1 of the project, was used as a basis for creating the No Build traffic model. The model was updated to include the Design Volumes, and minor traffic signal timing improvements. There are no infrastructure improvements included in this model, and all locations with exclusive pedestrian phasing remain. The No Build traffic model results are based on an average of five one-hour SimTraffic simulation runs. The results of the simulations were compiled and summarized by roadway section (as described in **Volume 1: Section 7.3**). The simulation Level of Service (LOS) results for all three peak periods (AM, Midday and PM) are tabulated by roadway section, intersection approach and overall intersection for each signalized intersection (See ***Appendix B*** for explanation of levels of service). ***Appendix B*** contains detailed LOS, delay, travel time and network results for each peak hour.

**Section 1:** ***Western Junior Highway to Brookside Drive***

The No Build simulation results for Section 1 indicate that Suburban Greenwich would be expected to operate with generally acceptable traffic conditions with overall intersection LOS D or better at all intersections with the exception of the Edgewood Drive/Prospect Street intersection which would operate at LOS F in the AM peak period. This intersection changed from a LOS D (54 sec/veh) in the existing model to a LOS F (89 sec/veh) in the No Build model.

The Section 1 travel time results for the Existing and No Build conditions are shown in ***Table 2.2***. A comparison of the simulation travel time results indicate that Section 1 would experience a significant increase in northbound travel time during the AM peak hour.

***Table 2.2: Section 1 Existing & No Build Travel Time Results***

| Peak | Direction | Existing | | No Build | |
|---|---|---|---|---|---|
| | | Time (min) | Speed (mph) | Time (min) | Speed (mph) |
| AM | NB | 3.7 | 21.6 | 5.0 | 16.1 |
| | SB | 3.3 | 24.6 | 3.7 | 21.6 |
| MID | NB | 3.6 | 22.2 | 3.7 | 22.1 |
| | SB | 3.2 | 25.3 | 3.3 | 24.7 |
| PM | NB | 3.9 | 20.9 | 3.6 | 22.3 |
| | SB | 3.0 | 26.9 | 3.4 | 23.8 |

***Table 2.3: No Build Conditions Section 1 LOS Results***

**a. Results for AM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Western Jr Highway | A | A | C | - | A |
| Weaver St / Holly Hill Ln | C | B | C | E (72) | C |
| Valley Dr | B | A | - | C | A |
| Old Post Rd #3 | - | - | - | B | - |
| Harold Ave | A | A | B | B | A |
| Old Post Rd #2 / Josephine Evaristo Ave | - | - | C | C | - |
| Oak St / Columbus Ave | - | - | C | B | - |
| Edgewood Dr / Prospect St | F (99) | F (95) | E (58) | E (57) | F (89) |
| Brookside Dr | B | B | E (58) | E (57) | C |

**b. Results for MIDDAY Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Western Jr Highway | A | A | B | - | A |
| Weaver St / Holly Hill Ln | C | B | B | C | C |
| Valley Dr | B | A | - | C | B |
| Old Post Rd #3 | - | - | - | B | - |
| Harold Ave | A | A | B | C | A |
| Old Post Rd #2 / Josephine Evaristo Ave | - | - | C | E (40) | - |
| Oak St / Columbus Ave | - | - | A | D | - |
| Edgewood Dr / Prospect St | C | C | D | C | C |
| Brookside Dr | B | B | D | D | C |

**c. Results for PM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Western Jr Highway | A | A | B | - | A |
| Weaver St / Holly Hill Ln | B | B | D | E (62) | C |
| Valley Dr | A | A | - | C | B |
| Old Post Rd #3 | - | - | - | A | - |
| Harold Ave | A | A | B | B | A |
| Old Post Rd #2 / Josephine Evaristo Ave | - | - | C | D | - |
| Oak St / Columbus Ave | - | - | B | C | - |
| Edgewood Dr / Prospect St | D | E (56) | E (57) | D | D |
| Brookside Dr | B | B | D | E (57) | C |

**Section 2: *Dearfield Drive/Field Point Road to Old Church Road***

The No Build simulation results for Section 2 indicate that Downtown Greenwich has generally heavier traffic than Section 1, with various movements and intersections operating near or at capacity. The key problem area in Section 2 is the Whole Foods Market area between the Church St/Mason St and Maher Avenue/Millbank Avenue/Maple Avenue intersections. When comparing the Existing conditions analysis to the No Build analysis, the Chuch Street/Mason Street intersection increased from LOS D to LOS E during the Midday peak hour with all approaches operating at LOS E with the exception of the northbound direction. During the PM peak hour the Maple Avenue/Millbank Avenue intersection increased from LOS E to LOS F with the southbound direction operating at almost two minutes of delay. Also during the PM peak hour the Church Street/Mason Street intersection increased from LOS D to LOS E.

The Section 2 travel time results for the Existing and No Build conditions are shown in ***Table 2.4***. The simulation travel time results indicate that Section 2 experienced an increase in southbound travel time during the PM peak hour which is consistent with the increased delay results seen at several intersections.

***Table 2.4: Section 2 Existing & No Build Travel Time Results***

| Peak | Direction | Existing | | No Build | |
|---|---|---|---|---|---|
| | | Time (min) | Speed (mph) | Time (min) | Speed (mph) |
| AM | NB | 4.0 | 16.1 | 4.1 | 15.9 |
| | SB | 5.0 | 13.0 | 4.7 | 13.9 |
| MID | NB | 5.1 | 12.7 | 5.3 | 12.3 |
| | SB | 4.8 | 13.6 | 5.3 | 12.3 |
| PM | NB | 6.0 | 10.9 | 5.6 | 11.6 |
| | SB | 6.0 | 10.8 | 6.8 | 9.6 |

***Table 2.5: No Build Conditions Section 2 Results***

**a. Results for AM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Dearfield Dr / Field Point Dr | C | C | D | D | D |
| Benedict Place | A | A | E (56) | D | B |
| Greenwich Ave / Lafayette Place | C | C | - | E (58) | C |
| Church St / Mason St | C | D | D | D | D |
| Maher Ave | B | A | - | E (73) | B |
| Maple Ave / Millbank Ave | C | D | E (77) | D | D |
| Old Church Rd | A | B | D | C | B |

**b. Results for MIDDAY Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Dearfield Dr / Field Point Dr | C | C | E (63) | D | D |
| Benedict Place | A | B | D | D | C |
| Greenwich Ave / Lafayette Place | E (67) | C | - | E (64) | D |
| Church St / Mason St | D | E (66) | E (57) | E (68) | E (58) |
| Maher Ave | C | A | - | E (67) | B |
| Maple Ave / Millbank Ave | D | D | E (64) | D | D |
| Old Church Rd | A | C | C | C | B |

**c. Results for PM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Dearfield Dr / Field Point Dr | D | C | E (76) | D | D |
| Benedict Place | A | A | D | D | B |
| Greenwich Ave / Lafayette Place | D | C | - | E (56) | D |
| Church St / Mason St | D | F (107) | E (56) | E (61) | E (71) |
| Maher Ave | E (57) | A | - | E (70) | C |
| Maple Ave / Millbank Ave | E (75) | F (104) | E (75) | D | F (82) |
| Old Church Rd | B | C | F (85) | D | C |

**Section 3: *Overlook Drive to River Road***

The No Build simulation results for Section 3 indicate that the Cos Cob area would continue to experience congestion in the Hub area particularly at the intersection of Strickland Road/Taylor Drive/Cross Lane during the PM peak period. Traffic volumes through this area did not noticeably increase between the Existing conditions traffic volumes and the No Build (Design) traffic volumes. Signal timing changes helped improve operations in some locations; however, other locations experienced a noticeable increase in delay, for example, Indian Field Road and Strickland Road/Taylor Drive/Cross Lane intersections during the AM peak hour where the southbound Route 1 direction increased from LOS C to LOS D, and Taylor Drive increased from LOS D to LOS E.

The Section 3 travel time results for the Existing and No Build conditions are shown in ***Table 2.6***. The simulation travel time results indicate that Section 3 has a minor increase in travel time during the AM peak hour which is likely due to the increased delay results at the Indian Field Road and Strickland Road/Taylor Drive/Cross Lane intersections.

***Table 2.6: Section 3 Existing & No Build Travel Time Results***

| Peak | Direction | Existing | | No Build | |
|---|---|---|---|---|---|
| | | Time (min) | Speed (mph) | Time (min) | Speed (mph) |
| AM | NB | 5.5 | 16.3 | 5.8 | 15.5 |
| | SB | 4.9 | 18.3 | 5.4 | 16.7 |
| MID | NB | 5.4 | 16.5 | 5.7 | 15.6 |
| | SB | 5.9 | 15.2 | 5.8 | 15.3 |
| PM | NB | 6.6 | 13.6 | 6.2 | 14.4 |
| | SB | 6.7 | 13.4 | 5.1 | 17.7 |

***Table 2.7: No Build Conditions Section 3 Results***

**a. Results for AM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | NW | ALL |
|---|---|---|---|---|---|---|
| Overlook Dr | A | A | C | - | - | A |
| Hillside Rd | C | C | - | D | - | C |
| Old Post Rd #6 / Indian Field Rd | D | D | C | E (69) | - | D |
| Strickland Rd / Taylor Dr / Cross ln | D | D | C | E (70) | E (59) | D |
| Sinawoy Rd | A | B | - | C | - | B |
| Orchard St / Mead Ave | C | D | D | D | - | D |
| River Rd | D | C | C | D | - | C |

**b. Results for MIDDAY Peak Hour**

| Intersecting Street | NB | SB | WB | EB | NW | ALL |
|---|---|---|---|---|---|---|
| Overlook Dr | A | A | B | - | - | A |
| Hillside Rd | B | B | - | D | - | B |
| Old Post Rd #6 / Indian Field Rd | C | D | C | C | - | C |
| Strickland Rd / Taylor Dr / Cross ln | E (61) | D | C | E (58) | E (57) | D |
| Sinawoy Rd | B | C | - | C | - | B |
| Orchard St / Mead Ave | C | D | D | D | - | C |
| River Rd | B | C | C | D | - | C |

**c. Results for PM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | NW | ALL |
|---|---|---|---|---|---|---|
| Overlook Dr | A | B | C | - | - | B |
| Hillside Rd | B | B | - | D | - | B |
| Old Post Rd #6 / Indian Field Rd | D | C | C | D | - | C |
| Strickland Rd / Taylor Dr / Cross ln | D | D | D | E (73) | F (107) | D |
| Sinawoy Rd | B | A | - | C | - | B |
| Orchard St / Mead Ave | D | A | E (56) | E (60) | - | C |
| River Rd | D | C | D | D | - | D |

### Section 4: Riverside Lane to Havemeyer Lane/Laddins Rock Road

The No Build simulation results for Section 4 indicate that the I-95 Exit 5 interchange is the primary problem area within the section, operating at LOS E for all three peak periods with failing approaches during each peak. Section 4 in the No Build condition generally operates similar to the Existing conditions with minor increases in travel time results for the AM and MID peak periods (***Table 2.8***).

***Table 2.8: Section 4 Existing & No Build Travel Time Results***

| Peak | Direction | Existing | | No Build | |
|---|---|---|---|---|---|
| | | Time (min) | Speed (mph) | Time (min) | Speed (mph) |
| **AM** | **NB** | 5.7 | 15.7 | 6.0 | 14.8 |
| | **SB** | 4.8 | 18.6 | 4.8 | 18.6 |
| **MID** | **NB** | 5.0 | 17.9 | 4.9 | 18.2 |
| | **SB** | 4.5 | 19.8 | 4.7 | 19.2 |
| **PM** | **NB** | 5.4 | 16.6 | 5.3 | 16.8 |
| | **SB** | 5.3 | 16.9 | 5.2 | 17.4 |

***Table 2.9: No Build Conditions Section 4 Results***

**a. Results for AM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | SW | ALL |
|---|---|---|---|---|---|---|
| Riverside Ln | D | C | C | D | - | D |
| Sheep Hiill Rd / Lockwood Ln | C | C | C | D | - | C |
| I-95 Exit 5 NB/SB/ Neil Ln | D | E (64) | F (92) | E (78) | E (60) | E (66) |
| Sound Beach Ave | B | C | C | E (59) | - | C |
| Rockmere Ave | A | A | D | B | - | A |
| Wendle Place | A | A | D | B | - | A |
| Havemeyer Ln / Laddins Rock | C | C | E (56) | E (73) | - | D |

**b. Results for MIDDAY Peak Hour**

| Intersecting Street | NB | SB | WB | EB | SW | ALL |
|---|---|---|---|---|---|---|
| Riverside Ln | C | B | C | D | - | C |
| Sheep Hiill Rd / Lockwood Ln | C | C | D | E (68) | - | C |
| I-95 Exit 5 NB/SB/ Neil Ln | D | E (68) | D | F (116) | E (63) | E (64) |
| Sound Beach Ave | B | B | C | D | - | C |
| Rockmere Ave | A | A | D | C | - | A |
| Wendle Place | A | A | D | B | - | A |
| Havemeyer Ln / Laddins Rock | C | C | C | C | - | C |

**c. Results for PM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | SW | ALL |
|---|---|---|---|---|---|---|
| Riverside Ln | C | C | C | D | - | C |
| Sheep Hiill Rd / Lockwood Ln | B | B | D | F (155) | - | C |
| I-95 Exit 5 NB/SB/ Neil Ln | E (61) | E (76) | D | F (176) | D | E (74) |
| Sound Beach Ave | C | C | D | D | - | C |
| Rockmere Ave | A | A | D | B | - | A |
| Wendle Place | A | A | D | B | - | A |
| Havemeyer Ln / Laddins Rock | C | C | C | C | - | C |

### Section 5: Alvord Lane to W. Main Street / Greenwich Ave

The No Build simulation results for Section 5 indicate that the during the PM peak period the West Avenue intersection would operate at LOS F with approach delays of between 1-3 minutes per vehicle, which is similar to Existing conditions. Section 5 in the No Build condition operates similar to the Existing conditions due to no volume adjustments being made between the Existing and No Build conditions. ***Table 2.10*** shows the Section 5 Existing and No Build condition travel time results, and ***Table 2.11*** shows the Section 5 No Build LOS results.

***Table 2.10: Section 5 Existing & No Build Travel Time Results***

| Peak | Direction | Existing | | No Build | |
|---|---|---|---|---|---|
| | | Time (min) | Speed (mph) | Time (min) | Speed (mph) |
| AM | NB | 3.8 | 17.0 | 3.9 | 16.6 |
| | SB | 4.2 | 15.4 | 4.2 | 15.4 |
| MID | NB | 4.2 | 15.2 | 4.2 | 15.2 |
| | SB | 3.7 | 17.3 | 3.8 | 17.0 |
| PM | NB | 5.2 | 12.4 | 4.8 | 13.5 |
| | SB | 4.3 | 15.0 | 3.8 | 16.8 |

***Table 2.11: No Build Conditions Section 5 Results***

**a. Results for AM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Alvord Lane | A | B | D | D | B |
| Harvard Lane | B | A | D | - | B |
| West Ave | C | C | D | D | C |
| Virgil St / Diaz St | - | - | C | F (62) | - |
| Wilson St | B | A | D | - | A |
| Richmond Hill Ave / High St | A | B | D | - | B |
| Stillwater Ave | A | A | - | C | B |
| W. Main St / Greenwich Ave | B | B | B | C | B |

**b. Results for MIDDAY Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Alvord Lane | B | A | D | D | C |
| Harvard Lane | B | A | C | - | B |
| West Ave | D | B | D | D | D |
| Virgil St / Diaz St | - | - | C | C | - |
| Wilson St | A | A | D | - | A |
| Richmond Hill Ave / High St | A | A | D | - | A |
| Stillwater Ave | A | A | - | C | A |
| W. Main St / Greenwich Ave | A | A | B | C | B |

**c. Results for PM Peak Hour**

| Intersecting Street | NB | SB | WB | EB | ALL |
|---|---|---|---|---|---|
| Alvord Lane | B | B | C | C | C |
| Harvard Lane | C | A | C | - | B |
| West Ave | E (64) | B | F (115) | F (99) | E (74) |
| Virgil St / Diaz St | - | - | E (41) | E (44) | - |
| Wilson St | A | A | D | - | A |
| Richmond Hill Ave / High St | A | A | E (62) | - | A |
| Stillwater Ave | C | A | - | C | B |
| W. Main St / Greenwich Ave | B | B | B | B | B |

## 2.3 Build Conditions Operational Analysis

The Build traffic model includes project Design Volumes, infrastructure changes and signal modifications based on the concepts developed during the Design Workshop (see ***Volume 2: Public Involvement***, for detailed descriptions of the concepts and visual renderings). The Build analysis was conducted for the highest daily peak hour (PM Peak), using the same methodology as was used for the Existing and No Build. Results of the analysis were compiled and summarized for each study area section. ***Appendix C*** contains detailed LOS and delay results for the PM peak hour Build condition.

**Section 1: *Western Junior Highway to Brookside Drive***

The proposed concept for Section 1 includes a three-lane section comprised of a single through lane in each direction, with dedicated left turn lanes at the intersections (***Figure 2.2***), and a center turn lane between intersections. Additionally, the concept includes revising pedestrian phasing from exclusive to concurrent at all intersections within the section. This concept extends the entire length of the section from Western Junior Highway to Brookside Drive before returning to the existing cross-section. It should be noted the Design Workshop Summary Report includes a concept to redevelop the Byram Circle, located a quarter-mile southwest of the Route 1 and Western Junior Highway intersection, but was not operationally analyzed due to Byram Circle not being included in the project limits and lack of available traffic data.

The Section 1 travel time results in ***Table 2.12*** show a nine percent increase and one percent increase in travel time in the northbound and southbound directions, respectively, when comparing the Build and No Build simulation results.

***Table 2.12: Section 1 - PM Peak Hour Travel Time Results***

| Travel Time Limits | Direction | Simulated Travel Time (Seconds) | | |
|---|---|---|---|---|
| | | Existing | No Build | Build |
| Western Jr. Highway to Brookside Drive | NB | 231 | 217 | 236 |
| | SB | 179 | 204 | 207 |

The Section 1 LOS and delay results in ***Table 2.13*** indicate that Build LOS and delay would be consistent with Existing and No Build conditions with overall intersection LOS D or better at all intersections during the PM peak hour.

***Table: 2.13 Section 1 - PM Peak Hour LOS and Delay Results***

| Intersecting Street | Existing | No Build | Build |
|---|---|---|---|
| Western Jr. Highway | A (6) | A (6) | A (7) |
| Weaver Street / Holly Hill Lane | C (24) | C (24) | C (28) |
| Valley Drive | B (12) | B (12) | B (19) |
| Harold Ave | A (2) | A (2) | A (4) |
| Edgewood Drive / Prospect Street | D (44) | D (53) | D (41) |
| Brookside Drive | C (21) | C (21) | B (19) |

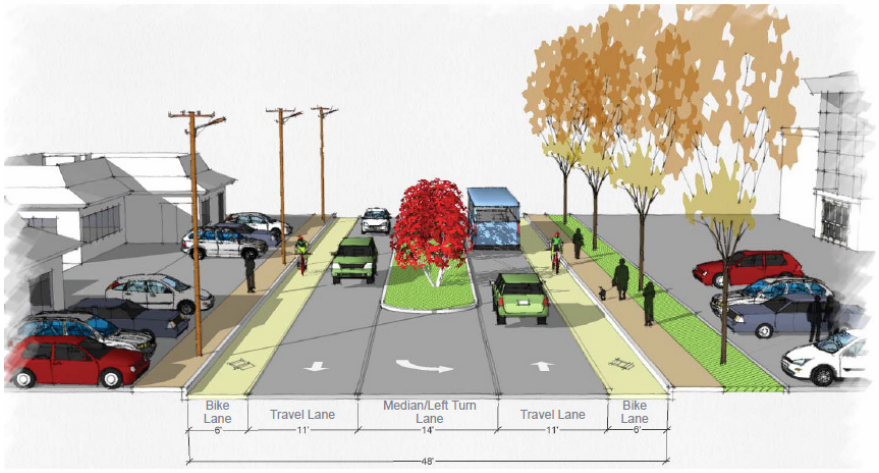



*Figure 2.2: Proposed Cross Section (Dearfield to State Line)*

**Section 2: *Dearfield Drive / Field Point Road to Old Church Road***

Preliminary traffic analysis for a three-lane section through the Downtown Greenwich district indicated significant increases to delay and was therefore considered infeasible. However, while the existing four-lane section is proposed to remain under Build conditions, pedestrian improvements including intersection bulb-outs (***Figure 2.4***) and a new pedestrian connection at the Maher/Millbank/Maple intersection are proposed. These pedestrian enhancements were not operationally analyzed due to limited impacts to traffic operations; however, the shorter crossing distance and reduction in time needed for pedestrians to cross would be expected to increase the green time available for traffic flow.

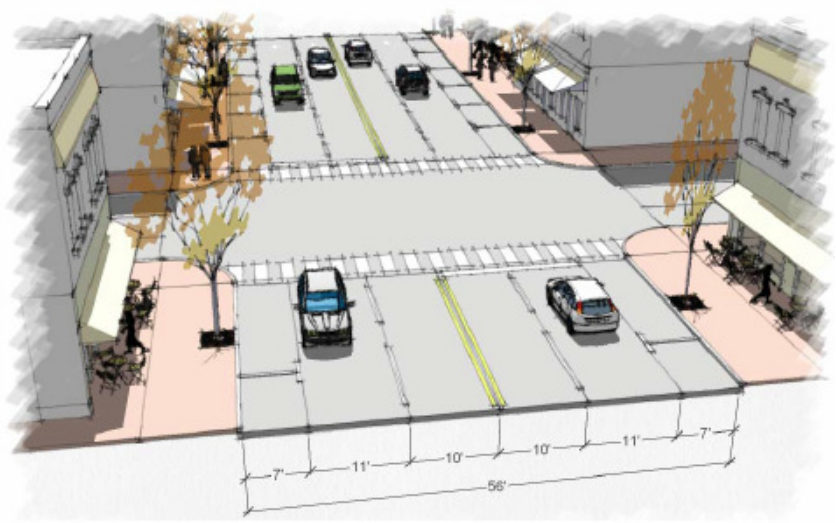



*Figure 2.3: Existing Cross Section with 56' Crossing Distance*


*Figure 2.4: Proposed Cross Section with 42' Crossing Distance*

**Section 3: *Overlook Drive to River Road***

The Cos Cob district contains several concepts with varying degrees of impact to this section of the corridor. For the most part, this section consists of a three-lane cross-section comprised of a single through lane in each direction, with a center turn lane between intersections. However, Section 3, in addition to the three-lane cross-section, also has intersection specific improvements as described below:

### Indian Field Road and US 1 Intersection

- At the Indian Field Road/US 1 Intersection, the concept includes moving left turns from northbound Route 1 at Indian Field Road to a new signalized intersection 800 feet to the north.

### Cross Lane / Taylor Drive to Sinawoy Road

- Realign Cross Lane with Taylor Dr.
- Redesign Sinawoy Road to bring right turning vehicles to the intersection and reduce pedestrian crossing widths.

### Orchard Street / Mead Avenue and US 1 Intersection

- Construct pedestrian blub-outs.

The Section 3 travel time results provided in ***Table 2.14*** indicate a 19 percent decrease and three percent decrease in travel time in the northbound and southbound directions, respectively, when comparing the Build and No Build simulation results. The three primary reasons for the favorable results are: (1) the use of concurrent pedestrian operations, (2) the realignment of Cross Lane and Taylor Drive, (3) the changes at Indian Field Road and US 1 intersection.

***Table 2.14: Section 3 - PM Peak Hour Travel Time Results***

| Travel Time Limits | Direction | Simulated Travel Time (Seconds) | | |
|---|---|---|---|---|
| | | Existing | No Build | Build |
| Hillside Road to Sinawoy Road | NB | 367 | 345 | 280 |
| | SB | 323 | 222 | 216 |

The largest improvement is realized at the Strickland/Taylor/Cross intersection where realigning Taylor Drive with Cross Lane, and creating dedicated left turn lanes results in LOS B operations under Build conditions (See ***Table 2.15***). The LOS and delay results for Section 3 indicate that the Cos Cob area would be expected to operate with generally acceptable traffic conditions with overall intersection LOS D or better at all intersections during the PM peak hour.

***Table 2.15: Section 3 - PM Peak Hour LOS and Delay Results***

| Intersecting Street | Existing | No Build | Build |
|---|---|---|---|
| Hillside Rd | B (17) | B (19) | C (26) |
| Indian Field Rd / Old Post Rd #6 | C (35) | C (33) | C (24) |
| Strickland Rd / Taylor Dr / Cross Ln | E (75) | D (42) | B (19) |
| Sinawoy Rd | C (30) | B (15) | B (11) |
| Orchard St / Mead Ave | D (42) | D (40) | D (36) |
| River Rd | C (35) | D (40) | C (27) |

**Section 4: Riverside Lane to Havemeyer Lane/Laddins Rock Road**

The Riverside district contains several concepts with varying degrees of impact to this section of the corridor. Section 4 concepts include the following:

**Riverside Lane to Sheep Hill Road**

- No changes.

**I-95 Exit 5/Neil Lane to Sound Beach Avenue**

- Reconfiguration including extension of Neil Lane to Sound Beach Avenue, two roundabouts replacing signals, and new shopping center access along Route 1.

**Rockmere Avenue to Havemeyer Lane / Laddins Rock Road**

- Three-lane section comprised of a single through lane in each direction, with dedicated left turn lanes at the intersections, and a center turn lane between intersections.

Conceptual analysis of the Exit 5 two-lane roundabout showed potential; however, queuing issues on the southbound and northbound I-95 exit ramp approaches as well as on Neil Lane indicate more comprehensive traffic analysis will need to be conducted for this roundabout that incorporates the traffic impacts (i.e., travel pattern changes) of the design concept (extension of Neil Lane) as well as the overall network wide traffic operations. Further details on this design concept can be found in the Design Workshop Summary Report (see ***Volume 2: Public Involvement***).

The Section 4 travel time results in ***Table 2.16*** show a nine percent increase in travel time in the northbound and southbound directions when comparing the Build and No Build simulation results between Rockmere Avenue and Havemeyer Lane.

***Table 2.16: Section 4 - PM Peak Hour Travel Time Results***

| Travel Time Limits | Direction | Travel Time (Seconds) | | |
|---|---|---|---|---|
| | | Existing | No Build | Build |
| Rockmere Avenue to Havemeyer Lane | NB | 90 | 85 | 93 |
| | SB | 92 | 76 | 83 |

The Section 4 LOS and delay results in ***Table 2.17*** indicate that the Rockmere Ave to Havemeyer Lane section of Riverside would be expected to operate with generally acceptable traffic conditions with overall intersection LOS D or better at all intersections during the PM peak hour for the Build condition.

***Table 2.17: Section 4 - PM Peak Hour LOS and Delay Results***

| Intersecting Street | Existing | No Build | Build |
|---|---|---|---|
| Rockmere Avenue | A (9) | A (7) | A (7) |
| Wendle Place | A (8) | A (7) | A (8) |
| Havemeyer Lane / Laddins Rock Rd | D (43) | C (30) | D (37) |

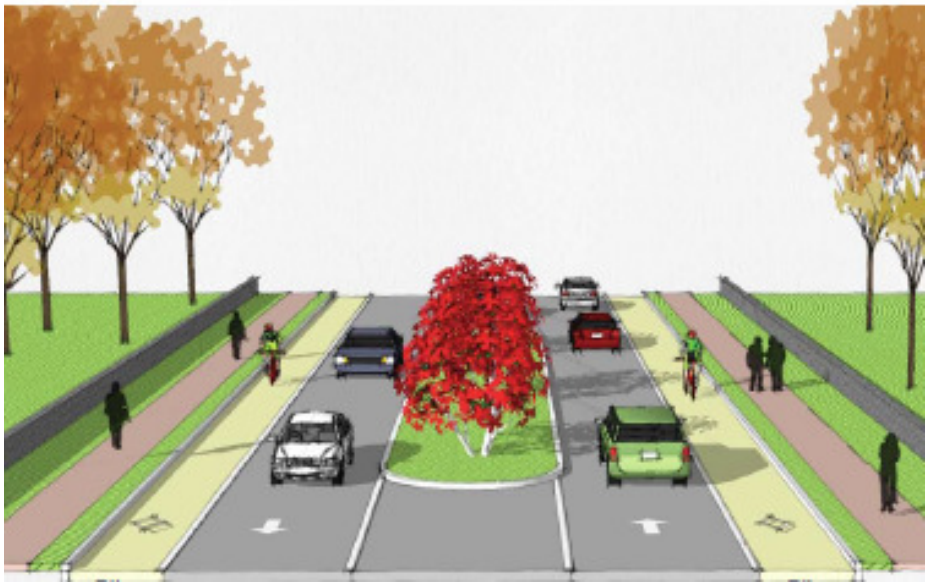


*Figure 2.5: Proposed Midblock Cross Section*

**Section 5: Alvord Lane to W. Main Street / Greenwich Ave**

The Stamford district contains several concepts with varying degrees of impact to this section of the corridor. Section 5 concepts include the following:

**Alvord Lane Roundabout**

- Single lane roundabout (***Figure 2.6***).

**Harvard Lane to Richmond Hill Avenue**

- Three-lane section is comprised of a single through lane in each direction, with dedicated left turn lanes at the intersections, and a center turn lane between intersections, and
- Reconfigure Jackie Robinson Park including realigning Richmond Hill Avenue with High Street and removing the signal at Wilson Street.

**West Main Street / Greenwich Avenue Roundabout**

- Modified single lane roundabout.

The Section 5 travel time results in ***Table 2.18*** show a nine percent increase and two percent increase in travel time in the northbound and southbound directions, respectively, when comparing the Build and No Build simulation results.

***Table 2.18: Section 5 - PM Peak Hour Travel Time Results***

| Travel Time Limits | Direction | Simulated Travel Time (Seconds) | | |
|---|---|---|---|---|
| | | Existing | No Build | Build |
| Alvord Lane to West Main Street | NB | 311 | 286 | 313 |
| | SB | 205 | 191 | 194 |

The Section 5 LOS and delay results in ***Table 2.19*** indicate that traffic operations at the key intersection would be expected to operate with overall intersection LOS D or better at all intersections during the PM peak hour for the Build condition. The initial analysis for the two roundabouts was completed is VISSIM as isolated facilities; therefore, impacts on the surrounding network are unknown.

***Table 2.19: Section 5 - PM Peak Hour LOS and Delay Results***

| Intersecting Street | Existing | No Build | Build |
|---|---|---|---|
| Alvord Lane | C (26) | C (20) | B (15) |
| Harvard Lane | B (17) | B (15) | C (26) |
| West Avenue | F (96) | E (74) | D (38) |
| Virgil Street / Diaz Street | C (16) | B (10) | A (7) |
| Wilson Street / Richmond Hill Ave | A (5) | A (5) | A (4) |
| High Street / Richmond Hill Ave | A (5) | A (6) | A (2) |
| Stillwater Ave | B (18) | B (16) | C (30) |
| West Main Street / Greenwich Ave | B (17) | B (15) | B (12) |

*Figure 2.6: Proposed Roundabout at Alvord Lane*

## 2.4 Long Term 2030 Analysis

In addition to analyzing the concepts for the build conditions (see ***Section 2.1: Future Conditions Methodology***, for a detailed description of how the traffic volumes used in the build analysis were developed), the project team was asked to conduct additional traffic analysis using CTDOT-developed 2030 traffic volumes. This was done to assess potential long-term conditions. It should be noted that the 2030 traffic volumes used for the analysis are not constrained by the current capacity of the roadway (i.e., in some sections of the corridor the 2030 traffic volumes exceed the amount of traffic that could be accommodated by the existing roadway width).

The project team conducted long-term analysis for the following three conditions: 2030 No Build, 2030 Fix and 2030 Proposed.

- ***2030 No Build:*** This scenario includes optimized signal timings and cycle lengths but no geometric changes from Existing conditions.
- ***2030 Fix:*** This scenario optimized the signal timings and cycle lengths for each intersection examined in the 2030 No Build scenario and added geometric improvements in order for the intersection to operate at LOS D or better.
- ***2030 Proposed:*** This scenario analyzed the proposed geometric design concepts and signal timing changes outlined in the previous section using the 2030 traffic volumes.

The analysis for these three conditions and corresponding 2030 traffic volumes are located in ***Appendix D***.

# Evaluation Matrix and Implementation Plan

## 3.1 Evaluation Matrix

The project team and SWRPA have developed an evaluation matrix that identifies the strengths and weaknesses of each concept and recommends next steps. The design concepts analyzed in the matrix emerged from the Design Workshop held October 26-28, 2010 in Greenwich, Connecticut and are presented in more detail in the Design Workshop Summary Report (see ***Volume 2: Public Involvement***). The concepts are organized by study area section and intersection to show where each begins and ends, and are compared across four categories: *benefits*, *impacts*, *traffic analysis*, and *implementation*.

Each category, with the exception of traffic analysis, contains criteria which assesses each alternative based on its positive or negative impact, and the scale of this impact from minimal to significant. The traffic analysis category compares the Level of Service (LOS) and travel time for the 2010 Existing Conditions, No Build and Build alternatives. The implementation category contains several columns summarizing the benefits, impacts and traffic analysis, as well as overall anticipated project timeframe, order of magnitude cost estimates, and recommended next steps for each concept.

The following is a description of the evaluation criteria found within the matrix:

| | |
|---|---|
| ● **Positive Impact** | Design concept positively enhances the corridor. Size of the circle indicates the scale (minimal to significant) of the impact. |
| ● **Negative Impact** | Design concept diminishes or causes complications to the corridor. Size of the circle indicates the scale (minimal to significant) of the impact. |

**Benefits**

| | |
|---|---|
| **Parking** | Anticipated impacts to parking design and/or change in the number of parking spaces. |
| **Multi-Modal** | Anticipated impacts to bicycle, pedestrian, and transit accommodations including dedicated bicycle lanes, multi-use trails and pedestrian bump-outs. |
| **Community Vision** | Consistent with the public vision developed during the Visioning Workshop including community character, mix of land use, traffic mobility, and multi-modal function. |
| **Safety** | Anticipated impact to safety including pedestrian enhancements, speed reduction, bicycle lanes, dedicated left turn lanes, and type and number of crashes. |

**Impacts**

| | |
|---|---|
| **Environmental** | Expected impacts (positive and/or negative) to environmental features including cultural/historical resources, stormwater, wetlands, etc. |
| **Access** | Anticipated impacts (positive and/or negative) to access including relocation and/or removal of business and residential access points. |
| **ROW** | Anticipated impact to properties. |
| **Utilities** | Expected impacts to surface and sub-surface utilities including utility poles, drainage, and lighting, and any signal modification including foundation relocation, signal head modifications, and mast arm adjustments. |

**Traffic Analysis**

| | |
|---|---|
| **LOS (Delay)** | PM peak hour LOS based on average vehicle delay in seconds per vehicle for design volumes. |
| **Travel Time** | PM peak hour travel time in minutes. Percent comparison is Build condition compared to No Build condition. |

**Implementation**

| | |
|---|---|
| **Overall Benefits** | Overall anticipated benefit based on the four criteria within the benefits category. |
| **Overall Impacts** | Overall anticipated impact based on the four criteria within the impacts category. |
| **Overall Transportation** | Overall anticipated transportation impact/benefit based on the LOS and travel time criteria within the traffic analysis category. |
| **Timeframe** | Estimated project completion time including analysis, design and construction. The anticipated timeframe is impacted by the issues within benefits, impacts and traffic analysis categories. |

*Timeframe:*

*Short = 0-2 years,*
*Medium = 2-5 years,*
*Long = 5+ years.*

**Implementation**

**Estimated Construction Cost** Order of magnitude cost estimates.

**Recommended Next Phase** The recommended next phase for each concept based on the anticipated benefits, impacts, traffic analysis and estimated construction costs. Next phase of project development includes Design, Concept Refinement, and Concept Development.

*Design (D)* - Concepts with minimal impacts and remaining issues that could move to design.

*Concept Refinement (CR)* - A preferred concept is defined, and focus shifts to furthering the details of the concept so that impacts/issues can be identified and resolved.

*Concept Development (CD)* - Initial concepts have been developed, but more analysis and concept design needs to be completed to better understand the benefits and issues so a preferred concept can be identified. .

The intent of the evaluation matrix is (1) to provide an evaluation for each concept to help prioritize the concepts in the implementation plan and (2) identify the next step for each concept.

# US 1 Greenwich-Stamford Operational Improvements Plan

## Evaluation Matrix

| Section | Intersection | Design Modification | BENEFITS: Parking | BENEFITS: Multi-Modal | BENEFITS: Community Vision | BENEFITS: Safety | IMPACTS: Environmental | IMPACTS: Access | IMPACTS: ROW | IMPACTS: Utility | TRAFFIC ANALYSIS: LOS (Delay) Existing | LOS (Delay) No Build** | LOS (Delay) Build*** | Travel Time (minutes) Existing | Travel Time (minutes) No Build** | Travel Time (minutes) Build*** | IMPLEMENTATION: Overall Benefits | Overall Impacts | Overall Transportation | Timeframe | Est. Construction Costs | Recommended Next Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Byram | State Line | Byram Circle Reconfiguration 2 Roundabouts | ● | ● | ● | ● | ● | ● | ● | ● | - * | - * | - | - | - | - | ● | ● | - | Long | $$$$ | CD |
| | Byram Circle | | | | | | ● | ● | | | - * | - * | - | | | | | | | | | |
| | Western Jr Hwy. | 3 Lane Cross-Section Dedicated Bike Lanes | · | ● | ● | ● | · | ● | · | ● | A (6) | A (6) | A (7) | NB 3.9 SB 3.0 | NB 3.6 SB 3.4 | NB 3.9 +9% SB 3.5 +1% | ● | · | ● | Short | $$ | D |
| | Weaver Street | | | | | | | | | | C (24) | C (24) | C (28) | | | | | | | | | |
| | Valley Drive | | | | | | | | | | B (12) | B (12) | B (19) | | | | | | | | | |
| | Harold Ave | | | | | | | | | | A (2) | A(2) | A (4) | | | | | | | | | |
| | Edgewood Drive | | | | | | | | | | D (44) | D (53) | D (41) | | | | | | | | | |
| | Brookside Drive | | | | | | | | | | C (21) | C (21) | B (19) | | | | | | | | | |
| Downtown Greenwich | Dearfield Drive | Intersection Bulb Outs | · | · | ● | · | · | · | · | ● | D (41) | D (40) | - | NB 6.0 SB 6.0 | NB 5.6 SB 6.8 | - | ● | · | - | Short | $ | D |
| | Benedict Place | | | | | | | | | | B (17) | B (16) | - | | | | | | | | | |
| | Lafayette Place | | | | | | | | | | D (51) | D (41) | - | | | | | | | | | |
| | Greenwich Ave | | | | | | | | | | | | | | | | | | | | | |
| | Church St | | | | | | | | | | E (62) | E (71) | - | | | | | | | | | |
| | Maple Ave/ Millbank Ave | Pedestrian Crossing/Connection | · | · | ● | · | ● | · | ● | ● | E (73) | F (82) | - | - | - | - | · | ● | - | Medium | $ | CR |
| Greenwich Green | Old Church Road | 3 Lane Cross-Section Dedicated Bike Lanes Indian Field Intersection Improvements | · | ● | ● | ● | ● | ● | ● | ● | C (21) | C (22) | - | - | - | - | ● | ● | ● | Long | $$ | CD |
| | Overlook Drive | | | | | | | | | | A (9) | B (12) | - | - | - | - | | | | | | |
| | Hillside Road | | | | | | | | | | B (17) | B (19) | C (26) | NB 1.4 SB 1.6 | NB 1.6 SB 1.5 | NB 1.5 -2% SB 1.1 -27% | | | | | | |
| | Indian Field Road | | | | | | | | | | C (35) | C (33) | C (24) | | | | | | | | | |

**Cost**

- $ $0 - $2 Million
- $$ $2 - $5 Million
- $$$ $5 - $10 Million
- $$$$ $10 Million +

**Recommended Next Phase**

- D - Design
- CR - Concept Refinement
- CD - Concept Development

**Positive Impact**

- ● Significant
- ● Medium
- ● Minimal

**Negative Impact**

- ● Significant
- ● Medium
- ● Minimal

**Negligible or No Impact**

- ·

* Traffic analysis not completed due to Byram Circle not being included in the project limits and lack of available traffic data.

** No Build analysis includes design volumes, optimized cycle lengths and signal timings, and existing exclusive pedestrian phasing.

*** Build analysis includes design volumes and concurrent pedestrian phasing. Travel time percent comparison is between No Build and Build.

# US 1 Greenwich-Stamford Operational Improvements Plan

## Evaluation Matrix

| Section | Intersection | Design Modification | BENEFITS: Parking | BENEFITS: Multi-Modal | BENEFITS: Community Vision | BENEFITS: Safety | IMPACTS: Environmental | IMPACTS: Access | IMPACTS: ROW | IMPACTS: Utility | TRAFFIC ANALYSIS: LOS (Delay) Existing | LOS (Delay) No Build** | LOS (Delay) Build*** | TRAFFIC ANALYSIS: Travel Time (minutes) Existing | Travel Time No Build** | Travel Time Build*** | IMPLEMENTATION: Overall Benefits | Overall Impacts | Overall Transportation | Timeframe | Est. Construction Costs | Recommended Next Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cos Cob | Strickland/Cross | 3 Lane Cross-Section Strickland/Cross Reconfiguration | ● | ● | ● | ● | ● / ● | ● / ● | ● | ● | E (75) | D (42) | B (19) | NB 1.8 / SB 2.0 | NB 1.3 / SB 1.1 | NB 0.8 -43% / SB 0.8 -28% | ● | ● | ● | Long | $$ | CD |
| | Sinawoy Road | | | | | | | | | | C (30) | B (15) | B (11) | | | | | | | | | |
| | Orchard St | 3 Lane Cross-Section Intersection Bulb-outs | ● | ● | ● | ● | · | · | · | ● | D (42) | C (34) | D (36) | NB 2.0 / SB 1.5 | NB 2.4 / SB 0.8 | NB 1.9 -21% / SB 1.3 +60% | ● | · | - | Short | $ | CR |
| | Diamond Hill | | | | | | | | | | A (3) | A (3) | A (4) | | | | | | | | | |
| | River Road | | | | | | | | | | C (34) | D (40) | C (27) | | | | | | | | | |
| Riverside | Riverside Lane | No Changes | · | · | · | · | · | · | · | · | C (33) | C (31) | - | NB 4.5 / SB 5.0 | NB 4.5 / SB 4.9 | - | · | · | - | · | · | · |
| | Sheep Hill Road | | | | | | | | | | B (18) | C (26) | - | | | | | | | | | |
| | I-95 Exit 5 NB | I-95 Exit 5 Reconfiguration 2 Roundabouts & New Connections | · | ● | ● | ● | ● | ● | ● | ● | E (76) | E (74) | - | | | | ● | ● | - | Long | $$$$ | CD |
| | Sound Beach Ave | | | | | | | | | | C (34) | C (32) | - | | | | | | | | | |
| | Rockmere Ave | 3 Lane Cross-Section Dedicated Bike Lanes | · | ● | ● | · | · | · | · | ● | A (9) | A (7) | A (7) | NB 1.5 / SB 1.5 | NB 1.4 / SB 1.3 | NB 1.6 +9% / SB 1.4 +9% | ● | · | ● | Short | $ | D |
| | Wendle Place | | | | | | | | | | A (8) | A (7) | A (8) | | | | | | | | | |
| | Havemeyer Lane | | | | | | | | | | D (43) | C (30) | D (37) | | | | | | | | | |
| West Stamford | Alvord Lane | Single Lane Roundabout | · | ● | ● | ● | ● | ● | ● | ● | C (26) | C (20) | B (15) | NB 5.2 / SB 3.4 | NB 4.8 / SB 3.2 | NB 5.2 +9% / SB 3.2 +2% | ● | ● | ● | Medium | $ | CR |
| | Harvard Lane | 3 Lane Cross-Section Dedicated Bike Lanes | ● | ● | ● | ● | · | · | · | ● | B (17) | B (15) | C (26) | | | | ● | · | ● | Short | $ | D |
| | West Avenue | | | | | | | | | | F (96) | E (74) | D (38) | | | | | | | | | |
| | Virgil St/Diaz St | | | | | | | | | | C (16) | B (10) | A (7) | | | | | | | | | |
| | Roosevelt/Wilson | Richmond Hill Reconfiguration Jackie Robinson Park Reclamation | ● | ● | ● | ● | ● | ● / ● | ● | ● | A (5) | A (5) | A (4) | | | | ● | ● | · | Medium | $$ | CR |
| | Richmond Hill | | | | | | | | | | A (5) | A (6) | A (2) | | | | | | | | | |
| | Stillwater Ave | Hybrid Roundabout | ● | ● | ● | ● | ● | ● | ● | ● | B (18) | B (16) | C (30) | | | | ● | ● | · | Medium | $$ | CR |
| | West Main Street | | | | | | | | | | B (17) | B (15) | B (12) | | | | | | | | | |

**Cost**

| | |
|---|---|
| $ | $0 - $2 Million |
| $$ | $2 - $5 Million |
| $$$ | $5 - $10 Million |
| $$$$ | $10 Million + |

**Recommended Next Phase**

D - Design

CR - Concept Refinement

CD - Concept Development

**Positive Impact**

- ● Significant
- ● Medium
- ● Minimal

**Negative Impact**

- ● Significant
- ● Medium
- ● Minimal

**Negligible or No Impact**

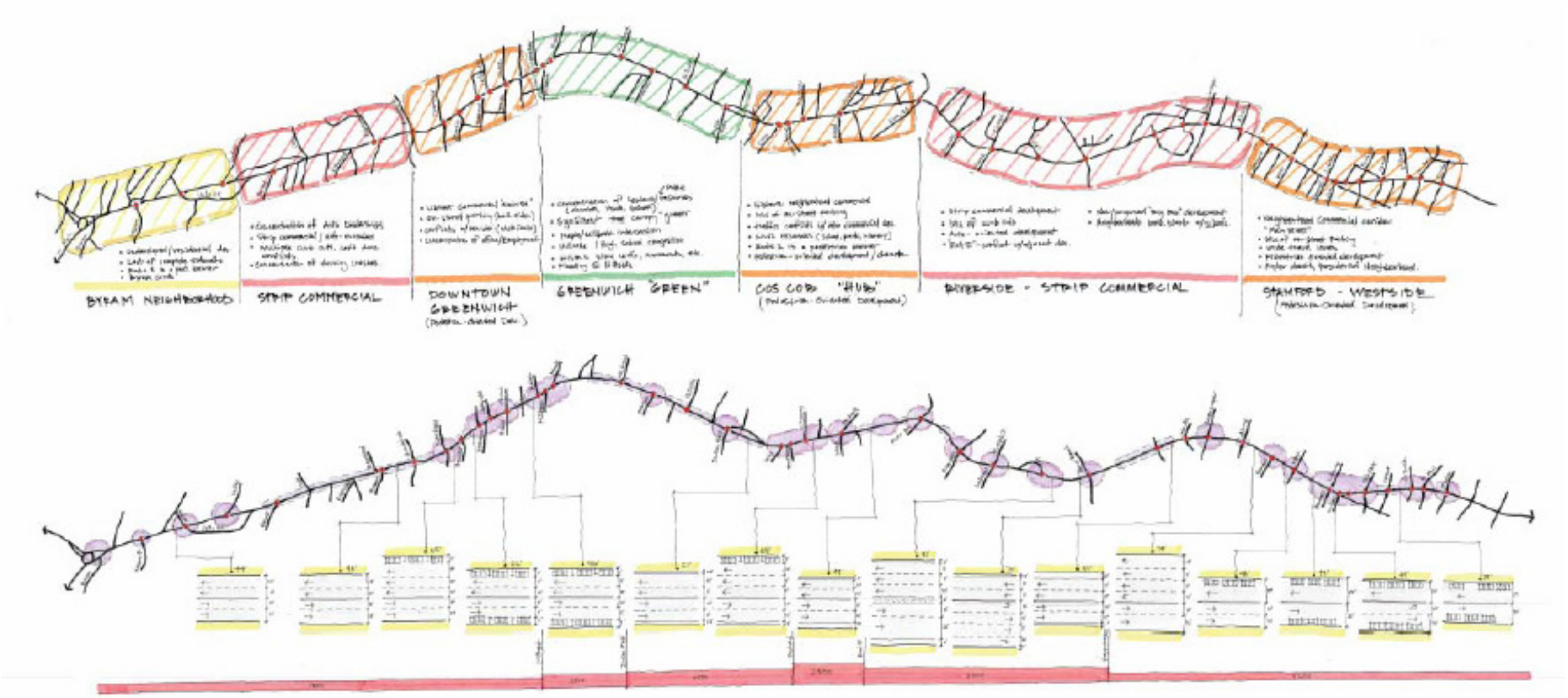
- ·

** No Build analysis includes design volumes, optimized cycle lengths and signal timings, and existing exclusive pedestrian phasing.

*** Build analysis includes design volumes and concurrent pedestrian phasing. Travel time percent comparison is between No Build and Build.

## 3.2 Implementation Plan

The project team and SWRPA have developed a plan that prioritizes the implementation of concepts in the evaluation matrix. The implementation plan groups projects by the recommended next phase of design, concept refinement, and concept development to separate projects ready for quick implementation and project requiring further study. Within the recommended next phase, projects are prioritized from top to bottom based on the projects benefits, impacts, traffic operations analysis, public and stakeholder perception, cost, any outstanding concept issues, and ease of implementation.



# US 1 Greenwich-Stamford Operational Improvements Plan

Implementation Plan

| Next Phase | Section | Priority | Action | Lead | Timeframe | Cost Range | Major Factors Affecting Cost Range |
|---|---|---|---|---|---|---|---|
| DESIGN | ALL | High | - Retime and coordinate signals using Synchro model ★ | Greenwich Stamford | Short | <$100K | None |
| | West Stamford | High | - Create a consistent roadway cross-section from W. Main/Greenwich Ave thru Havemeyer Ln<br>- One lane per direction with turn lanes and/or center turn lane where applicable (1.0 mile)<br>- Define parking by adding landscaping treatments and intersection bulb-outs | Stamford CTDOT | Medium | $500K - $2M | Landscaping, median and intersection treatments, ADA accommodations, signal modifications |
| | Downtown Greenwich | Moderate | - Install Intersection bulb-outs in Downtown Greenwich between Dearfield Dr and Maple Ave ★<br>- 6 signalized intersections | Greenwich | Short | <$500K - $1M | Potential impacts to stormwater and drainage |
| | Riverside | Moderate | - Implement road diet from Havemeyer Ln to Rockmere Ave with bicycle lanes (0.45 Mile)<br>- 3 signalized intersections | Greenwich CTDOT | Short | $500K - $2M | Landscaping, median and bike lane treatments, ADA accommodations, signal modifications |
| | Byram | Moderate | - Implement road diet from State Line to Brookside Drive with bicycle lanes (1.65 Miles)<br>- 6 signalized intersections | Greenwich CTDOT | Short | $2M - $4M | Landscaping, median and bike lane treatments, ADA accommodations, signal modifications |
| CONCEPT REFINEMENT | ALL | Moderate | - Adaptive signal technology in key sections | Greenwich Stamford CTDOT | Short | $100K - $1M | Technology investigation, equipment, installation, number of intersections |
| | Downtown Greenwich | Moderate | - Install pedestrian accommodations at Maher/Millbank/Maple intersection | Greenwich SWRPA | Medium | $100K - $500K | New sidewalk, median treatment, possible ROW costs, historic sites |
| | West Stamford | Moderate | - Realign Richmond Hill Ave intersection and improve Jackie Robinson Park | Stamford SWRPA | Medium | $3M - $5M | ROW impacts to possible 4(f) property, roadway design, traffic signal, pavement/street treatments |
| | West Stamford | Moderate | - Implement single lane roundabout at Route 1 and Alvord Lane | Stamford CTDOT | Medium | $1M - $2M | Anticipated ROW and utility impacts. |
| | West Stamford | Moderate | - Implement 2/1 hybrid lane roundabout at Route 1 and West Main St/Greenwich Ave | Stamford CTDOT | Medium | $2M - $3M | Anticipated ROW and utility impacts. Possible 4(f) properties on NE and SE corners. |
| | Cos Cob | Moderate | - Implement road diet & bulb-outs in Cos Cob between Orchard St and River Rd (0.4 Miles)<br>- 3 signalized intersections (Orchard Street and two Diamond Hill intersections) | Greenwich CTDOT | Short | $500K - $2M | Landscaping, median and intersection treatments, ADA accommodations, signal modifications |
| CONCEPT DEVELOPMENT | Byram | High | - Reconfigure the Byram Circle<br>- 2 single lane roundabouts | Greenwich CTDOT SWRPA NYSDOT | Long | $10M + | New/modified roadway, roundabouts, ROW impacts, landscaping, access, environmental and utility impacts, historic site on south side |
| | Greenwich Green & Cos Cob | Moderate | - Implement road diet from Old Church Road to Sinawoy Rd (1.1 miles)<br>- Includes intersection changes at Indian Field and Taylor/Cross | Greenwich CTDOT | Medium | $3M - $5M | Landscaping, median and intersection treatments, ADA accommodations, signal modifications, back-in angle parking, parking lot reconfiguration, waterfront access, ROW |
| | Cos Cob | Moderate | - Redevelop Route 1 at Sinawoy Rd -<br>New park/plaza, replacement on-street parking, planted median, reconfigure Starbucks parking | Greenwich CTDOT | Long | $2M - $4M | Anticipated ROW impacts to possible 4(f) property, access, utilities, transportation enhancements, back-in angle parking, parking lot reconfiguration, waterfront access |
| | Riverside | Low | - Improve Exit 5 by modifying existing ramps & connecting Neil Lane to Sound Beach Ave | CTDOT | Long | $5M - $10M | Redesigned interstate ramps, new roadways, intersections and connections |
| | Riverside | Low | - Reconfigure Route 1 between Neil Lane and Sound Beach Ave<br>- Replace Neil Lane and Sound Beach Ave signals with roundabouts, and provide new shopping access | CTDOT | Long | $10M + | Anticipated ROW, access, utility impacts, two (2) new roundabouts, new signalized intersection, landscaping |

★ Early action item

Notes:

Concepts within each plan are ordered by prioritization

## 3.3 Implementation Plan Project Grouping Recommendations

The Implementation Plan is based on individual projects grouped into "Next Phase" categories, but some projects that cross phase and/or section boundaries should be grouped together for roadway continuity. The following individual projects should be considered as group projects:

***Riverside & West Stamford Road Diet***

- DESIGN - West Stamford - Create consistent roadway cross section from W. Main Street/Greenwich Avenue through Havemeyer Lane
- DESIGN - Riverside - Implement road diet from Havemeyer Lane to Rockmere Ave with bicycle lanes
- CONCEPT REFINEMENT - West Stamford - Implement single lane roundabout at Route 1 and Alvord Lane

The goal with this grouping is to maintain a three lane cross section from just east of Sound Beach Avenue to Wilson Street/Richmond Hill Avenue where the existing two lane cross section will be met. The proposed roundabout at Alvord Lane is a single lane roundabout and it would be beneficial to have single lane approaches on Route 1 leading up to the roundabout.

***Greenwich Green & Cos Cob Road Diet***

- CONCEPT REFINEMENT - Cos Cob - Implement road diet & bulb outs in Cos Cob between Orchard Street and River Road
- CONCEPT DEVELOPMENT - Greenwich Green & Cos Cob - Implement road diet from Old Church Road to Sinawoy Road

The goal with this grouping is to maintain a three lane cross section for the entire Greenwich Green and Cos Cob roadway sections. In Greenwich Green the road diet will begin east of Maple Avenue and terminate just west of River Road in the Cos Cob section. The redevelopment of Route 1 at Sinawoy Road project could also be included with this grouping, but not including it does not preclude the project from being completed at a later date.

In addition to the grouped projects listed above, the two Riverside concept development projects at Exit 5 and Neil Lane/Sound Beach Avenue could be grouped together if design or operational characteristics of each individual projects requires the projects be carried out together.