Strategic Implementation Plan, I-95 West Corridor

New York to New Haven

April, 2019

CONNECTICUT DEPARTMENT OF TRANSPORTATION

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Introduction

When Interstate 95 (I-95) was constructed, it was part of a huge, multi-decade initiative to connect cities and towns across the United States with high-speed expressways. In 1954, the Connecticut General Assembly authorized construction of the 129-mile-long Greenwich-Killingly Expressway. It was completed in 1958 for $464 million. In 1957, the portion of the expressway stretching from the New York state line to East Lyme became known as I-95 and became part of the national system of interstate highways. Governor Abraham Ribicoff opened the partially-completed expressway to traffic in January 1958.

Now, 60 years after I-95 opened, the highway is overburdened and under-invested—particularly, the segment of I-95 in southwestern Connecticut between the City of New Haven and the CT/NY state line (referred herein as the "I-95 West Corridor") is experiencing some of the worst traffic congestion in the nation.

Connecticut Governor Abraham Ribicoff officially opens the I-95 Expressway in January 1958 (Photo credit: CTDOT)

Purpose and Need

Targeted removal of critical bottlenecks addresses two key objectives of CTDOT: **reducing traffic delay** and **improving travel reliability**.

This plan addresses the I-95 West Corridor, which passes through Fairfield and New Haven counties. This corridor has not had substantial capacity-related improvements made since its original construction in 1958. Increased congestion and unpredictable travel times in the corridor are a major source of frustration for residents and businesses alike. The morning rush hour often lasts four hours and traffic jams can stretch over 20 miles. This burdens businesses with costs they cannot control and threatens economic growth.

This plan was preceded by a 2012 study conducted under a grant from the Federal Highway Administration (FHWA) to evaluate the I-95 corridor utilizing the Value Pricing Pilot Program (VPPP). The VPPP study assessed alternative ways to manage congestion on the corridor, including adding additional lanes. The evaluations, traffic modeling, and other data developed under the VPPP study provided CTDOT with a much greater understanding of current and future travel demand in the region and the extent of traffic congestion.

Along with highway improvement scenarios for other interstate corridors, the VPPP study also identified the travel time benefits of widening I-95 in southwestern Connecticut. A subsequent CTDOT study completed in April of 2018, the *I-95 Improvements—Feasibility Evaluation Study (Greenwich to New Haven)*, evaluated the feasibility of adding one additional travel lane in each direction along I-95 between the CT/NY state line and Bridgeport. The I-95 feasibility study also evaluated various safety and operational spot improvements on I-95 between Bridgeport and New Haven.

The VPPP study and the I-95 feasibility study shed light on traffic bottlenecks in the I-95 West Corridor and led CTDOT to further explore the causes and extent of these bottlenecks. Further, those studies precipitated CTDOT to undertake this *Strategic Implementation Plan, I-95 West Corridor – New York to New Haven*, to determine the effectiveness or merits of constructing specific, incremental, and cost-effective improvements that target the bottlenecks; especially in light of the exceptional costs to widen I-95 to four lanes in each direction between the CT/NY state line and Bridgeport—the total approximated costs range between $5.5 billion and $10.6 billion.

Targeted removal of critical bottlenecks addresses two key objectives of CTDOT: reducing traffic delay and improving travel reliability.

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Goals and Objectives

Plan Goals

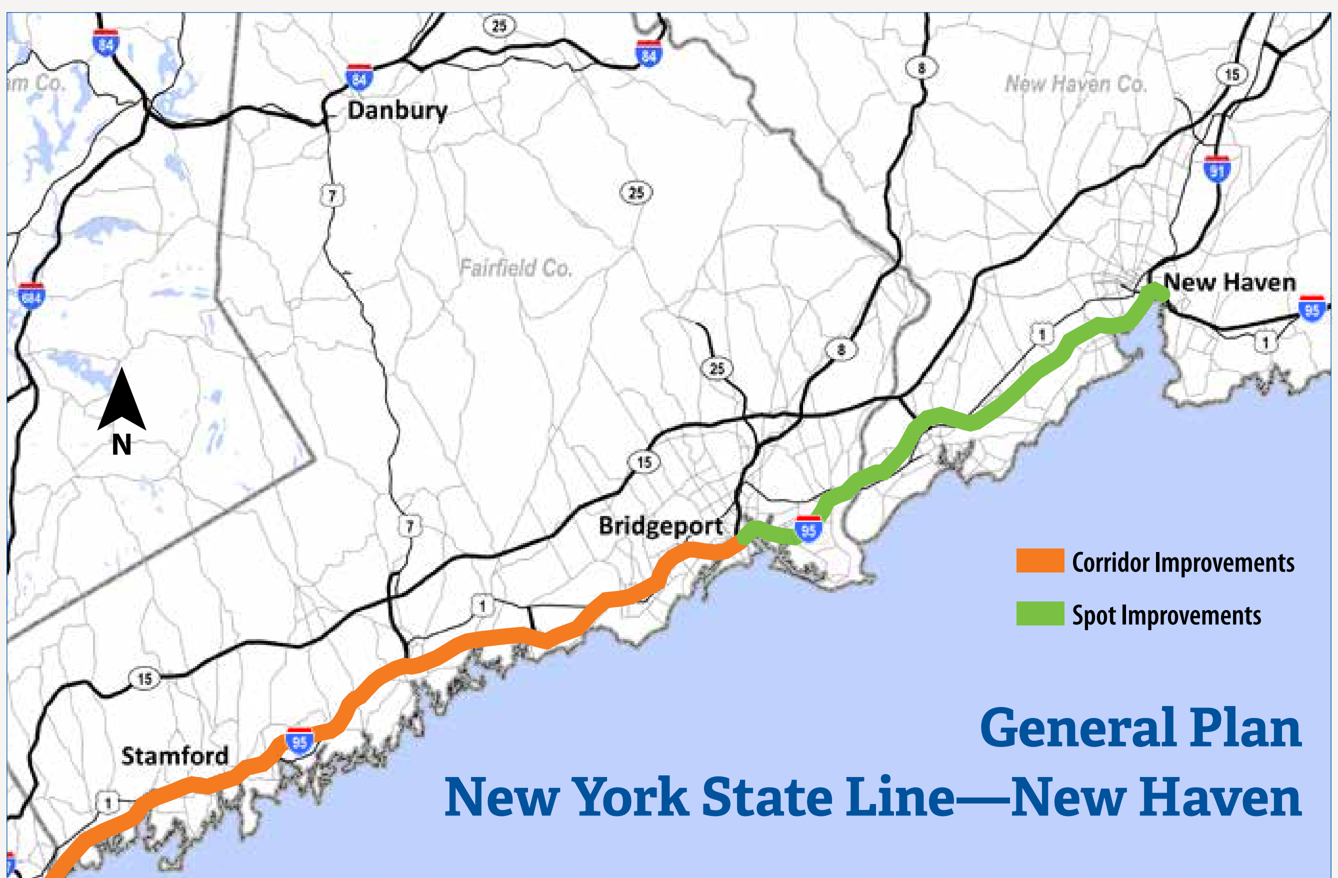
The goals of this plan are to leverage the data and findings of the VPPP and the I-95 feasibility studies to determine the degree to which targeted, budget-savvy improvements to I-95 can improve safety, travel times, and speeds in advance of a full-length corridor widening project.

The strategy to reduce congestion, improve travel reliability, and improve highway safety presented in this plan is based on selective highway widening and interchange improvements that are targeted to remove or reduce major traffic bottlenecks. This targeted bottleneck strategy is more cost-effective than typical, corridor-wide approaches that widen both sides of a highway over long stretches. Bottleneck mitigation and safety benefits can be achieved by widening limited segments of highway, often in just one direction. This reduces rights-of-way impacts, costs, and time required to design and construct.

Plan Objectives

- Analyze existing studies and recent inspection reports, crash statistics, and traffic congestion data to determine the most serious safety issues and identify areas with the biggest bottlenecks.
- Conduct micro-simulation modeling of traffic to evaluate improvement scenarios.
- Identify localized projects that would provide the most benefit to users of the I-95 Corridor from the City of New Haven to the New York state line by measuring the safety benefits, reduction of travel time, and vehicle hours of delay.
- Identify an environmental permitting approach to projects focusing on "independent utility" of each project.

In short, the goals and objectives of this study are to identify and assess incremental projects that would provide the "Biggest Bang for the Buck."



Facts and Context of the I-95 West Corridor

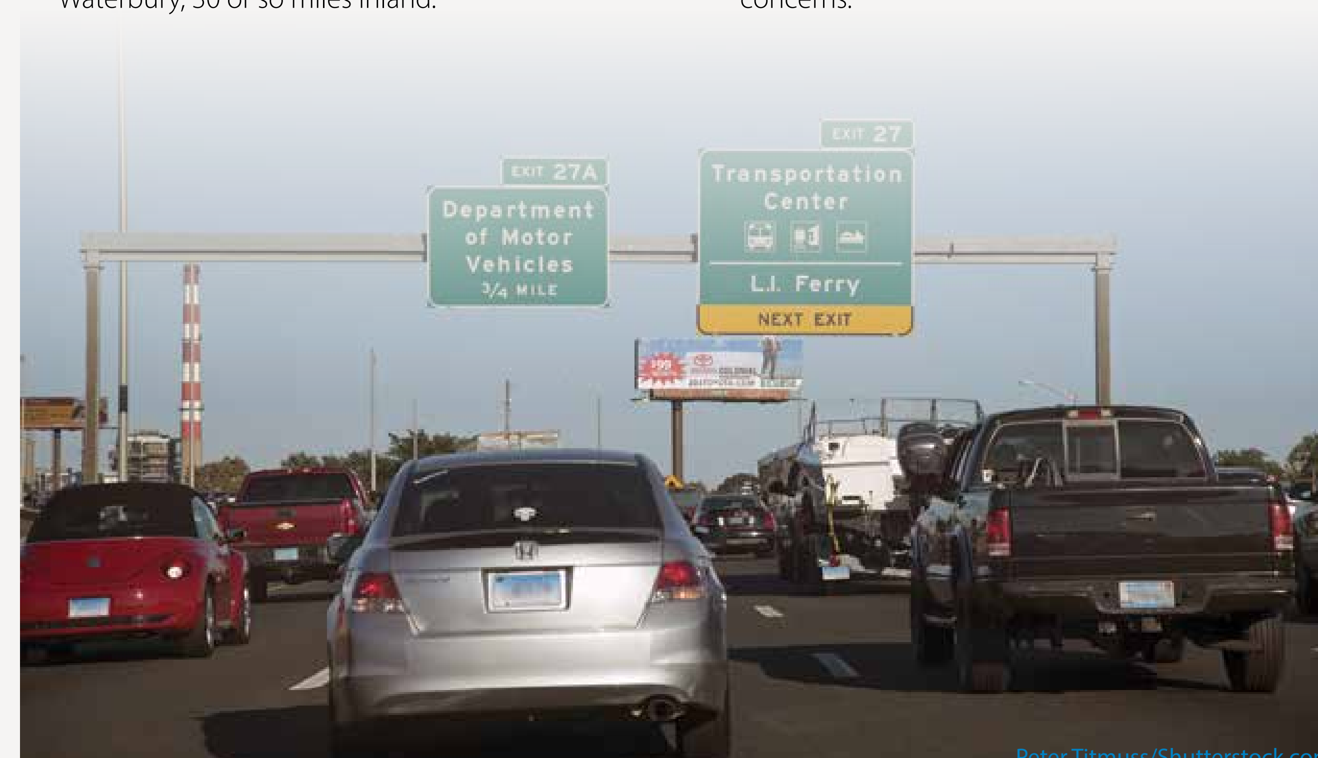
The following key facts and trends provide perspective on the purpose and need for targeted improvements to the I-95 West Corridor:

State and Regional Context:

- Connecticut's surface transportation network connects the New York metropolitan region and Mid-Atlantic states with the rest of New England (most notably, Boston, Massachusetts); the I-95 West Corridor is central and integral to that network.
- Southwestern Connecticut is home to three of the state's largest cities—Stamford, Bridgeport, and New Haven.
- The surface transportation network in this corridor is a tightly knit concentration of interstate routes, state highways, parkways, and rail lines, most notably I-95, Route 1, and the Merritt Parkway, which all parallel the coast. The busiest commuter rail line in the nation (the New Haven Line) parallels I-95. Limited access highways such as Routes 7 and 8 and other major roads connect this coastal corridor to the nearby cities of Danbury and Waterbury, 30 or so miles inland.

> Connecticut's western I-95 corridor has experienced steady increases in traffic volumes. *Budget constraints and multiple competing priorities have hindered progress in keeping pace with demand.*
>
> *Stamford Daily Voice*

- In spite of the density of transportation assets, the corridor is Connecticut's most congested, which is restricting economic growth in the corridor and the state. In addition, residents and businesses in the corridor have expressed a desire to enhance and improve access to New York City.
- 42% of businesses surveyed by the Connecticut Business & Industry Association believe that the state's road congestion restricts or limits the territory of their market.[1]
- 15% of businesses surveyed have considered relocating because of regional transportation concerns.[2]



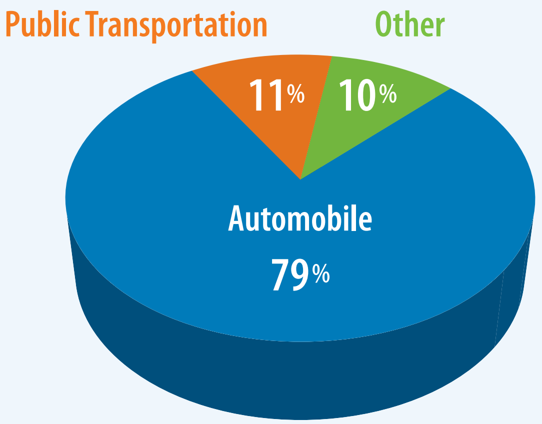
Peter Titmuss/Shutterstock.com

1. Winiarskyj, L. (2014, January 15). Bridging the Gap. Retrieved from http://www5.cbia.com/cbianews/article/bridging-the-gap/
2. Ibid.

Fairfield County

As Connecticut's most populous and fastest-growing county, it is also the county most highly dependent on I-95 for travel needs.

- Nearly 80% of residents who live in Fairfield County rely on travel by car to get to work.
- Nearly half of all Fairfield County commuters travel to workplaces along the I-95 Corridor.



- Fairfield County communities closest to New York rely more heavily on commuter rail than anywhere else in the state, this represents from 11% to 18% of all work trips.[3]
- Fairfield County generates a significant proportion of Connecticut's wealth. While it accounts for 26% of the state's population, 35% of the state's personal income is earned in Fairfield County.

New Haven County

- New Haven County ranks third in population and third in personal income generated in the state.
- About 79% of workers in New Haven County drive and about 5.1% take public transportation to work.
- New Haven County commuters rely less on I-95 to get to work than do Fairfield County commuters, as only about 10%-15% of jobs in New Haven County are located along the I-95 Corridor.[4]

> *The I-95 West Corridor from New Haven to the CT/NY state line has some of the most severe traffic congestion in the nation.*[5]

Truck Freight

- A significant amount of goods move through Connecticut, however, most of them originate outside of Connecticut with 44% of freight movements in Connecticut being through trips.
- Roughly 94% of freight with an origin or destination in Connecticut moves via trucks.
- 99% of freight passing through Connecticut is truck-based through traffic.
- According to a 2017 report by the American Road and Transportation Builders Association (ARTBA), "The overall business environment in the United States is changing, and there is likely to be a greater importance placed on logistics and global transportation networks. The value of total truck freight shipments on Connecticut roads is expected increase from $247.3 billion in 2015 to $372.8 billion in 2040. Truck shipments of Connecticut goods for export alone are estimated to increase from $3.9 billion in 2015 to $12.5 billion—an increase of over 220%."[6]

3. U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
4. Ibid.
5. INRIX. (2018, February 2). INRIX Global Traffic Scorecard. Retrieved from http://inrix.com/scorecard/
6. American Road and Transportation Builders Association. (2017, September). The Economic Impact of Failing to Invest in Connecticuts Highways, Bridges and Transit. Retrieved from http://www.cact.info/documents/FORWEBSITE_2017_CCIA_ARTBA_EconImpactStudy.compressed.pdf

Traffic Volumes[7]

- The I-95 Corridor between the New York state border and New Haven exhibits some of the highest traffic volumes in the country.
- Average daily traffic is highest along this section of I-95 compared to other major statewide interstates (I-91, I-84, I-395, I-691, I-291) and state highway corridors (Route 15, Route 2, Route 8, Route 9).
- More than a dozen mainline locations experience more than 160,000 vehicles on an average weekday. This occurs on segments of I-95 in Greenwich, Stamford, Darien, Norwalk, and Bridgeport.
- The highest mainline volume of 171,100 vehicles occurs just south of the Route 25/Route 8 interchange in Bridgeport.

> *During the morning or afternoon peak hours, travelers on the I-95 West Corridor can routinely expect delays that increase travel times between 70% and 80% over delay-free conditions.*[8]

- Ramp volumes to and from Route 25/Route 8, Route 7 and Milford Parkway Interchanges are among the highest in the corridor.

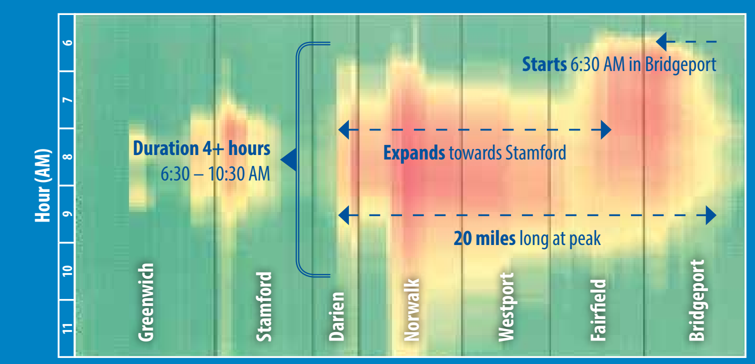
Travel Speeds and Delay – Average Morning Rush Hours

- In the southbound direction, significant delay exists between 6:30 AM and 10:00 AM. Most of the congestion is experienced between Bridgeport and Stamford.
- 20 minutes of delay are being experienced on average for a trip between New Haven and Greenwich, with 18 minutes of that delay occurring between Bridgeport and Stamford. The 18-minute delay over this 24-mile trip is an increase of more than 80% when compared to a delay-free trip.

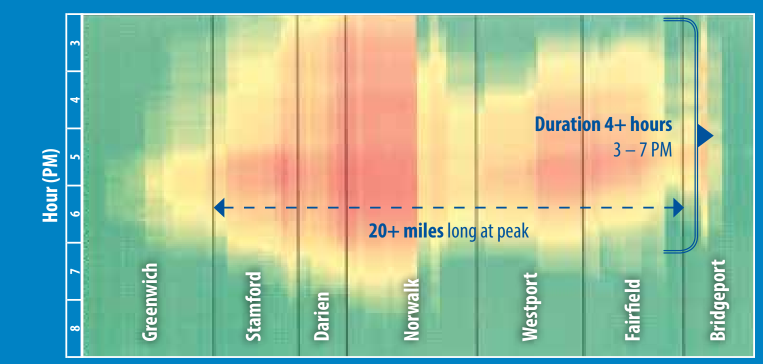
Travel Speeds and Delay – Average Evening Rush Hours

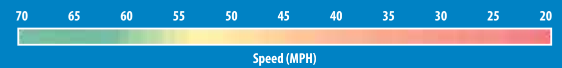
- In the northbound direction, congestion lasts almost five hours between Stamford and Norwalk. Similar to the AM southbound direction, congestion on average is shown to be significant between Bridgeport and Greenwich, spanning nearly four hours in duration.
- 20 minutes of delay are being experienced on average for a trip between Greenwich and New Haven, with 16 minutes of that delay occurring between Stamford and Bridgeport. The 16-minute delay over this 24-mile trip is an increase of more than 70% when compared to a delay-free trip.

I-95 Southbound AM Period



I-95 Northbound PM Period



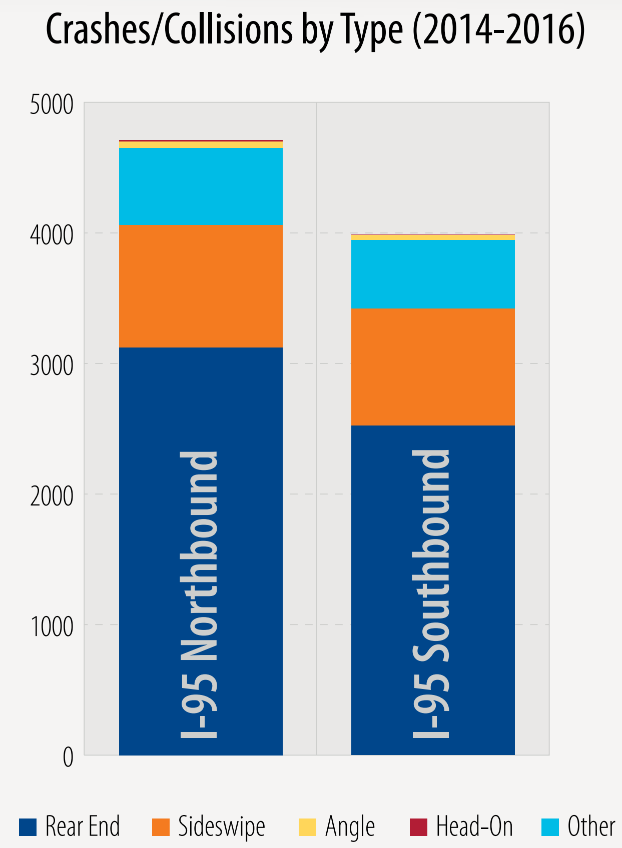


7. CDM Smith. (2016, September). Connecticut I-95 Corridor Congestion Relief Study. Retrieved from https://www.dotdata.ct.gov/ct_congestion_site/documents/final/FULL%20PDF%20OF%20FINAL%20REPORT.pdf
8. Ibid.

Crash Analysis:

An analysis of crash records for I-95 from 2014-2016 revealed that, as can be expected, segments of the corridor that exhibit the highest daily volumes also exhibit the highest crash rates.[9]

- Certain segments along the corridor from Greenwich to New Haven have a higher crash rate than the national average of 2.1 crashes per million miles traveled.[10, 11]
- More than 60% of all crashes in both directions were rear-end collisions, less than 23% were sideswipe, and the remaining 16% were angle, head-on, or other/unknown. This is indicative of congested conditions with slow speeds and dense traffic.



Current CTDOT Projects in the Corridor

Although Connecticut has limited funding available, CTDOT has made significant investments in the corridor over recent years and continues to make additional investments, as listed below.

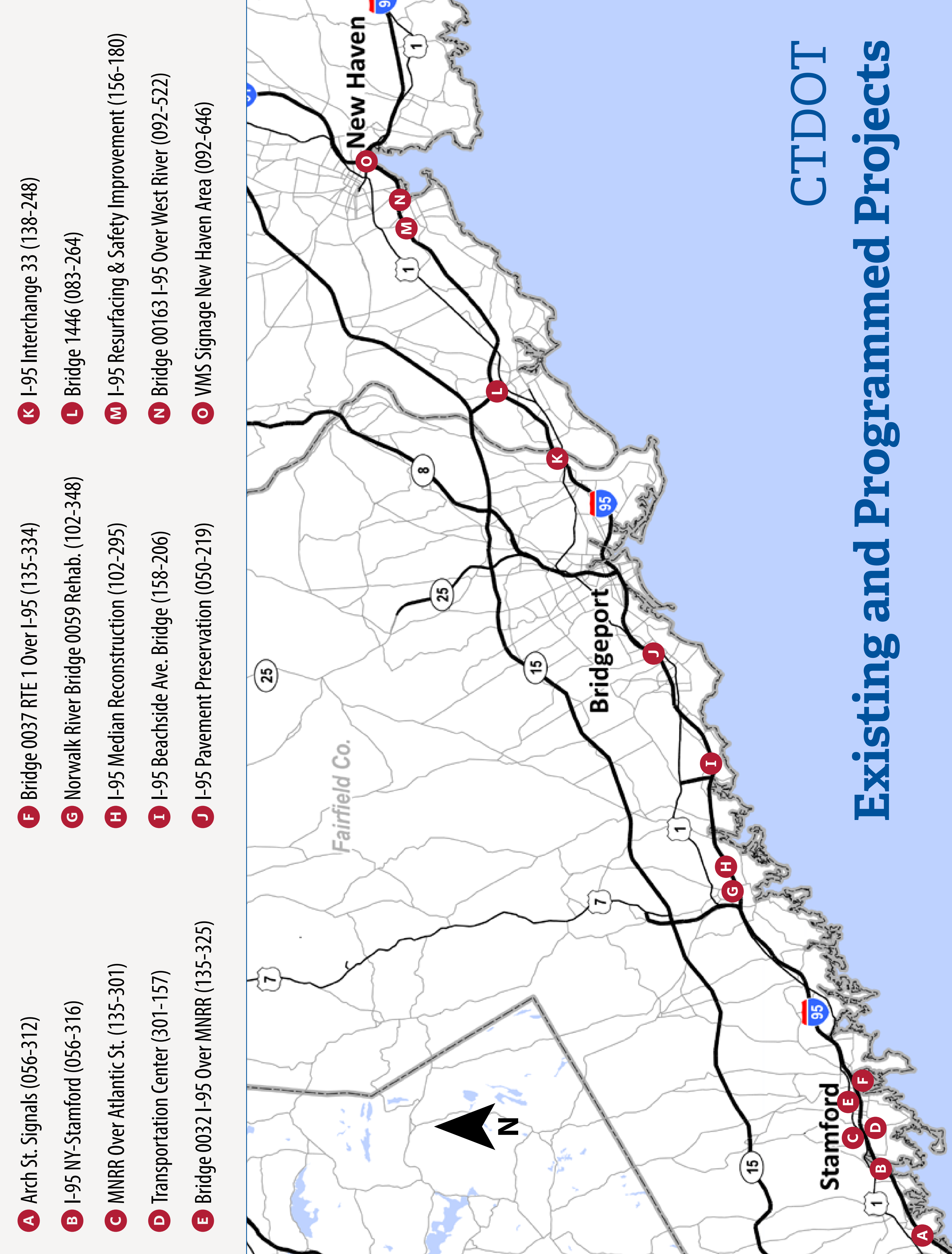
Recently completed projects:

- Adding Auxiliary Lanes, Norwalk Exits 14-16 – Median Barrier, Safety Improvements, and Pavement Resurfacing
- Replacement of the Bridgeport Viaduct
- Replacement of the Moses Wheeler Bridge
- Reconstruction of Service Plaza Rest Areas
- I-95 New Haven Harbor Crossing Project (Q Bridge Project)
- Bridge Rehabilitation, I-95 over Metro-North Railroad (MNRR), Stamford
- Norwalk River Bridge (Yankee Doodle Bridge) Rehabilitation and Painting, Norwalk
- Median Barrier, Safety, and Resurfacing, Exits 16-17, Norwalk/Westport
- Interchange Improvement at Exit 33, Stratford

Projects which are currently in various stages of implementation include:

- Resurfacing projects between New York state line and Exit 7 – Pavement and Safety Improvements, Greenwich

Reconstruction and widening of the Q Bridge.



9. University of Connecticut "Connecticut Crash Data Repository". Retrieved https://www.ctcrash.uconn.edu/
10. Insurance Institute for Highway Safety. General statistics. Retrieved from https://www.iihs.org/iihs/topics/t/general-statistics/fatalityfacts/state-by-state-overview/2016
11. National Highway Traffic Safety Administration. National Statistics. Retrieved from https://cdan.nhtsa.gov/tsftables/National%20Statistics.pdf

Study Approach and Methodology

This study utilized a vast amount of data from record plans, bridge inspection reports, crash statistics, and congestion data to determine the most serious safety issues and the most significant bottlenecks. The study approach included four key steps: 1) identify critical bottlenecks; 2) conduct traffic operations analysis and microsimulation modeling of various improvement scenarios at the critical bottlenecks; 3) assess existing conditions and determine the physical limitations of the project areas; and, 4) analyze findings and prepare conceptual plans and cost estimates for near-term solutions.

1 Identify Critical Bottlenecks

To identify highway segments or areas with the greatest congestion (i.e. traffic bottlenecks), CTDOT analyzed congestion patterns and travel speeds using data collected from INRIX for I-95. INRIX is a transportation data analytics company that specializes in collecting and processing real-time data from anonymous cell phones, connected cars, and other sources to create traffic speed information for freeways, highways, and arterials. In addition to the INRIX data, aerial video and observations by helicopter were used to identify key causes of congestion.

In keeping with plan objectives, the project methodology focused on identifying strategic projects that would provide the largest user benefits by measuring the safety improvement, reduction of travel time, and vehicle hours of delay in the corridor.

Adding a lane on I-84 provided for lane continuity.

- Adding a directional lane along segments of I-95 mainline;
- Extending acceleration and deceleration lanes at interchanges;
- Adding auxiliary lanes between interchange ramps;
- Improving/modifying the geometry of interchanges, including potential improvements to the interface of on- and off-ramps and the local road network.

2 Traffic Operations Analysis/ Simulation Modeling

CTDOT utilized a micro-simulation computer model to simulate and evaluate traffic operational improvements. For example, adding an additional lane in specific sections along the corridor and analyzing, through traffic simulation, the improvement characteristics and interactions of vehicles as they move through the network. The results of the analyses show changes in vehicle speeds and delays as a result of the improvements.

Based on these analyses, it was recognized that significant operational improvements, including increased speeds, reduced congestion, and reduced delay can be achieved by adding lanes either in the northbound or southbound directions to address peak directional periods.

3 Assess Existing Conditions

The physical feasibility of the improvement projects were assessed to determine limitations and exceptional cost considerations to construct these strategic improvements. This included an assessment of existing bridges and other highway structures, environmental sensitivities, complexity of interchange configurations, and the availability of state-owned ROW.

- **Major Highway Structures:** Bridges and other major highway structures represent one of the biggest cost constraints or considerations of a highway improvement projects. Of the 120 structures along the corridor between Greenwich and Bridgeport, 80 structures are bridges that carry I-95 over local roadways, railroads, or bodies of water, 33 structures are bridges that carry local roadways and railroads over I-95, and seven structures are culverts.

Of the 120 highway structures in the corridor, eight major structures will require varying degrees of modifications or total replacement to allow the addition of new travel lanes. These include the Mianus River Bridge in Greenwich, Stamford area bridges, the I-95 bridge over Metro-North Railroad in Stamford, the Yankee Doodle Bridge in Norwalk, and the I-95 bridge over Saugatuck River in Westport.

- **Minor Highway Structures:** Each structure was analyzed to determine if the existing structure, including abutments, deck, parapets, etc. could accommodate the strategic widening in its current design or if replacement, or modification is necessary to accommodate the various different widening improvements. Of these structures, 37 require complete replacement, 32 require widening, and 59 can accommodate an additional lane with minor improvements.

- **Interchanges:** Between Greenwich and Bridgeport, there are 27 interchanges. The interchanges have varying degrees of complexity, but most have the ability to accommodate an additional lane in each direction or other strategic improvements without substantial reconstruction. However, a number of interchanges have geometric or traffic operational challenges or deficiencies that will require reconstruction to accommodate additional travel lanes or auxiliary lanes. With many closely-spaced interchanges, there is a tendency to use I-95 as a local connecting route rather than a regional facility. These local trips add significant amounts of volume and friction at the interchanges to the already over-capacity corridor.

While the conceptual plans developed for the strategic projects include tentative interchange improvements, four interchanges will require additional analysis, simulation, and further study to identify the most effective treatment. The following interchanges are the most "challenging" in the I-95 West Corridor and therefore represent the greatest potential to achieve congestion reduction benefits:

Reconstruction of the Moses Wheeler Bridge.

- Stamford Exits 7-9, including Bridge 00032 I-95 over Metro-North
- Norwalk Exits 13-16, including the Norwalk River Bridge
- Exits 22-24 in Fairfield with closely spaced interchanges and local access roadways
- Exit 27A – I-95/Route 8 ramp geometry

Improvements to these "challenging" interchanges have the potential to significantly improve traffic flow, capacity, and safety and therefore help correct bottlenecks in the corridor.

- **Right-of-Way:** CTDOT evaluated the availability of state-owned right-of-way (ROW) to construct the strategic improvements identified in this plan and the potential need to acquire additional ROW. Using NAD 83 aerial topographic LIDAR surveys and existing ROW, a "model" was developed to identify wetland boundaries, property lines, and evaluate property constraints. Contrary to a previously held belief that extensive ROW would need to be acquired, CTDOT generally found that adequate ROW exists to support I-95 widening and related interchange improvements throughout the corridor. However, it should be noted that major interchanges like the four noted above, would likely require ROW acquisitions, as any substantial change to alignments will impact surrounding properties.

4 Analyze Findings and Prepare Conceptual Plans and Cost Estimates

Based on the traffic analysis/micro-simulation modeling and assessment of existing conditions, a total of 10 strategic projects were identified for conceptual designs. These strategic improvements include one or more of the following elements:

- Adding a lane along a targeted section of I-95;
- Extending acceleration and deceleration lanes at interchanges;
- Adding auxiliary lanes between interchange ramps;
- Improving the geometry of interchanges, including potential improvements to the interface of on- and off-ramps and the local road network.

Since many of these projects are not adjacent to one another, they can be considered to have "independent utility," and can be evaluated separately from the environmental process standpoint.

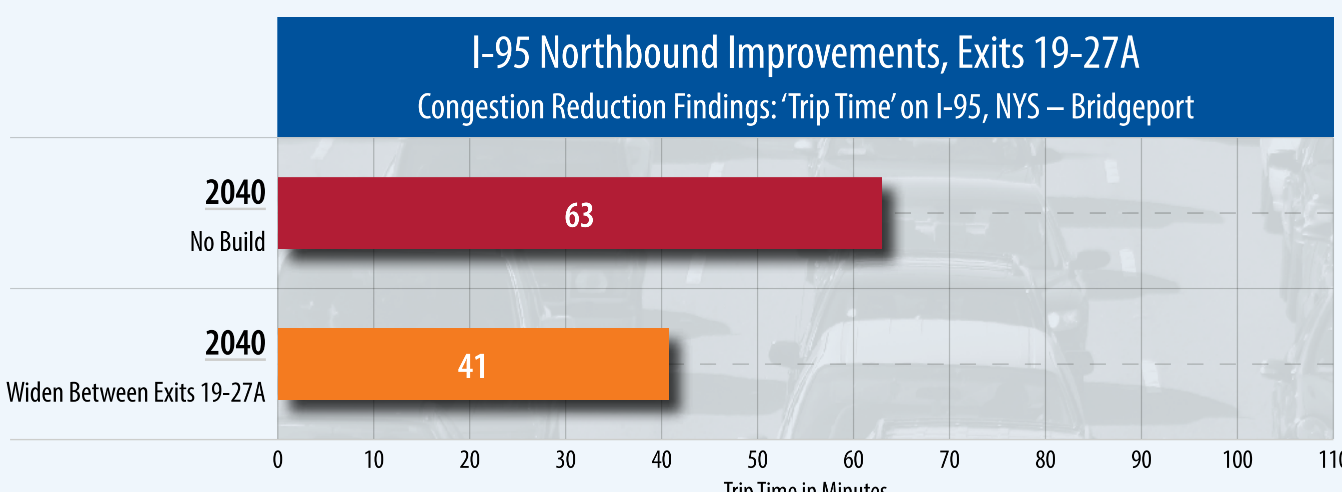
The analysis included a determination of the travel time savings or reductions in delay that could be attained by the projects. For example, by adding a lane in the southbound direction between the New York state line and Exit 7 in Stamford, a 9% decrease in Vehicle Hours of Travel (VHT) and a 35% decrease in Vehicle Hours of Delay (VHD) can be realized. Similarly, adding a lane in the northbound direction between Exits 19 and 27A can produce a 35% reduction in VHT and a 64% reduction in VHD.

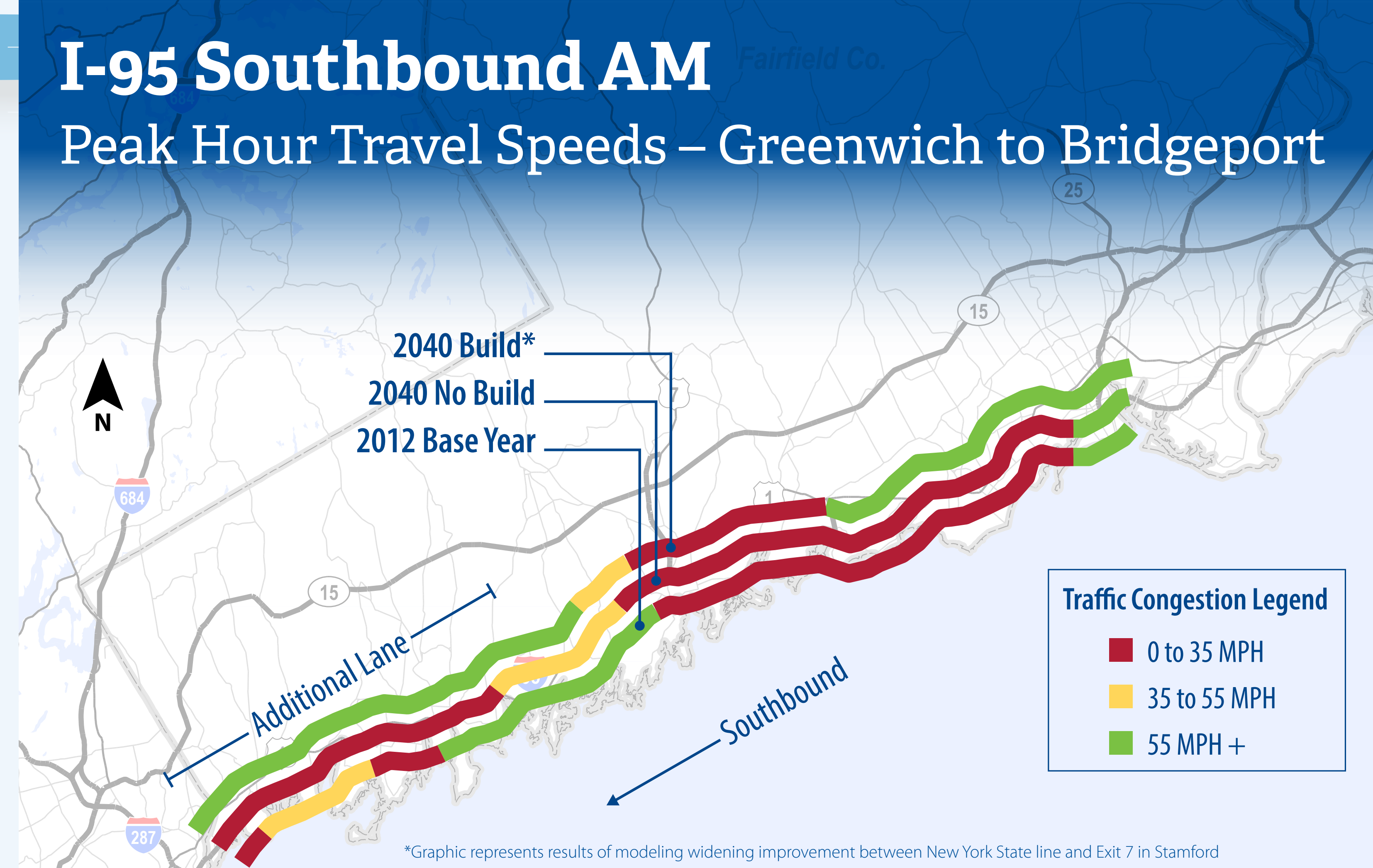
> …relatively small improvements to discrete segments of the I-95 West Corridor can result in significant improvement to corridor travel times – at a fraction of the cost to widen the corridor from three lanes to four lanes in each direction.

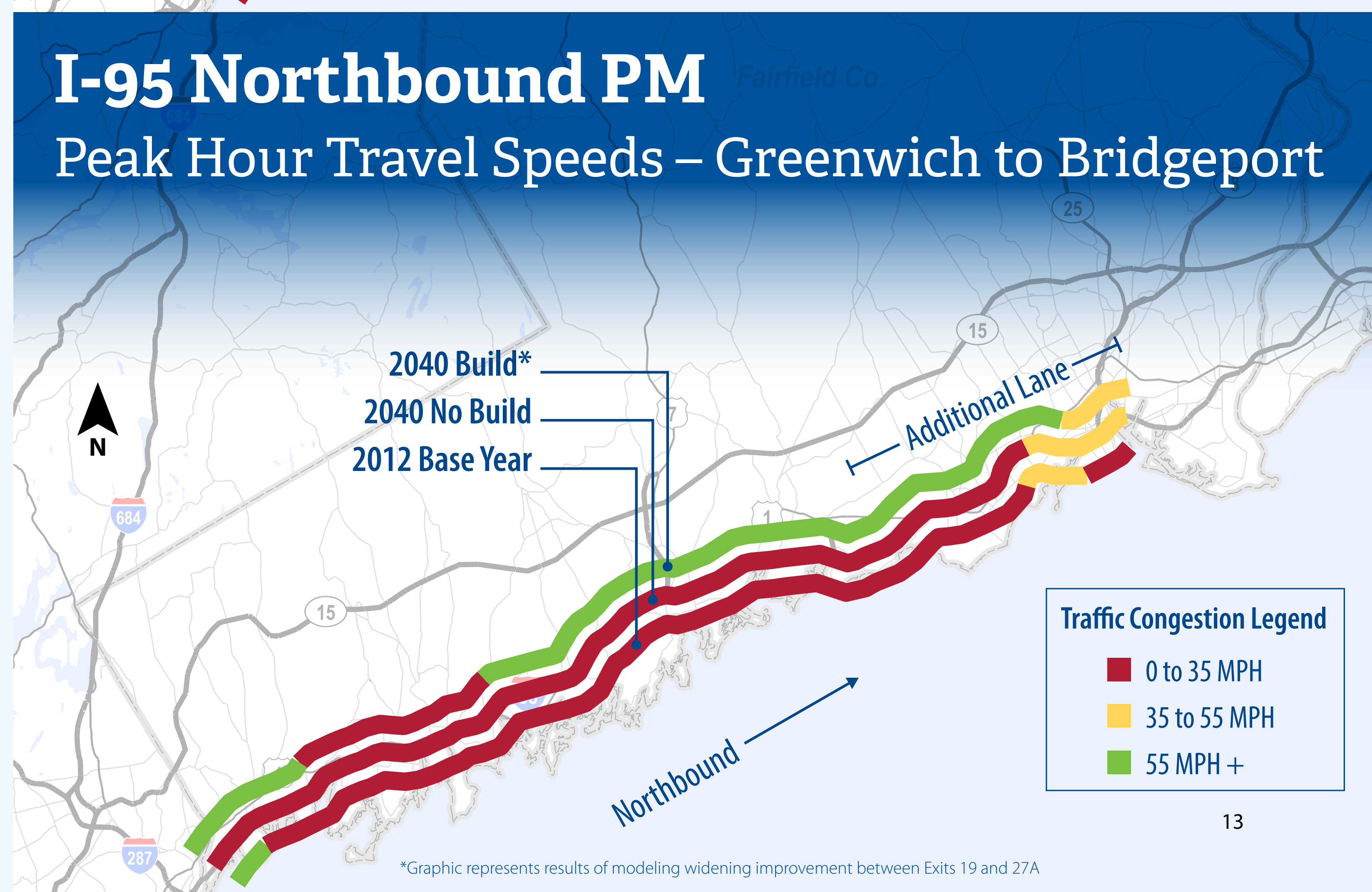
The 10 projects identified for advanced to conceptual design are emblematic of the central strategy of this implementation plan–that relatively small, directional (i.e. not necessarily improvements to both northbound and southbound travel lanes), operational improvements to discrete segments of the I-95 West Corridor can result in significant improvement to corridor travel times – at a fraction of the cost to widen the corridor from three lanes to four lanes in each direction.

To depict this implementation strategy and provide a basis for cost estimates, CTDOT then refined conceptual plans of the 10 strategic projects and prepared cost estimates for each to include in the *Strategic Implementation Plan, I-95 West Corridor – New York to New Haven.*

Costs for the concepts were developed using historical data from other I-95 projects and are inclusive of engineering, program management, inspection, construction costs, as well as ROW, environmental mitigation, and incidentals.







Implementation Plan

Identification of Short-Range, Mid-Range, and Long-Range Projects

In consideration of factors related to: a) complexity (recognizing that the implementation of a project typically needs to start many years in advance of construction); b) cost; c) environmental permitting; d) mitigation of potential impacts (such as traffic impacts during construction); and, e) funding availability, and recognizing the safety and traffic congestion reduction benefits, the 10 identified strategic projects along the I-95 Corridor from Greenwich to New Haven have been assigned to three categories:

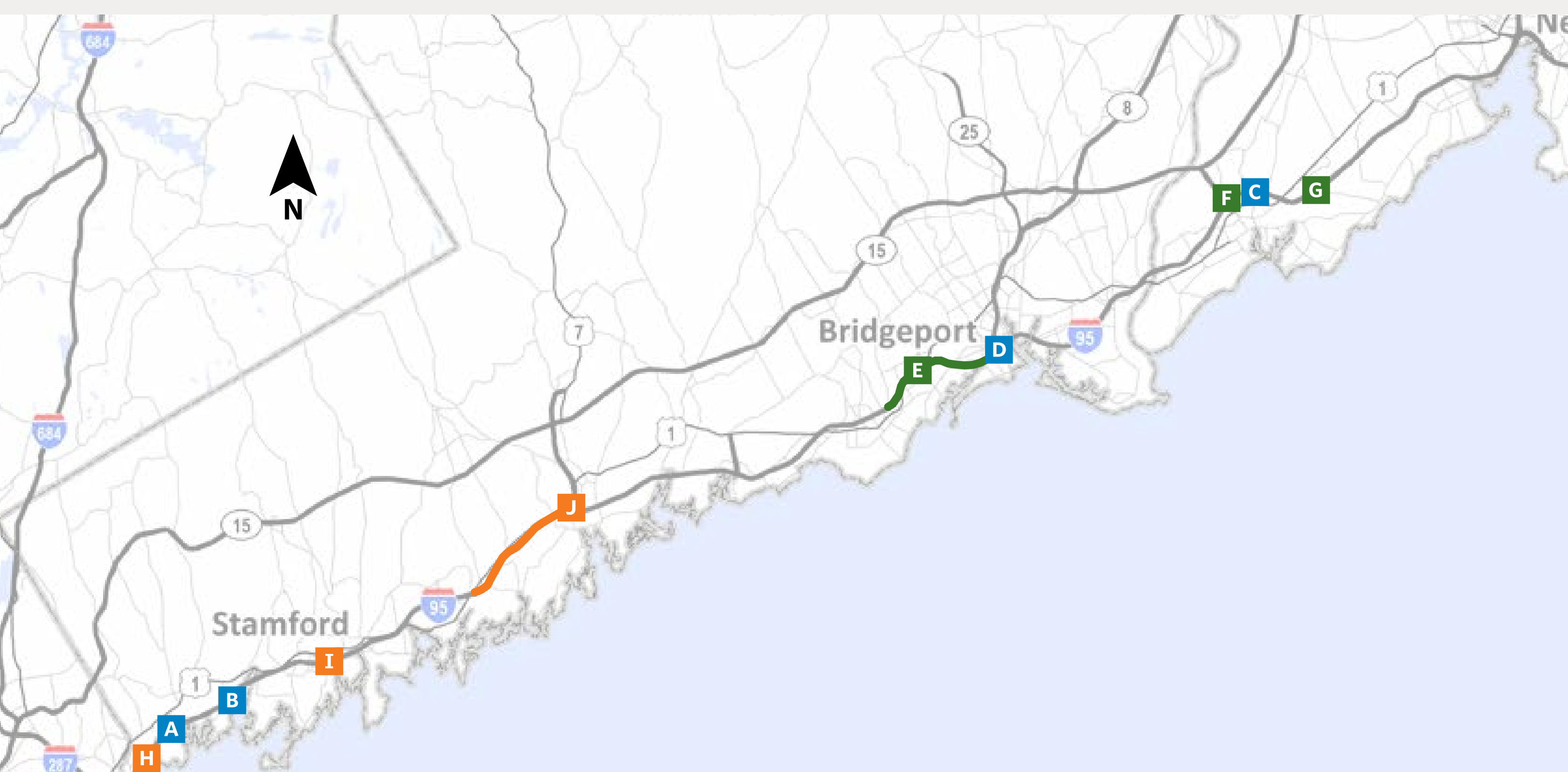
Short-Range Improvements (1-5 years) – Reflect projects which can be implemented and completed in 1-5 years, exhibit independent utility, and require minimal environmental documentation.

Mid-Range Improvements (5-10 years) – Require additional study and evaluation due to anticipated more extensive environmental documentation, public outreach, and will likely span multi-year construction phases.

Long-Range Improvements (20+ years) – Based on studies initiated in the Mid-Range category, these improvements will be highly dependent on availability of funding. These projects can be initiated singularly, have independent utility, and can be initiated in phases.

Key:

- A I-95 SB Exit 3 Off-Ramp
- B I-95 SB Exit 6-7 Auxiliary Lane
- C I-95 Exit 38 SB Off & On Ramps
- D I-95 NB Exit 27A
- E I-95 NB Exits 19-27A
- F I-95 Exit 38 Milford Connector
- G I-95 Exits 39 & 40
- H I-95 SB Exit 7-New York State Line
- I I-95 Exits 7-9
- J I-95 Exits 13-16



SHORT-RANGE

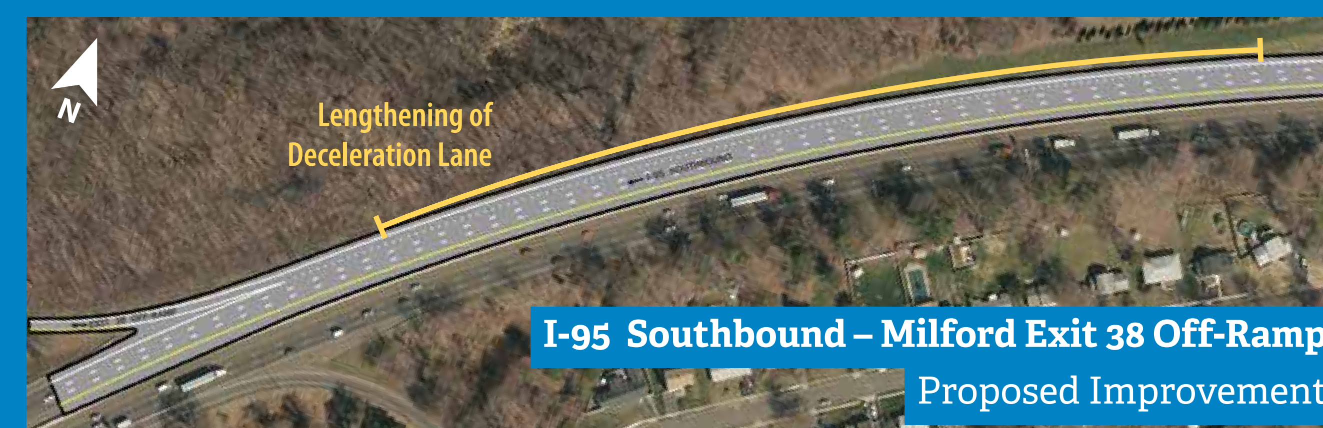
Description of Strategic Projects and Their Benefits

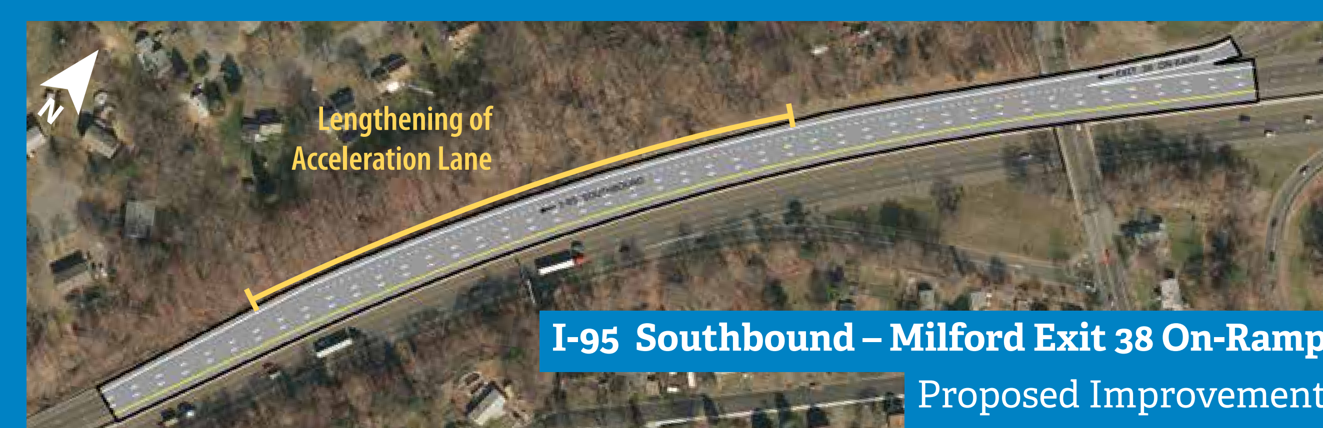
Following is a list and description of the 10 strategic projects grouped under the categories of **Short-Range**, **Mid-Range**, and **Long-Range**:

A Greenwich Exit 3 Southbound Off-Ramp to Arch Street – Increase deceleration lane length and expand off-ramp's storage to prevent back-up on I-95. During the morning peak hour, the back-up can stretch nearly a mile and can cause a safety hazard on mainline I-95. The improvement is a safety enhancement that will be included in the current resurfacing project under design and meets the definition of independent utility. The improvement will be coordinated with the resurfacing project currently under design as well as the signal system improvements under design by the Town of Greenwich. Estimated cost: **$4-$6 million.***

B I-95 Southbound Exit 6-7 – Add auxiliary lane between Exit 7 on-ramp and Exit 6 off-ramp, Greenwich. The short weaving section between the southbound on ramp from Greenwich Avenue and the Exit 6 off-ramp at West Avenue creates conflict and disruption to the main line flow along this section of southbound I-95. Adding an auxiliary lane in this section will improve safety and merge/diverge operations. This project exhibits the requirements for independent utility and can be implemented exclusively of other improvements. Estimated cost: **$6-$8 million.***

C I-95 Southbound Exit 38 Ramps, Milford – This improvement consists of lengthening the deceleration lane in the southbound direction on I-95 approaching the Milford Connector and lengthening the acceleration lane from the Milford Connector to I-95 southbound. This is a spot improvement which will improve operation and safety in the corridor and reduce queues from developing in the right lane. This project also meets the definition of independent utility. Estimated cost: **$2.5 million.*** ▼





*Estimated costs include construction, design, program management, construction engineering and inspection, ROW, environmental compliance, NEPA documentation, State Police, Intelligent Transportation Systems (ITS), and incidentals.

SHORT-RANGE

D I-95 Northbound Exit 27A (I-95/Route 8/Route 25 Interchange) –

This interchange is a major system interchange connecting I-95 with a link to northern Connecticut via Route 8 & 25. Traffic volumes exiting northbound I-95 for Route 8 & 25 are higher than can be accommodated in a single-lane off-ramp which causes a queue to develop in the right northbound lane of I-95. Additionally, the existing ramp design restricts sight-lines and cannot accommodate two lanes to exit as it is. These constraints cause friction on I-95, reducing capacity and causing northbound I-95 to backup and queues to develop from Exit 19 to Exit 27A (six miles).

Creating a two-lane off-ramp on I-95 northbound to allow two lanes to exit to Route 8 & 25 will reduce congestion and queuing on I-95. When combined with proposed additional lane (Mid-Range proposal "E") being added northbound on I-95 from Exit 19 to 27A, improved performance on I-95 will reduce delay and congestion substantially. This project has independent utility and can stand on its own merit. Estimated cost: **$17 million.*▼**

Existing

Proposed

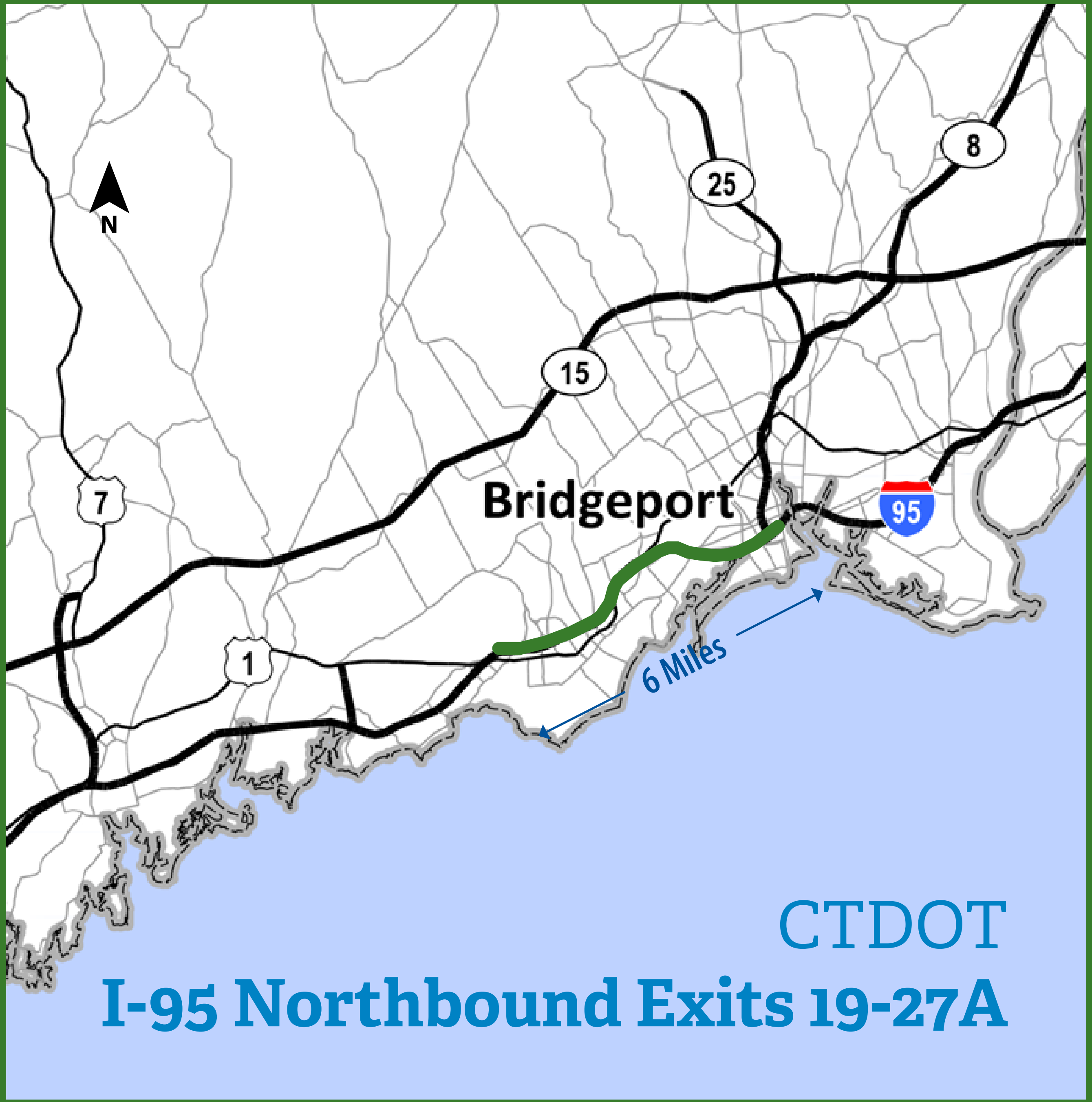
*Estimated costs include construction, design, program management, construction engineering and inspection, ROW, environmental compliance, NEPA documentation, State Police, Intelligent Transportation Systems (ITS), and incidentals.

MID-RANGE

E I-95 Northbound Exits 19-27A, Bridgeport –

Issue: I-95 northbound in the PM peak period develops queues which cause significant congestion that develop as far south as Stamford. The results of micro-simulation analysis show that by adding a fourth lane along I-95 in the northbound direction between Exits 19 and 27A (6 miles) will provide a significant reduction in VHD by 64% and improve travel time by 35% along the entire northbound section of I-95 from Greenwich to Bridgeport during the PM peak periods.

Solution: To implement the construction of a fourth lane northbound that will complement the short-term improvement at Exit 27A. The improvement will also require the evaluation and study of the interchanges from Exits 20-24 with consideration of Collector-Distributor (C-D) roads and reconfiguration of interchanges and exits. Estimated cost: **$350-$650 million.*▼**



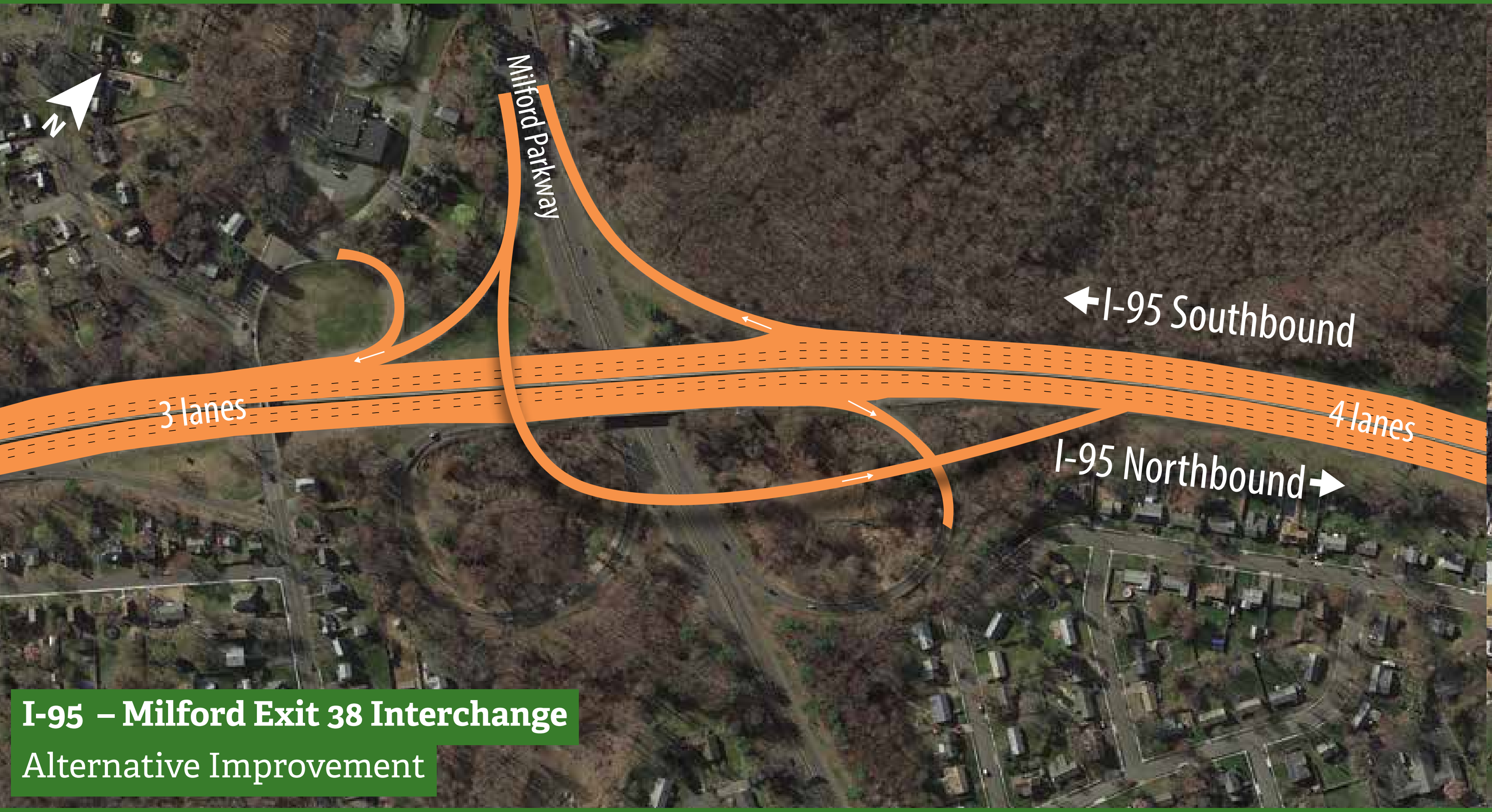
*Estimated costs include construction, design, program management, construction engineering and inspection, ROW, environmental compliance, NEPA documentation, State Police, Intelligent Transportation Systems (ITS), and incidentals.

MID-RANGE

F I-95-Exit 38 Milford Connector, Milford –

Issue: The interchange between I-95 and the Milford Connector (Exit 38) is a clover leaf interchange with a minimal weaving section on I-95 between on- and off-ramps in both the northbound and southbound directions. In addition, the posted 25 mph speeds on the ramps along with heavy volumes during the PM peak periods cause queues to develop on the southbound connector north of I-95 in the right lane, creating congestion and unsafe operational conditions.

Solution: Since the most significant and predominant movement is southbound Milford Connector to I-95 northbound, the removal of the loop ramp in the southwest quadrant of the interchange with an elevated flyover to I-95 northbound is a potential alternative. Estimated cost: **$140-$160 million.*▼**



I-95 – Milford Exit 38 Interchange
Alternative Improvement

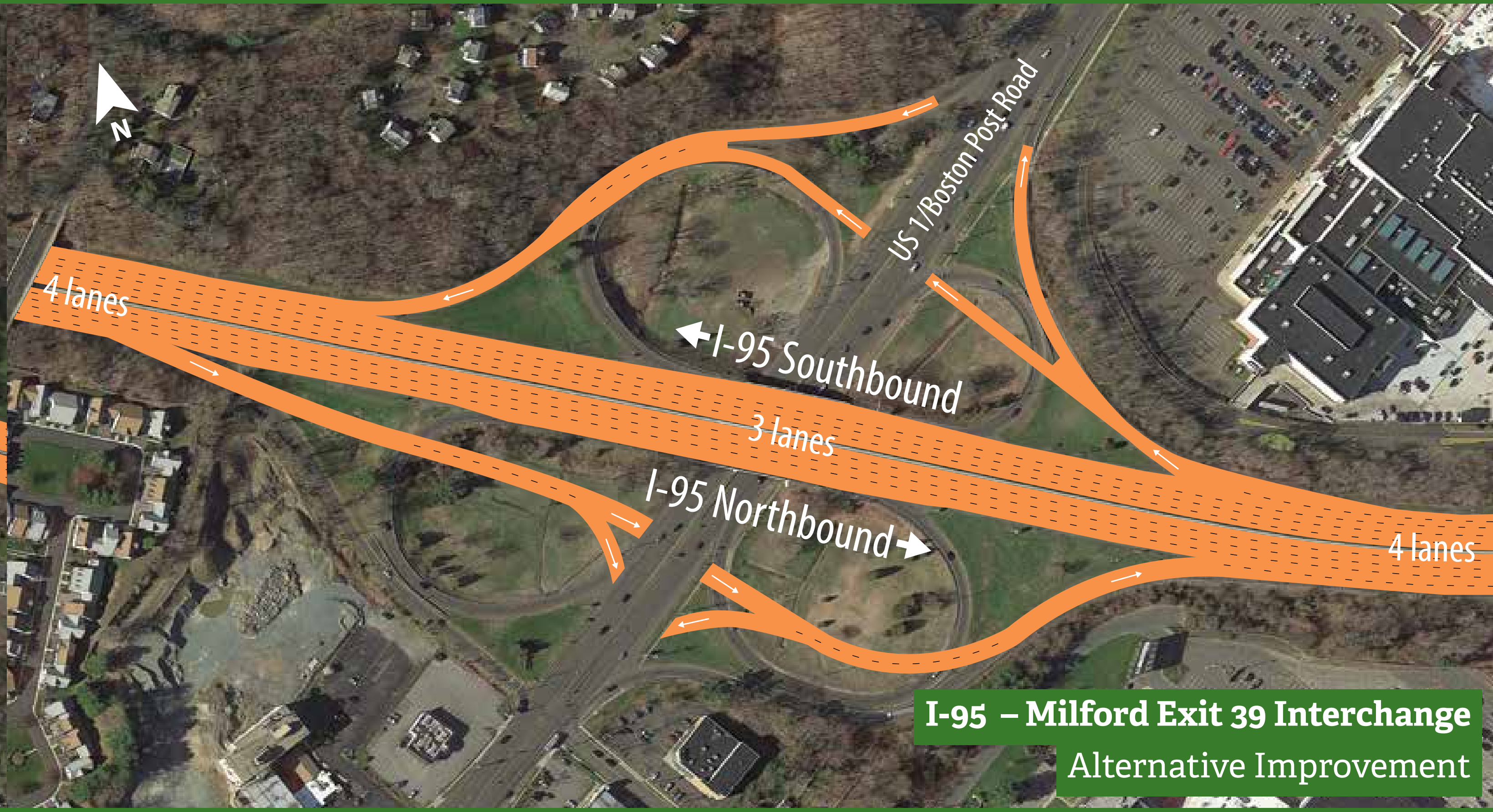
*Estimated costs include construction, design, program management, construction engineering and inspection, ROW, environmental compliance, NEPA documentation, State Police, Intelligent Transportation Systems (ITS), and incidentals.

G I-95 & Boston Post Road/Route 1 to Exit 39 and Woodmont Road Exit 40, Milford –

Issue: The Exit 39 Interchange between I-95 and US Route 1, like the Exit 38 Interchange, is a cloverleaf with short weaving sections on I-95. Land use in the area consists of dense commercial development and a major shopping center adjacent to the interchange. Additional development throughout the corridor is occurring, which is anticipated to make traffic conditions worse. The northbound direction is also impacted by queues developing between the Exit 39 on-ramp and Exit 40 off-ramp.

Solution: The alternative would consist of changing the configuration of the interchange to either a single point urban or diverging diamond. The reconfiguration will eliminate the weave condition and significantly improve operations. The northbound I-95 section between Exit 39 and Exit 40 (Woodmont Road) should have a fourth lane added to accommodate queuing at Exit 40. Estimated cost is **$90 million.*▼**

MID-RANGE



I-95 – Milford Exit 39 Interchange
Alternative Improvement

*Estimated costs include construction, design, program management, construction engineering and inspection, ROW, environmental compliance, NEPA documentation, State Police, Intelligent Transportation Systems (ITS), and incidentals.

H Greenwich I-95 Southbound Exit 7 to New York State Line –

Issue: I-95 southbound in the AM peak hour develops queues and heavy congestion resulting for the travel patterns towards New York and I-287. By adding a fourth lane in the southbound direction, the simulation analysis in the AM southbound direction provided the second highest quantifiable benefit with a 35% reduction in VHD (vehicle hours of delay) and a 12% reduction in travel time over this 9.6-mile section of roadway. This improvement, coupled with the implementation by NYSDOT adding a second exit lane to I-287, shows significant improvements in operations.

Solution: Implementation of this project needs to be coordinated with the current resurfacing project in the corridor. It should not preclude the widening improvements but complement the future improvement of the study phase of the segment between Exits 7-9 and the widening and replacement of Bridge 00032. Estimated cost: **$0.6-$1.3 billion.***

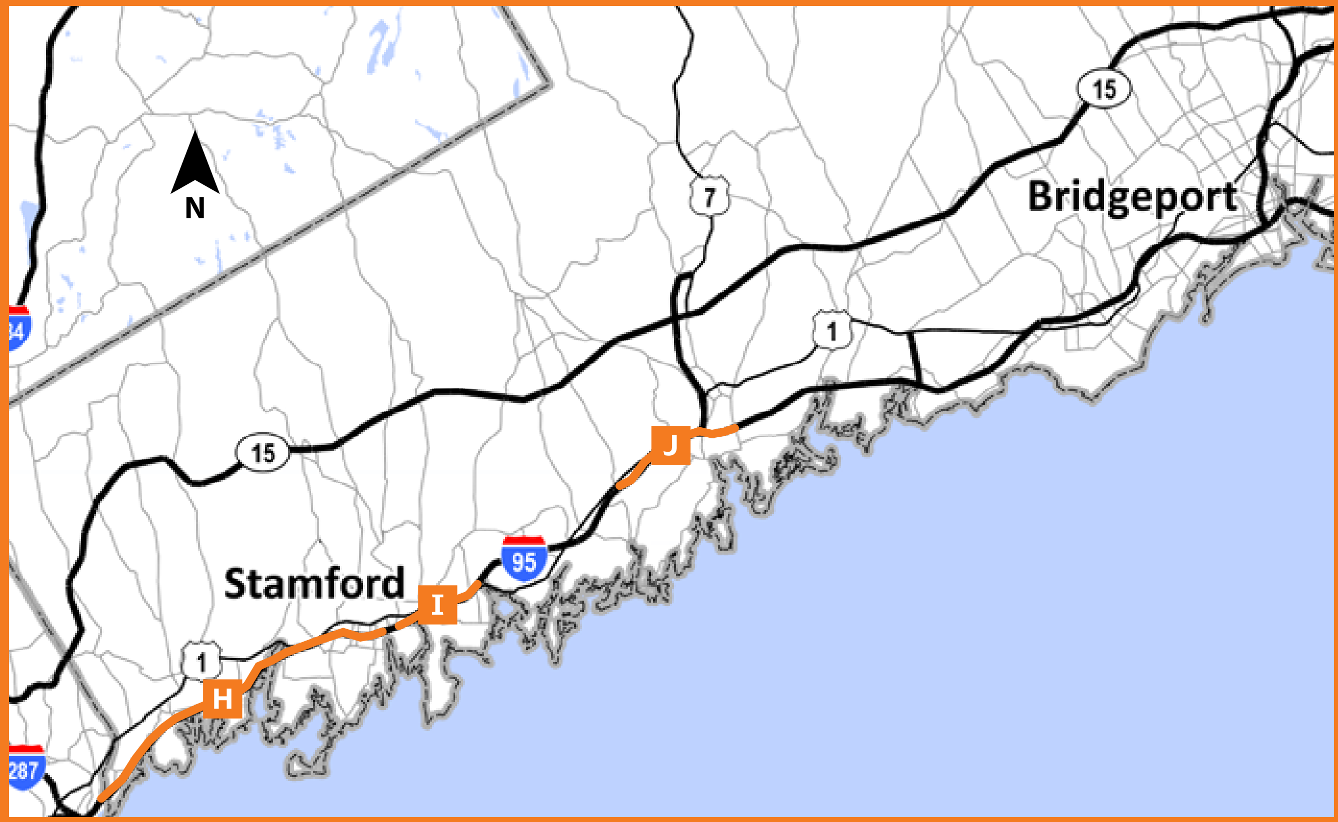
I Stamford I-95 Exits 7-9 & Bridge 00032, I-95 over Metro-North –

This segment of I-95 located in downtown Stamford and continuous to the Transportation Center consists of several structures and retained earth embankment. The structures carry I-95 over several local streets. Entrance and exit ramps to both directions of I-95 provide access and egress through a complex configuration of roadways. Immediately north of the area, I-95 is carried over the Metro-North railroad corridor on a structure using through girders which must be totally replaced due to the inability of widening this structure type in phases, e.g. one direction (northbound or southbound) at a time. A detailed operational analysis of this segment is necessary to understand impacts to the roadway network and access to I-95, as well as a staging construction plan for the replacement of this structure (aka. Bridge 00032). Estimated cost to develop this structure replacement plan: **$1.5-$2.5 million.** Estimated cost: **$1.6-$2.6 billion.***

J Norwalk I-95 Exits 13-16 –

Although this segment of I-95 has had a number of improvements in the past, adding a fourth lane in each direction requires a more global operational analysis of the interchange with Route 7 and the local street system. This segment of I-95 is bisected by the Norwalk River. I-95 is not only used to carry through trips but also serves to convey local trips over the river from East Norwalk to South Norwalk. Norwalk Hospital, located west of the river, relies on this access from I-95 to provide the fastest response time for first responders. Operational analysis of this segment, including Interchanges 13-16 along with a structural study for widening and replacing the I-95 Norwalk River Bridge (Yankee Doodle Bridge) is necessary. Consideration should be given to utilizing service roads that would consolidate and improve access. Estimated cost to develop the plan: **$1.5-$2.0 million.** Estimated cost: **$0.5-$1.0 billion.***

*Estimated costs include construction, design, program management, construction engineering and inspection, ROW, environmental compliance, NEPA documentation, State Police, Intelligent Transportation Systems (ITS), and incidentals.



LONG-RANGE

Project Challenges and Considerations

The ability to undertake and construct these strategic projects will depend on a number of factors and associated risks and challenges, including:

- National Environmental Policy Act (NEPA) and the Connecticut Environmental Policy Act (CEPA) environmental documentation and project approvals
- Project design considerations
- Project funding and financing
- Project implementation and scheduling

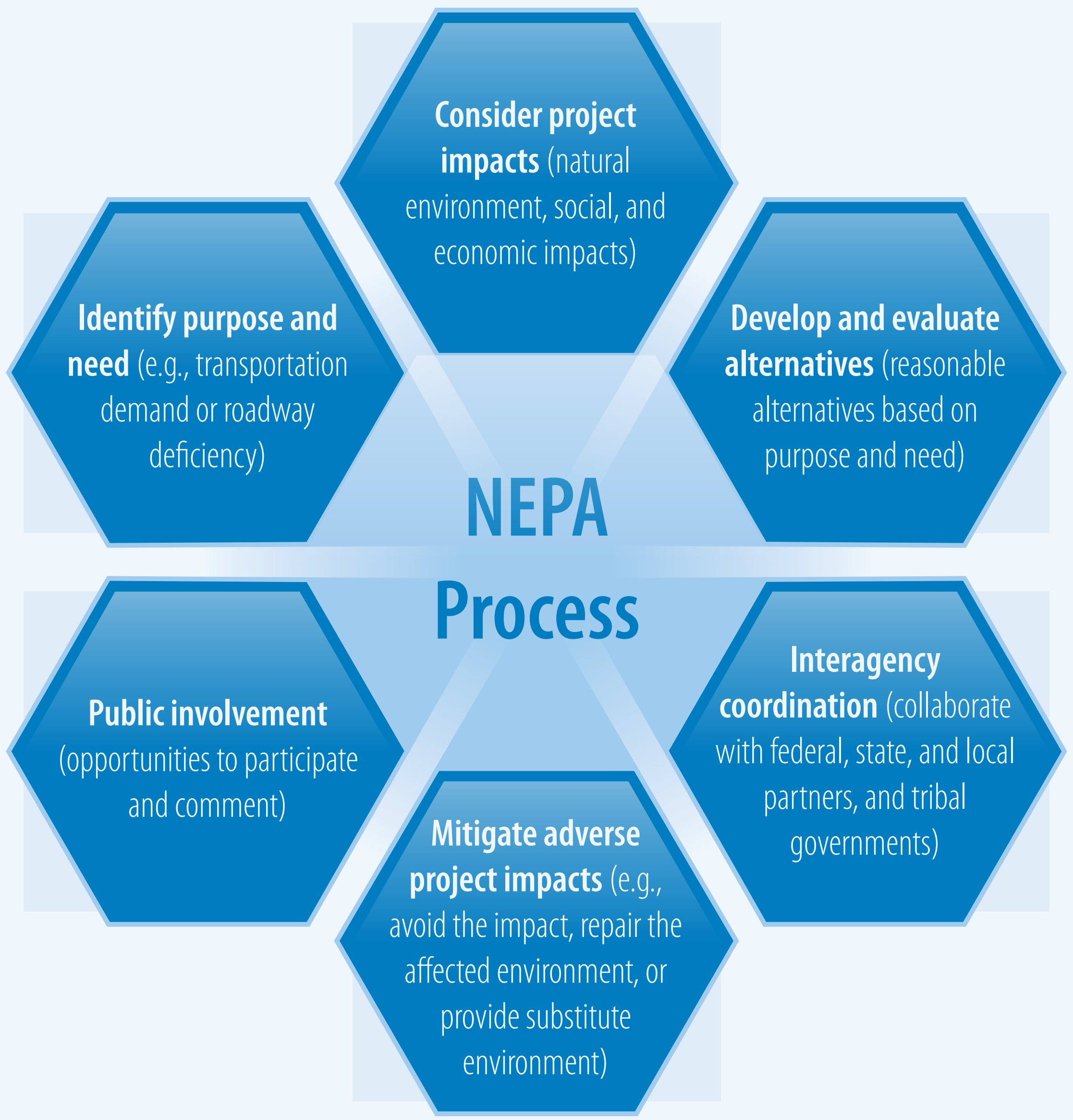
NEPA/CEPA Environmental Documentation and Project Approvals

FHWA allows multiple projects within the same corridor to be implemented independently if each project exhibits "independent utility." Independent utility means that a proposed action or project can be considered as a "stand alone" project because it serves a distinct purpose or function and can be constructed without affecting the construction of other projects in the area. Independent utility can also serve as a test to determine what constitutes a "single and complete project" under the U.S. Army Corps of Engineers regulatory permitting program.

The 10 strategic implementation projects identified in this plan have been determined to all have independent utility. This is important because the environmental documentation and permitting for each NEPA and CEPA project could be done independent of one another. NEPA and CEPA, could proceed independently for each, in a more streamlined process.

NEPA and CEPA require that proposed federally and state-funded projects undergo a process to identify and evaluate their potential impacts and engage the public regarding those impacts. This work must occur in the early planning phases of a project before key decisions are made. Each strategic project for the I-95 West Corridor will go through the NEPA and CEPA environmental documentation and approval processes, unless any of the projects are granted a "categorical exclusion" from the acts. A categorical exclusion means a category of action(s) which do not individually or cumulatively have a significant effect on the human environment and, for which, in the absence of extraordinary circumstances, neither an environmental assessment nor an environmental impact statement is required (40 CFR 1508.4).

The principal requirements of CEPA are similar, though the specific regulations and notification requirements differ. For NEPA, the final determination is made by the sponsoring federal agency. For CEPA, the final determination is made by the State of Connecticut's Office of Policy and Management (OPM). When both federal and state funds are expected to be utilized on a project, both NEPA and CEPA requirements must be met. This is typically achieved with the issuance of a joint environmental document (i.e. an EA or an EIS).



Project Design

Considerable work needs to be undertaken to advance each of the projects through the environmental process, preliminary and final design, procurement of construction services, and construction, including:

- Environmental process
- Determination of the form of project delivery (e.g. Design/Bid/Build vs. Design-Build)
- Refinement of traffic simulation modeling including more detailed analysis of local road impacts, and alternative population and traffic growth scenarios.
- Field survey and detailed condition assessment to avoid unforeseen construction issues such as pavement conditions and bridge foundation conditions.
- Planning and design of the maintenance and protection of traffic during construction, including alternative routes and encouraging commuters to use alternate modes of travel. This work needs to consider impacts to parallel but independent transportation facilities including Metro-North Railroad and the Merritt Parkway.

Project Funding and Financing

Project funding and financing is key to any transportation project and is subject to state and federal review and appropriation. A variety of state and federal sources provide funding for transportation projects in Connecticut. The project funding process generally involves adopting the project in state and regional capital plans, including the project in a bond request and bond allocation, and appropriating project funds.

The U.S. Department of Transportation and FHWA require each project in excess of $500 million to have a detailed financial plan once it is approved through the environmental process. The financial plan is accompanied by a project management plan which lays out the framework for project execution and ensures factors such as availability of materials and cost escalation are considered.

Project Management and Scheduling

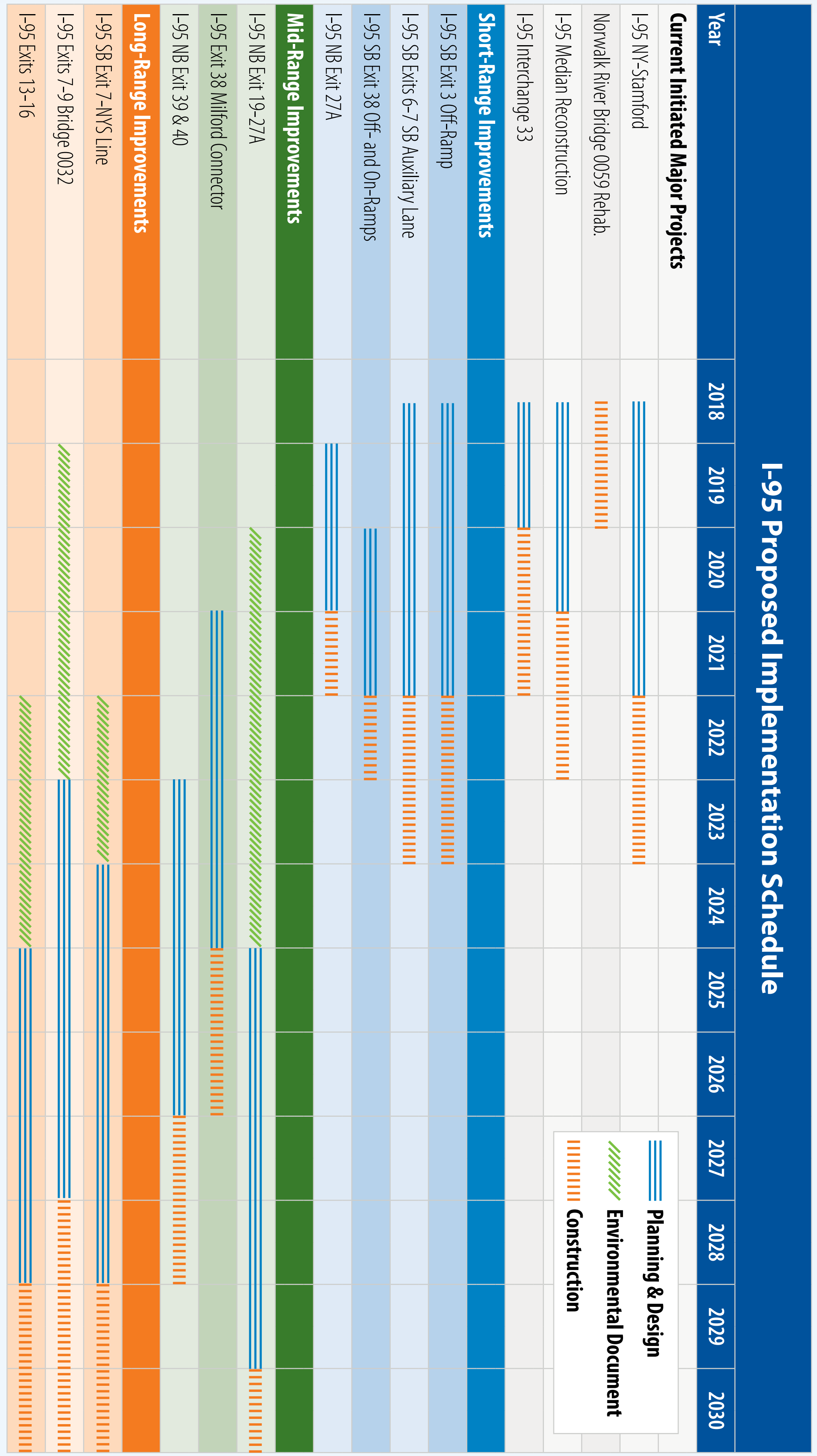
Project management and scheduling of transportation projects would include development of detailed resource allocation plans, project phasing plans, and project schedules. This planning is essential to reduce project risks, avoid unreasonable project delays, and avoid the potential for project impacts, such as cumulative construction or traffic impacts of adjacent projects. This phase is also critical to understanding how these projects fit into CTDOT's Transportation Capital Plan, and in which years.

The project management plan and its execution would include cost control provisions, interagency coordination, and development of critical path scheduling.

Overall Project Timeline and Process

The following timeline provides a tentative, overall schedule for implementing the I-95 West strategic projects, including current major projects, and short-range, mid-range, and long-range strategic projects. It identifies the general process as projects progress from project initiation and concept development, through NEPA and CEPA environmental documentation, planning and design, and construction.

Projects identified in the short-range category are anticipated to only require a categorical exclusion for NEPA approval. All other projects are anticipated to satisfy the requirements for independent utility but will require the preparation of a full NEPA and CEPA document. All projects will involve a formal public involvement process.



Summary

The original I-95 highway corridor, constructed in 1954, now provides access to one of the world's largest economies and is in need of major investment. This Strategic Implementation Plan provides the framework for targeted investments within the I-95 Corridor between the CT/NY state line and New Haven. By examining the available ROW, crash characteristics, traffic volumes, and through the development of a detailed traffic microsimulation model, key projects have been identified that can be advanced in the short, mid, and long-term to significantly improve the performance of the system.

In addition to the short and mid-range projects and concepts included herein, alternatives need to be developed for several major segments along the corridor that present especially challenging or expensive projects due to ROW constraints, or the engineering complexity of the proposed improvement. These include special evaluations of the following segments:

- I-95 between Exits 7 and 9, including Bridge No. 00032 (I-95 over Metro North);
- I-95 between Exits 13 and 16 and the Norwalk River Bridge; and
- I-95 between Exits 20 and 24 northbound and southbound.

It is also important to ensure that current transportation programs support the needs of the system. Regular and ongoing improvements and maintenance must be completed to ensure the current system is maintained in a state of good repair. Regular and ongoing maintenance can sustain a modern, well-functioning I-95 Corridor.

This Plan proposes concrete, implementable projects that address certain operational deficiencies that should be advanced. While the schedule, cost estimates, and modeling included herein represent a snapshot in time, the Plan identifies projects and concepts that can greatly improve the performance of the I-95 corridor. These improvements will result in travel time savings or reductions in delays. Two examples include: a 9% decrease in Vehicle Hours of Travel (VHT) and a 35% decrease in Vehicle Hours of Delay (VHD) by adding a lane in the southbound direction between the New York state line and Exit 7; and a 35% reduction in VHT and a 64% reduction in VHD by adding a northbound lane between Exits 19 and 27A. Other proposed projects provide similar performance improvements to the corridor. The combination of short, mid-range, and long-term projects can support a growing Connecticut economy for decades to come.

CONNECTICUT DEPARTMENT OF TRANSPORTATION