



November 2017

Connecticut Statewide Freight Plan



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LIST OF ACRONYMS

AHTD – Annual Hours of Truck Delay
ATA – American Trucking Association
BPA – Bridgeport Port Authority
CIP – Capital Improvement Plan
CMAQ – Congestion Mitigation and Air Quality Program
CNG – Compressed Natural Gas
COG – Council of Governments
CPA – Connecticut Port Authority
CRA – Connecticut Railroad Association
CRFC – Critical Rural Freight Corridors
CTDOT – Connecticut Department of Transportation
CUFC – Critical Urban Freight Corridors
CVISN – Commercial Vehicle Information Systems and Networks
DECD – Department of Economic and Community Development
DEEP – Department of Energy and Environmental Protection
DMV – Department of Motor Vehicles
EJ – Environmental Justice
EPA – United States Environmental Protection Agency
FAA – Federal Aviation Administration
FAST Act – Fixing America’s Surface Transportation Act
FHWA – Federal Highway Administration
FMCSA – Federal Motor Carrier Administration
FRA – Federal Railroad Administration
FTA – Federal Transit Administration
FTIP – Freight Transportation Improvement Program
GIS – Geographic Information System
GPS – Global Positioning Systems
HCAADT – Heavy Commercial Average Annual Daily Traffic
HHS – U.S. Department of Health and Human Services
HOS – Hours of Service
HSIP – Highway Safety Improvement Program
ITS – Intelligent Transportation Systems
LEP – Limited English Proficiency
LRP – Long Range Plan
MAP-21 – Moving Ahead for Progress in the 21st Century Act
MPG – Miles Per Gallon
MPH – Miles Per Hour
MPO – Metropolitan Planning Organization
NAAQS – National Ambient Air Quality Standards

LIST OF ACRONYMS

NAFTA – North American Free Trade Agreement
NBI – National Bridge Inventory
NECR – New England Central Railway
NERFG – New England Regional Freight Group
NFAC – National Freight Advisory Committee
NFSP – National Freight Strategic Plan
NHFN – National Highway Freight Network
NHFP – National Highway Freight Program
NHL – New Haven Line
NHPA – New Haven Port Authority
NHPP – National Highway Performance Program
NHS – National Highway System
NHTSA – National Highway Traffic Safety Administration
NMFN – National Multimodal Freight Network
NSB – Naval Submarine Base
OSOW – Oversize-Overweight
PHFN – Primary Highway Freight Network
PHFS – Primary Highway Freight System
PHMSA – Pipeline and Hazardous Materials Safety Administration
PPPs – Public-Private Partnerships
PTC – Positive Train Control
RQI – Ride Quality Index
RRIF – Railroad Rehabilitation and Improvement Financing
STF – Special Transportation Fund
STIP – State Transportation Improvement Program
STRAHNET – Strategic Highway Network
TEP – Tax Exempt Program
TIFIA – Transportation Infrastructure Finance and Innovation Act
TIGER – Transportation Investment Generating Economic Recovery
TRANSCOM – Transportation Operations Coordinating Committee
TTTR – Truck Travel Time Reliability
USACE – United States Army Corps of Engineers
USDOT – United States Department of Transportation
WIM – Weigh-in-Motion Systems



EXECUTIVE SUMMARY

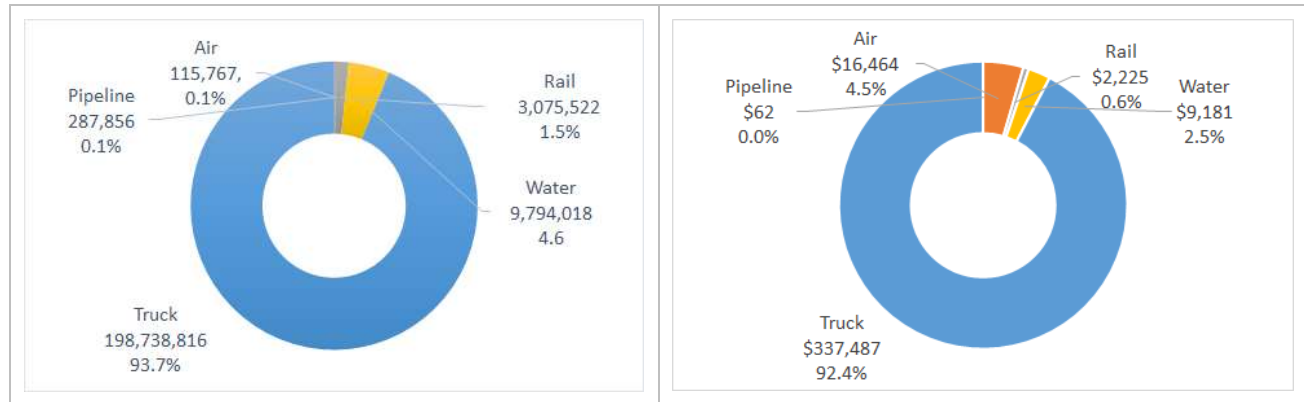
Freight movement is invisible to most of us, yet we expect much from it. Think about the last time you ordered a gift for someone at the last minute that was delivered within a single day of your order. Making deliveries happen so efficiently and seamlessly takes advanced logistics and a well-functioning and well-integrated system of roads, rail, ports and airports. The State of Connecticut operates and maintains much of that system, and partners with the private sector to maintain and operate some of it as well. This system must be fast, but it also needs to be safe for everyone. Connecticut lies in one of the largest economic regions of the world, and is a major supplier and importer of goods and services, all of which rely on a properly functioning freight network. In order to keep this system working safely and efficiently both now and in the future, Connecticut must formulate the right policies, technologies and investments to operate, maintain and expand the system that is in place today, and be prepared for the changes that are coming.

The Connecticut Statewide Freight Plan is part of that preparation. It reviews the State of Connecticut's multi-faceted and interconnected freight system and sets a direction for policies, technologies and investments that will help the state meet the future and thrive in it.

OVERVIEW OF FREIGHT TRANSPORTATION IN CONNECTICUT

- Connecticut's freight system is comprised of public and privately owned infrastructure. As discussed in more detail in chapter 5, the operations for freight movements are almost entirely conducted by the private sector, with public or quasi-public entities providing much of the infrastructure.
- In 2014, the shipments of commodities on Connecticut's freight system contributed to business activity valued at \$58.1 billion. About one-quarter of business activity in the state is directly related to goods movement.
- Trucks move most of the freight that travels in Connecticut. Nearly 94 percent of the freight that travels to, from or through Connecticut does so by truck (**Figure ES-1**). Trucks also move over 84 percent of the fuel oil that is shipped to the state.
- Connecticut is part of a national network and a gateway for freight, connecting some of the nation's most productive population centers just beyond our borders to the north and south with the rest of the nation. Forty-four percent of freight movements in Connecticut are through trips. However, Connecticut's roads, and especially the Interstate System, carry a disproportionate burden of this through traffic - trucks transport over 99 percent of the freight that passes through Connecticut.
- Rail accounts for a relatively small share of freight by weight. Two-thirds of Connecticut's rail freight shipments consist of wood products, gravel, chemicals, plastics fuel and scrap metal. Clearance restrictions, weight restrictions, and low operating speeds diminish the effectiveness of the 648 miles that comprise Connecticut's freight rail network.

Figure ES-1: Connecticut Major Freight Flows by Tonnage (left) and Value (right, \$Millions)

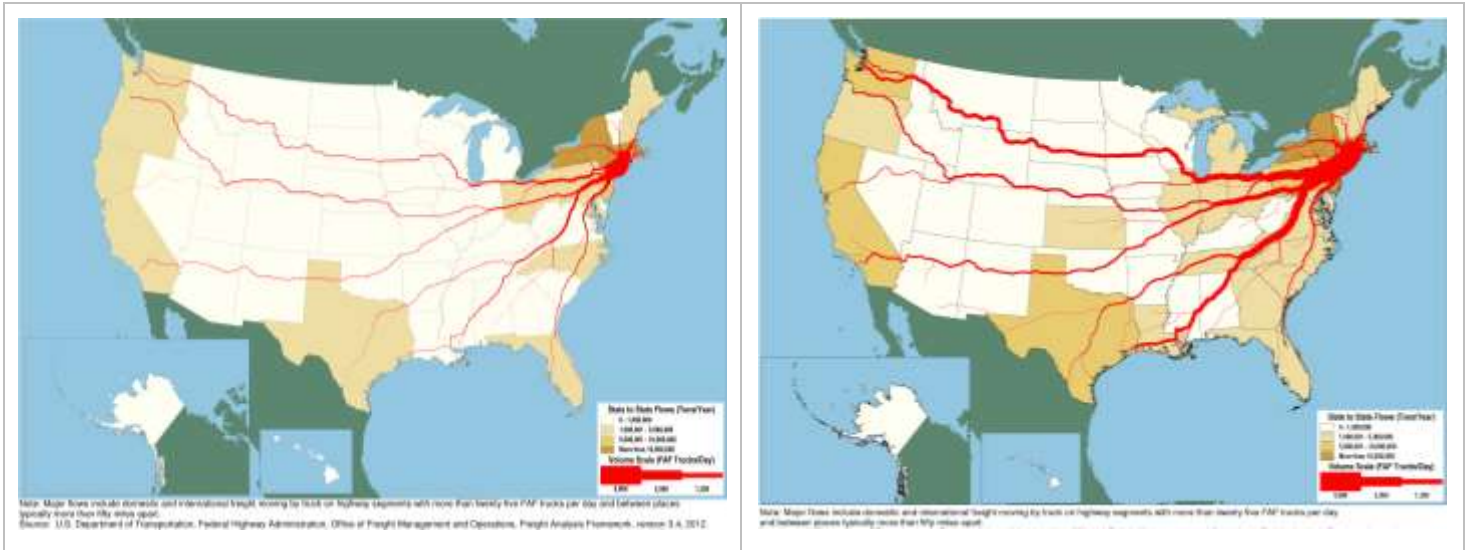


Source: CDM Smith and IHS-Transearch data, 2914

- Connecticut's pipeline system brings 97 percent of the state's natural gas shipments into the state. The pipeline system is limited in its capacity to meet growing demand.
- Scrap metal is Connecticut's largest single export commodity by weight. Half is exported through the Port of New Haven to international destinations. The balance is exported by truck to New England states.
- In 2016, over \$2.3 billion worth of petroleum products including fuel oil was shipped through the Port of New Haven.
- JFK is a major source of air cargo that travels to and from Connecticut by truck. Bradley International Airport shipped over \$172 million in high-value goods in 2014, consisting of high value components such as aircraft components, electrical and machinery parts as well as consumer goods.
- The Port of New York and New Jersey is the major conduit for waterborne freight to/from Connecticut by truck.
- Trucks encounter significant delay in the peak hours of travel on Interstate roads around Connecticut's urbanized areas. In 2016, truck delays were greatest along Interstate 95 between New York and New Haven, and I-84 near Danbury, Waterbury and Hartford.

While Connecticut's largest truck trading partners are its neighbors, there are significant connections with states in the south and west as well. **Figure ES-2 (left)** illustrates the major freight flows by truck to, from, and within Connecticut for 2010, and **Figure ES-2 (right)** depicts the 2040 truck freight forecasts. Together, these figures illustrate the increase in freight flows - nearly 59 percent over current levels - that are projected for Connecticut's roads within the next 25 years.

Figure ES-2 Major Freight Flows by Truck, 2010 (left) and 2040 (right) To, From and Within Connecticut



Source: US DOT, FHWA, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2012

Table ES-1 and **Table ES-2** exhibit the points of exit for international exports and their value as well as the breakdown of commodities and their value in the New England Region. Air transport is the major freight mode for international exports from Connecticut. Air transport allows for fast, just-in-time deliveries by businesses, saving money on inventory and logistical costs. In addition to becoming increasingly important in international trade, air transport can involve higher costs and be subject to delays or cancellations not experienced by other modes.¹

Table ES-1: Major Points of Exit for International Exports and Value in Connecticut, 2013

Location	Export Value, 2013
JFK Int'l., NY (air)	\$8.2 billion
New York, NY (sea)	\$1.1 billion
Laredo, TX (land)	\$1.0 billion
Buffalo, NY (land)	\$653 million
Newark, NJ (sea)	\$557 million
Baltimore, MD (sea)	\$490 million
Atlanta, GA.	\$458 million

Source: WISERTrade

¹ <https://www.gov.uk/transport-and-distribution-for-international-trade>

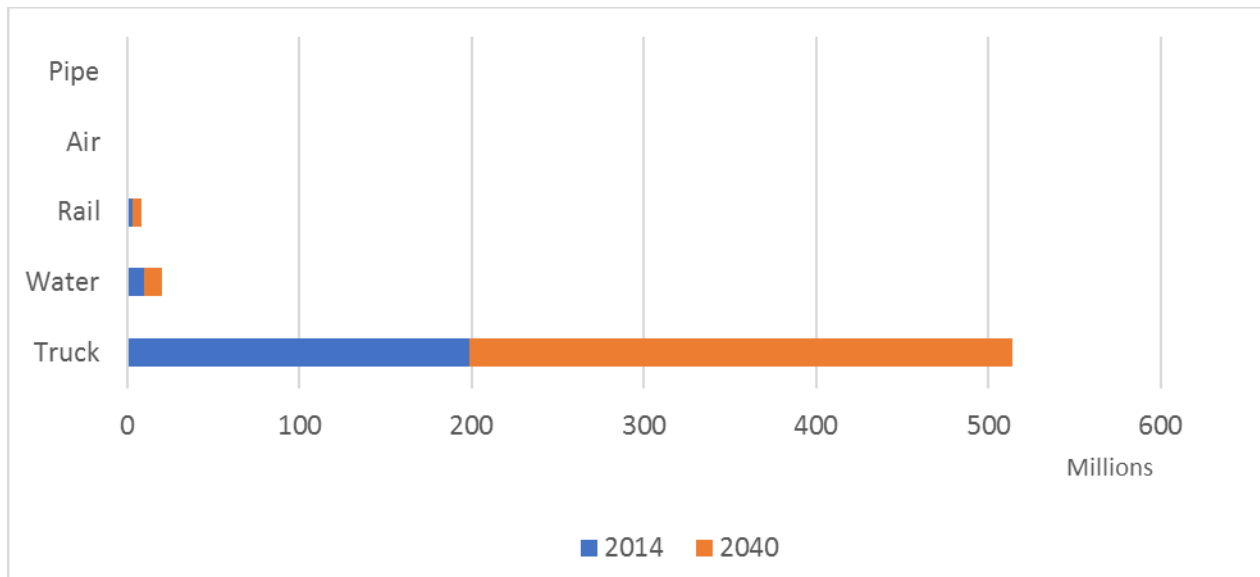
Table ES-2: Major Commodities Exported Internationally and Value in Connecticut, 2013

Commodities	Total Value, 2013
Aircraft & parts	\$7.7 billion
Industrial machinery	\$2.0 billion
Electric machinery	\$1.3 billion
Medical equipment	\$1.2 billion
Plastics	\$505 million
Copper	\$397 million

Source: WISERTrade

By 2040, Connecticut freight demand is expected to grow by 57 percent or 1.7 percent annually, from 212 million to 339 million tons. Trucks will move 97 percent of this increase, assuming the mix of modes that move freight remains the same. **Figure ES-3** presents current and future freight mode shares. These forecasts underscore the need to maintain and improve both the safety and efficiency of truck freight, and to seek partnership opportunities that can contribute to an effective multimodal system of cargo transport.

Figure ES-3 Total Connecticut Freight Tonnage by Mode, 2014 and 2040 (in Millions)



CDM Smith and IHS-Transearch data

SUMMARY OF FREIGHT RECOMMENDATIONS

The freight plan has been developed in conjunction with Connecticut's Long Range Statewide Transportation Plan (LRSTP), formerly referred to as TransformCT and Let's Go CT!, which identifies \$100 billion in long-range improvements in expansion, preservation and modernization. This plan is also consistent with the 2009 Long Range Plan. A substantial proportion (nearly 80 percent) of these improvements would have a direct benefit to freight transportation in Connecticut. Of note for the

long-distance travel characteristic of freight movements, projects in several key interstate corridors currently plagued with traffic congestion are prioritized for early implementation, including:

- Reconstructing major bridge structures on I-84 in Waterbury and Hartford, and redesigning major structures on I-84 in Danbury. These improvements will increase safety and operational efficiency, and remove barriers within these cities created by the interstate.
- Rebuilding and widening significant portions of I-95, in particular, the section from New Haven to New York, where the most significant truck bottlenecks occur. CTDOT is designing options for widening the section of the interstate from Branford, CT (east of New Haven) to Rhode Island. To address bottlenecks on the section of I-95 from New Haven to New York, CTDOT is looking at adding additional lanes and implementing travel demand management strategies, as well as significant commuter rail expansion options on the Metro North line between New Haven and New York.

CTDOT is currently working with the state legislature, the Governor and stakeholders to identify funding sources and administrative mechanisms for implementing many of these improvements over the next 15 years.

The state freight plan complements the long-range multimodal plan by adding recommendations that target goods movement in Connecticut. The recommendations encompass policy, infrastructure and technology elements, and address larger, system-wide goals that were developed over the course of the plan. The highlights of these recommendations include:

- Addressing the state's most significant highway freight bottlenecks, implementing the interstate and rail capital improvement projects identified on the long-range multimodal transportation plan.
- Addressing rail freight capacity issues and working in partnership with rail operators to expand 286,000 lb. capacity over priority routes such as the New Hartford-Springfield route, and expanding rail capacity on the Metro-North route.
- Increasing the supply of truck parking in Connecticut
- Modernizing technology to enforce vehicle weight limits, conduct truck inspections and conduct credentialing operations
- Improving rail technologies to improve safety through positive train control
- Providing more real-time and predictive information to truck operators, regarding truck parking availability, truck routes, hazards and incidents that impede truck travel.

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APPENDICES (UNDER SEPARATE COVER)

Appendix A – IHS-Transearch Freight Movements

Appendix B – Economic Context of Freight Transportation in Connecticut



I. INTRODUCTION

Every business and resident in Connecticut depends on the freight transportation system of roads, terminals, waterways, airports and pipelines for the commodities they use daily. Every investment in the transportation system that increases throughput, improves efficiency and reduces costs has a direct positive impact on Connecticut's economy. At the same time, freight transportation requires significant expenditures of energy to move large quantities of industrial and consumer goods over long distances, and the many agencies and businesses that develop policies, investments and programs to understand and mitigate the risks of freight transportation, do so to improve environmental quality and improve safety for all transportation system users.

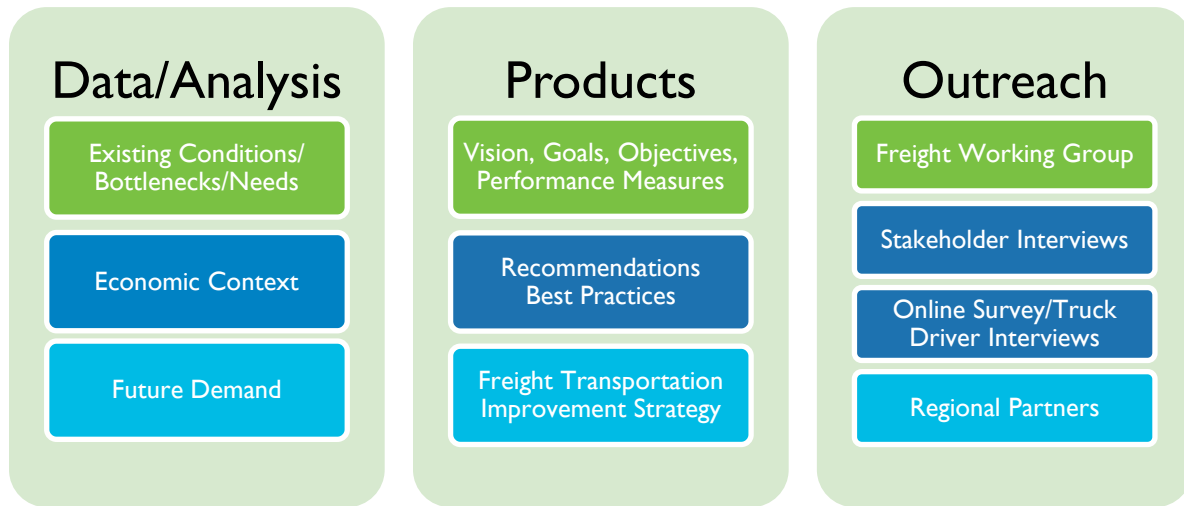
I.1 PURPOSE OF THE FREIGHT PLAN

The CTDOT Statewide Freight Plan (Freight Plan) serves the residents and businesses of the State of Connecticut to improve freight transportation by identifying the state's unique needs, recommending policies, and devising implementation strategies. The Freight Plan considers highway, freight rail, aviation, port and waterway needs. The Freight Plan also describes the pipeline system, but does not provide investment or policy recommendations for it. This Plan is prepared in accordance with, and pursuant to Fixing America's Surface Transportation Act (FAST ACT) (Pub. L. No. 114-94). The Plan is required in order for Connecticut to receive funding under the National Highway Freight Program (23 U.S.C 167) and must comprehensively address the State's freight planning activities and investments.

The Freight Plan is a long-term (25-year) perspective on the needs and issues of the freight transportation system. How and where freight move depends on many factors, including infrastructure condition and capacity, economic conditions and competitiveness, consumer demand, government regulations, transport technologies, international politics, and trade policies. These factors are in flux, making long-term predictions and recommendations more useful as a guide for establishing general priorities than as specific prescriptions. The Freight Plan takes a short-term view as well, and considers the value of the current State Transportation Improvement Program (STIP) to freight transportation.

I.2 PLAN DEVELOPMENT PROCESS

The Freight Plan is the product of extensive discussions with public and private sector partners combined with an in-depth analysis of the condition and performance of the state's freight transportation system (**Figure I.1**). This process ensured that the Plan's products and strategies were founded on goals and objectives shared by CTDOT and its partners, and that it reflected analysis based on sound data, the insights of experts from industry and the public sector, as well as the expectations of users of the freight transportation system.

Figure 1.1: Freight Plan Development Process

1.3 FREIGHT PLAN CONSISTENCY

This Freight Plan is consistent with the current Long-Range Transportation Plan, “Connecticut on the Move, Strategic Long Range Transportation Plan, 2009” and the draft Long Range Plan update under development, referred to as the “Connecticut Statewide Long Range Multimodal Transportation Plan, 2017” as well as the federal transportation legislation *Moving Ahead for Progress in the 21st Century (MAP-21) Act* in 2012 and the current legislation, *Fixing America’s Surface Transportation (FAST) Act* in 2015.

1.4 PLAN ORGANIZATION

The Freight Plan consists of technical analyses, policy reviews, outreach, and consideration of regulatory requirements organized into the following chapters:

- Chapter 2 – Strategic Goals, Objectives, and Performance Measures
- Chapter 3 – Connecticut’s Decision-Making Process
- Chapter 4 – Freight Policies, Strategies, and Institutions
- Chapter 5 – Stakeholder Engagement
- Chapter 6 – Economic Context of Freight
- Chapter 7 – Freight Demand
- Chapter 8 – Freight Transportation Assets
- Chapter 9 – Condition and Performance of the Freight System
- Chapter 10 – Trends, Needs, and Issues
- Chapter 11 – Freight Transportation Improvement Strategy
- Chapter 12 – Freight Investment Plan
- Chapter 13 – Bibliography of Plans Reviewed

Additional technical resources provide greater detail in several appendices, as referenced throughout this document.



2. STRATEGIC GOALS, OBJECTIVES, AND PERFORMANCE MEASURES

Coordinated and mutually-reinforcing strategic goals provide the framework for implementing the Connecticut Statewide Freight Plan in a consistent way across federal, state, regional, and local planning efforts. The Freight Plan goals and objectives were established in collaboration with freight stakeholders (refer to Chapter 5) and after reviewing various regional, state and federal plans related to freight transportation (see Bibliography). They reflect the National Freight Policy goals and multimodal transportation goals established in the draft Connecticut Long Range Statewide Plan, and Connecticut's State Rail Plan.

The freight goals and objectives address Connecticut's freight transportation system needs and articulate a consensus of thought about the future performance of the freight network. They also helped CTDOT identify potential new policies and establish performance measures for assessing and prioritizing future investments. Each goal is aligned with one or more objectives that describe the specific and measurable actions needed to achieve Connecticut's Freight Plan goals.

Goal 1: Safety and Security

- **Objective:** Enhance the safety and security of the freight transportation system in all modes.

Goal 2: Economic Competitiveness and Efficiency

- **Objective:** Support economic competitiveness, efficiency, and development through investment in the freight transportation system. Work with the private sector to identify needs and deficiencies.

Goal 3: Optimized Operations & Performance

- **Objective:** Attain and maintain adequate capacity and operational efficiency in the Connecticut freight system. Support the use of Intelligent Transportation Systems and technologies. Enhance the efficiency of the movement of goods into, out of, and throughout the State. Aim to improve the resilience of the freight system to extreme events or changes in travel demand.

Goal 4: State of Good Repair

- **Objective:** Proactively maintain freight system infrastructure to preserve CTDOT's capital investments.

Goal 5: Environmental Protection & Livability

- **Objective:** Ensure that improvements to the freight system do not negatively impact the environment and help improve the quality of life for Connecticut residents and visitors.



Goal 6: Program and Service Delivery

- **Objective:** Deliver projects and services faster, cost-effectively and with greater customer satisfaction. Create strong partnerships with state agencies, local governments, neighboring states and the private sector to foster collaboration, improve program delivery and facilitate public-private partnerships.

The 2015 passage of the current federal surface transportation legislation, FAST Act, brought a new focus on the importance of goods movement to the U.S. economy. The FAST Act establishes a new formula program for highway freight projects, emphasizes the need to address large-scale projects of national and regional significance by establishing a new competitive grant program, and improves upon the National Freight Network created under the MAP-21. While the Connecticut freight plan will guide project investments that will enhance the efficiency and effectiveness of the transportation system, it will also further the national freight policy goals of economic competitiveness and efficiency; congestion reduction; productivity; safety, security, and resilience of freight movement; infrastructure condition; use of advanced technology; performance, innovation, competitive and accountability in the operations and maintenance of the network, and mitigation of environmental impacts.

Figure 2.1 illustrates the alignment of the Freight Plan goals with National freight goals and the Connecticut Statewide Transportation Plan.

Figure 2.1: Alignment of Freight Plan Goals with Connecticut Statewide Transportation Plan and National Freight Goals

Comparison of National and State Freight and Transportation Goals

	Economic	Safety	Technology/ Operations	System Preservation	Sustain- ability	Delivery
National Freight Goals	Economic Competitiveness & Economic Efficiency	Safety, Security & Resilience	Advanced Technology	State of Good Repair	Reduced Environmental Impacts	Performance, Innovation, Competition & Accountability
CT Statewide Freight Plan Goals	Economic Competitiveness	Safety	Optimized Operations & Mobility	State of Good Repair	Environmental Protection & Conservation	Program & Service Delivery
CT Statewide Transportation Plan Goals	Economic Growth & Efficient Mobility	Safety	Optimized Operations	State of Good Repair	Livability & Resilience	Program & Service Delivery

2.1 FREIGHT-RELATED FEDERAL PERFORMANCE MANAGEMENT MEASURES

CTDOT has a long history of measuring the condition and performance of its transportation system, and basing its investment decisions on the data it collects and analyzes. FHWA has gradually introduced a national transportation performance management system to monitor and base investment decisions on transportation performance. CTDOT is implementing this system, which encompasses system condition, safety, air quality and congestion and mobility performance considerations. These system-wide highway measures address the condition and performance of the shared use highway system, which serves many travel markets, including long- and short-distance freight needs.

To ensure that the Freight Plan benefited from the best ideas and input from all CTDOT divisions regarding freight performance, CTDOT's planning staff assembled a cross-disciplinary group (aka the freight working group) to consider and assess various alternative measures. After considering this plan's draft goals and objectives, and reviewing the available data, CTDOT's existing performance measures as well as practices and approaches adopted by other transportation agencies in other states, the freight working group concluded that a measurement approach focused on success in implementation would be best. Specifically, they recommended that CTDOT use the freight-relevant performance measures that are required as part of the current performance management framework established in law, as listed in **Table 2-1**.

The working group saw performance measures as a way to monitor the success of plan implementation. By tracking performance over time, CTDOT will understand whether the plan's recommendations are being implemented and to what extent they help to achieve intended outcomes.

Table 2-1 outlines the federal performance measures that are relevant for freight performance and that state transportation agencies are required to provide by federal statute. By October 2018, states will submit a baseline performance report and subsequently provide reports every four years, as well as interim performance reports and interim targets. The reports will describe performance targets that have been set by the state and by MPOs. States will describe the actions they have taken to meet their targets and their progress towards achieving them. The FHWA is providing some of the data and analytical framework (on travel time data, for example) to assist the states in setting targets and reporting on progress. Agencies that cannot achieve their targets within the period of performance are expected to explain the reasons for the differences between the desired and actual outcomes.

Working Group Insights on Performance Management

“Thinking about how to measure progress both in freight and in implementing the freight plan is the best chance of success for a freight strategy. An initial focus can be on implementation of the freight plan itself, since this will be the best understood and controllable phase of executing a strategy.”

“The performance measures already identified as part of the planning process are very good.”

Table 2-1: Connecticut Freight Plan Performance Measures

National Freight Goal Area	Relevant Performance Measure
<ul style="list-style-type: none"> Safety, Security and Resilience 	Number and rate of traffic fatalities
	Number and rate of serious injuries
	Number of non-motorized fatalities and non-motorized serious injuries
<ul style="list-style-type: none"> State of Good Repair 	Percentage of National Highway System bridges classified in good condition
	Percentage of National Highway System bridges classified in poor condition
	Percentage of Interstate pavements in good condition
	Percentage of Interstate pavements in poor condition
	Percentage of non-Interstate National Highway System pavements in good condition
	Percentage of non-Interstate pavements in poor condition
<ul style="list-style-type: none"> Livability and Resilience 	Air quality criteria emission levels in areas that have not met standards: Volatile Organic Compounds, Nitrous Oxides, Carbon Monoxide, and particulate matter (PM ₁₀ /PM _{2.5}) ²
<ul style="list-style-type: none"> Economic Competitiveness and Economic Efficiency 	Annual hours of peak hour excessive delay per person ³
<ul style="list-style-type: none"> Economic Competitiveness and Economic Efficiency 	Truck Travel Time Reliability on the Interstate System

Following the phase in period and within 6 years, the CTDOT should adapt the performance framework to be more freight-focused. The measures listed below should be reported for the freight-intensive network components, including the Primary Highway Freight Network, and Critical Rural and Urban Freight Corridors. The Plan recommends that CTDOT also report on those portions of the network where higher proportions of truck traffic are expected.

² Greenhouse gas emissions measure had not been determined at the time of this writing

³ For areas over 1 million population by 2018 and 200,000 population, in 2022 and beyond



3. CONNECTICUT'S FREIGHT POLICIES, STRATEGIES AND INSTITUTIONS

Freight policies guide the development and implementation of a freight plan. They provide the framework for the actions to be taken, in order to understand and improve the movement of goods. Statewide freight plans are guided by not only state policies, but also those at the federal level. Federal policies must be complied with to take advantage of federally-supported freight programs, initiatives and projects. This chapter documents the state freight policies and the institutions that support them. It also reviews several long-range planning efforts that support freight movement.

3.1 CAPITAL IMPROVEMENT PROGRAM

The mission of the Connecticut Department of Transportation (Department) is to provide a safe and efficient intermodal transportation network that improves the quality of life and promotes economic vitality for the State and the region. The CTDOT 5-year Capital Program is the most important source of support for the public component of the state's multimodal freight system. Each year, CTDOT publishes the details of the program, which describes the funding allocations and priorities for right-of-way acquisition, planning, design, engineering and construction activities for road, bridge, public transportation and other transportation facilities improvements.

While the program is led by and is the responsibility of CTDOT, it is the product of collaboration with MPOs, local elected officials and other state agencies. In particular, CTDOT coordinates the Capital Improvement Program's development with Metropolitan Planning Organizations, as they develop their Transportation Improvement Programs. This coordination ensures that transportation investments are mutually reinforcing, compatible and timed to minimize traveler disruption and inconvenience.

CTDOT's process for prioritizing projects includes the requirements of federal funding programs, state requirements and legislative directives. Broadly speaking, the priorities are described in long-range planning documents and in strategic planning documents, both of which are updated regularly to reflect changing initiatives, needs and resource outlooks. Safety and state of good repair have always been the DOT's top priority, and CTDOT's data systems (e.g. bridge inspection and pavement condition databases) have provided much of the raw condition and performance information needed to recognize and assign resources to the top priorities. Capital expansion decisions have always been based on factors such as criticality of need and the potential for realizing mobility, safety and economic development objectives, but equity has been a consideration as well.

3.1.1 CTDOT Support for Freight Rail

Connecticut's freight rail system is owned and operated by several private rail companies, AMTRAK, and CTDOT. Public funds for rail capital improvements are allocated through the CTDOT capital budget, which is approved by the state legislature annually. Improvements to the CTDOT-owned rail system, as well as the administration and execution of the private rail support programs described below are funded through this process.

CTDOT manages several programs that support the private rail freight system, including: The Railroad Tax Exemption Program (TEP) and two grant programs.

The Railroad Tax Exemption Program allows rail operators to reduce their gross earnings tax by an amount equivalent to capital investments made on a dollar-for-dollar basis to upgrade or maintain their physical plant in Connecticut. Such projects are determined by the Commissioner of Transportation to be necessary and in the public interest. Participating railroads are subject to a monthly reporting requirement, regular compliance reviews and a yearly audit. A formal certification of eligibility by the Commissioner of Transportation must be provided to the Governor and the Chairpersons of the Transportation and Finance, Revenue and Bonding Committees annually.

Grants for Commercial Freight Rail Lines. CTDOT is authorized to use up to \$7.5 million in General Obligation bonds annually to provide competitive matching grants for commercial freight rail lines operating in Connecticut. Recipients must use the grants to improve, repair, and modernize existing rails, rail beds, and related facilities. Preference is given to projects that improve at-grade crossings to eliminate hazards or increase safety, and that connect to major freight generators.

The state also offers up to \$2.5 million in Special Tax Obligation bonds to CTDOT for establishing a Fix-It-First Program to repair, upgrade, or eliminate at-grade railroad crossings in Connecticut.

3.1.2 CTDOT Support for Port Operations

CTDOT supports the management and oversight of the Connecticut Port Authority (CPA) in providing funds for port improvements through the capital improvement program. The CPA relies on state bond funds, administered through the Department of Economic and Community Development or the Department of Transportation, for port improvements, dredging and property acquisition.

3.1.3 Planning Support for Freight

Connecticut's transportation system is owned, managed and operated by state, regional and city/town agencies. These agencies coordinate their planning and operations activities through informal consensus as well as through various federal and state statutes. CTDOT owns and operates most of the line-haul portions of the truck freight system, while municipalities manage many of the last mile connections.

Bonds

General obligation bonds finance the construction of public infrastructure projects. They are backed by the "full faith and credit" of the state. Special tax obligation bonds finance highway projects. the state's motor fuels tax, motor vehicle registrations, licenses and fees repay the debt on the bonds.

Long-range planning is a long-established component of that coordination. The long-range plans that the DOT and its partners work together to create, establish priorities for expansion, preservation and policy that are intended to influence short- and mid-term decisions.

Trucking

The Governor's \$100 billion long-range transportation improvement initiative, "Let's Go CT" represents a complete transformation of the state's transportation infrastructure. The initiative calls for rebuilding parts of the system that are beyond their useful life to meet current design and performance standards and expanding capacity on several of the line haul, high volume portions of the highway and rail systems. The expansion and preservation projects of most potential benefit to truck freight include:

- Major highway expansion projects on portions of I-95, I-91 and I-84, whose estimated cost is \$12.9 billion, of a \$13.8 billion highway enhancement program
- Development of a commercial vehicle information system (\$47.0 million)
- Major highway and bridge preservation projects (\$17.5 billion)
- Expansion of truck rest area facilities (\$196 million)

3.1.4 Freight Rail

The CTDOT 2012 Connecticut State Rail Plan identified several freight-related rail goals and objectives. These are summarized below:

- Increase freight rail usage by 25 percent over the next 20 years to reduce truck traffic and energy consumption
- Promote port connectivity by removing existing obstacles and through capital infrastructure improvements
- Explore alternative freight corridor options
- Identify public funding resources
- Coordinate with Metro North, the operator of the New Haven commuter rail Line, to install monitoring equipment to detect overloads and defective wheels on passenger and freight trains
- Develop a strategic plan for rail freight movements.
- Form partnerships with Class I railroads and short haul operators.
- Partner with northeast states to develop a vision for rail freight.
- Support a rail freight investment program.

- Continue to support improvements at public highway/rail grade crossings to maintain safe conditions. Develop a new Connecticut Railroad Bridge Management Program to evaluate bridges' routes to determine the feasibility of loading rail cars to the 286,000-pound full potential in Connecticut to promote economic growth, reduce fuel use, and reduce truck traffic on the state's highway system.
- Support efforts to increase clearances to 19 feet 6 inches or above on rail lines not encumbered by overhead catenary wire to permit the movement of larger cars in Connecticut that would allow a railroad with the ability to increase service or capture additional markets.
- Revitalize intermodal facilities/and inland ports in the state to serve the rapidly growing container segment of rail traffic that will help remove long-haul trucks from highways and deliver products to consumers faster.

Recommended Investment Strategies

The State Rail Plan also identified growth and investment strategies for freight rail:

- Emphasize the preservation of the existing system
 - Invest first in projects and initiatives that maintain and improve the transportation system in areas where the infrastructure is already in place.
 - Correct hazardous or potentially hazardous situations to avoid magnification of associated safety issues.
 - Provide for routine maintenance and upgrading of components of the rail system such as tracks, bridges and structures, power systems, rolling stock, rail stations, maintenance facilities, etc.
- Promote efficient system management and operation.
- Support, when efficient and effective, expanded and improved rail passenger services, rail parking facilities and rail stations, rail freight and improved access to airports and ports.
 - Undertake the rail capital projects and provide the transportation services for which the Governor and the Connecticut General Assembly have authorized funding.
 - Develop a plan for expanding rail freight in Connecticut and the surrounding region, including the state's commercial ports.
 - Support strategies and tactics adopted by Bradley Airport Board of Directors to strengthen passenger and freight service.
 - Implement the recommendations of the Connecticut Maritime Commission with respect to all ports in Connecticut.
 - Work with stakeholders to identify and prioritize needs, and advocate for funding and other resources required to support accessibility and mobility improvement projects across transportation modes for people and for freight to address the needs.
 - Identify and explore opportunities to enter into public/private partnerships to identify ways to improve transportation services and facilities and to fund such projects and initiatives.
- Collaborate with the freight railroads in maintaining and growing interconnectivity of the state rail freight system with the national network as a priority.

- Focus on investing in capital projects on individual rail segments using a measured approach to increase overall systems capacity. Priority investments include track and bridge improvements, crossing upgrades or replacement, improvements in drainage, culverts, and clearance limits, and other improvements to strengthen first-mile/last-mile interchange, off-loading, and other shipment connection points.

Recommended Priority Investments

The State Rail Plan also identified priority investments by railroad operator listed below:

- New Haven-Hartford-Springfield Line:
 - Rehabilitate the Windsor Locks-Enfield Connecticut River Bridge to support 286,000-lb., industry-standard load.
 - Rehabilitate Harford Union Station elevated track to support 286,000-lb., industry-standard load.
- New Haven Line (NHL) (including branch lines)
 - Rehabilitate bridges and elevated track to handle the 286,000-lb., industry-standard load.
- New England Central Railway (NECR)
 - Raise clearances for Phase II double-stack containers between Willimantic and New London.

3.1.5 Marine Freight

As described in the Connecticut's Deep-Water Port Strategy Study (2012), the State of Connecticut is committed to reversing the decline of its three deep water ports and their related industries. As outlined in **Table 3-1** and **Table 3-2**, the following recommended strategies, policies, and actions were summarized from this study.

Table 3-1: Port Strategies Study, Recommended Investment Strategies

Recommendation	Implementation/Rationale
Protect and enhance liquid bulk and related energy uses	The flow of petroleum products through the ports is critical to Connecticut's economy and its energy future
	Will pay economic dividends to every sector of the Connecticut economy, over time
	Significant investment in liquid bulk and related energy infrastructure already in place at the three ports
Protect and enhance shipyard and ship repair services	The private Thames shipyard in New London is the largest non-cargo employer among the three ports
	The State should streamline the regulatory processes for ship repair and ship building
Increase dry bulk and break-bulk cargoes (Required investments: Up to \$11 million for increased rail access to New Haven, up to \$14 million for North Yard expansion, and up to \$40 million for capital incentive improvements in New London)	Extend the ports' serviceable reaches into competitive regional markets
	Existing flows of salt, sand, and cement are tied to immediate local demand (highly captive and stable markets)
	Do not commit State capital without similar private commitment
Increase scrap metal exports (Required investments: Up to \$400k/year for public benefit grants)	Connecticut's largest export commodity by weight, of which the majority is trucked to ports outside of the State
	In order to capture a larger market share, Connecticut should partner with the three large processors, encourage smaller dealers by developing a statewide brokering system, and offer incentives as "heavyweight" containers on barge to divert traffic from congested I-95 corridor
Attract wood pellet exports (Required investments: \$2-12 million for specialized handling equipment and improvements)	Leverage existing rail connectivity: New England Central Railway provides direct access to Canadian and northern New England forestry production centers and has on-dock rail at the State Pier
	Support the investment in specialized infrastructure, to attract wood pellet flows through New London
Compete for break bulk lumber, copper and steel imports (Required investments: Up to \$11 million for new rail connections)	Break bulk commodities have traditionally been handled efficiently at the ports
	New Haven and New London could increase lumber and/or copper imports if/when housing construction rebounds in the Northeast and can also compete for various steel products
	Leverage existing rail connectivity to reach markets located in New England, Canada and the Midwest
Evaluate fresh food imports	Had historically been a valuable tenant at Bridgeport, but was attracted to competing regions due to inadequate port maintenance/infrastructure
	One potential fresh food anchor is the scallop and shellfish fleet in New London

Table 3-2: Port Strategies Study, Recommended Policies and Implementation Actions

Recommendation	Implementation/Rationale
Fund New Haven Channel and Small Marina Dredging (Required investments: \$1 million/year for small harbor dredging and up to \$10 million for New Haven dredging)	New Haven is the state’s most important cargo facility and its current business is threatened by shoaling and poor channel maintenance
Revise State Pier solicitation process (Required Investments: Up to \$10 million depending on specific cargo commitments)	The State should revise its solicitation process to seek a long-term public-private partnership Existing short-term leases and rent structures do not incentivize/reward cargo growth
Support BPA’s effort to retain ship repair services at the former Bridgeport/Derecktor Shipyard (Required Investments: Up to \$5 million depending on specific business commitments)	Significant state capital has already been spent on buildings and equipment at the Shipyard for which a return on investment should be sought The State has financial interest in returning economic activity to the Derecktor Shipyard and attracting a tenant that does not harm either adjacent uses in Bridgeport or other CT shipyards
Create Market-Based Grant-in-Aid Program (Required Investments: Up to \$8 million/year)	Leverage private sector investment and private sector employment Reflect, anticipate and respond to changes in local, regional, national and international cargo and non-cargo markets Fund infrastructure and capital investments only when complementary private investments or business activities are committed Support specific cargo or business activity goals (e.g. number of trucks diverted from I-95 or number of tons of emissions reduced or acres of wetlands restored with dredge material)

3.2 METROPOLITAN PLANNING ORGANIZATIONS (MPOs)

3.2.1 MPO Involvement in Statewide Freight Planning

Metropolitan Planning Organizations (MPOs) serve a critical role in Connecticut’s statewide freight planning efforts. According to guidance established by the Federal Highway Administration (FHWA), individual MPOs may initiate and pursue freight-related plans and studies for their respective regions, but there is no federally mandated requirement that an MPO develop any type of separate freight component in their long-range plans. When completed, an MPO’s freight-specific or freight-related plans and studies can inform statewide efforts on a region-by-region basis because of their focus on local issues that may have statewide ramifications.

3.2.2 MPO Freight Plans

Connecticut is made up of nine regional Councils of Governments, which function as the host agencies for Connecticut's eight Metropolitan Planning Organizations (MPOs) and two rural transportation planning organizations.

- Capitol Region Council of Governments
- Connecticut Metropolitan Council of Governments
- Lower Connecticut River Valley Council of Governments
- Naugatuck Valley Council of Governments
- Northeastern Connecticut Council of Governments
- Northwest Hills Council of Governments
- South Central Regional Council of Governments
- Southeastern Connecticut Council of Governments
- Western Connecticut Council of Governments

Out of Connecticut's eight MPOs (**Figure 3.1**), six have recently completed or have begun work on regional transportation plans that are freight-specific in nature or contain freight-related topics.

COGS and MPOs

Councils of Government are governing and/or coordinating bodies that represent and serve local governments. Metropolitan Planning Organizations develop area transportation plans and coordinate the transportation planning process. Often, MPOs provide the technical support staff for the COG.

Capitol Region Council of Governments (CRCOG)

- CRCOG Freight Infrastructure: As a part of its 2016-2017 Unified Planning Work Program, CRCOG conducted an analysis of the region's existing freight transportation infrastructure, and identified limitations of freight network connectivity within the region, as well as overall freight network constraints within Connecticut and New England.

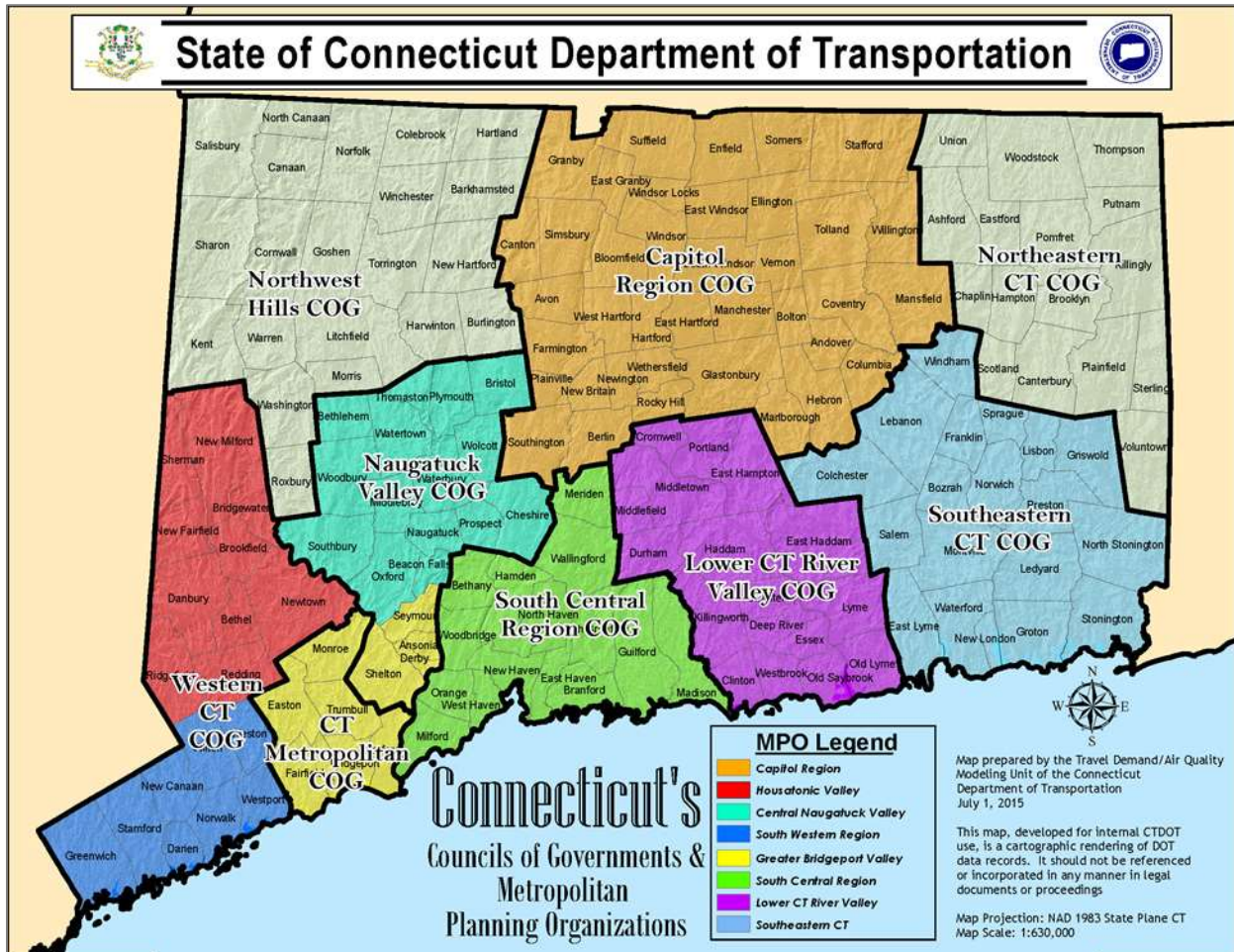
CRCOG has been involved in the development of the Connecticut Department of Transportation's Statewide Freight Plan, and has been supporting CTDOT as needed with document review, stakeholder outreach, and meeting involvement.

- Freight Movement in the Hartford Metropolitan Area: A Regional Freight Market Overview (2005): This study was commissioned by CRCOG in cooperation with the former Central Connecticut Regional Planning Agency and Midstate Regional Planning Agency. The report develops a baseline of freight movement activity that can be used to incorporate freight into the regional transportation planning process, as well as a methodological framework for future public-private partnerships in freight.

Western Connecticut Council of Governments (WestCOG) *

- South Western Region Freight Overview (2010): Completed in 2010 and updated in 2013, the South Western Region Freight Overview describes the region's freight system and presents trends that may impact the freight system over the next twenty to thirty years. The report identifies key elements of the freight transportation system in Southwestern Connecticut, describes the movement of goods through the region, and recognizes the safe, efficient, and economical movement of goods as an integral component of the region's multi-modal transportation system.

Figure 3.1: Connecticut Councils of Government and Metropolitan Planning Organizations



Source: Connecticut Department of Transportation

- Freight Rail in the Housatonic Region (2011):** Prepared for the former Housatonic Valley Council of Elected Officials (HVCEO) by the Housatonic Area Regional Transit District (HART) in 2011, this report is intended to assist municipalities in marketing buildings and land with proximity to rail, and to assist businesses seeking to use rail freight access points.

** After a 2014 analysis by the State of Connecticut Office of Policy and Management (OPM), the former South Western Regional Planning Agency (SWRPA) and Housatonic Valley Council of Elected Officials (HVCEO) MPOs were consolidated to create WestCOG.*

South Central Region Council of Governments (SCRCOG)

- Regional Freight Study (2016-2017):** SCRCOG initiated a Regional Freight Study in the summer of 2016. In cooperation with CTDOT, the SCRCOG study will prepare regional components for utilization in the Connecticut Statewide Freight Plan.

- Freight Cargo Study for Tweed New Haven Airport (2014): This report outlines various freight- and cargo-related goals, including developing the cargo context for the airport, working with the airport to establish cargo objectives, assessing the potential for a “freight village” or “business gateway” development concept, and developing growth strategies to support the freight cargo industry at and around the airport.

Naugatuck Valley Council of Governments (NVCOG)

- The Naugatuck Valley Council of Governments (NVCOG) functions as a host agency for the Central Naugatuck Valley MPO and has a contract with the Metropolitan COG to undertake transportation planning for four towns (Derby, Shelton, Seymour and Ansonia) that are part of the Greater Bridgeport & Valley MPO.

As part of their 2016-2017 Unified Planning Work Programs, both MPOs will develop a Regional Freight Inventory and Profile. These profiles are aimed at understanding freight and goods movement in the region, identifying weight restricted bridges, determining general freight issues and needs, and identifying and assessing rail crossings for improvement. This work is being coordinated with CTDOT's development of the Statewide Freight Plan.

Lower Connecticut River Valley Council of Governments (RiverCOG)

- Freight Movement in the Hartford Metropolitan Area: A Regional Freight Market Overview (2005): See above under Capitol Region Council of Governments (CRCOG)
- Freight Program Assessment (2011): This self-assessment conducted by the former Connecticut River Estuary Regional Planning Agency (CRERPA) covers current freight planning efforts as it relates to institutional organization, public and private sector relationships, planning and programming, funding, freight operations, multi-jurisdictional coordination, National Highway System intermodal connectors, and land use.

Connecticut Metropolitan Council of Governments (MetroCOG)

- Freight & Goods Movement Data Sources and Planning Analysis (2006): This study provides an overview of mobility needs as it relates to freight and identifies freight-related issues facing the Greater Bridgeport region. Additionally, the study aims to improve the integration of freight planning into the transportation planning process. The report recognizes that failure to address these issues will lead to worsening traffic on the region's highways, and recognizes the importance of understanding freight movement and pursuing appropriate investments.

3.2.3 Freight-Generating Land Uses Identified in MPO Reports

Connecticut's Metropolitan Planning Organizations coordinate member agencies' land use planning and zoning initiatives. Despite an overall decline in Connecticut's industrial and manufacturing base over the past 20 years, there remains a significant amount of industrial park and manufacturing capacity, much of it within the borders of the state's MPOs. Through their roles in the coordination of land use and transportation and their responsibilities in the development of regional Transportation Improvement Programs, the agencies can improve the business climate for freight-generating companies in Connecticut. Several MPOs have addressed freight as part of an economic development strategy in the studies summarized below.

South Western Region Freight Overview (2010)

This report identifies existing land uses in the region that generate freight, and acknowledges that region's small size, dense population, limited land availability, high land cost, and highway congestion reduces the attractiveness of the region for freight-related land uses. The report states that there are no outlying areas capable of supporting modern freight-related land uses, like large warehouses, distribution centers, or container intermodal facilities, and that most of the facilities of this nature that service the region are located outside the immediate area.

In looking forward, the report states that if current land use trends continue, existing freight-related business will continue to be crowded out of the market by higher-end residential and commercial uses, most notably at Stamford Harbor in the city's South End. In this scenario, it is likely that barge trips would be replaced by truck trips, further adding to the region's highway traffic.

Freight Cargo Study for Tweed New Haven Airport (2014)

This study recommends pursuing the development of an airport enterprise zone and "freight village" concept for Tweed – New Haven Airport. Despite the air cargo industry experiencing shifting demand, increased competition, and new federal regulations in recent years, niche markets like that of the bio-medical sector in the city of New Haven continue to need air cargo services that are efficient and expedient, especially for medical supplies and other high-value, time-sensitive goods and products.

Freight Movement in the Hartford Metropolitan Area: A Regional Freight Market Overview (2005)

In its inventory of regional freight facilities, this report suggests that future land use planning near Bradley International Airport consider access to the nearby CSX West Springfield Intermodal Terminal. Making nearby sites attractive for high-volume distribution and manufacturing could aid in boosting the region's freight-related economy.

The report also concludes that the region's infrastructure must provide high-speed and dependable logistics support to bolster dominant area industries in wholesale, retail, and service logistics providers. It is advised that regional freight operations be segmented from commuter corridors and pick-up and delivery activities be consolidated via land use and highway planning practices.

3.3 FREIGHT INSTITUTIONS

3.3.1 Freight-supportive State Agencies

The state institutions that influence the movement of freight in Connecticut are discussed in this section.

Connecticut Department of Transportation

Most freight planning at CTDOT falls within the Bureau of Policy and Planning. The Bureau of Policy and Planning conducts corridor and system-wide planning studies for the movement of people and goods, for all modes of transportation, including rail, bus, highway, aviation, bicycling, walking and waterway. Additional responsibilities related to freight movement are within the Bureau of Highway Operations, including the oversight of the highway and bridge systems such as snow and ice control, incident management, and oversize/overweight vehicle permitting. Within the Bureau of Engineering and Construction the Divisions of Bridges, Traffic Engineering, and Highway Design all influence the

movement of freight in Connecticut. The CTDOT also owns and operates two seasonal ferries across the Connecticut River and the State Pier in New London. <http://www.ct.gov/dot/site/default.asp>

Connecticut Airport Authority

The Connecticut Airport Authority was established in July 2011 to develop, improve and operate Bradley International Airport and the state's five general aviation airports (Danielson, Groton-New London, Hartford-Brainard, Waterbury-Oxford, and Windham airports). As noted, nearly all air cargo in Connecticut moves through Bradley International Airport. <http://www.ctairports.org/>

Connecticut Port Authority

In 2014, the Connecticut Legislature passed legislation establishing a quasi-public port authority is responsible for coordinating port development by promoting the benefits of Connecticut's three deep water ports and focusing on attracting private investments to leverage public-private partnerships. Responsibility for port oversight and operations was transferred from CTDOT to the authority.

The Connecticut Port Authority has the authority to pursue federal and state funds for dredging and other infrastructure improvements to increase cargo movement through Connecticut ports, market the advantages of such ports to the domestic and international shipping industry, coordinate the planning and funding of capital projects promoting the development of such ports and develop strategic entrepreneurial initiatives that may be available to the state.

<http://www.portsct.com/portsct/site/default.asp>

Connecticut Railroad Association

The Connecticut Railroad Association (CRA) represents the eight freight railroads that serve the State of Connecticut (Central New England Railroad, Connecticut Southern Railroad, CSX Transportation, Housatonic Railroad, Naugatuck Railroad, New England Central Railroad, Pan Am Railways, and Providence & Worcester Railroad). These freight railroads are both publicly and privately held. These railroads transport about 2.6 million tons of freight per year, providing a vital link between Connecticut and the broader North American rail network.

I-95 Corridor Coalition

The I-95 Corridor Coalition represents transportation agencies and toll authorities, as well as public safety and related organizations, from the State of Maine to the State of Florida along the Interstate 95 corridor. Transportation management and operations issues of common interest are addressed through this coalition. Through this consensus-driven, volunteer-based organization, key decision makers from state, local and regional member agencies collaborate to improve transportation system performance. The Coalition is viewed as a successful model for multi-state, interagency cooperation and coordination.

<http://i95coalition.org/>

TRANSCOM

The Transportation Operations Coordinating Committee (TRANSCOM) is a coalition of 16 New York – New Jersey – Connecticut metropolitan region transportation and public safety agencies. Created in 1986, the committee approaches regional transportation management in a cooperative, coordinated fashion. <http://www.xcm.org/XCMWebSite/Index.aspx>

New Haven Port Authority

The New Haven Port Authority (NHPA) is a facilitator and supporter of maritime uses at the port, rather than a day-to-day operator. The Port Authority, working with the private entities, the City of New Haven and the State, guides and monitors the land use and development within the Port District. The NHPA owns one significant parcel of land, and various sub-parcels within this area are licensed to terminal operators for staging and storage activities. NHPA has collaborated with several city departments to secure funding to improve security and air quality at the port and continues to seek funding opportunities to improve the port's infrastructure.

<http://www.cityofnewhaven.com/PortAuthority/>

Bridgeport Port Authority Commission

The Bridgeport Port Authority (BPA) is directed by a five-member Board of Commissioners and is managed by an executive director and staff. The City of Bridgeport has planning and zoning authority over the Port District. The Harbor Commission has some authority over water side activities, however authority over activities water-ward of the high tide line ultimately rests with the Connecticut Department of Energy and Environmental Resource and the US Army Corps of Engineers. The BPA controls the land side. <http://bridgeportct.gov/content/89019/89540/89601.aspx>

Connecticut Maritime Coalition

The Connecticut Maritime Coalition is a non-profit trade association facilitating the competitiveness of Connecticut's maritime industries. The group identifies issues facing the maritime industries in Connecticut and seeks solutions for them. <http://www.ctmaritime.com/>

Connecticut Department of Motor Vehicles

The Connecticut Department of Motor Vehicles (DMV) issues commercial driver's licenses. There are several requirements for obtaining a commercial driver's license, including successfully completing a commercial driver's license exam, and passing a physical examination.

<http://www.ct.gov/dmv/site/default.asp>

The Department of Motor Vehicles is also tasked with truck weighing and inspection operations in Connecticut. While state police efforts are aimed solely at compliance with laws and regulations, the DMV is charged with carrying out the Federal Motor Carrier Safety Assistance Program, which focuses on vehicle weight and safety regulation.

Weighing and inspection of trucks is conducted at over 30 locations statewide under the auspices and efforts of the DMV. Of these 30 locations, six are fixed locations with permanent weighing facilities, platform scales, and dedicated space for storage of trucks taken out of service due to weight, safety, or other violations.⁴ The six locations are (**Figure 10.3**):

- 1. I-95 northbound in Waterford—one single platform scale and scale house,
- 2. I-95 southbound in Waterford—one dual axle weighing platform scale and scale house,
- 3. I-95 northbound in Greenwich—quadruple static scales and scale house,
- 4. I-91 northbound in Middletown—one triple pad axle weighing platform scale and scale house,

⁴ <https://www.cga.ct.gov/2006/rpt/2006-R-0776.htm>

- 5. I-84 eastbound in Danbury—triple pad static scale and scale house, and
- 6. I-84 westbound in Union—triple pad static scale, inspection pit, and scale house.

Connecticut Department of Economic and Community Development

The Connecticut Department of Economic and Community Development (DECD) creates a strategic vision for economic development, recruits employers, trains workers and provides financial assistance to communities seeking to grow their employment base. DECD's 2015 strategic plan identified health biosciences, digital media, tourism, insurance and financial services, advanced manufacturing and aerospace and green energy as opportunities for growth or as industries to sustain and nurture.

<http://www.ct.gov/ecd/site/default.asp>

Metropolitan Planning Organizations

Federal law requires that a Metropolitan Planning Organization (MPO) be designated for each urban area with a population of 50,000 or more. Connecticut's eight MPOs (**Figure 3.1**) receive federal funding for transportation planning activities. MPOs develop financially constrained metropolitan transportation plans and short-term transportation improvement programs in coordination with CTDOT. The long-range plans identify transportation improvements and services within the metropolitan area boundaries for the next 20 to 25 years.

The FAST Act requires each MPO to set performance targets in relation to the freight measures, integrate these targets within their planning processes, and report periodically on their progress in relation to these targets. [§1201; 23 USC 134(h)(2), 134(i)(2)(C)]

Towns/Municipalities

In Connecticut, there are 169 towns and cities that are responsible for building, operating and maintaining local transportation infrastructure, including roads, bridges, and bicycle and pedestrian pathways and maintenance equipment and facilities.

Connecticut Department of Energy and Environmental Resources

The Connecticut Department of Energy and Environmental Resources (DEEP) CT DEEP has a broad mandate and portfolio to protect the state's natural resources and public health, and to regulate the energy industries that operate in the state. DEEP has worked with the Governor's office to establish aggressive goals and policies to reduce greenhouse gas emissions and reduce reliance on non-renewable energy sources. <http://www.ct.gov/deep/site/default.asp>

3.3.2 Other Northeast Freight Partners

Freight investment planning often concerns and has effects on multiple states. CTDOT shares information about its investment and planning activities with counterparts in New York, Massachusetts and Rhode Island on an informal basis and it also coordinates directly with neighbor states on initiatives that require joint decision-making to produce better and faster outcomes.

CTDOT is a member of the New England Regional Freight Group (NERFG), which is organized to share information on local investment initiatives and to seek solutions to issues of mutual interest. Over the course of the development of the Freight Plan, CTDOT met with the NERFG 10 times, most recently in 2016.

One highlight of these meetings was a regional freight summit hosted by the Volpe Center in 2014. States from the Northeast shared information about how they are making freight work better in their states, and they heard about freight issues and trends from national and international perspectives. The agenda included discussions about:

- Federal freight provisions, policies and incentives
- National freight trends at the regional scale
- A leadership panel discussion of opportunities for coordination and cooperation
- A discussion of the challenges of global competition at the regional scale
- A Roundtable discussion of critical single and multimodal freight safety initiatives
- A seminar centered on planning for sustainability and resilience in the regional freight system

3.3.3 Freight-Related Regulations

The federal government has established regulations that govern the operation of interstate freight operations. These regulations cover many aspects of freight operations, including maximum width limits and minimum lengths for trucks. These regulations provide a consistent and predictable set of operating rules for motor carriers across all states. As the principal agency governing the operation of truck freight, the Federal Motor Carrier Administration (FMCSA) has established several regulations that govern the licensing and operation of trucks on the highway system. Connecticut has adopted these FMCSA regulations. These cover:

- Controlled substance and alcohol testing
- Driver qualifications and driver's license requirements
- Safety fitness procedures
- Safety and hazardous materials handling
- Financial responsibility
- Inspection, repair and maintenance
- Accessories needed for safe operation
- Hours of service
- Transportation of hazardous materials

In addition, Connecticut has developed complementary or more specific standards for truck length, height and weight; vehicle registration; insurance; reporting fuel use tax; licensing, and alcohol and drug testing.

The federal hours of service regulations were established to maintain safe truck operations. The regulations stipulate that..." freight operators may not drive more than 11 hours following 10 consecutive hours off duty or drive for any period after having been on duty 14 hours, following 10 consecutive hours off duty."⁵ Drivers are required to maintain a logbook showing their on- and off-duty times. Increasingly, this task is being automated by in-vehicle systems that monitor and record truck movements. An unintended consequence of the hours of service regulations is that drivers seek unsanctioned parking locations rather than continue driving at the end of their legal operating hours when there are no vacancies in the sanctioned parking areas.

⁵ Connecticut Department of Motor Vehicles, *Motor Carrier Handbook*, 2016

Oversize and Overweight Vehicles

Connecticut General Statutes Section 13b-61 indicates that all monies collected or received by the State from license, permit, and fee revenues – which includes vehicle permit fees for oversize and overweight vehicles – shall be credited to the Special Transportation Fund (STF) monthly. In the year between October 2014 and October 2015, 87,008 trip permits were issued and 1,370 annual permits were issued under these provisions. As part of the permitting process, CTDOT assigns truck routes for oversize/overweight vehicles, and reviews the vehicle management procedures suggested by the applicant.

The 1982 Surface Transportation Assistance Act sets weight and dimension limits for vehicles operating on the National Network and more specifically, in the Interstate system. While the federal weight limit for vehicles operating on the Interstate system without a special permit is 80,000 pounds, there are exemptions and pre-existing state statutes that allow higher weight limits, and these exceptions vary by state.

Connecticut generally adheres to the federal standards, with some exceptions. Milk tankers and other trucks hauling agricultural commodities up to 100,000 in gross vehicle weight (GVW) may travel on the Interstate system. Single axle and tandem axle vehicles meeting axle spacing limits may travel at slightly higher weights than the federal provisions allow.

Some neighboring states with provisions that predate the STAA allow trucks to exceed the 80,000 lb. limit. For example, a grandfather provision allows vehicles up to 127,400 lbs. GVW to travel on the Massachusetts Turnpike. The trucking industry has communicated its preference for a harmonized system of truck size and weight regulations across state lines.



4. FEDERAL FREIGHT POLICIES, STRATEGIES, AND INSTITUTIONS

To develop implementable recommendations that will maintain and improve Connecticut’s freight transportation system, it is important to understand the national policy environment in which the freight system functions. Funding programs as well as national policy and regulatory restrictions all establish areas of emphasis and create the framework for implementation.

4.1 NATIONAL FREIGHT ADVISORY COMMITTEE

In June 2014, the National Freight Advisory Committee (NFAC) appointed by the Secretary of Transportation, published its recommendations for the development of the National Freight Strategic Plan (NFSP). The NFSP will implement and advance the National Freight Policy and Goals established under MAP-21 and continued under the FAST Act. The recommendations are categorized into three elements outlined in MAP-21:

1. **Barriers:** An assessment of statutory, regulatory, technological, institutional, financial, and other barriers to improved freight transportation performance (including opportunities for overcoming the barriers)
2. **Best Practices:** To improve the performance of the national freight network
3. **Best Practices:** To mitigate the impacts of freight movement on communities

4.2 NATIONAL FREIGHT POLICY

National freight policy is designed to help the United States compete in the global economy and achieve goals related to economic competitiveness and efficiency. National policy sets a common framework for states to determine the specific investments that best address their priorities and needs.

The FAST Act, passed by Congress in 2016 and promulgated by the Federal Highway Administration (FHWA) focuses heavily on investments in freight. The act establishes new formula and discretionary grant funding programs for freight. The FAST Act also establishes a national policy of maintaining and improving the condition and performance of the National Multimodal Freight Network (“the Network”), described below, to ensure that the Network provides a foundation for the U.S. to compete in the global economy. The FAST Act specifies goals associated with this national policy related to the condition, safety, security, efficiency, productivity, resiliency, and reliability of the Network, and to reduce the adverse environmental impacts of freight movement on the Network. These goals are to be pursued in a manner that is not burdensome to State and local governments. [49 U.S.C. 70101]

4.3 FAST ACT FREIGHT POLICY AND PROVISIONS

The FAST Act contains several initiatives and provisions to improve the condition and performance of the freight network and support investment in freight-related surface transportation projects.

4.3.1 National Highway Freight Program

Included in the FAST Act is an estimated \$1.2 billion per year for use towards a new National Highway Freight Program (NHFP), with the focus of improving efficiency and movement of freight on the National Highway Freight Network (NHFN). Monies are disbursed by formula state-by-state based on eligible activities, including performance measurement, freight planning, operational improvements, and construction. Despite being heavily highway-focused in nature, a State may elect to use up to 10 percent of awarded NHFP funds towards public or private freight rail, ports and water facilities, and intermodal facilities each fiscal year. States are required to have a federally approved freight plan to obligate NHFP funds (beginning December 4, 2017).

The establishment of a National Highway Freight Network by the FHWA was required by the Fixing America’s Surface Transportation (FAST) Act. This network comprises the Primary Highway Freight System (PHFS), State- and MPO-designated critical rural and urban freight corridors, and other portions of the Interstate Highway System that do not fall within the PHFS. **(Figure 4.1)**

Figure 4.1: Primary Highway Freight Network, Connecticut



Source: FHWA

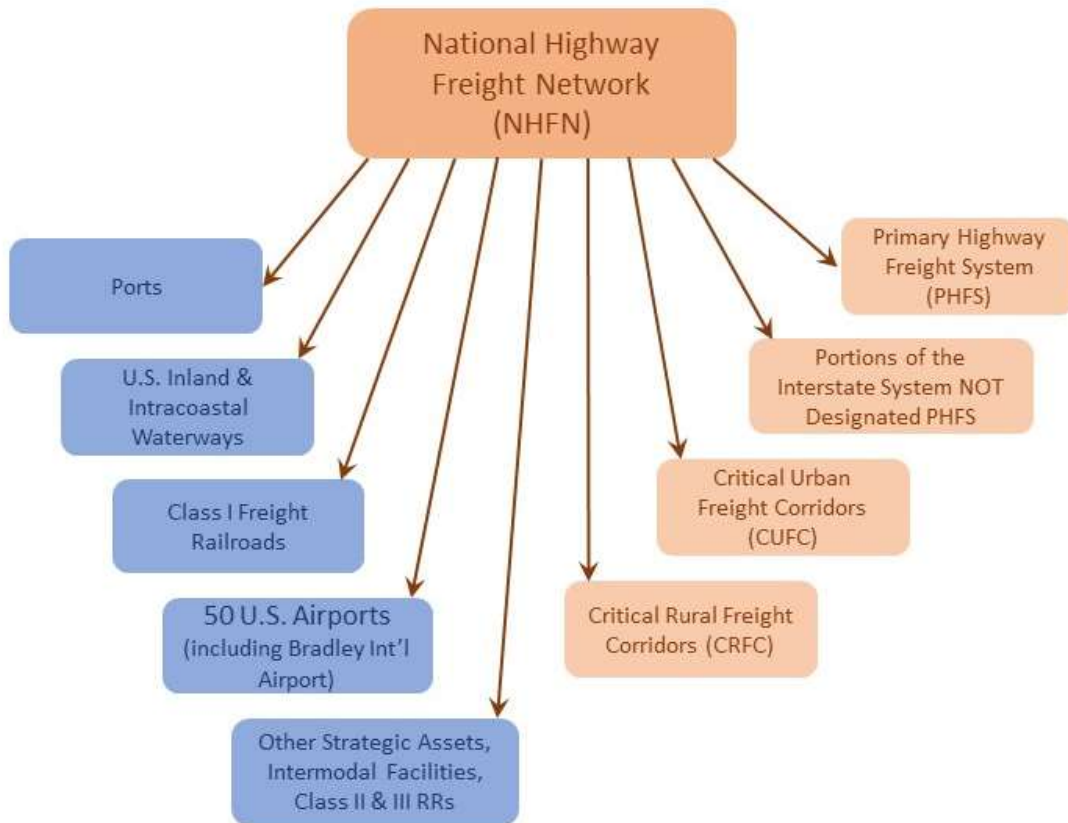
Connecticut may use National Highway Freight Program (NHFP) Funds to improve any part of its Interstate System. Interstate 395 (shown in gray in Figure 4.1) is not part of the Primary Highway Freight Network but is eligible for NHFP funds because Connecticut’s PHFN mileage falls below a threshold of two percent of the total US PHFN mileage, as set in law.

4.3.2 National Multimodal Freight Network

To complement its highway-oriented freight provisions, the FAST Act includes many multimodal freight policy and planning provisions. Among these provisions is the National Multimodal Freight Network. The FAST Act directs the U.S. DOT to establish an interim National Multimodal Freight Network (NMFN), to include the NHFN, freight rail systems of Class I railroads, the Great Lakes, the St. Lawrence Seaway, inland and intercostal waterways, ports and airports that meet specified criteria, and other strategic freight assets. (Figure 4.2) Following a public comment period, U.S. DOT must designate a National Multimodal Freight Network, and must re-designate this network every five years thereafter, with input from a wide range of stakeholders.

The purpose of the NMFN is to 1) assist States in strategically directing resources toward improved system performance for the efficient movement of freight; 2) inform freight transportation planning; 3) assist in the prioritization of Federal investment; and, 4) assess and support Federal investments to achieve the goals of the National Multimodal Freight Policy.

Figure 4.2: National Highway Freight Program



Source: CDM Smith

4.3.3 Critical Rural and Urban Freight Corridors

Critical Rural Freight Corridors (CRFCs) and Critical Urban Freight Corridors (CUFCs) provide access and connectivity to the NHFN. States may designate such corridors, and by doing so, can strategically direct resources towards improved system performance on the NHFN. The designation of CRFCs and CUFCs will increase the network that can be improved with NHFP formula funds and FASTLANE Grant Program funds for eligible projects that support national goals identified in 23 U.S.C. 167(b) and 23 U.S.C. 117(a)(2).

Critical Rural Freight Corridors

23 U.S.C. 167(e) identifies the requirements for designating CRFCs. A state may designate a public road within the borders of the state as a CRFC if the public road is not in an urbanized area, and meets one or more of the following seven elements:

- Is a rural principal arterial roadway and has a minimum of 25 percent of the annual average daily traffic of the road measured in passenger vehicle equivalent units from trucks (Federal Highway Administration (FHWA) vehicle class 8 to 13);
- Provides access to energy exploration, development, installation, or production areas;
- Connects the PHFS or the Interstate System to facilities that handle more than:
 - 50,000 20-foot equivalent units per year; or
 - 500,000 tons per year of bulk commodities;
- Provides access to a grain elevator, an agricultural facility, a mining facility, a forestry facility, or an intermodal facility;
- Connects to an international port of entry;
- Provides access to significant air, rail, water, or other freight facilities in the state; or
- Is determined by the state to be vital to improving the efficient movement of freight of importance to the economy of the State.

Connecticut may designate up to 150 miles of network as part of the CRFC system. Connecticut's Rural Freight Corridors are made part of this plan by reference and may be designated or modified in conjunction with an update of this plan, or independently as necessary.

Critical Urban Freight Corridors

23 U.S.C. 167(f) identifies the requirements for designating CUFCs. In an urbanized area with a population of 500,000 or more individuals, the MPO, in consultation with the state, may designate a CUFC. In an urbanized area with a population of less than 500,000 individuals, the state, in consultation with the MPO, may designate a CUFC.

A public road designated as a CUFC must be in an urbanized area, regardless of whether the population is above or below 500,000 individuals, and meet one or more of the following four elements:

- Connects an intermodal facility to the PHFS, the Interstate System, or an intermodal freight facility;

- Is located within a corridor of a route on the PHFS and provides an alternative highway option important to goods movement;
- Serves a major freight generator, logistic center, or manufacturing and warehouse industrial land; or
- Is important to the movement of freight within the region, as determined by the MPO or the State.

Connecticut may designate up to 75 miles of network as part of the CUFC system. Connecticut's Urban Freight Corridors are made part of this plan by reference and may be designated or modified in conjunction with an update of this plan, or independently as necessary.

4.3.4 National Freight Strategic Plan

In 2015, USDOT released a draft National Strategic Freight Plan. The plan highlights key trends and challenges, including congestion, institutional and financial, that need to be addressed to enable economic growth. The plan describes a range of possible public and private sector actions to improve freight infrastructure and planning processes.

4.3.5 Freight Data, Planning, and Reporting

The FAST Act directs USDOT to develop or improve data and tools to support an outcome-oriented, performance-based approach to evaluating proposed transportation projects. It also directs DOT to consider improvements to existing freight flow data collection.

4.3.6 Freight Conditions and Performance Report

The FAST Act requires DOT to prepare a biennial report describing the condition and performance of the national freight network.

4.3.7 State Freight Advisory Committees and Freight Plans

USDOT has been directed to encourage states to establish a freight advisory committee composed of a representative cross-section of public- and private-sector freight stakeholders. It also requires DOT to encourage each state to develop a comprehensive plan for its immediate and long-range freight-related planning and investment.

4.3.8 Jason's Law

Jason's Law makes construction of safety rest areas, commercial motor vehicle (CMV) parking facilities, electric vehicle and natural gas vehicle infrastructure eligible for federal funding on the National Highway System (NHS). It also requires the U.S. DOT to survey states within 18 months of enactment about their CMV traffic and their capability to provide CMV parking. The U.S. DOT must periodically update this survey, and must post the results on DOT's website. Projects eligible to receive funding include:

- Construction of safety rest areas with truck parking.
- Construction of truck parking areas adjacent to commercial truck stops and travel plazas.
- Opening existing facilities to truck parking, including inspection and weigh stations and park-and-ride facilities.
- Promoting availability of publicly or privately-provided truck parking on the NHS.
- Construction of turnouts along the NHS for commercial motor vehicles.
- Making capital improvements to public truck parking facilities closed on a seasonal basis that will allow those facilities to remain open all year.
- Improving the geometric design of interchanges on the NHS to improve access to truck parking facilities.

4.3.9 Special Permits During Periods of National Emergency

Allows states to issue divisible load permits to overweight trucks exclusively carrying relief supplies for up to 120 days following a Presidential declaration of a major disaster.

4.3.10 Transport of Hazmat and Radioactive Materials

Federal law requires the Secretary of Transportation to establish regulations governing the transport of hazardous materials (hazmat).⁶ These regulations apply to anyone who ships or transports hazmat, as well as manufacturers of packaging designed to transport hazmat.⁷ According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), hazmat is defined as “a substance or material capable of posing an unreasonable risk to health, safety, or property when transported in commerce.”⁸ The USDOT has identified more than 3,000 such materials.⁹ Hazmat are categorized into nine hazard classes, including explosives, flammable liquids and radioactive materials. Each class is associated with a level of transport risk.¹⁰

In Connecticut, the Naval Submarine Base (NSB) New London in Groton is a key generator of Class 7 radioactive materials which are transported via rail. Within the Nuclear Regional Maintenance Department at the base, the Radiological Controls group is responsible for all radioactive materials associated with submarine nuclear propulsion systems, including the receipt, transfer, stowage, disposal, and shipping of radioactive materials.¹¹

States and localities are limited in their ability to impose requirements such as route restrictions on hazmat shipments. In general, state or local regulations or requirements are preempted by the federal regulations except when a more stringent state or local regulation is necessary to mitigate or eliminate a local safety hazard, and such regulation does not conflict with a federal law or regulation or unduly

⁶ 49 U.S.C. 5101 et. seq.

⁷ 49 CFR 171.1.

⁸ <https://www.phmsa.dot.gov/resources/glossary#H>

⁹ National Research Council, Transportation Research Board (TRB). *Special Report 283. Cooperative Research for Hazardous Materials Transportation: Defining the Need, Converging on Solutions*. Washington, D.C., 2005.

¹⁰ <https://ehs.ncsu.edu/hazardous-materials-classification/>

¹¹ http://www.mybaseguide.com/navy/120-1778/nsb_new_london_commands_at_naval_submarine_base_new_london

burden interstate commerce. There are procedures to designate hazmat highway routes within local jurisdictions, but the process must follow federal regulations. Local control of rail operations is even more limited than other modes since rail transportation travels for the most part over privately-owned infrastructure.¹²

There are special hazmat regulations that apply to radioactive materials transported by rail. The rules govern the packaging and separation of such shipments from passengers, rail employees, and animals, and specify the number of packages of radioactive material that may be transported by rail car or stored at any single location based on safety indexes that are defined in regulation.¹³

4.3.11 Additional Freight Funding Programs

Various federal grant/loan opportunities are available for freight-related projects and each of the programs has its own unique requirements. A majority of the funding for freight-related improvements is administered through the USDOT, with additional funding from non-USDOT sources. Federal transportation infrastructure funding and financing programs are discussed in this section.

Infrastructure for Rebuilding America Grants

Formerly known as the Nationally Significant Freight and Highway Projects (FASTLANE) program, the Infrastructure for Rebuilding America (INFRA) program offers funding assistance for freight-beneficial projects on a competitive grant basis. There is \$1.5 billion in funding assistance available through 2018 for highway, rail, port, and intermodal freight projects of national and regional significance. INFRA grants are available to states, MPOs, tribes, localities, and federal land management agencies pursuing higher-cost mega-projects. The selection criteria include degree of enhancement to local economic vitality, innovation in delivery and project streamlining, leveraging of federal funds and project readiness.

National Highway Performance Program

The National Highway Performance Program (NHPP) guides activities related to the condition and performance of the National Highway System (NHS) and provides funding for the construction of new facilities on the NHS. It ensures that investments of federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS.¹⁴ Under MAP-21, routes eligible for NHPP funding include:

- The Interstate System
- Principal arterials (including those not previously designated as part of the NHS) and border crossings on those routes
- Intermodal connectors – highways that provide motor vehicle access between the NHS and major intermodal transportation facilities
- The Strategic Highway Network (STRAHNET). STRAHNET is a nationwide system of roads deemed necessary to support U.S. military operations.

¹² Texas Transportation Institute, *Public Guidance for Managing Hazardous Material Transportation in Texas*, August 2009.

¹³ 49 CFR 173.403.

¹⁴ U.S. Department of Transportation, FHWA, retrieved July 26, 2014 from <https://www.fhwa.dot.gov/map21/factsheets/freight.cfm>

- STRAHNET connectors to major military installations

Surface Transportation Program

Under the FAST Act, the Surface Transportation Program (STP) is a block grant program which provides flexible funding for projects on any Federal-Aid highway, bridges on public roads, bridge and tunnel inspection and inspector training.¹⁵ Eligible freight projects also include bridge clearance increases to accommodate double-stack freight trains, capital costs of advanced truck stop electrification systems, freight transfer yards, and truck parking facilities, as well as surface transportation infrastructure improvements in port terminals for direct intermodal interchange, transfer, and port access.

Congestion Mitigation and Air Quality Program

The Congestion Mitigation and Air Quality Program (CMAQ) program is continued in MAP-21 and the FAST Act to provide a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act.¹⁶ CMAQ money supports transportation projects that reduce mobile source emissions in areas designated by the U.S. Environmental Protection Agency (EPA) as nonattainment or maintenance of national ambient air quality standards. Eligible activities include those related to rail intermodal freight transportation improvements. To be eligible for funding, the project must reduce emissions of criteria pollutants¹⁷ for which the area is in non-attainment. CMAQ funding is administered jointly by the FHWA and the Federal Transit Administration (FTA) and is allocated among the states based on the severity of their air quality status.

Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) supports projects that improve the safety of road infrastructure by adding capacity, improving alignment or operations, such as intersections, curves or making road improvements such as signing, pavement markings or adding rumble strips. The HSIP also offers eligibility for truck parking

The Transportation Infrastructure Finance and Innovation Act

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. The goal of TIFIA financing is to leverage federal resources and stimulate private capital investment in transportation infrastructure by providing credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to projects of national or regional significance. TIFIA financing is available for large-scale public or private transportation projects, including highway, bridge and rail intermodal freight improvements. The program is aimed at large projects with a minimum value of approximately \$50 million. The maximum TIFIA-financed portion is 33 percent and is administered by the USDOT's TIFIA Joint Program Office.

Railway-Highways Crossing (Section 130) Program

Funds to improve rail-highway crossings are set-aside from the federal HSIP apportionment. The program provides funds for the elimination of hazards at railway-highway crossings and is apportioned to states by formula. Eligibility includes the relocation of highways to eliminate railway-highway grade

¹⁵ U.S. Department of Transportation, FHWA, retrieved July 26, 2014 from <https://www.fhwa.dot.gov/map21/factsheets/freight.cfm>

¹⁶ Ibid

¹⁷ The criteria pollutants are nitrogen dioxide, lead, carbon monoxide, ozone, particulate matter and sulfur dioxide

crossings and projects at railway-highway grade crossings to eliminate hazards posed by blocked crossings due to idling trains.

There are 313 highway grade crossings in Connecticut, with 231 listed as freight railroad crossings, in which the railroad company is responsible for maintenance of the track and any pavement between the rails. Many of these crossings need replacement or repair of crossing surfaces on the approach as well as repair or replacement of signs, signals, crossing gates and other warning or protective devices. The FAST Act authorized \$225 million to be set aside from the Highway Safety Improvement Program (HSIP) for FY 2016, but the later enacted Department of Transportation Appropriations Act, 2016 raised the set-aside amount for FY 2016 to \$350 million. Connecticut is to receive about \$2 million from FY 2017-FY 2020.

Federal Rail Safety Improvement Act of 2008

This Act addresses rail safety through regulations; it also authorizes grants for investing in rail technology, railroad safety infrastructure, rail grade crossing improvements, and education, subject to annual appropriations. Provisions under the Act are administered by the Federal Railroad Administration (FRA).

Rail Line Relocation and Improvement Capital Grant Program

Under this program, a state (or political subdivision such as a parish) is eligible for a grant from FRA for any construction project that improves the route or structure of a rail line and involves a lateral or vertical relocation of a portion of rail line, or mitigates the adverse effects of rail traffic on safety, motor vehicle traffic flow, community quality of life, or economic development.

Railroad Rehabilitation and Improvement Financing Program

The Railroad Rehabilitation and Improvement Financing (RRIF) program provides direct federal loans and loan guarantees to finance the development of railroad infrastructure¹⁸. Under this program, established in 1998, the FRA provides up to \$35 billion in direct loans and loan guarantees, with \$7 billion reserved for Class I railroad projects. The loans can be used to refinance outstanding infrastructure debt. The program also helps to finance project investments directly, up to the total cost of the project. State and local governments, government-sponsored authorities, corporations, railroads, and others can participate in the program.

Transportation Investment Generating Economic Recovery Discretionary Grants

The Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant program provides a unique opportunity for USDOT to invest in road, rail, transit and port projects that have the potential to achieve critical national objectives. Since 2009, Congress has dedicated more than \$4.1 billion for six rounds to fund projects that have a significant impact on the nation, a region or a metropolitan area.¹⁹

¹⁸ U.S. Department of Transportation, FRA, retrieved August 14, 2014 from <http://www.fra.dot.gov/Page/P0128>

¹⁹ U.S. Department of Transportation, retrieved 8/14/14 from <http://www.dot.gov/tiger>

U.S. Army Corps of Engineers Harbor Maintenance Trust Fund

The U.S. Army Corps of Engineers (USACE) is responsible for maintaining federal navigation channels. Under the Harbor Maintenance Trust Fund (HMTF), the principal legislative vehicle for guiding the USACE Civil Works Program under the 2014 Water Resources Development Act (WRDA), expenditures will increase each year until 2025, when 100 percent of available funds will be directed towards operations and maintenance activities. The Harbor Maintenance Trust Fund is funded by a harbor maintenance tax (HMT) on imported and domestic waterborne cargo and cruise passengers. The HMTF is used to cover the USACE's cost of dredging channels, maintaining jetties and breakwaters, and operating locks along the coasts and in the Great Lakes. The HMTF may be used only with an appropriation by Congress.

Inland Waterways Trust Fund for Locks and Dams

The Inland Waterways Fuel Tax and Trust Fund was established by the Water Resources Development Act of 1986. The Act established a Federal marine fuel tax of \$0.20 per gallon to support 50 percent of the cost of inland waterway infrastructure development and rehabilitation. The tax generates approximately \$85 million annually. The Trust Fund balance began to decline in 2003 when increasing amounts were used to modernize the inland waterway system. This continued until 2009 when the Trust Fund balance was exhausted, limiting the amount of spending to the annual tax revenues available. There is now a substantial backlog of authorized projects, and the limited funding available has been spread over a list of projects, which has extended the construction time for each project. The 2014 WRDA directs the Secretary of the Army to conduct a study to report on potential revenue sources for the Inland Waterway Trust Fund. With the passing of the Able Act, as of April 1, 2015 the Inland Waterway Trust Fund tax was increased to \$0.29 per gallon.

FAA Airport Improvement Program

The Airport Improvement Program (AIP) is administered by the Federal Aviation Administration (FAA) and provides grants for planning and developing public-use airports that are included in the National Plan of Integrated Airport Systems (NPIAS). For large and medium primary hub airports, the grant covers 75 percent of eligible costs (or 80 percent for noise program implementation). For small primary, reliever, and general aviation airports, the grant covers a range of 90 to 95 percent of eligible costs, based on statutory requirements. Eligible projects include improvements related to enhancing airport safety, capacity, security, and environmental concerns. In general, sponsors can use AIP funds on most airfield capital improvements or repairs and, in some specific situations, for terminals, hangars, and non-aviation development.

Department of Commerce

The Department of Commerce (DOC) administers federal funding for grants and cooperative agreements in the form of discretionary and nondiscretionary funds. The grants most germane to freight are administered by the Economic Development Administration (EDA). The EDA provides public works funds for distressed communities to revitalize, expand, and upgrade their physical infrastructure to attract new industry, encourage business expansion, diversify local economies, and generate or retain long-term, private sector jobs, and investment.²⁰

²⁰ <http://www.eda.gov/programs.htm>

4.3.12 Metropolitan and Statewide Planning

The FAST Act continues to encourage freight shippers and providers of freight transportation services to participate in metropolitan and statewide transportation planning processes. It also requires that planning processes consider projects and strategies to increase the accessibility and mobility of people and for freight; and enhance the integration and connectivity of the transportation system across and between modes, for people and freight. Freight plans must be completed and updated at least every 5 years.

Federal law established under *Moving Ahead for Progress in the 21st Century Act (MAP-21)* and the *Fixing America's Surface Transportation (FAST) Act* requires a transition to a performance-driven and outcome-based program. The purpose of performance-based decision making is to increase the transparency and accountability of states for their investment of federal tax dollars in transportation infrastructure. A performance-driven program also provides a data-driven framework for improved project planning and investment decision-making processes that accounts for system reliability, economic vitality, and environmental sustainability.²¹

The Federal Highway Administration (FHWA) has established national goals that states and local agencies can collectively work towards to address safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability and reduced project delivery delays.²²

To help states, achieve these national goals, FHWA has published final rules that establish performance measures for State departments of transportation (State DOT) and Metropolitan Planning Organizations (MPO) to use as required by the MAP-21 and the FAST Act. This is the first time that all state DOTs and MPOs are required to track and report performance data using a national framework of consistent performance measures.

The measures must be used by State DOTs and MPOs to assess the performance of the Interstate and non-Interstate National Highway System (NHS) to carry out the National Highway Performance Program (NHPP); to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions to comply with Congestion Mitigation and Air Quality Improvement (CMAQ) Program regulations.

Relative to freight travel, the FHWA established one performance measure for state DOTs to adopt and implement to assess freight movement on the Interstate System. The measure is Truck Travel Time Reliability (TTTR) and represents the average reliability of truck travel for all reporting segments on the Interstate System. The FHWA also specified the inputs and calculations requirements for this measure. To assist states in implementing this performance measure, the FHWA will provide state DOTs and MPOs free access to the National Performance Management Research Data Set (NPMRDS) - a travel time data set that includes freight-only travel times. This data resource provides detailed vehicle travel time information to monitor system performance.

²¹ <https://www.federalregister.gov/articles/2014/06/02/2014-12155/statewide-and-nonmetropolitan-transportation-planning-metropolitan-transportation-planning#h-21>.

²² <http://www.fhwa.dot.gov/tpm/about/goals.cfm>

State DOTs must establish two-year and four-year performance targets, as applicable, within one year of the effective date of final rule. State DOTs are also required to report to FHWA on the performance and progress of transportation projects in performance reports beginning January 1, 2018. State DOTs are encouraged to coordinate with MPOs to establish consistent targets, to the maximum extent practicable. The FHWA will assess each State DOT's progress toward achieving performance biennially and use the data to assess the impacts of Federal funding investments.

Transportation agencies are encouraged set additional performance measures that are relevant to the goals in their transportation plan and that help them measure progress towards those goals.



5. CONNECTICUT FREIGHT TRANSPORTATION ASSETS

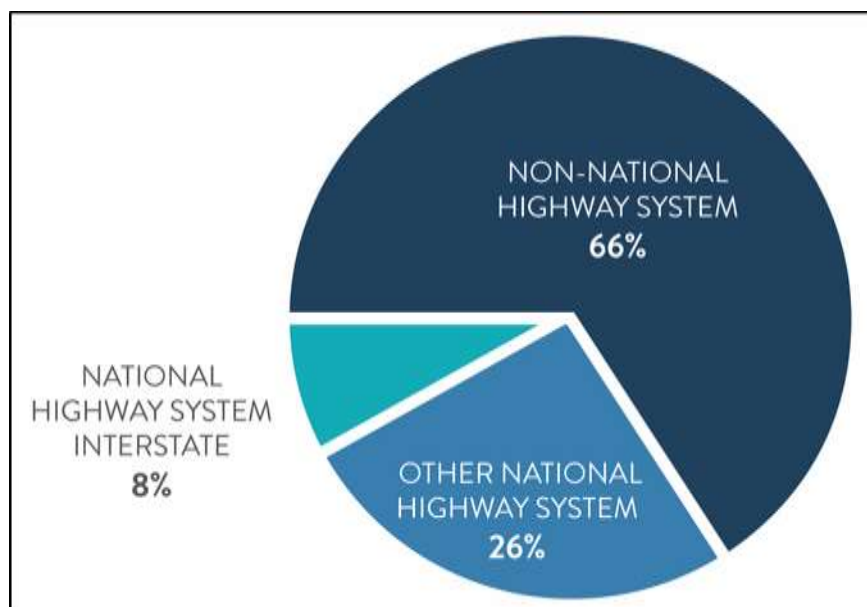
Connecticut’s freight transportation system is a large inter-connected system of roads, highways, air services, ports and waterways that connect the state with the rest of the U.S. and the world. The system is owned and operated by a variety of private and public entities, each operating under different cost structures, business models and objectives. This section reviews the extent and attributes of the networks that carry freight into, through and within Connecticut.

5.1 HIGHWAYS

In Connecticut, there are over 21,400 miles of public roadways. CTDOT is directly responsible for overseeing all design, construction, maintenance, and improvements for nearly 20 percent of the state’s roadway mileage. The state-maintained roads comprise Connecticut’s most heavily-traveled roads - the Interstate System and most of the major arterials.

As shown in **Figure 5.1**, National Highway System Interstates make up just eight percent of state-maintained roads; however, roughly 80 percent of truck freight travel moves on the Interstate System.

Figure 5.1: State Maintained Roads, Miles

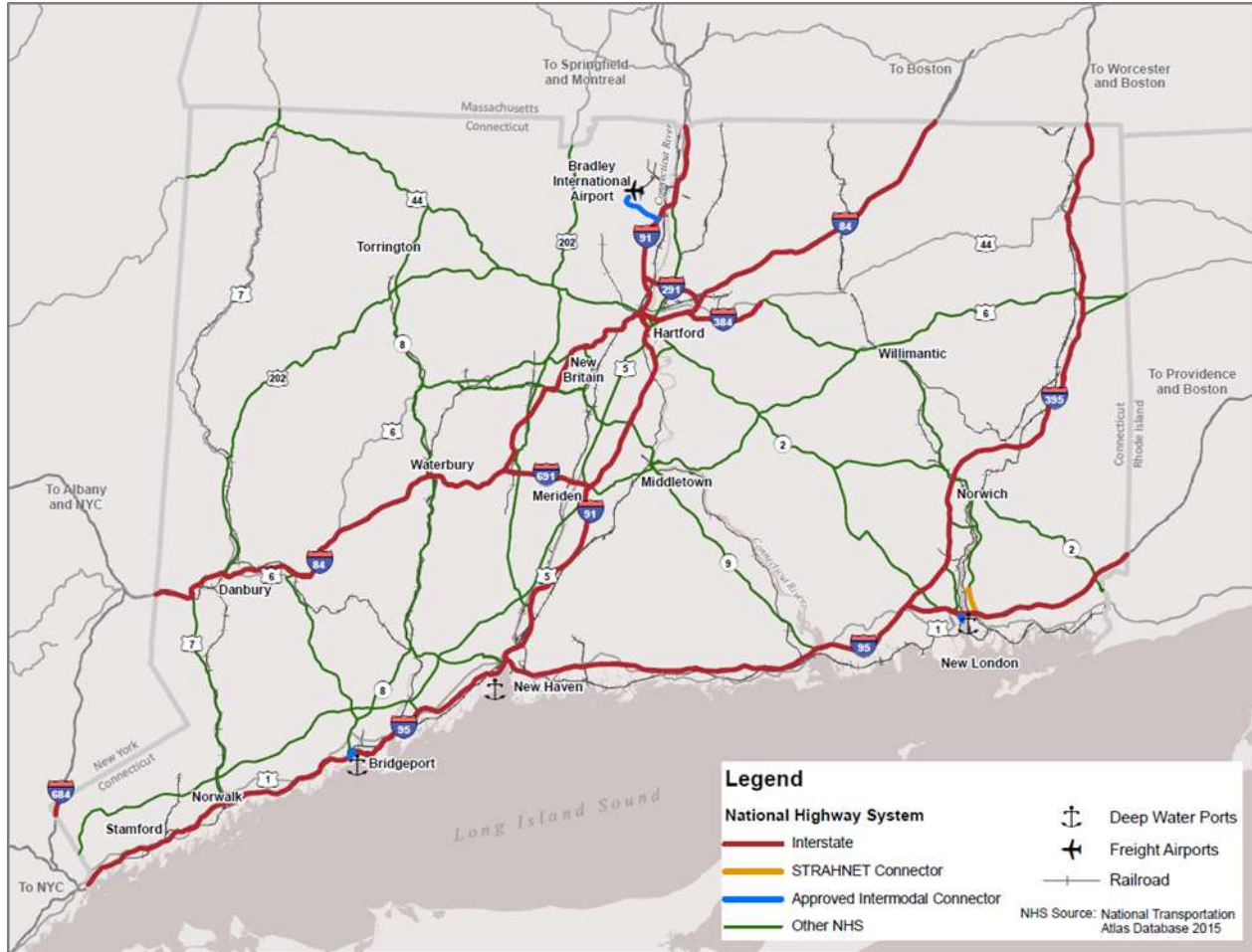


Source: FHWA, Highway Statistics

As shown in **Figure 5.2**, the 1,392 miles of the National Highway System connect population and employment centers within the State and form connections with the rest of the U.S. The rest of the state system (2,719 miles) and the non-state system (17,271 miles) provide access between regions

within the state, and they also provide the local system connections to factories, stores, warehouse and distribution centers and intermodal facilities. For the most part, the last and first mile connections of the highway freight system are on the non-state highway system.

Figure 5.2: National Highway System Roads



Source: CTDOT

5.2 FREIGHT RAIL

There are nine privately owned freight railroad companies operating in Connecticut and the Connecticut Department Transportation provides freight rail support through several programs. These companies own most of the rail freight infrastructure and all of the rail freight equipment operating within the state. The rail service operators include CSX Transportation, Providence & Worcester Railroad Company, Housatonic Railroad Company, Pan Am Southern Railway (including Pan Am Railways), Springfield Terminal Railroad, New England Central Railroad, Naugatuck Railroad Company, Central New England Railroad, and Connecticut Southern Railroad.

There are over 628 miles of freight railroad right-of-way in the state consisting of public and privately-owned property as shown in **Table 5-1**.

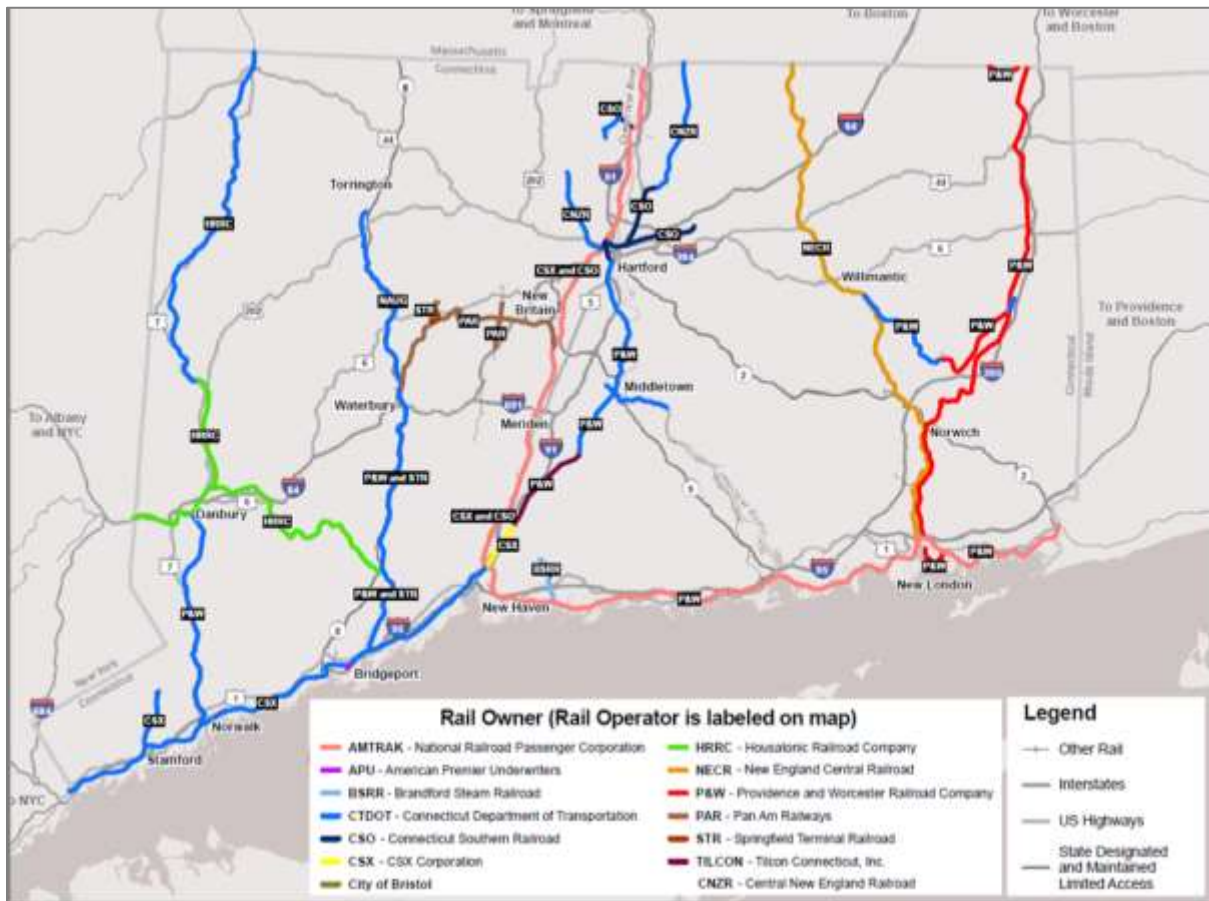
Table 5-1: Connecticut Freight Railroad Right-of-way Miles

PUBLIC	ROW Miles
<i>Freight Railroad Operating Rights</i>	
Federal – Amtrak owned (Shore Line and Springfield Line)	122.5
State of Connecticut owned (New Haven Line and misc.)	128.2
<i>Freight Railroad Lease Agreements</i>	
State of Connecticut owned	129.1
Municipal – City of Bristol owned	2.0
Total Public	381.8
PRIVATE	
Freight Railroad Companies (privately owned)	246.7
Total Private	246.7
TOTAL	628.5

Source: Connecticut State Rail Plan 2012-2016, CTDOT.

The locations of freight rail lines by railroad operator and ownership are shown in **Figure 5.3**. Most of the freight rail operations in Connecticut involve shared-use agreements between owners of passenger rail operators and freight rail companies.

Figure 5.3: Rail Operators in Connecticut, and Ownership

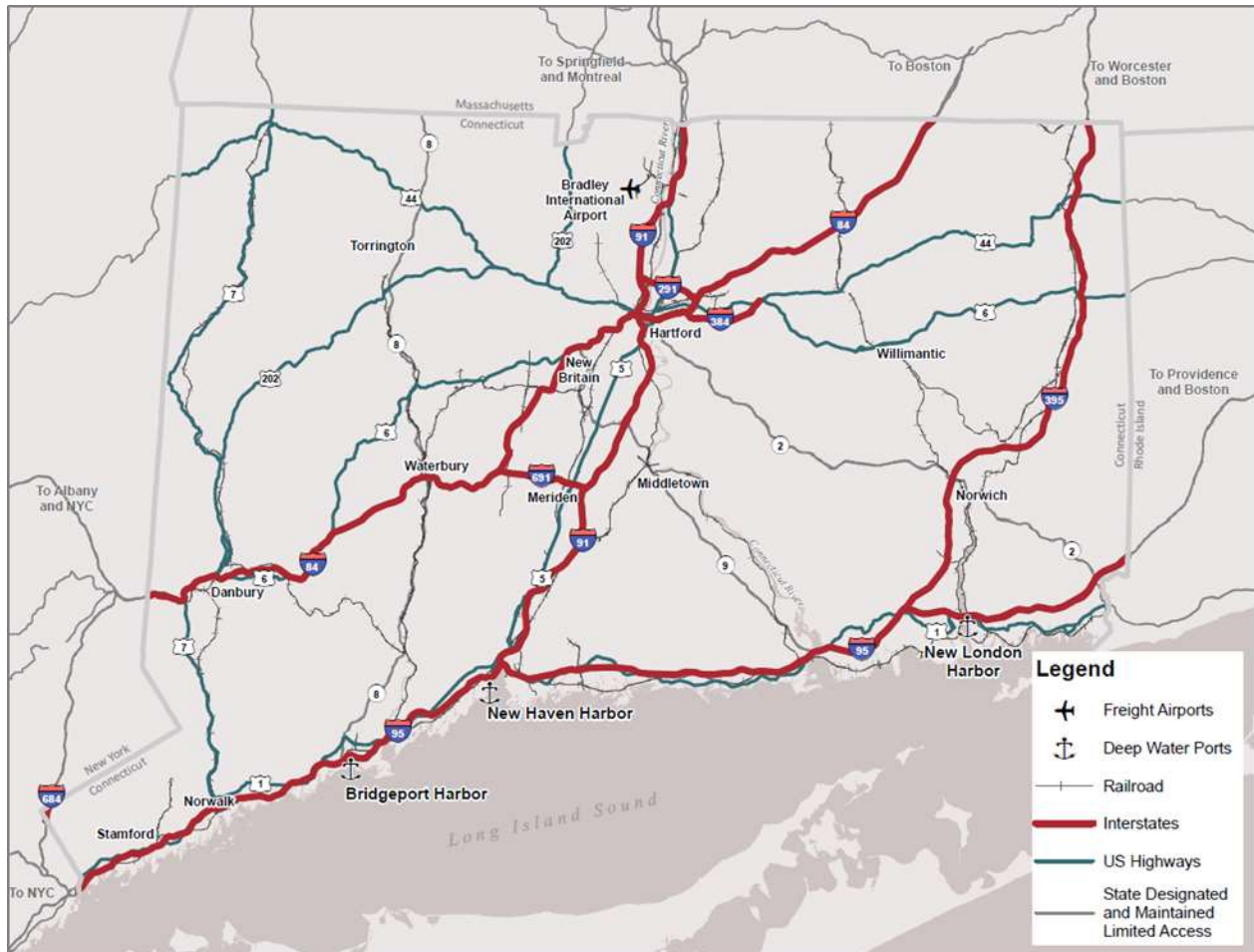


Source: CTDOT and CDM Smith

5.3 WATER TRANSPORTATION

There are three deep water commercial ports in Connecticut – New London, New Haven and Bridgeport – that handle freight movement (**Figure 5.4**).

Figure 5.4: Connecticut Deep Water Commercial Ports



Source: CTDOT and CDM Smith

5.3.1 Port of New Haven

The Port of New Haven is the highest volume commercial shipping port on Long Island Sound and the busiest port between Boston and New York City. The 366-acre port can accommodate ships ranging from 20,000 to 40,000 deadweight tons. It has ten berthing facilities at eight terminal locations ranging from 200 to 1,500 feet. There is approximately 250,000 square feet of indoor storage and 50 acres of outdoor storage within the port district. The port primarily handles petroleum products, chemicals, scrap metal, metallic products, cement, sand and stone, salt and general break bulk cargo. The Port of New Haven's fuel facilities are part of the U.S. Government's strategic heating oil reserve.

5.3.2 Port of Bridgeport

The Port of Bridgeport occupies 23 acres with 1,350 linear feet of waterfront. The 160-foot pier accommodates vessels up to 300 feet in length, 60-foot beam, and 18-foot draft. Additional Port Authority-owned acreage is contiguous to the site for future expansion of the shipyard facility.

5.3.3 Port of New London

The Port of New London has two piers through which freight moves: State Pier and Long Dock (also known as CVRR Pier or the Salt Pier). The State Pier is approximately 1,000 feet long with two main berths and water depths of 30 to 35 feet. The Long Dock is an older pier with structural deficiencies. The berthing area depths are 16 to 23 feet and are primarily used for berthing barges and smaller vessels. The port also includes warehouses, a garage, an administration building, and support structures.

5.3.4 Ferry Operations

Ferry services located at the Port of New London that handle freight include:

- Cross Sound Ferry: a passenger and road vehicle ferry service, operating between New London, Connecticut and Orient, Long Island, New York. The service is privately owned and operated by Cross Sound Ferry Services, Inc., and is headquartered in New London. According to the company's website, it serves over one million passengers annually. The ferry handles trucks moving freight between Connecticut and Long Island. Outside of the peak summer season, the ferry has excess capacity that is used for trucks and freight, which includes gravel and other heavy items (Connecticut Office of Policy and Management 2013).
- The Fishers Island Ferry District: a passenger, auto, and freight service operating between New London and Fishers Island, New York.
- The Block Island Express: a passenger-only service operating between New London and Block Island, Rhode Island.

5.4 AIR CARGO

Air cargo in Connecticut is handled through the state-owned Bradley International Airport (BDL). BDL has three cargo complexes: Roncari Freight Facility, Aviation Facilities Company, and UPS Air Express Sorting Hub. BDL also services six air cargo airlines: ABX Air, FedEx Express, FedEx Feeder (by Wiggins Airways), Southern Air, UPS Airlines, and Flight Express. In 2009, BDL handled approximately 110,000 tons of air cargo.

5.5 PIPELINE

Connecticut is served by both gas and oil pipelines. There are approximately 590 miles of gas transmission pipelines in Connecticut, with three interstate pipelines which together move for 43 percent of the state's natural gas imports, by weight. Natural gas also accounts for 88 percent of all commodities moved through the state's pipelines. The principal lines in Connecticut are²³:

²³ Connecticut Department of Energy and Environmental Protection

- Algonquin Gas Transmission (AGT - Enbridge) originates in New Jersey where it connects to Texas Eastern and runs from Danbury northeasterly to Thompson, with major spurs to North Haven and New London.
- Iroquois Gas Transmission System (IGT) starts at the Canadian border, enters Connecticut at Sherman and runs southeast through Milford, then offshore to Long Island.
- Tennessee Gas Transmission (TGP -Kinder Morgan) starts in the Gulf, enters Connecticut in Greenwich, runs northeasterly leaving Connecticut in Suffield, with a spur from Massachusetts to Torrington.

The principal oil pipeline in Connecticut transports jet fuel from the Port of New Haven (Buckeye terminal) to the Bradley International Airport and for the Massachusetts Air National Guard Base in Westover, Massachusetts (Connecticut's Deep-Water Ports Strategy Study, 2012).

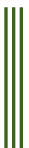


6. ECONOMIC CONTEXT OF FREIGHT

There are strong correlations between the amount or value of freight shipped and the overall health of a state or regional economy. The freight transportation system is the means by which Connecticut moves its exports and by which it imports components and materials for the goods it produces and the consumer goods it consumes. Freight movement is vital to the state, and the right increases in freight transportation supply will have a direct and positive effect on economic growth.

6.1 HIGHLIGHTS

- In 2014, the shipments of commodities on Connecticut's freight system contributed to business activity valued at \$58.1 billion. Nearly one-quarter of business activity in the state is directly related to goods movement.
- Connecticut's \$251 billion economy includes \$26.8 billion attributed to freight-dependent manufacturing sectors. The output of the manufacturing sector alone amounts to 10.7 percent of the state economy.
- Across all business sectors, outbound freight transportation dependency represents \$58.7 billion of the state economy while inbound freight transportation dependency represents \$57.5 billion of Connecticut's economy.
- The Aircraft Engine and Parts and the Aircraft Manufacturing Sectors are the top industry drivers of the 3.2 percent average annual compound growth in the Primary Manufacturing Sector forecasted from 2015 to 2042.
- The Pharmaceutical Preparation Manufacturing industry leads the Secondary Manufacturing Sector in Connecticut, and is forecast to more than triple in value of output to over \$27 Billion annually by 2042.
- Refined Petroleum Products is the top commodity category shipped into the state, accounting for 14 percent of the total of all inbound shipments to the state.
- Warehouse and Distribution Center freight traffic represents six percent of total inbound shipments into the state.



6.2 DEPENDENCE OF CONNECTICUT INDUSTRY ON FREIGHT TRANSPORTATION

6.2.1 Businesses & Economic Dependence on Freight

Businesses in Connecticut depend on the movement of goods to reach their customers and provide inputs for their continued operations. The degree to which industries depend on freight transportation varies with the nature of the business, with agriculture and some manufacturing firms depending more on outbound freight transportation of production than for inbound transportation of supplies. Consumers in Connecticut, as represented by households, are primarily freight dependent for deliveries, using inbound transport of freight much more heavily than outbound freight transport of waste, recyclables, product returns or parcel shipments. At one extreme, the (passenger and freight) rail transportation service industry is almost entirely dependent on outbound transportation, with approximately 97 percent of the sector's output, value added, income and jobs dependent on outbound transportation. In contrast, many businesses in service sectors of the economy depend very little on freight transportation in either direction, essentially only requiring office supplies as physical inputs provided by inbound transportation. Thus, industry sectors such as Finance and Insurance show zero percent outbound freight transportation service dependence²⁴ and only about one percent dependence on inbound freight transportation. **Appendix B** contains the dependency on freight transportation in Connecticut of the individual industries that comprise the state economy. These are presented as a percent of total output, value added, income²⁵ and jobs²⁶ separately for outbound transportation and then for inbound transportation.

For Connecticut, the economic dependence on outbound transportation for all industries is 23.4 percent for output, 24.8 percent for value added, 23.5 percent for income and 22.8 percent for jobs. The overall economic dependence on inbound transportation of all industries is 22.9 percent for output, 20.8 percent for value added, 22.8 percent for income and 23.2 percent for jobs. This means outbound freight transportation dependency represents \$58.7 billion of the Connecticut economy while inbound freight transportation dependency represents \$57.5 billion of the state economy. In the future, as the service sector share of the economy continues to grow, the overall average economic dependence on freight will shrink, although with the economy already heavily dominated by the service sectors, further reductions in freight dependence will be small.

What are Output and Value Added?

Output is a measure total industry sales, including those used as inputs to produce goods by other companies.

Value added is the difference between the output of an industry and the cost of the inputs needed to produce the industry's goods. This is sometimes seen as a measure of profitability.

²⁴ Garbage collection and outbound postal mail pickups are not included in the outbound freight dependency data.

²⁵ U.S. Bureau of Economic Analysis defines income as the wages and salaries of workers in jobs in the industry

²⁶ U.S. Bureau of Economic Analysis defines jobs as the number of workers employed in the industry

6.3 INDUSTRY PROFILE OF THE CONNECTICUT ECONOMY

The economy of Connecticut, like the U.S., is dominated by the services sector, rather than goods producing sectors such as Manufacturing, Agriculture or Mining. At the end of 2015, the Connecticut Department of Labor reported that just 9.5 percent of state employment was engaged in manufacturing, while 90.4 percent of non-farm employment was in the service sector. Freight transportation serves all industries in the state, but Manufacturing remains the most directly dependent on freight transportation besides the Transportation Services sector itself. According to the U.S. Bureau of Economic Analysis, Connecticut's \$251 billion in Gross State Product (2014) included \$26.8 billion (10.7%) attributed to the freight-dependent manufacturing sectors. Within the past decade, the recession of 2008-2009 resulted in a large downturn in the state's Manufacturing, Wholesale and Retail Trade and Warehousing and Distribution sectors. In Connecticut, the Wholesale and Retail Trade and Warehousing and Distribution sectors have recovered and now exceed pre-recession levels of output. The value of output in the Manufacturing sectors has struggled to recover, and is still below pre-recession peaks. The state's Agriculture and Utility sectors experienced smaller impacts from the 2008 recession, although they have since grown slowly.

Economic Data and Modeling

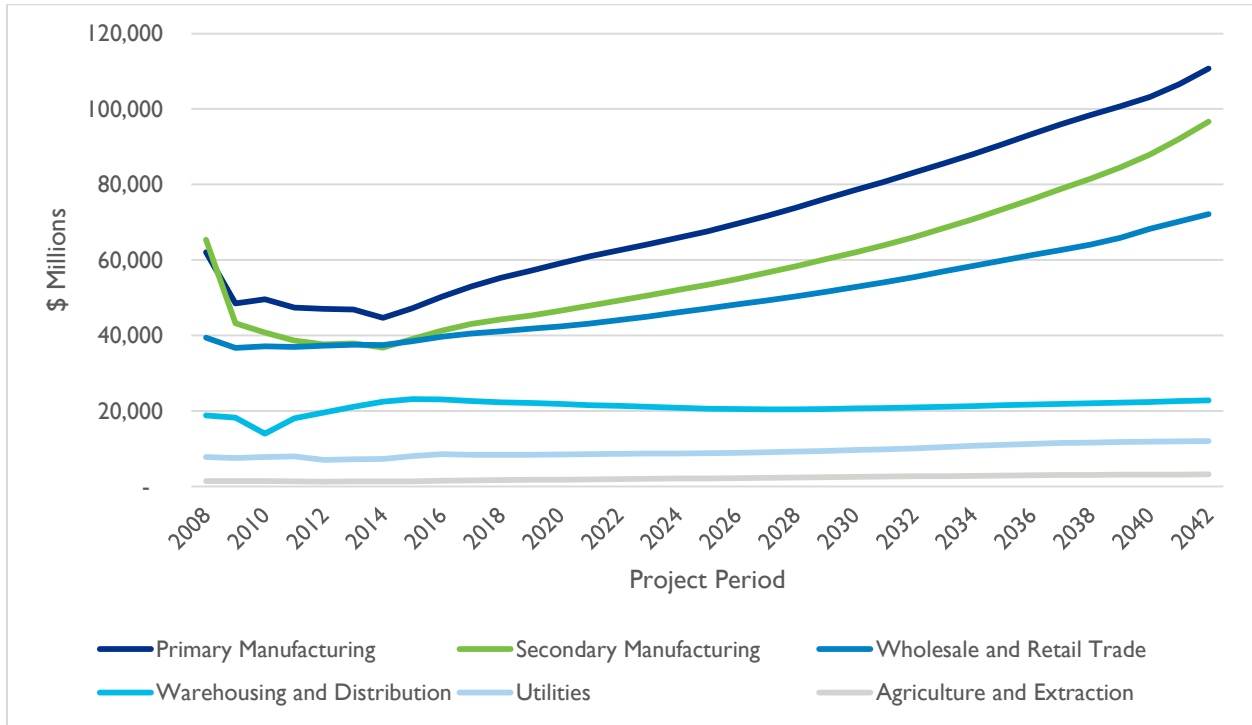
The IHS-Transearch Modal Commodity database contains information about the value and tonnage of Connecticut freight flows. This database is linked with input-output tables - information about how Connecticut industries use and produce commodities. Together these data sources help us understand the value of freight to the Connecticut economy.

The long-term forecasts are for continued recovery in Connecticut Manufacturing, with both Primary²⁷ Manufacturing and Secondary Manufacturing sectors growing the most of any sectors in the state. Wholesale and Retail Trade are also expected to see gains. Compared with Manufacturing, the size and growth of the Warehousing and Distribution, Agriculture and Extraction and Utilities sectors are forecasted to be much smaller for Connecticut. These slower growing sectors are in a more mature phase of development with limited in-state potential to grow as rapidly as new technically-oriented manufacturing due to the competitive situation, the impact of regulations and availability of land compared with alternative suppliers out-of-state.

Comparisons in the relative value of industry sector output forecasted to 2042 in **Figure 6.1** show the long-term importance of Manufacturing and Wholesale and Retail Trade to Connecticut. More detailed economic analysis can be found in **Appendix B**.

²⁷ Primary Manufacturing transforms raw materials into industrial materials. Secondary Manufacturing produces goods for final consumption from industrial materials and components.

Figure 6.1: Trends in the Major Industry Sector Shares of the Connecticut Economy, 2008 – 2042



Source: EDR Group from TREDIS and Moody's Analytics

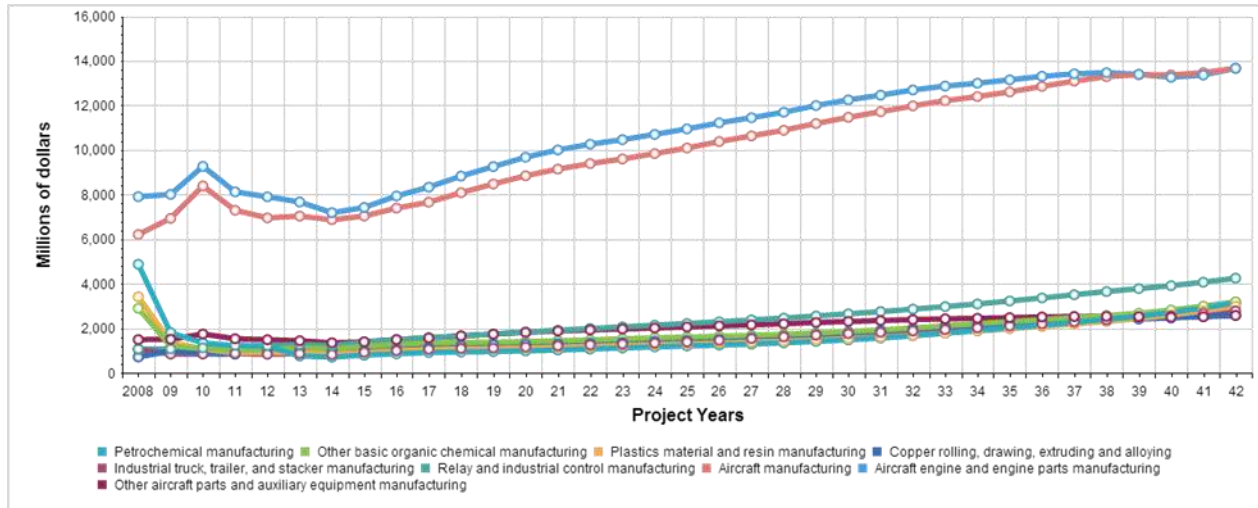
6.4 INDUSTRIES DRIVING MANUFACTURING GROWTH IN THE CONNECTICUT ECONOMY

The Primary Manufacturing industry sector within the Connecticut economy is being driven by the growth in the Aircraft Engine and Parts and the Aircraft manufacturing sectors. These two sectors are the top industry drivers of the 3.2 percent average annual compound growth in the Primary Manufacturing Sector forecasted from 2015 to 2042. In **Figure 6.2** the composition of output of the top industries driving the Connecticut Primary Manufacturing sector shows the relative importance of the aircraft engine and aircraft manufacturing sectors to other sectors in the Connecticut economy.

Primary and Secondary Manufacturing

Primary Manufacturing transforms raw materials into industrial materials. Secondary Manufacturing produces goods for final consumption from industrial materials and components.

Figure 6.2: Composition of Output of Top Industries Driving the Connecticut Primary Manufacturing Sector to 2042



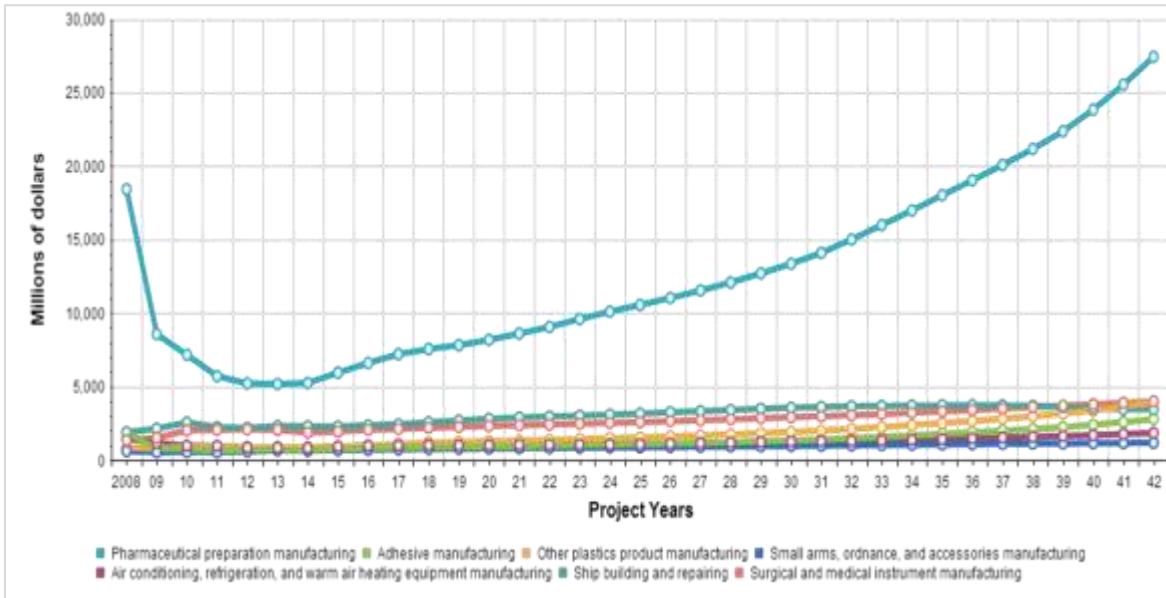
Source: EDR Group

Apart from aircraft, aircraft engine and parts manufacturing, other top drivers of the Primary Manufacturing sector growth are Relays and Industrial Controls manufacturing and Other Basic Organic Chemical manufacturing. After the declines in these industry sectors observed in 2009 – 2010, the forecast for continued average annual compound growth from 2015 to 2042 of 4.3 percent and 3.7 percent, respectively, in these subsectors shows the key drivers of the forecast growth in Primary Manufacturing.

The Secondary Manufacturing industry sector within the Connecticut economy is being driven by the growth observed and forecasted to continue in the Pharmaceutical Preparation Manufacturing industry. The Secondary Manufacturing in this case is production of finished pharmaceutical preparation products for consumption from industrial materials and components. As seen in **Figure 6.3**, though this industry saw a great decline in output following the 2008 recession, and recovery has been subsequently modest, the longer-term projections are for steady modest growth that leads to record high output, as the value of production, by 2036 and further growth beyond. The other industry sectors driving growth in Secondary Manufacturing are projected to see modest growth.

The geography of freight shipments in the inbound direction to Connecticut, in total across modes of transportation for 2013 in millions of dollars, is depicted in the state inbound freight map in **Figure 6.4**. Inbound freight follows the location of the economic activity in the state, in Fairfield, New Haven and Hartford counties.

Figure 6.3: Composition of Output of Top Industries Driving the Connecticut Secondary Manufacturing Sector to 2042



Source: EDR Group

Figure 6.4: Connecticut State Inbound Freight Map, Total All Commodities, All Modes of Transport by County, 2013



Source: CDM Smith

The geography of shipments in the outbound direction from Connecticut, in total, across modes of transportation for 2013 is depicted in the Connecticut state outbound freight map in **Figure 6.5**. Bradley International Airport, rail lines connecting Connecticut to Massachusetts rail lines and intermodal centers, as well as I-91 are significant freight assets located in Hartford county, which has the largest share among Connecticut counties of outbound freight movements by value.

Figure 6.5: Connecticut State Outbound Freight Map, Total All Commodities, All Modes of Transport by County, 2013



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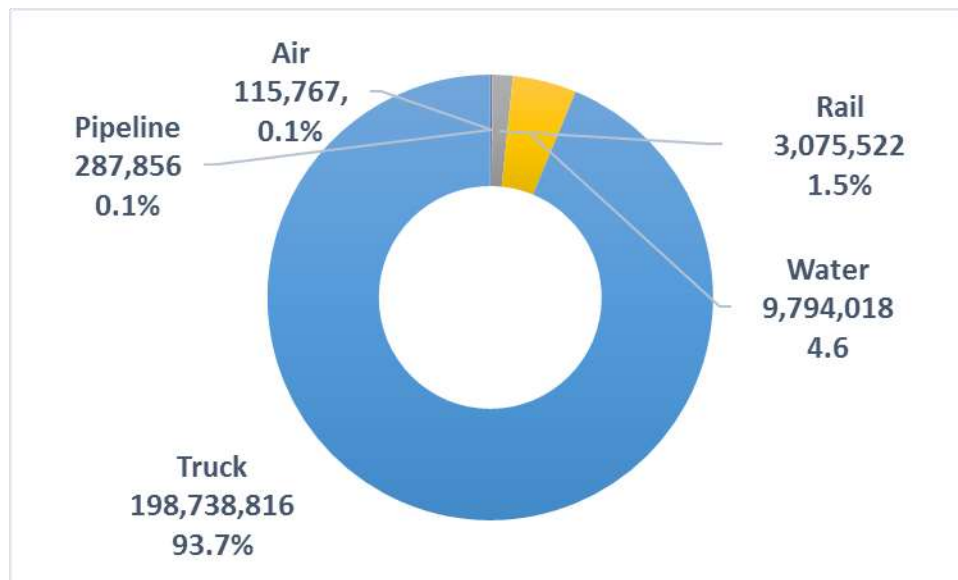
7. FREIGHT DEMAND

In 2014, 212.0 million tons of freight valued at \$365.4 billion moved over Connecticut's transportation system. Freight moves almost exclusively by truck, accounting for 93.7 percent of all freight moved in terms of tonnage and 92.4 percent by value. Port, rail and air account for the remaining commodities transported in the state. **Figure 7.1** and **Figure 7.2** show the mix of modes and their contribution to the state's freight movements, by tonnage and value. Despite the presence of significant congestion, Connecticut's highway system is the most direct and accessible means of transport, both for long-distance movements that begin or end outside the state and for local transport and deliveries.

Why we need to understand freight demand

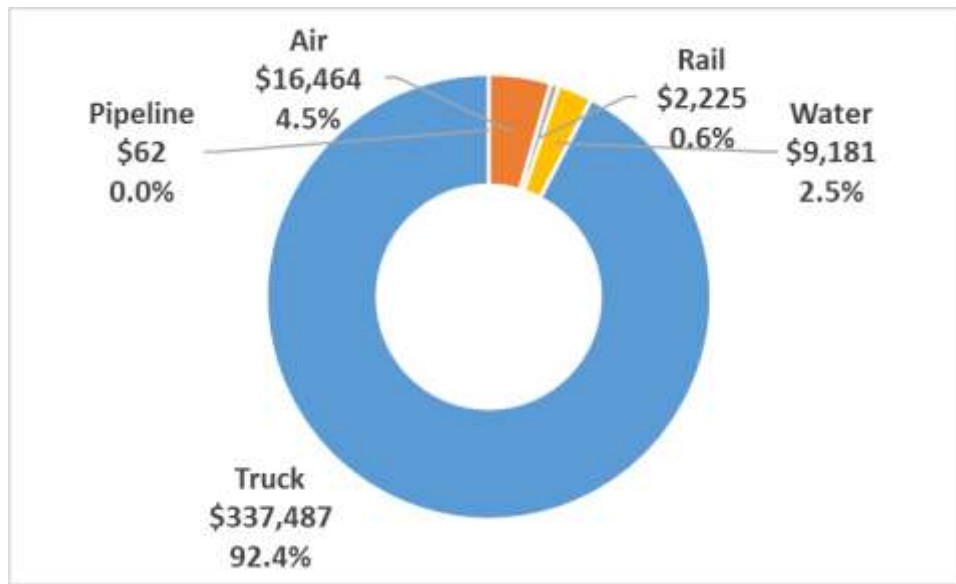
Understanding the how, where and how much of freight travel helps CTDOT target future improvements where they will produce the most public benefit.

Figure 7.1: Mode Share of Freight Moved in Connecticut by Tonnage (Millions), 2014



Source: IHS-Transearch and CDM Smith

Figure 7.2: Mode Share of Freight Moved in Connecticut by Value (\$Millions), 2014



Source: IHS-Transearch and CDM Smith

7.1.1 Freight Flow by Direction

Slightly less than half (44.4 percent by weight) of all freight that moves in Connecticut passes through the state, that is, it is neither originating from or destined to a location in Connecticut. Interstate freight traffic is a fact for all states, however, as a gateway state Connecticut experiences a relatively high proportion of through traffic. (Figure 7.3) Nearly all freight through traffic travels on Connecticut’s highway system (99.9 percent). In effect, the highway freight system in Connecticut serves the economies of its neighbors, New York and Massachusetts, as well as its own.

Figure 7.3: Connecticut Freight Moved by Direction, Tons (Millions) and Value (\$Millions), 2014

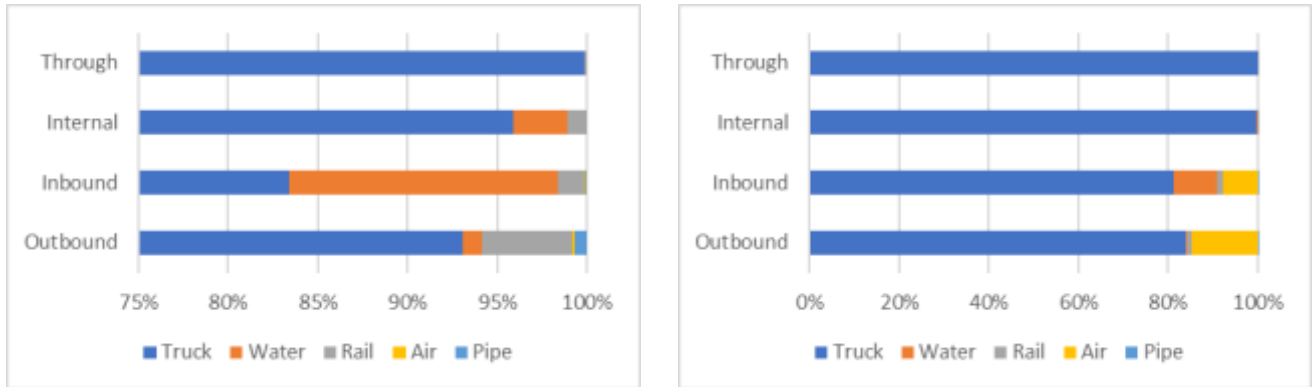


Source: IHS-Transearch and CDM Smith

Connecticut is a net importer (of commodity goods, highlighting the state’s transformation to a service-based economy that consumes more physical goods than is exported. Over 27.5 percent of total freight flows are inbound, compared to 11.0 percent by weight outbound.

Figure 7.4 presents the distribution of freight flows by direction in Connecticut. As the charts show, the shares of inbound, outbound, internal and through travel by value and by tonnage are very similar, with through travel leading, followed by inbound, outbound and internal travel.

Figure 7.4: Connecticut Freight Moved by Direction and Mode (Percentage by Weight on Left, Value on Right), 2014



Source: IHS-Transearch and CDM Smith

From a statewide perspective, most freight moves by truck in Connecticut. However, the water, air and rail systems carry significant amounts of freight either outbound or inbound and are well suited for moving particular commodities. **Figure 7.4** shows that:

- Waterborne transportation moves 15.0 percent of all inbound freight by weight, 70 percent of which is composed of petroleum products such as fuel oil.
- By weight, rail accounts for about 5 percent of outbound shipments, over 65 percent of which is low value, high weight cargo such as Waste or Scrap Materials and Non-metallic Minerals.
- By value, air shipments account for 7.5 percent of freight shipped out of Connecticut. These shipments correspond to low weight, high value small package shipments as well as electronic equipment and other high value manufactured goods.

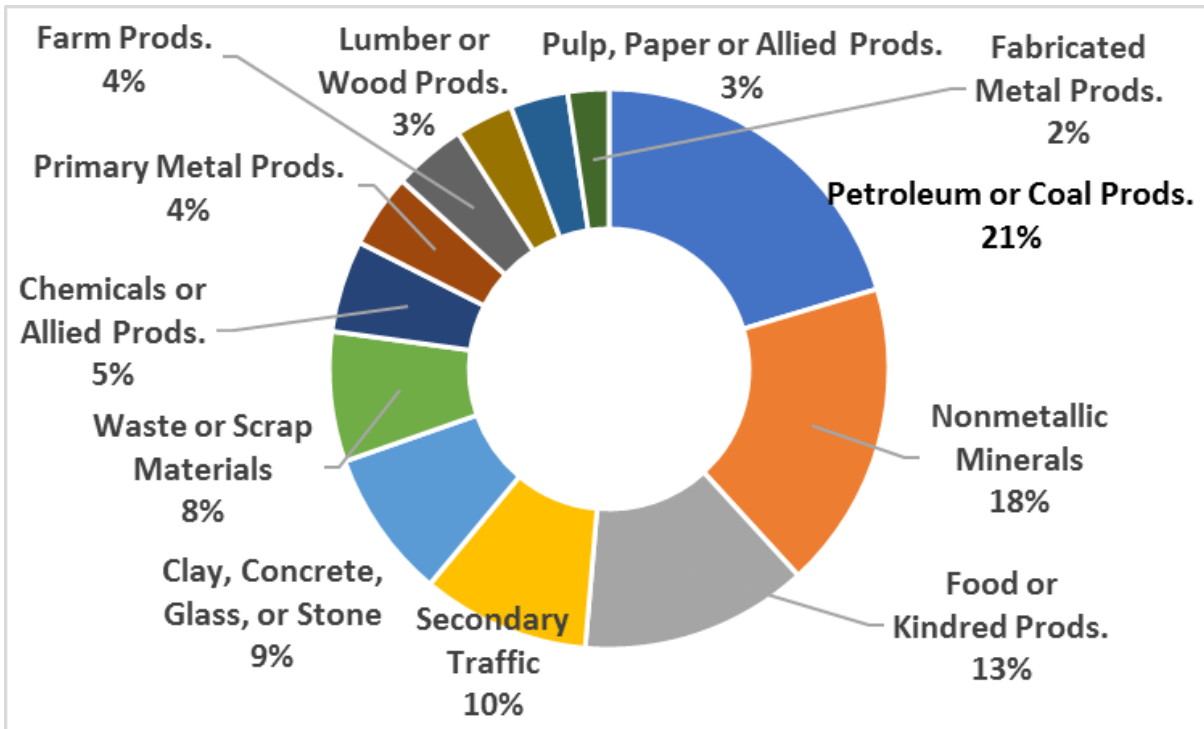
What do some of these commodity names mean?

Secondary traffic means freight movements from distribution centers or warehouses to consuming points like retail stores.

Carbon, rock salt and sulfur are examples of non-metallic minerals. Their average value is \$10/ton in Connecticut

The commodity categories that travel in Connecticut are dominated by heavy goods such as Petroleum Products (21 percent), Food and Kindred Products (13 percent) and Nonmetallic Minerals (18 percent). Several of the top 10 commodities are often shipped relatively short distances, and their use in construction of buildings and infrastructure around the state makes their transport important to the state economy. Petroleum and Coal products are important in the state as the transportation equipment and residential heating users of these products sustain inbound demand. Waste and scrap commodities are usually produced as a byproduct of manufacturing or just from the end-of-life of commodities. **Figure 7.5** presents the top 10 commodities that travel in Connecticut, by weight. The top 10 accounts for 88.6 percent of all commodities.

Figure 7.5: Connecticut Top 10 Commodities (Percentage by Weight), 2014



Source: IHS-Transearch and CDM Smith

Secondary traffic refers to freight movements from distribution centers or warehouses to consuming points like retail stores.

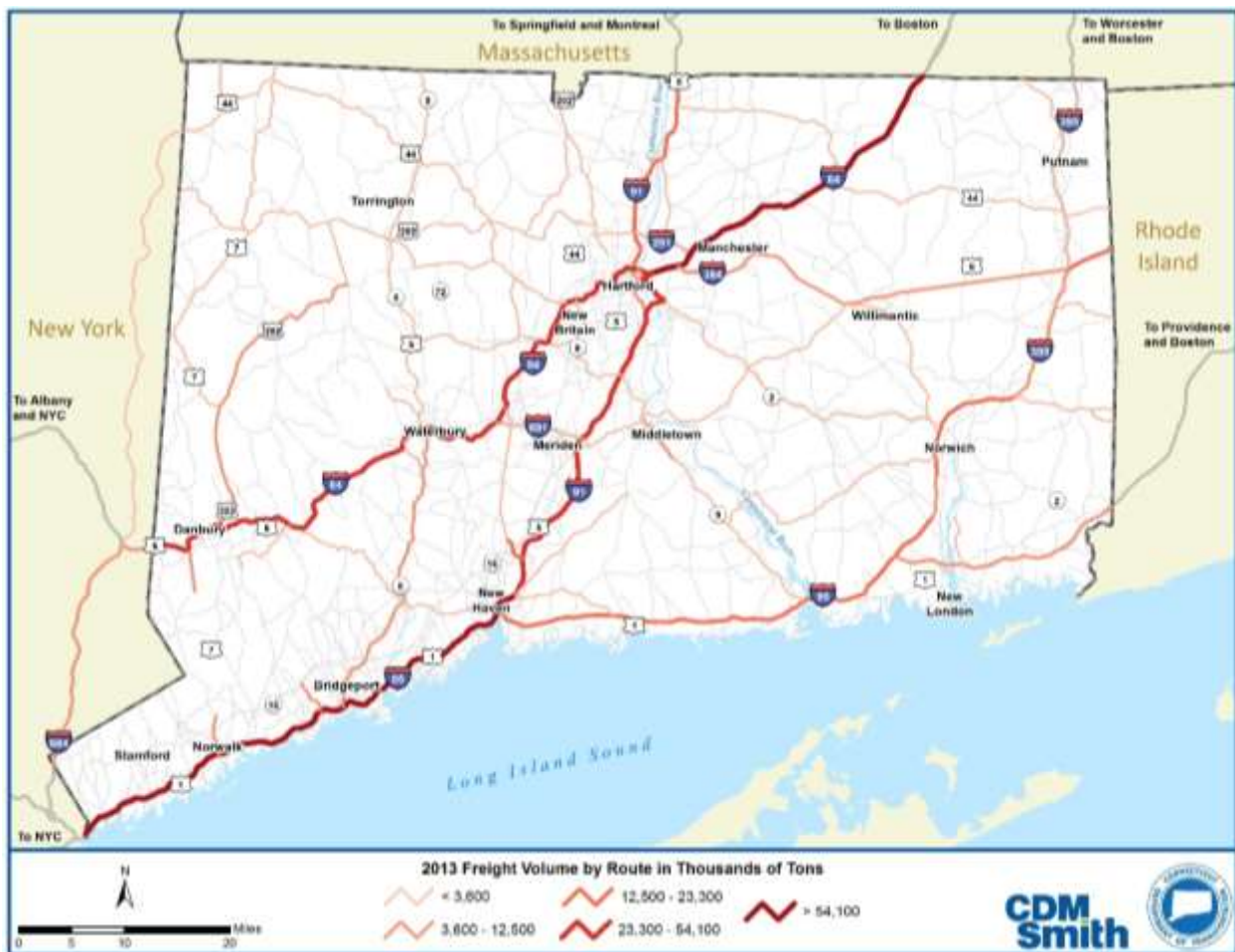
7.2 TRUCKING

In 2014 12.7 million truck units carried 198.7 million tons of freight, valued at \$337.5 billion. On average, total truck commodity movements are valued at \$1,698/ton. Truck movements represent 93.7 percent of modal tonnage in Connecticut and 92.4 percent of total modal value in 2014, by far the largest relative share. Through travel accounts for over 60 percent of all freight-related truck vehicle miles traveled (VMT) in Connecticut, and less than 10 percent of the truck freight travel is produced by local freight movements.

Freight-carrying trucks account for 10-15 percent of all vehicles on Connecticut's most heavily traveled roads. I-95 from New York to New Haven, I-91 from New Haven to Hartford and I-84 from New York to Massachusetts carry the highest volumes of trucks in the state, whether by tonnage or by value.

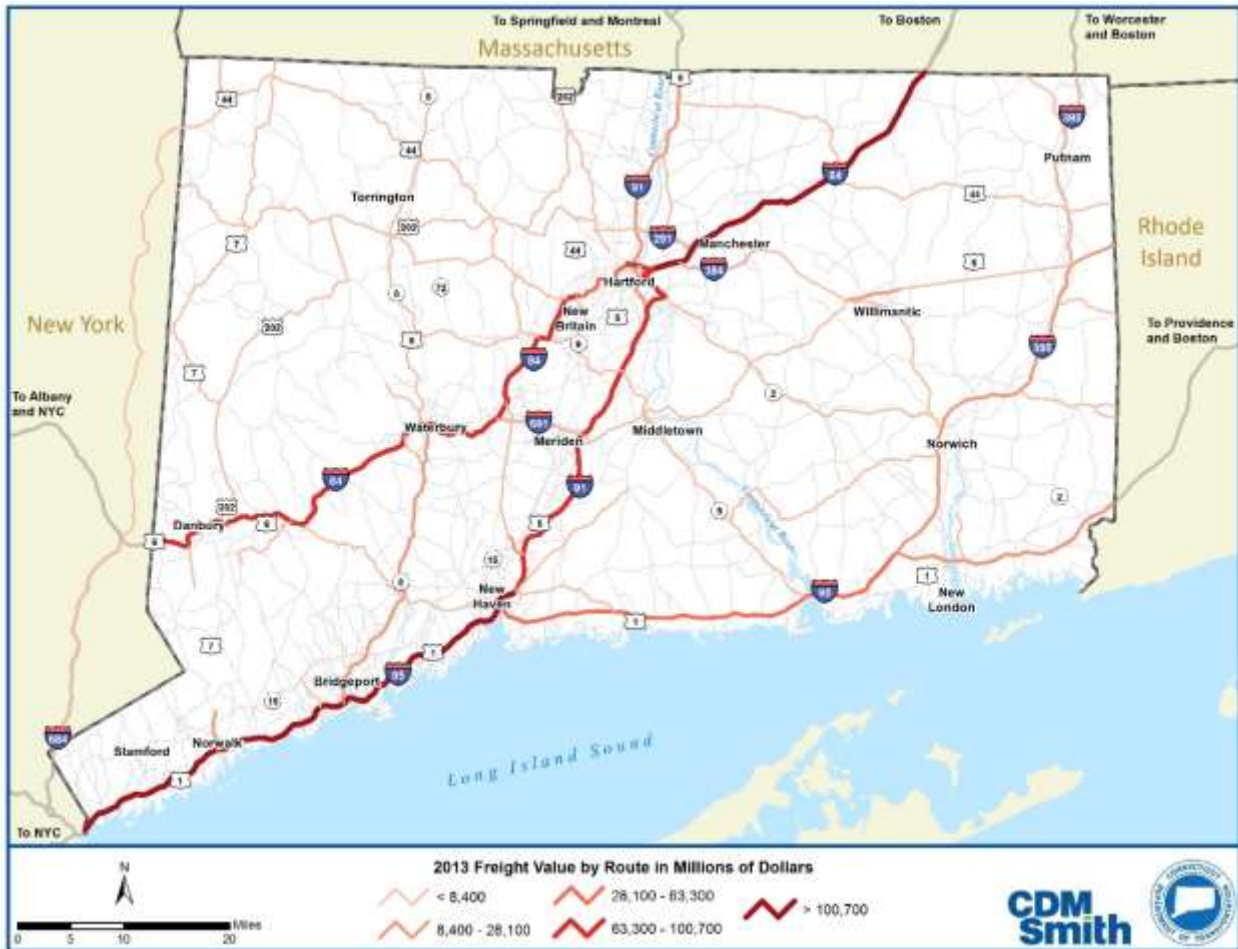
Figure 7.6 and **Figure 7.7** present truck freight volumes by tonnage and value, respectively.

Figure 7.6: Connecticut Freight Volume Moved by Truck by Route, 2014



Source: CDM Smith and IHS-Transearch data

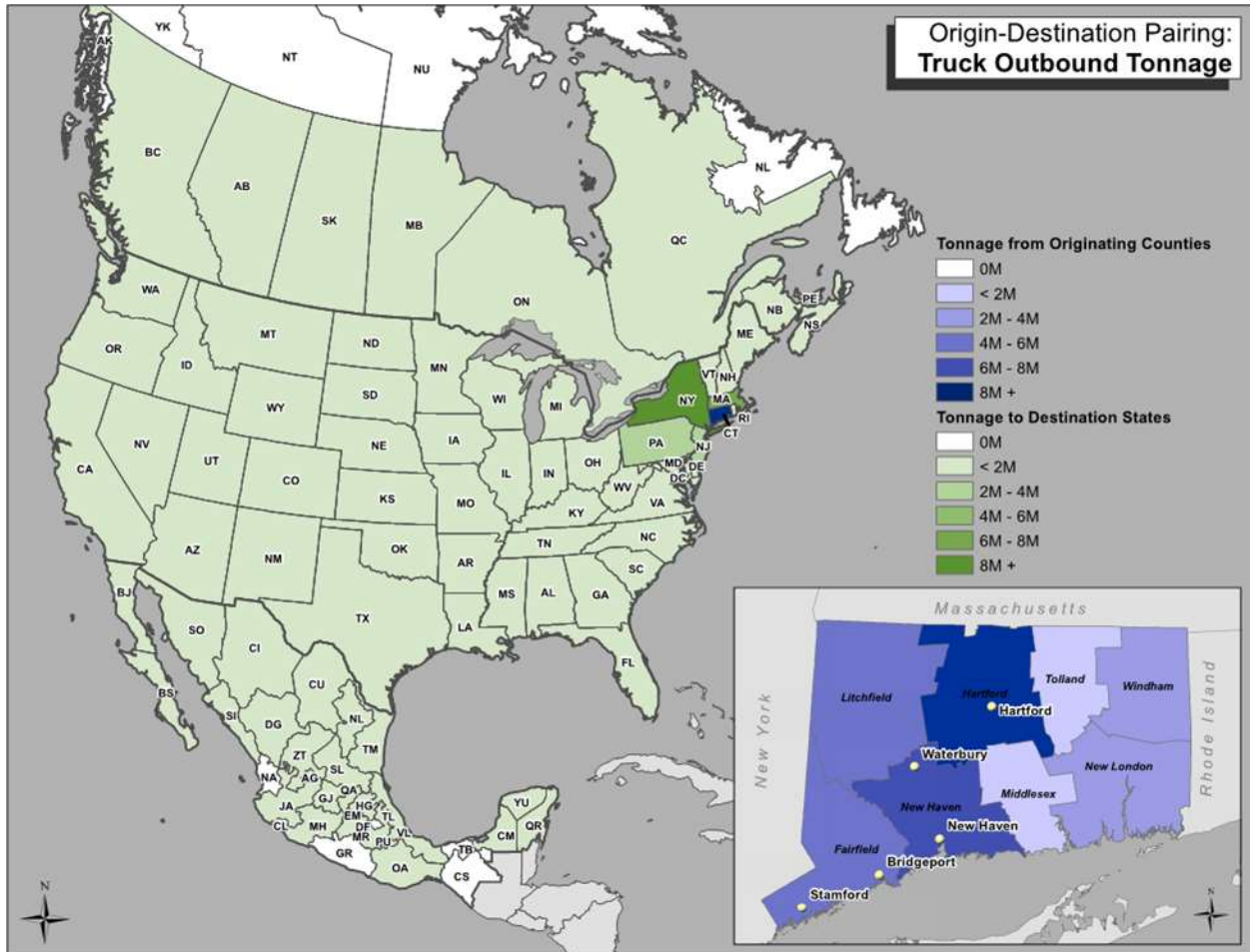
Figure 7.7: Connecticut Freight Value Moved by Truck by Route, 2014



7.2.1 Truck Flows From, To and Within Connecticut

Major outbound truck tonnages in 2014 are shown by county origin in **Figure 7.8**. Truck movements destined for out-of-state travel from Hartford County (8.5 million, 25.4 percent), New Haven County (7.0 million, 20.9 percent), and Fairfield County (6.0 million, 17.8 percent). Nearly 2/3 of the out-of-state shipments are destined for a neighbor state. The major destinations of outbound freight are New York (10.2 million, 30.3%), Massachusetts (7.8 million, 23.3%), and New Jersey (3.5 million, 10.4%).

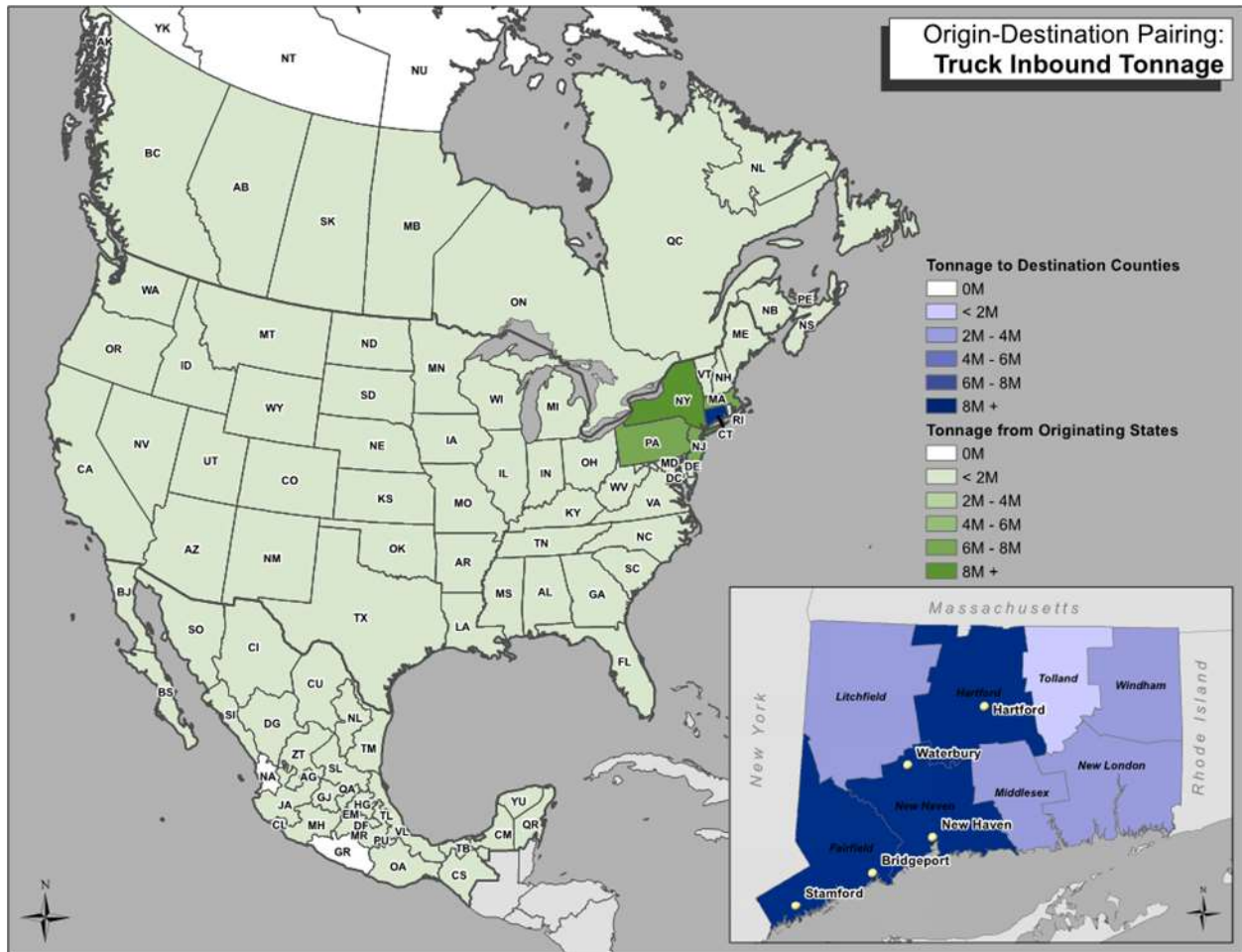
Figure 7.8: Top Outbound Truck Shipments by Tonnage (with county of origin), 2014



Source: CDM Smith and IHS-Transearch data

Major inbound truck tonnages in 2014 are shown by state origin in **Figure 7.9**. Over half of all truck movements originate from a nearby state: New York (11.2 million, 23.0%), Massachusetts (7.7 million, 15.9%), and New Jersey (6.5 million, 13.4%). The primary destinations of inbound truck shipments are Hartford County (14.0 million, 28.8%), Fairfield County (11.7 million, 24.0%), and New Haven County (10.5 million, 21.6%).

Figure 7.9: Top Inbound Truck Shipments by Tonnage (with county of destination), 2014



Source: CDM Smith and IHS-Transearch data

7.2.2 Truck Freight Types and Distances Travelled

Connecticut is part of a dense, compact region in close proximity to major transfer points for water-borne traffic and rail traffic. Connecticut is part of a multimodal network in which a significant proportion of truck freight moves goods for the last leg of a multimodal trip.

There is currently a substantial amount of containerized cargo that is destined for, or originates in, Connecticut. Virtually all international containerized cargo enters or departs through non-Connecticut ports, with the Port of New York and New Jersey handling most of it. These containers are then moved to and from Connecticut by truck, for the most part utilizing the I-95 corridor.

For the top two types of truck trips in Connecticut, Truckload and Private trucking, the greatest number of trips is in the 101-to-200-mile length category. The largest number of Less-Than-Truckload (LTL) truck trips is in the 500-and-over miles length category, reflecting the smaller shipment size services provided by the LTL motor carriers.

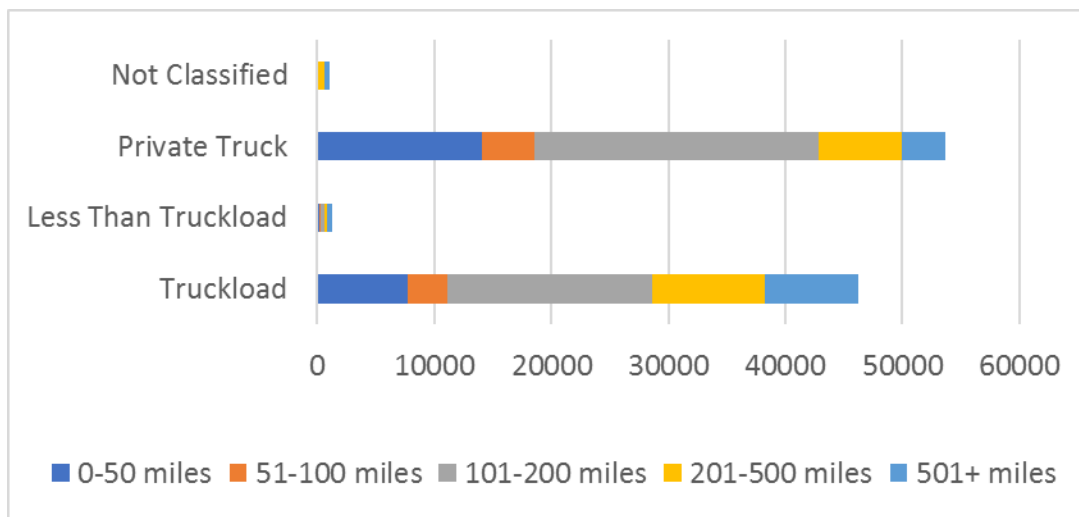
Connecticut-serving truck freight travels relatively short distances, indicating that nearby origins and destinations such as warehouse and distribution centers, retail centers, ports and airports serve a large proportion of commodity needs. Approximately 70 percent of all Connecticut-serving truck trips (excluding through travel) are within a four-hour drive of the state. **Figure 7.10** shows the distribution of truck travel by distance category for Connecticut truck freight movements, by truck delivery category.

Container Traffic

Containers have standardized dimensions. They can be loaded and unloaded, stacked, transported efficiently over long distances, and transferred from one mode of transport to another without being opened. The handling system is completely mechanized.

Source: U.S. Bureau of Transportation Statistics

Figure 7.10: Distribution of Connecticut Truck Freight Travel by Distance, 2014 (Trips, excluding through travel)



Source: CDM Smith and IHS-Transearch data

7.2.3 Commodities Carried by Truck

Figure 7.11 and **Figure 7.12** present the top commodities delivered by truck in 2014. Collectively, consumer goods transferred from warehouses or other transfer points (Secondary Traffic), fuel, commodities used in construction and manufacturing (Clay, Concrete, Glass or Stone and Non-metallic minerals) and food goods accounted for 71 percent of all goods shipped by truck

In terms of value, the top commodities shipped in 2014 are Secondary Traffic, Electrical Equipment, Chemicals and Food Products (**Figure 7.12**). These five commodities accounted for 48 percent of all goods shipped by value in 2014.

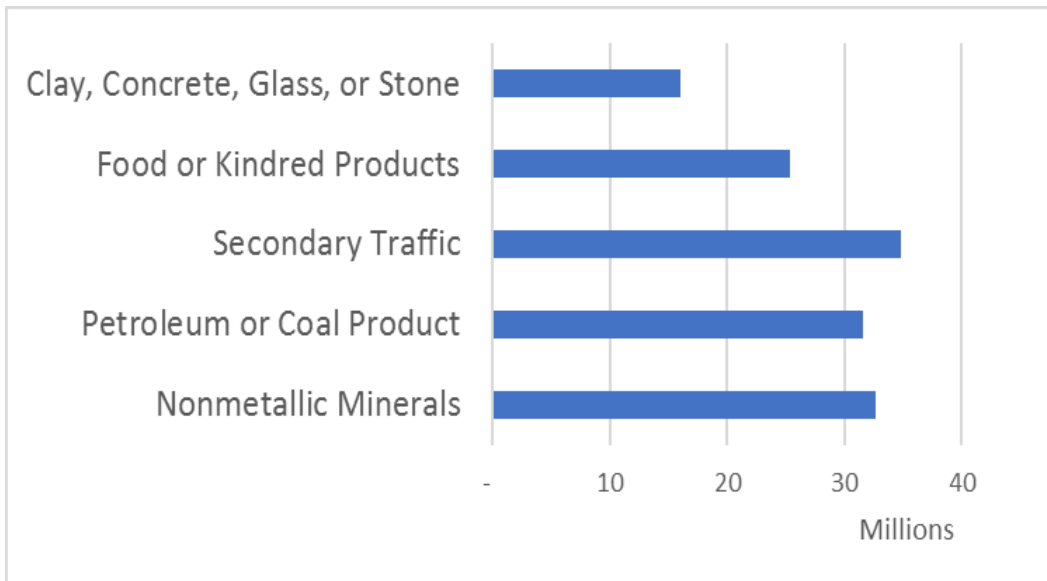
Truck Freight Categories

Truckload: A single trailer or container that encounters multiple forms of transportation along its route, such as truck/ship/rail.

Less than truckload (LTL): A driver or carrier with many types of cargo and many different destinations. Generally, involves the use of terminal facilities to break and consolidate shipments. A LTL driver normally has a dedicated or regional route.

Source: US Bureau of Transportation Services

Figure 7.11: Tonnage of Top Five Commodities Shipped by Truck, 2014



Source: CDM Smith and IHS-Transearch data

Figure 7.12: Value of Top Five Commodities Shipped by Truck 2014

Source: CDM Smith and IHS-Transearch data

7.2.4 Forecast Truck Freight Demand

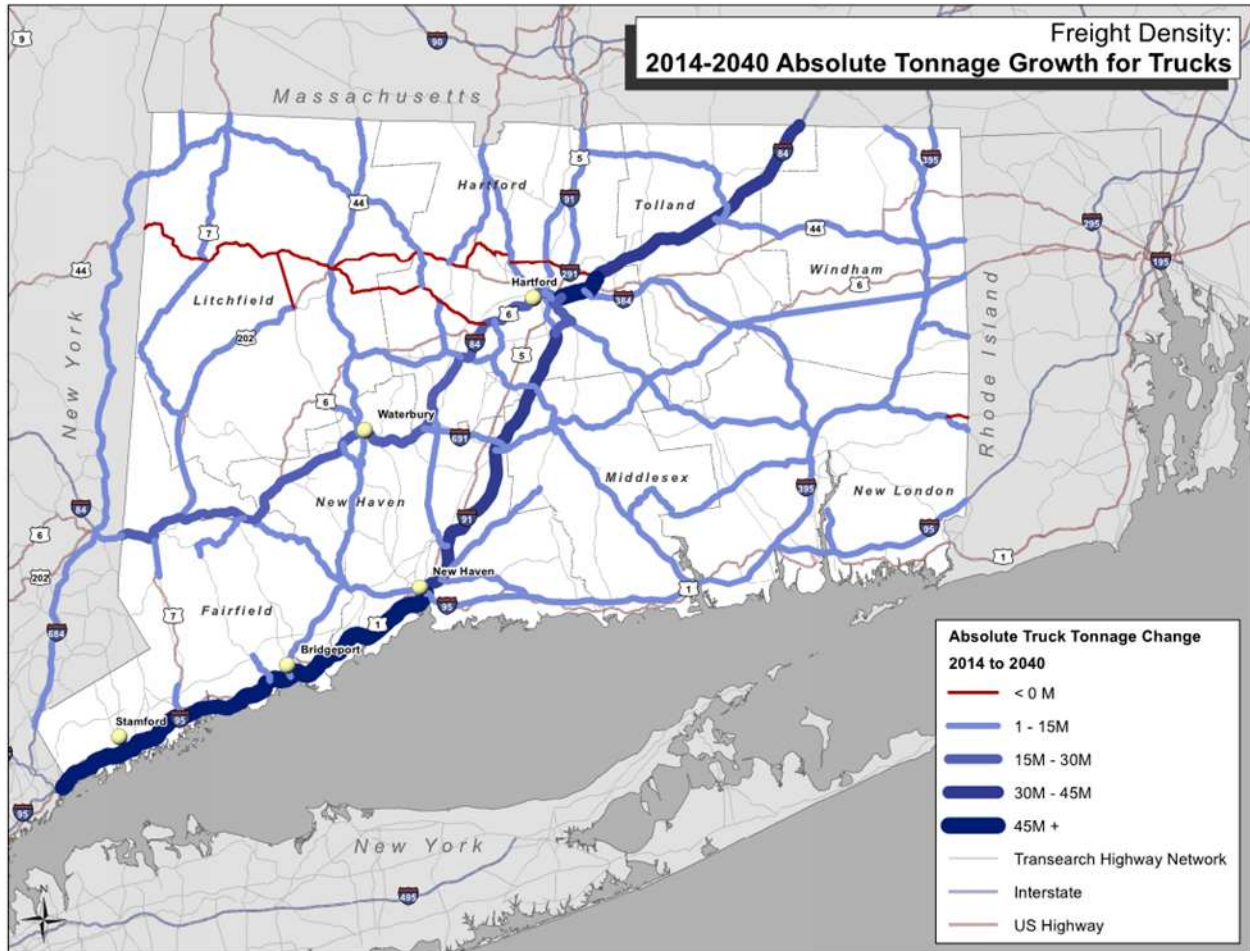
Truck tonnage is forecast to increase from 198.7 million in 2014 to 315.4 million in 2040, an increase of 58.7 percent (1.8 percent annually). Truck commodity value is forecast to increase from \$337.5 billion in 2014 to \$681.1 billion by 2040, an increase of 101.8 percent (2.7 percent annually). The most heavily traveled truck routes today will absorb the most growth, according to forecasts, meaning I-95 from New York City to New Haven, along I-91 from New Haven to Harford, and from Harford to the Massachusetts border along I-84 (see **Figure 7.13**). In percentage terms, the growth is more dispersed throughout Connecticut, with many secondary routes exhibiting a greater percentage growth than the primary interstate corridors.

Total truck freight-related vehicle miles traveled (VMT) is expected to increase by 88 percent from 2009 to 2040. Through freight is projected to account for the largest share of the forecasted increase in Connecticut's freight truck travel, which is expected to increase by 103 percent.²⁸

Year 2040 truck travel forecasts are mapped in **Figure 7.13**. Consistent with current patterns, future truck freight flows are forecast to be concentrated on the Interstate System, with the highest flows occurring between Connecticut and New York, and Connecticut and Massachusetts.

²⁸ Development of a Strategic Plan for Reducing Emissions Associated with Freight Movement, Connecticut Department of Energy and Environmental Protection, July 2011

Figure 7.13: Connecticut Truck Freight Tonnage Growth, 2014-2040



Source: CDM Smith and IHS-Transearch data

7.2.5 Major Truck Freight Generators

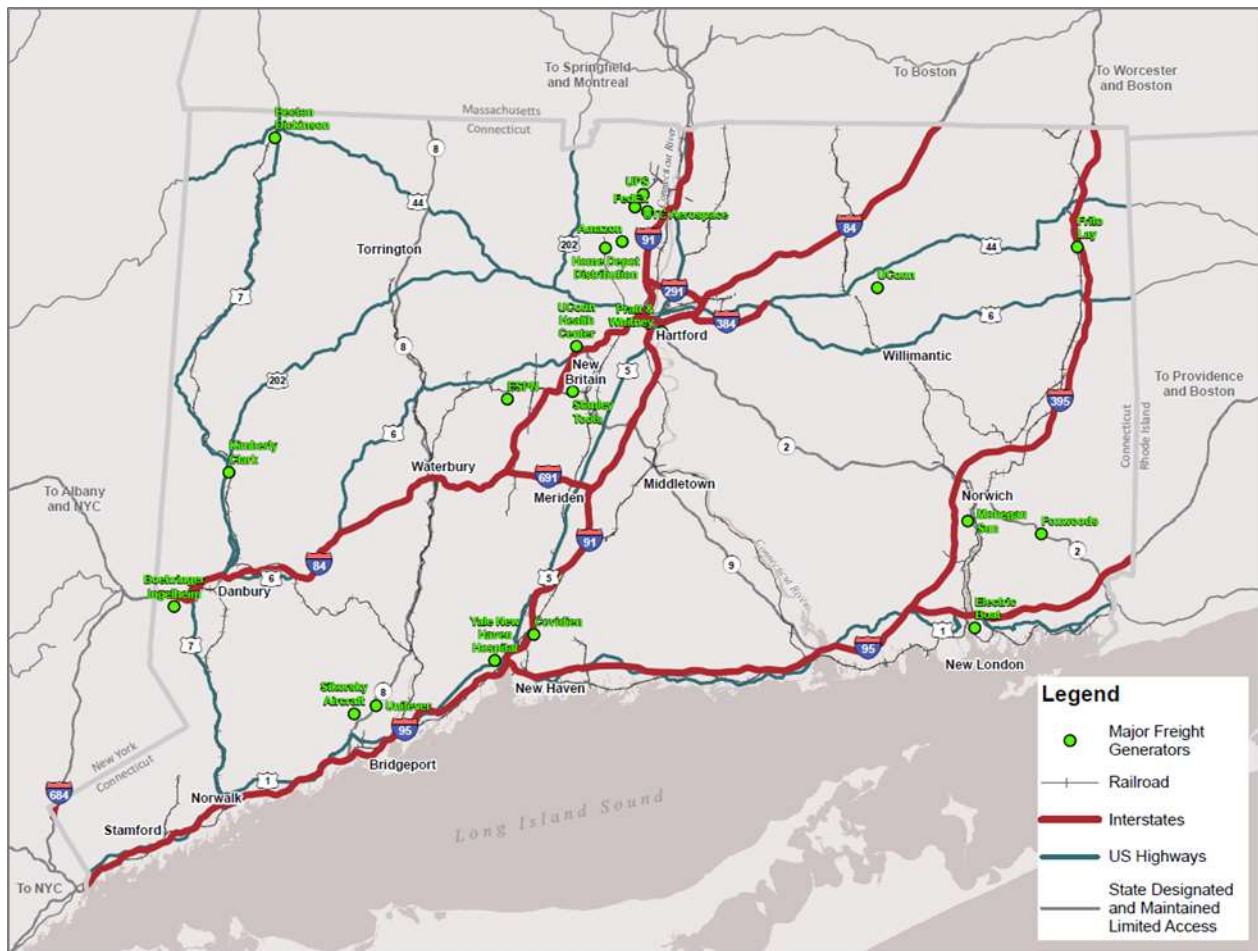
Thousands of retail shops, warehouses and manufacturing plants throughout Connecticut ship and receive goods delivered by truck every day. Several dozens of these generate significant volumes of truck traffic, due to the freight-intensive nature of the business or the sheer size of the establishment, or a combination of the two. Connecticut's major truck freight generators impact regional and local freight operations, and produce traffic impacts on local intersections, freeway ramps and mainline facilities. In understanding these businesses and their locations, CTDOT can learn more about their transportation needs and their impact on the local and regional transportation systems.

Truck Freight Generators

CTDOT used in-house knowledge and employment databases to develop this first-ever compilation of truck freight generators. CTDOT will continue to expand and refine this database, as a shared resource with MPO partners.

Figure 7.14 presents the locations of the major freight generators. For the most part, the generators lie along the state's major travel corridors.

Figure 7.14: Location of Major Truck Freight Generators



Source: CTDOT, 2017

7.3 FREIGHT RAIL

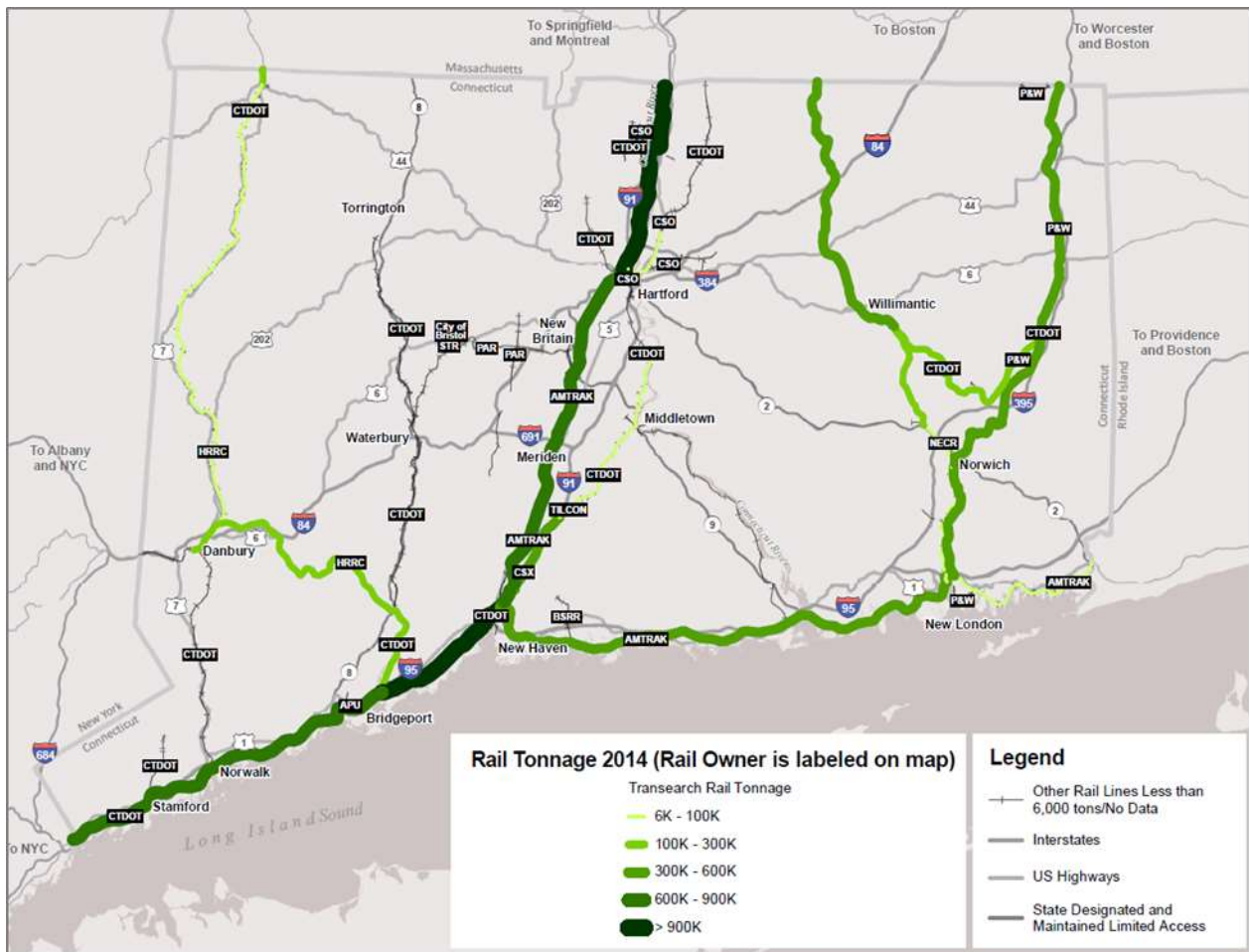
There are eight railroad companies in Connecticut that carry freight either through leasing agreements or through operations on their owned infrastructure and equipment. The rail freight system in Connecticut is largely owned by the private sector, but significant portions of it are owned by AMTRAK (Amtrak, or the National Railroad Passenger Corporation, is partially government funded yet operated and managed as a for-profit corporation) and CTDOT.

7.3.1 Existing Rail Freight Demand

In 2014, rail freight moved 3.1 million tons of goods, valued at \$2.2 billion, carried by 32,619 units. On average, total rail commodity movements are valued at \$724/ton. Rail movements represented 1.5 percent or modal tonnage in Connecticut and 0.6 percent of total modal value in 2014.

Major rail freight corridors include routes served by the major rail operators (Class I carriers), as seen in **Figure 7.15**. The densest rail traffic routes parallel the truck routes: between New York City and New Haven along the Metro-North Commuter Railroad-owned track (MNCW) along I-95, and from New Haven up through Hartford and beyond along the Amtrak-owned track (AMTK) parallel to I-91.

Figure 7.15: Connecticut Freight Rail Tonnage, 2014



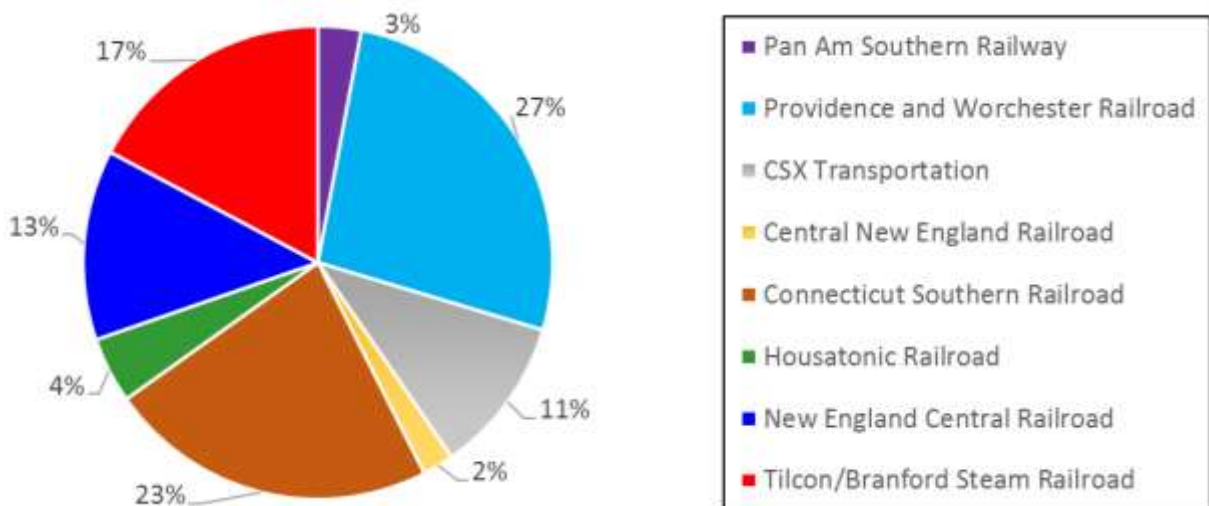
Source: CDM Smith and IHS-Transearch data

Freight rail accounts for less than two percent of all Connecticut goods movement. The factors contributing to this level of usage include:

- The location of rail freight routes and intermodal terminals in adjacent states. Major container ports and rail yards are in New York, northeastern New Jersey and Massachusetts.
- The weakening of Connecticut's industrial base and tightening of the product stream. This results in changes to the way goods are manufactured, shipped, and received.
- Class I rail service is limited to portions of southwest Connecticut.
- The nearest freight rail crossing of the Hudson River connecting southwest Connecticut with New York is 140 miles north of New York City at Selkirk, New York. Freight rail that passes through Selkirk must enter or leave Connecticut through Massachusetts.
- The increase in the use of just-in-time delivery reduces the amount of supplies needed to be kept on hand, limiting the amount of inventory and warehousing needed.

Significant tonnage is moved each year by several freight railroads that serve Connecticut. **Figure 7.16** illustrates the shares of freight tonnage moved in 2014. These freight railroads are connected to the North American rail network. CSX Transportation handles most of the long-haul rail freight traffic into and out of Connecticut. It uses a freight hub at a large rail yard in Selkirk, New York, near Albany. Trains from across the country are routed direct to Selkirk, much like the hub-and-spoke concept utilized by airlines and FedEx. From Selkirk, large blocks of railcars are sent to direct connections with Connecticut short line and regional railroads in Massachusetts.

Figure 7.16: Rail Freight Tonnage by Operator, 2014



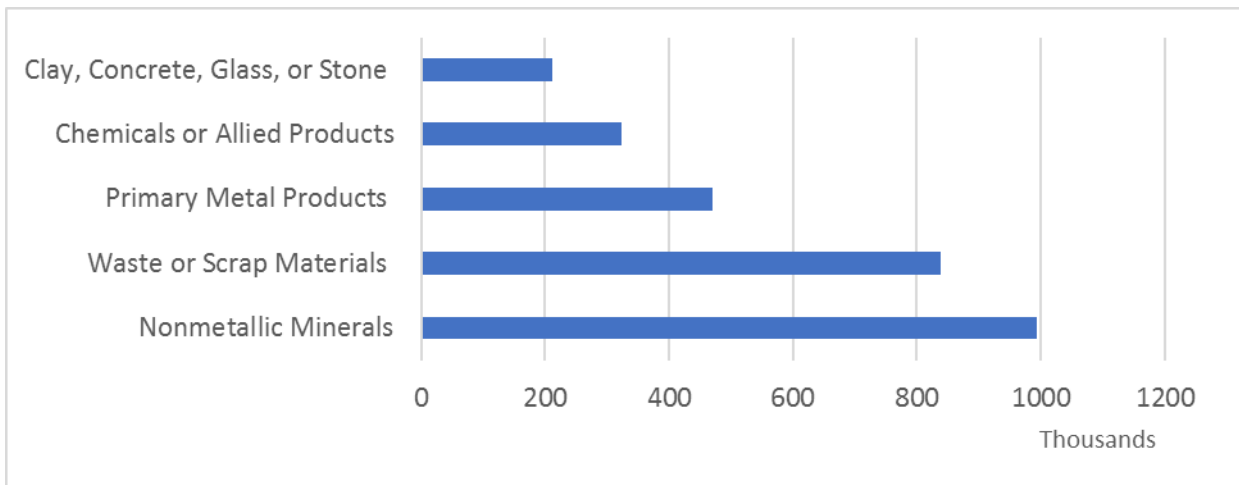
Source: CDM Smith and IHS-Transearch data

In addition, significant rail freight traffic from Atlantic Canada, the Midwest, Gulf Coast, and Pacific Coast enters Connecticut at Stafford Springs, over the New England Central Railroad. High-value chemical and plastic pellet rail traffic that originates in the Gulf Coast region is routed to Chicago and Montreal, and then to a connection with the New England Central Railroad.

Connecticut’s freight rail system exports low value high weight commodities and imports higher value goods for construction and as inputs to manufacturing processes. In 2014, outbound rail accounted for nearly 60 percent of all rail freight movements, with a low value weight per ton of \$399. The major categories of freight rail traffic originating in the state include scrap metal and paper; crushed stone, gravel and sand; concrete and clay products; pulp and paper products; and chemicals. Inbound traffic accounted for 28 percent of the total by weight, but the inbound freight is more valuable: the average value per ton in 2014 was \$1,587. The major categories of freight rail traffic terminating in Connecticut include crushed stone, gravel and sand; primary metal products; grain and food products; lumber and wood products; pulp and paper products; chemicals; and petroleum and coal products.

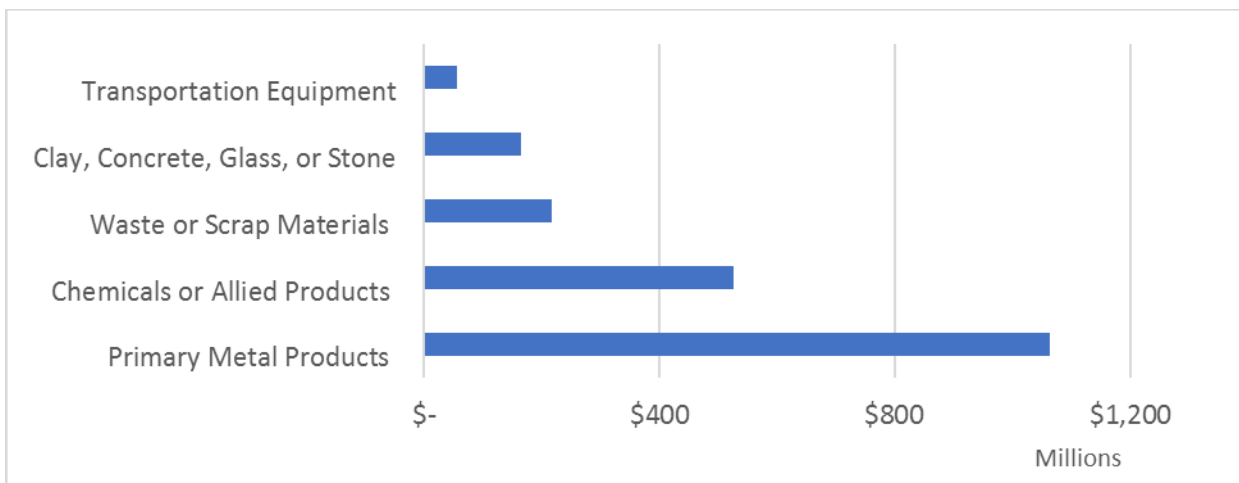
The top five commodities by tonnage and value are shown in **Figure 7.17** and **Figure 7.18**. Nonmetallic minerals, the top commodity by weight, accounts for over 37 percent of all outbound shipments but its value is only \$10 per ton. Primary Metal Products is the top commodity by value (\$2,268 per ton) and accounts for over 54 percent of all inbound shipments, by value.

Figure 7.17: Top Five Commodities Shipped by Rail by Tonnage (Thousands), 2014



Source: CDM Smith and IHS-Transearch data

Figure 7.18: Top Five Commodities Shipped by Rail by Value (\$ Millions), 2014

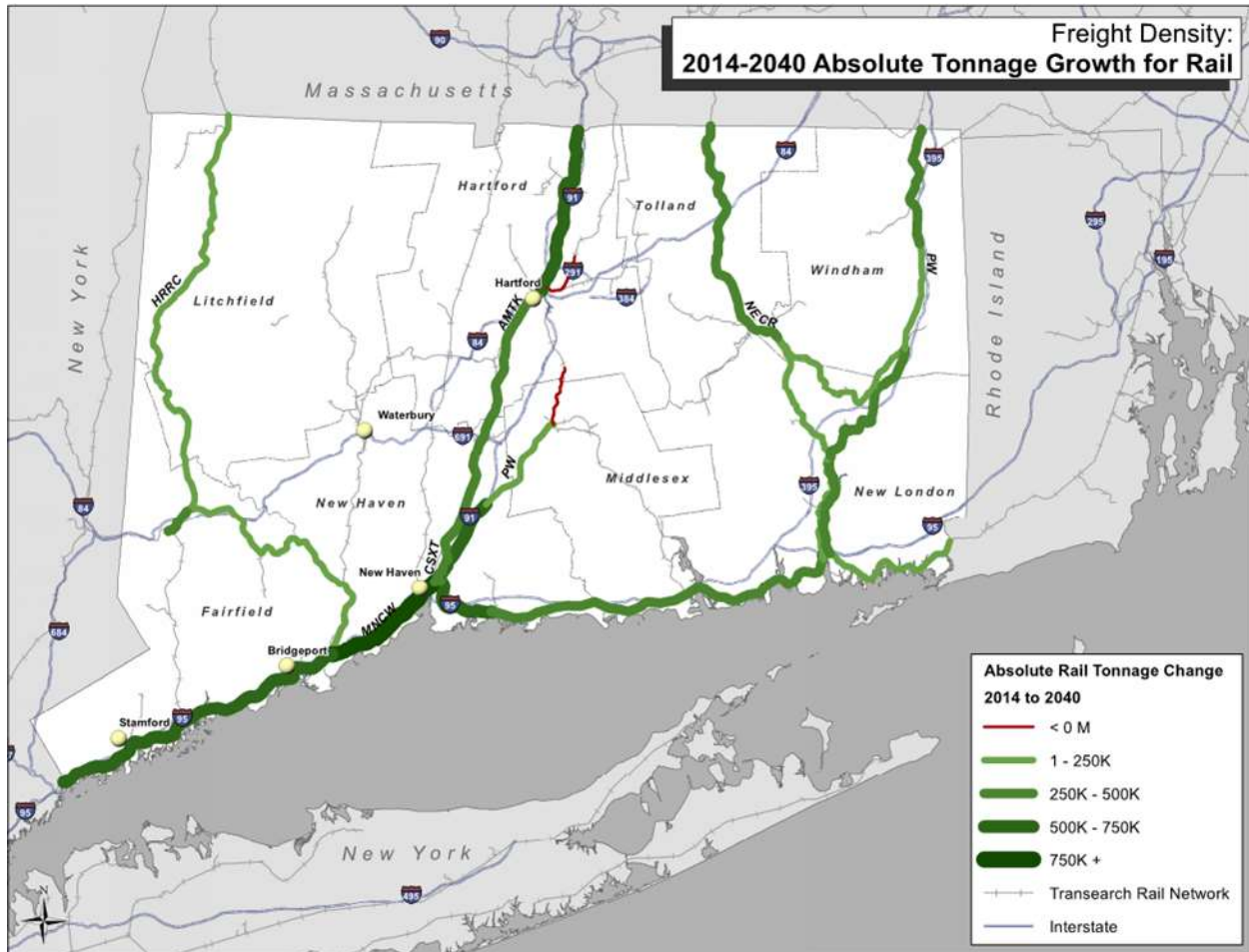


Source: CDM Smith and IHS-Transearch data

7.3.2 Forecast Rail Freight Demand

Rail tonnage is forecast to increase from 3.1 million in 2014 to 5.5 million in 2040, an increase of 78.3 percent (2.2 percent annually). Rail commodity value is forecast to increase from \$2.2 billion in 2014 to \$3.4 billion by 2040, or 54.7 percent (1.7 percent annually). Rail freight growth is projected to occur on the rail-equivalent corridors of the most heavily traveled truck routes, generally following I-95 and I-91. In percentage terms, the largest growth in rail traffic is projected for the southeastern portion of the state (Figure 7.19).

Figure 7.19: Forecast of Truck Freight Growth (by tonnage), 2014-2040



Source: CDM Smith and IHS-Transearch data

7.4 WATER TRANSPORTATION

In 2012, the Connecticut Office of Policy Management released the results of a year-long study on the state's three deep water ports. Connecticut's Deep-Water Port Strategy Study provides a market analysis and identification of infrastructure investments to assist the state in developing and implementing a long-term strategy for economic development

Port Forecasts

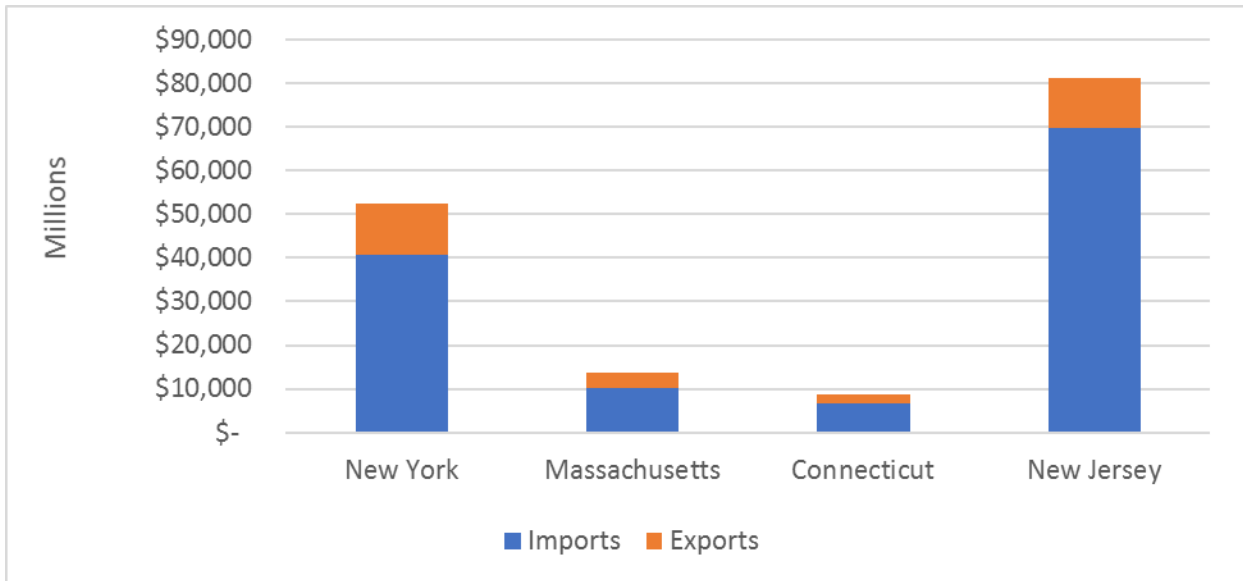
The IHS-Transearch port flow data is limited in explaining international imports and exports. CTDOT used a different database (U.S. Census waterborne statistics) for existing port flows, but used IHS Transearch to provide an indication of 2014-2040 growth.

of the ports. The study acknowledges that the decline in goods movement through Connecticut's ports can be attributed to the evolving economies of scale supply chain in the U.S., the ports' geographic locations, and changes in Connecticut's industries.

According to the study, there are four key characteristics of a successful container port:

- Ready access to major metropolitan consumer markets—largely served by trucks and local warehousing;
- Adequate waterside and landside capacity to accommodate ever-larger ships (e.g. dredging, berthing and cranes), longer trains (e.g. on-dock and near-dock rail facilities) and larger volumes of heavier trucks (e.g. dedicated truck ramps and sophisticated gate and security control systems);
- Adequate financial resources to build, maintain, and constantly enhance waterside, landside and offsite transportation capacity, and
- Adequate institutional capacity to provide a stable and adaptable investment climate for both public and private investors.

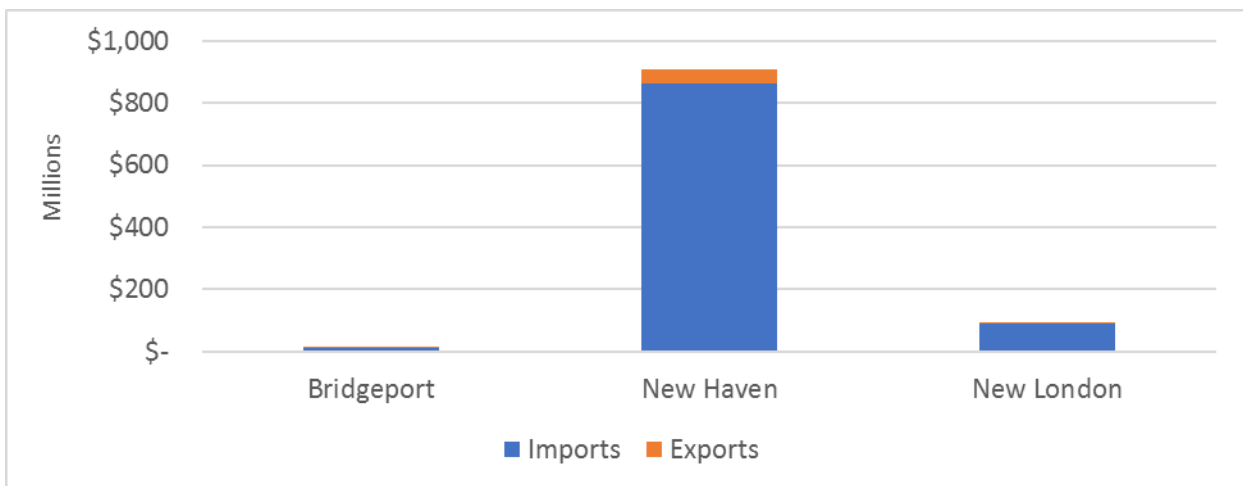
The State of Connecticut has established a port authority and current planning initiatives indicate a desire for additional port development. Connecticut's ports are capable of serving some local demand but are challenged to capture a significant share of regional demand, given the established presence of significant port operations in New York and Massachusetts. As shown in **Figure 7.20**, New York and New Jersey (mostly comprising activity at the Port of New York & New Jersey) dominate regional ocean-going trade with more than \$130 billion worth of cargo moved in 2016. Connecticut, ranked 36th by port trade value, conducted trade worth \$8.7 billion in 2016. Imports accounted for 78 percent of the total.

Figure 7.20: Value of Port Trade by State, 2016

Source: Bureau of the Census, USA Trade Online

7.4.1 Existing Port Demand

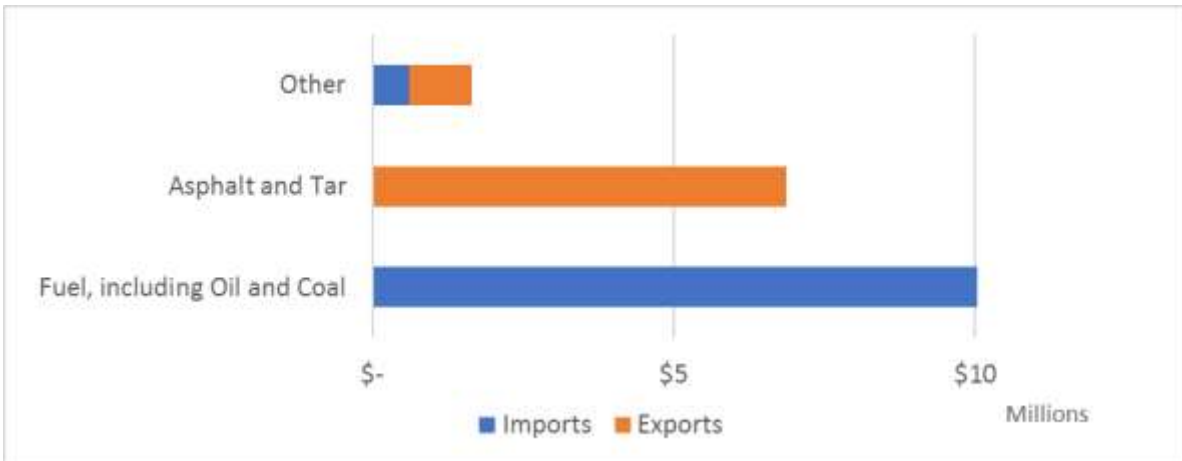
The value of port trade for Connecticut's three deep water ports is shown in **Figure 7.21**. The Port of New Haven is the dominant port in terms of total value and tonnage of domestic shipments.

Figure 7.21: Value of Trade by Connecticut Port, 2016

Source: Bureau of the Census, USA Trade Online

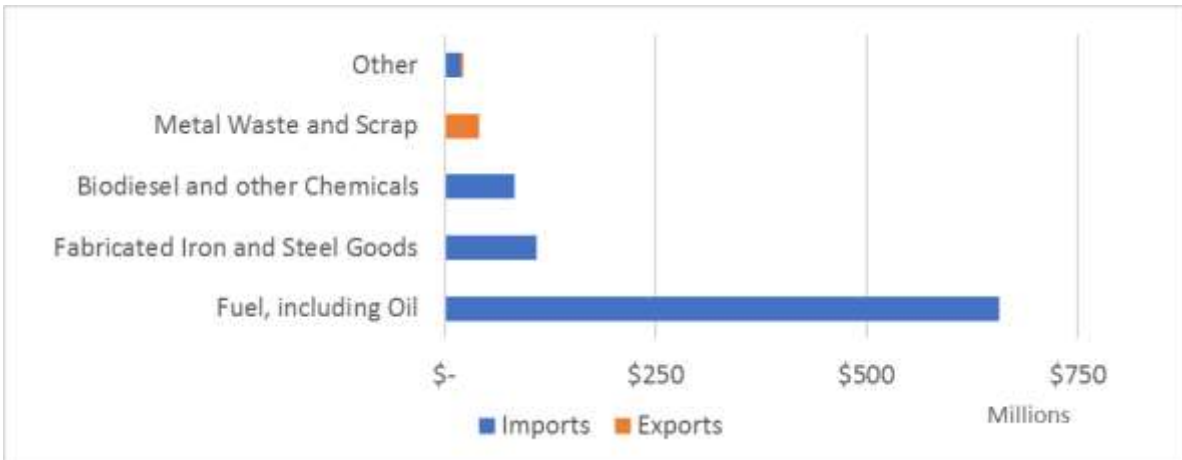
The value of Connecticut port imports and exports by major commodity is shown in **Figure 7.22**, **Figure 7.23** and **Figure 7.24**. Liquid bulk fuels and petroleum products comprise most of Connecticut's imports, and originate predominately from other New England ports. Export shipments are largely barge movements to the southern U.S. and Gulf coast region.

Figure 7.22: Commodities Shipped from and to Port of Bridgeport, by Value, 2016



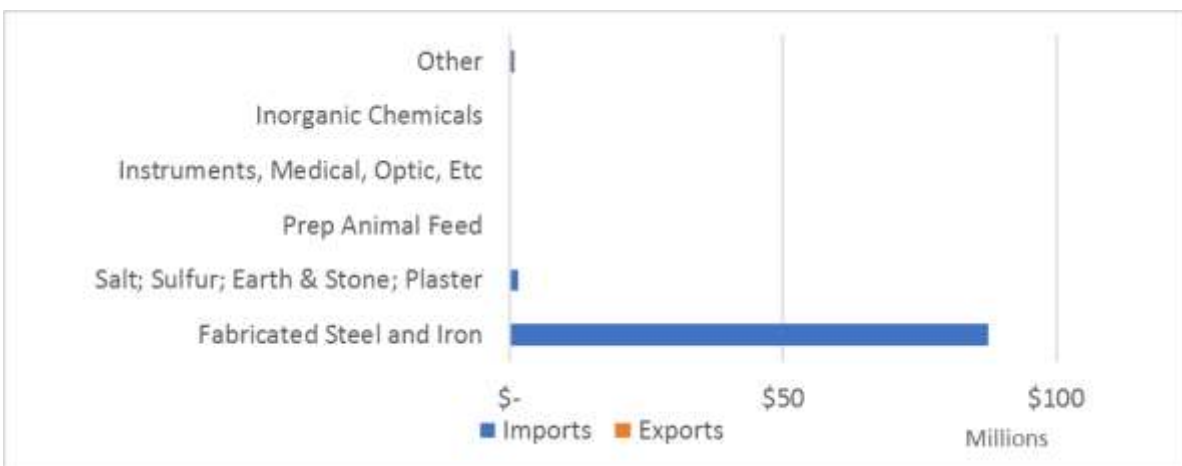
Source: Bureau of the Census, USA Trade Online

Figure 7.23: Commodities Shipped from and to Port of New Haven, by Value, 2016



Source: Bureau of the Census, USA Trade Online

Figure 7.24: Commodities Shipped from and to New London, by Value, 2016



Source: Bureau of the Census, USA Trade Online

Other significant imports in terms of value include salt (New Haven and New London), railway track (Bridgeport), and iron and steel (New London). Scrap metal is nearly the only waterborne export by value shipped out of New Haven. Biodiesel accounts for nearly 50 percent of the non-petroleum based fuel oil imports at New Haven. Bitumen, used in roofing and paving, is the dominant import at Bridgeport at 64 percent. New Haven's dominant import is fuel oil 74 percent and New London imports a variety of fabricated iron and steel products, which in total account for 97.4 percent of all New London imports by value.

Air Cargo

Bradley International Airport's ranking comes from Federal Aviation Administration data and pertains to all-cargo transport. It does not include cargo shipped in the "belly" of passenger jets.

7.4.2 Forecast Port Demand

Growth in port flows is forecast to be modest, due to the continued strong competitive position of the Port of New York and New Jersey and the relative inaccessibility of Connecticut's ports in the Long Island Sound. Between 2014 and 2040, cargo shipments are forecast to grow by 8.3 percent and 6.6 percent, by tonnage and value, respectively. The commodity mix (fuel, scrap metal, finished steel and metal goods, building materials, coal, optical and medical equipment) are forecast to be similar to the composition of cargo today.

7.5 FERRY OPERATIONS

Ferries are not a freight transportation mode per se, however, Bridgeport and New London ferry services transport more than half a million cars and trucks annually (CT Office of Policy and Management 2013). No figures are available about freight moved on the state's ferry system.

7.6 AIR CARGO

7.6.1 Current Air Cargo Demand

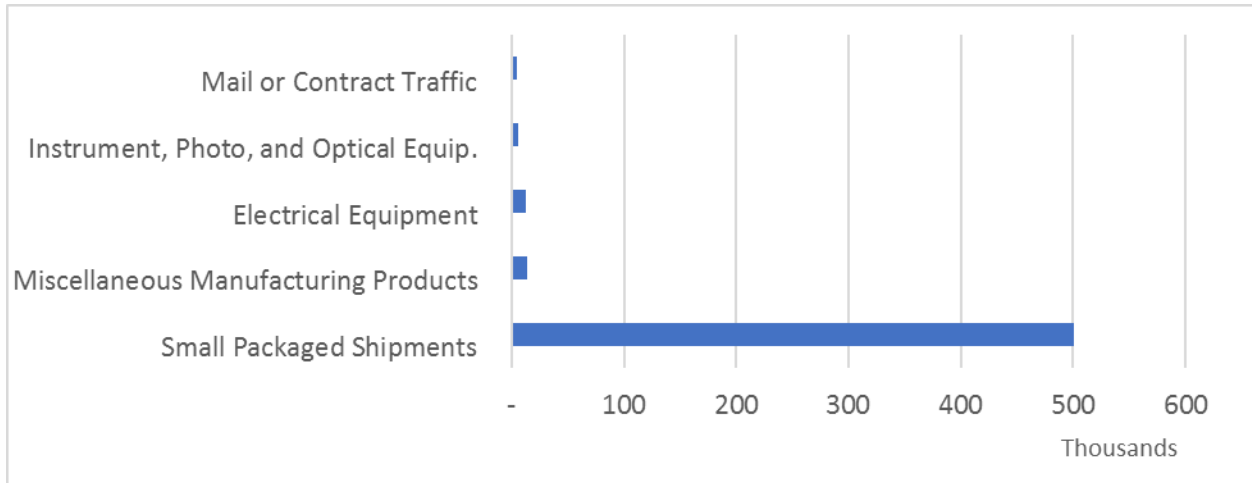
Connecticut air movements in 2014 totaled 115.8 thousand tons, valued at \$16.5 billion. Operations at Bradley International Airport account for nearly all-air cargo activity in the state. While air cargo accounts for a small fraction of total commodity flows in the state, the freight it does transport is high-value – averaging over \$142,000 per ton.

Connecticut air movements in 2014 represented less than 0.1 percent of modal tonnage, but because of the very high value/ton, air freight value represented 4.5 percent of total Connecticut freight value, second behind trucking. In 2016, Bradley International Airport ranked 33rd in all cargo transport tonnage, with 122,392 metric tons²⁹ of cargo transported.

As seen in **Figure 7.25** and **Figure 7.26**, the commodities shipped by air serve the higher-value consumer goods market, manufacturing processes and various technology needs including those of the medical industry. Small packaged goods by far accounted for the majority of 2014 air freight, by weight. FedEx and UPS have consistently accounted for over 93 percent of air cargo activity at Bradley. The highest value shipments by value were manufactured goods and electrical equipment.

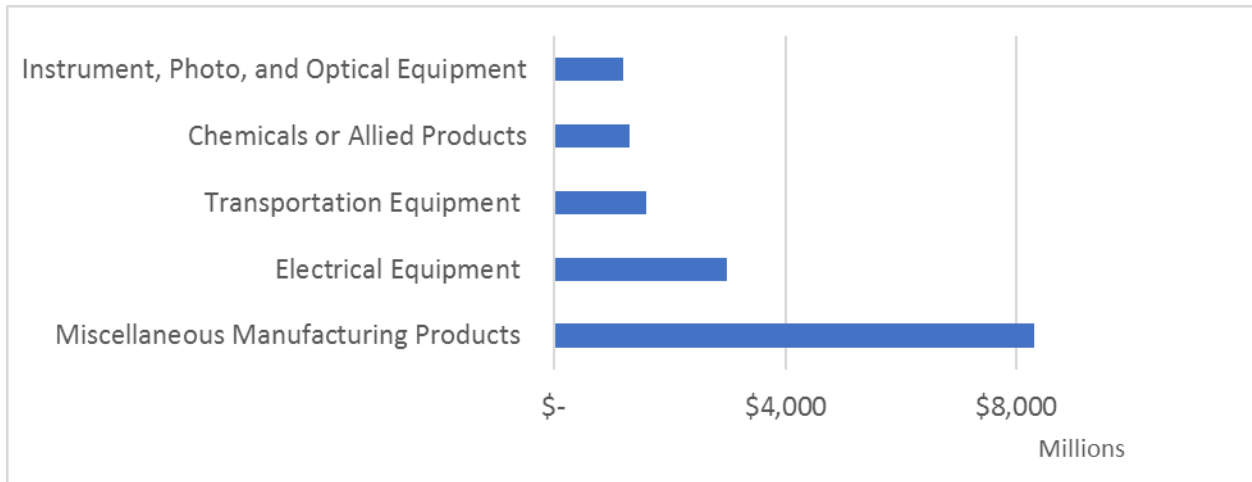
²⁹ From draft of 2017 Bradley International Airport Master Plan. One metric ton is equal to 2,204.6 pounds

Figure 7.25: Air Cargo Handled at Bradley International Airport, by Weight (pounds, 2014)



Source: IHS-Transearch and CDM Smith

Figure 7.26: Air Cargo Handled at Bradley International Airport, by Value (\$millions, 2014)



Source: IHS-Transearch and CDM Smith

7.6.2 Forecast Air Cargo Demand

According to IHS-Transearch forecasts, air tonnage is forecast to increase from 116 thousand tons in 2014 to 252 thousand tons in 2040, an increase of 117.3 percent (3.0 percent annually). Air commodity value is forecast to increase from \$16.5 billion in 2014 to \$38.0 billion by 2040, or by 130.9 percent (3.3 percent annually). A nearly identical mix of top commodities as today is forecast for 2040: Small Packaged Shipments, Electrical Equipment, Miscellaneous Manufacturing Products, and Instruments, Photo and Optical Equipment Chemicals or Allied Products.

7.7 PIPELINE

Connecticut's pipelines moved 287.9 thousand tons of Crude Petroleum, Natural Gas, and Petroleum or Coal Products, valued at \$62 million. In effect, almost 100.0 percent of all pipeline-related movements are Crude Petroleum and Natural Gas, most of which is outbound Natural Gas, with some inbound Crude Petroleum. The state's primary petroleum pipeline has a terminus at the Buckeye terminal, at the Port of New Haven.

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8. CONDITION AND PERFORMANCE OF CONNECTICUT'S FREIGHT SYSTEM

Connecticut is in the midst of a capital improvement program known as the Let's Go CT! Ramp Up program. The "ramp up" refers to the first five years of budget appropriations to jump start the 30-year Let's Go CT! vision. The initiative supports both passenger and freight transportation. However, aging infrastructure affects all freight modes and funding for maintenance and improvements will continue to be a concern. Assessing the freight system's condition and performance helps inform and focus future investment strategies.

8.1 HIGHWAY SYSTEM

8.1.1 Pavement Condition

The condition of roads on Connecticut's National Highway System has steadily improved since 2012. Currently, the ride quality on 86 percent of the system is in acceptable or better condition. (Figure 8.1)

Figure 8.1: 2011-2015 Condition of National Highway System Roads



Source: Connecticut Department of Transportation

Ride Quality

Ride quality measures the roughness of the pavement as you drive over it. In the future, CTDOT will report additional measures that address factors like structural integrity.

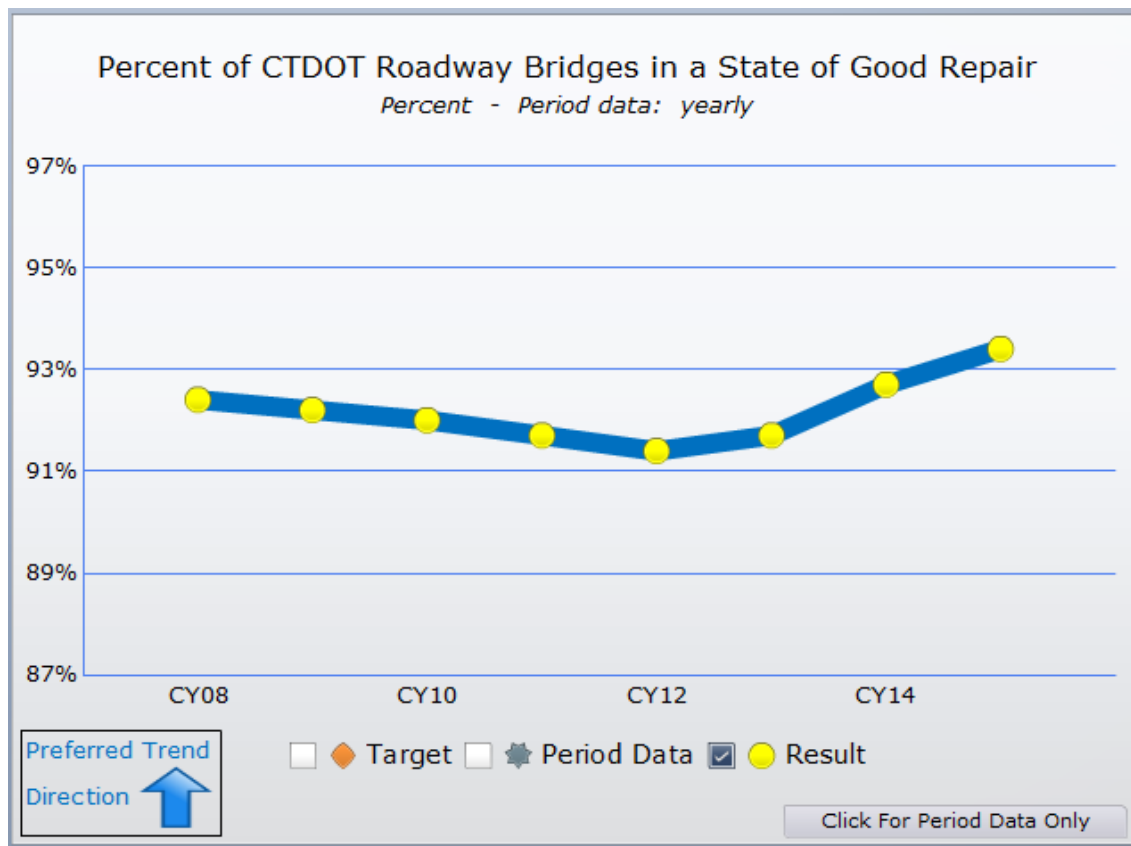
8.1.2 Bridge Condition

The condition of Connecticut's bridges is on an upward-moving trend (see **Figure 8.2**). Since 2012, the percentage of bridges in a state of good repair has increased from 90.5 percent to 93.2 percent, against a system wide goal of 95 percent. Connecticut can expect to see continued improvement in the bridge ratings due to the ramp up.

Bridge Condition

CTDOT inspects its bridges thoroughly on a regular basis. These inspections produce ratings (National Bridge Inventory Condition Ratings) of many bridge components such as the deck and substructure. The lowest rating among the four main components becomes the bridge's overall rating.

Figure 8.2: Percent of State Maintained Bridges in a State of Good Repair (2011)



Source: Connecticut Department of Transportation

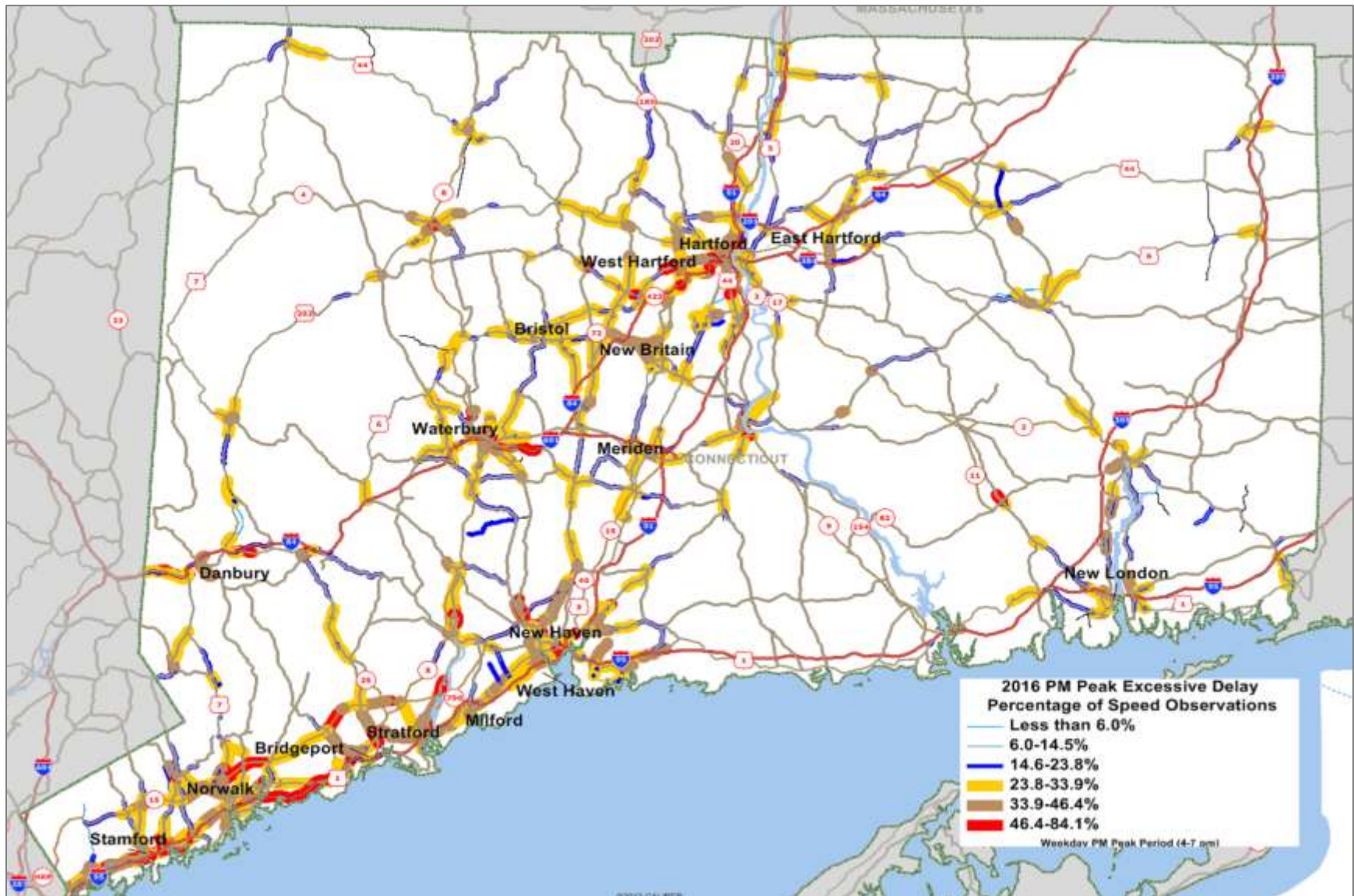
8.1.3 Mobility and Congestion

A significant number of locations on Connecticut's roadway system experience frequent, recurring slowdowns, especially during the peak periods of weekday travel. **Figure 8.3** shows the frequency of slow travel during weekday evening travel hours. Major roadways, including the signalized arterial system, freeways and expressways, show many locations of slow speeds more than 25 percent of the time around many of Connecticut's urbanized areas and on major corridors. Connecticut is looking at an "all of the above" solution to the issue of congestion, including providing more transit opportunities, increasing highway capacity and pricing options.

Slow Speeds

Slow speeds correspond to the percentage of observed speeds that are under ½ the free flow speed. Free flow speed is measured during the overnight hours, which are generally congestion-free.

Figure 8.3: Recurring Slow Speed Locations on the Connecticut Highway System (2016)



Source: National Performance Management Data Set and CDM Smith

8.1.4 Truck Freight Bottlenecks

In 2012, 12.7 million trucks ³⁰ moved cargo on Connecticut's roadways, primarily in the National Highway System, including the Interstate System. In completing their shipments within the delivery windows they have agreed to, motor carriers must travel through the same corridors as passenger vehicles, often during the same peak travel periods. In 2016, the locations at which truck drivers experience the most severe congestion generally corresponded to the same locations as passenger vehicles. They are:

- I-95, from New York to Bridgeport
- I-95, from West Haven to New Haven
- I-95 from Old Lyme to East Lyme
- I-84, from New York to Danbury (CT-7)
- I-84, from east of Danbury (US-202 to CT-34)
- I-84, West of Waterbury (CT-188 to CT-63)
- I-84 in Waterbury, (CT-847 to 3 miles east)
- I-84, from West Hartford to US 44 in Hartford
- I-91 from North of CT-3 to Charter Oak Bridge ramps (East Hartford)
- CT-5, from Berlin to CT-175

This review corroborates CTDOT's emphasis on the need for congestion relief and the reconstruction of sections of I-95 and I-84. However, last-mile connector issues, as well as operational, state of good repair and truck parking issues exist as well, as the team learned through conversations with the trucking industry and public agency stakeholders.

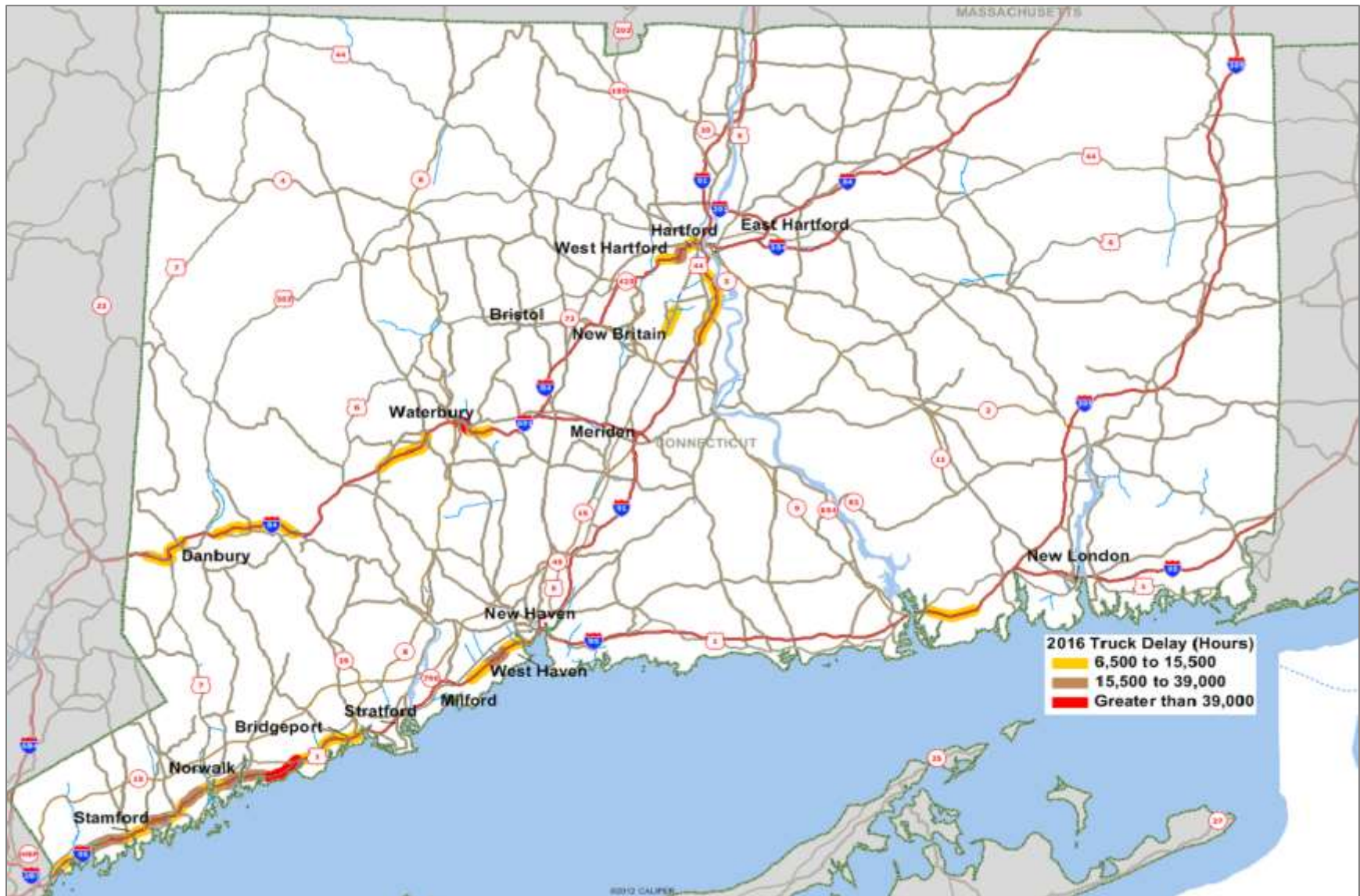
Figure 8.4 presents the most significant locations of truck delay in 2016.

Truck Bottleneck Analysis

To identify bottlenecks the team analyzed more than 150 million speed observations and thousands of truck volume counts on the National Highway System collected throughout Connecticut in 2016, to estimate cumulative truck delay. Using this large volume of data helps to assure that the high congestion locations that have been identified are an accurate reflection of actual conditions experienced by truck drivers.

³⁰ Source: 2014 IHS-Global Insight data, expressed as truck units.

Figure 8.4: Truck High Congestion Locations, 2016



Source: CTDOT, National Performance Management System and CDM Smith

8.1.5 Truck Crashes

Crash Frequency

Between 2009 and 2014, commercial vehicle crashes represented 18.5 percent (105,704) of all motor vehicle (571,618) crashes. Between 2009 and 2014, the average number of all motor vehicle crashes decreased by an annual average rate of -1.42 percent, while commercial vehicle crashes decreased by an annual average rate of -2.66 percent. The number of commercial vehicle crashes as a percentage of all motor vehicle crashes varied from year to year, ranging from a high of 20.3 percent in 2011, to a low of 17.0 percent in 2012. (Table 9-1).

Table 8-1 : Commercial Vehicle and All Motor Vehicle Crashes by Year (2009 – 2014)

Year	Truck Crashes	All Motor Vehicle Crashes	CMV/All Vehicle Crashes
2009	19,614	103,710	18.9%
2010	19,662	101,621	19.4%
2011	15,904	78,435	20.3%
2012	16,264	95,452	17.0%
2013	17,117	95,826	17.9%
2014	17,143	96,574	17.8%
Total	105,704	571,618	18.5%

Source: CTDOT, Hosted by University of Connecticut's (UConn) Connecticut Crash Data Repository

Crash Severity

All crashes are categorized as fatal, injury, or property damage only (PDO) based on the most severe impact to the driver(s) or passenger(s). For example, a crash that results in a fatality and one injured person would be categorized as fatal, a crash that results three injured persons would be categorized as injury, and a crash that results in no fatalities or injured persons would be categorized as PDO.

There were 105,704 crashes involving a commercial vehicle between 2009 and 2014 (Table 8-2). The percentage of crashes that involved fatalities, injury, and property damage only (PDO) was 0.3 percent, 21.5 percent, and 78.2 percent, respectively.

Table 8-2 : Commercial Vehicle Crashes Involving Pedestrians by Severity (2009 – 2014)

Year	Fatal	Injury	PDO	Total
2009	36	4,206	15,372	19,614
2010	56	4,222	15,384	19,662
2011	45	4,110	11,749	15,904
2012	50	3,438	12,776	16,264
2013	54	3,452	13,611	17,117
2014	45	3,297	13,801	17,143
Total	286	22,725	82,693	105,704

Source: CTDOT, Hosted by University of Connecticut's (UConn) Connecticut Crash Data Repository

There were 670 crashes involving pedestrians and a commercial vehicle between 2009 and 2014 (**Table 8-3**). The percentage of crashes with pedestrians that involved fatalities, injury, and PDO was 13.9 percent, 7.9 percent, and 78.2 percent, respectively. Almost one-fifth (17.8 percent) of all commercial vehicle crashes that involved fatalities also involved pedestrians.

Table 8-3: Commercial Vehicle Crashes Involving Pedestrians by Severity (2009 – 2014)

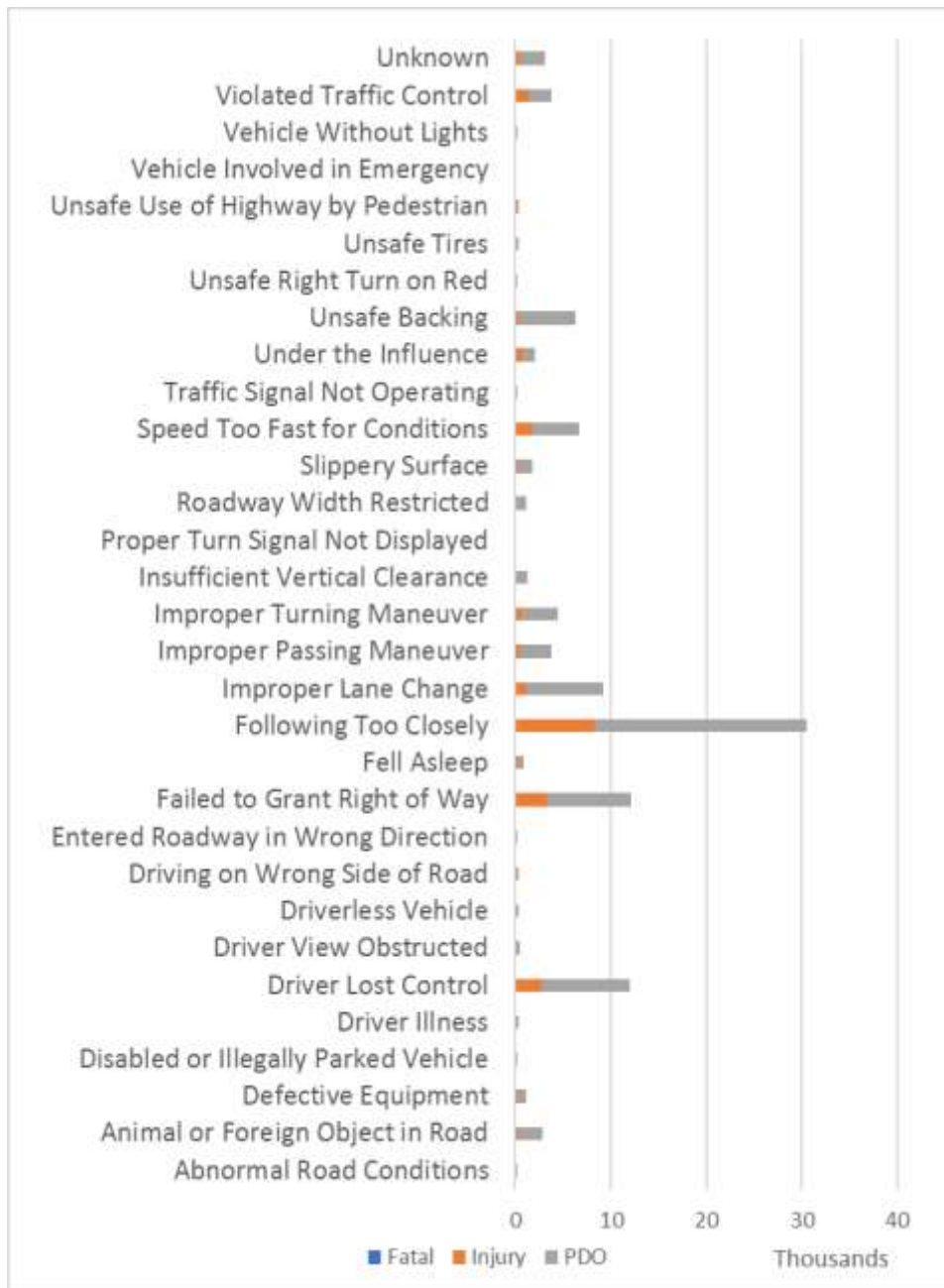
Year	Fatal	Injury	PDO	Total
2009	4	92	14	110
2010	13	121	10	144
2011	6	116	2	124
2012	8	79	4	91
2013	11	83	9	103
2014	9	75	14	98
Total	51	566	53	670

Source: CTDOT, Hosted by University of Connecticut's (UConn) Connecticut Crash Data Repository

Contributing Factors

Following Too Closely was the main contributing factor in nearly one third of commercial vehicle crashes (28.8 percent) between 2009 and 2014 (**Figure 8.5**). The next highest contributing factors were Failed to Grant Right of Way (11.4 percent), Driver Lost Control (11.3 percent), and Improper Lane Change (8.7 percent). Vehicle condition and roadway condition were not frequently cited as contributing factors. These findings point to the need for continued driver education and enforcement.

Figure 8.5: Commercial Vehicle Crashes, Contributing Factors, (2009-2014)



Source: CTDOT, Hosted by University of Connecticut's (UConn) Connecticut Crash Data Repository

8.2 FREIGHT RAIL

8.2.1 Freight Rail Bottlenecks

- Rail activity in CSX's Cedar Hill yard (New Haven) increased significantly in 2017 and delays are encountered at entry and exit points.
- The Connecticut River Bridge, located near Windsor north of Hartford, is a major constraint to freight operations between Hartford and Springfield, Massachusetts. Currently, Connecticut Southern, one of several operators that use the bridge, is experiencing issues scheduling shipments during the time windows that are available. The Central New England Railroad also reports capacity constraints in accessing an auxiliary branch line in East Long Meadow, Massachusetts. As planned service improvements to passenger service for the New Haven-Hartford-Springfield line are implemented, delays are likely to increase. The cost of a double-track, 286k replacement bridge is estimated at \$50 million.
- The Hartford Viaduct is a series of highway and rail bridge structures on I-84, located in and around Hartford. The structures are well past their useful life, and are a chokepoint for freight traffic as well as for passenger vehicles and trucks. One of the options under study for the viaduct is to move the railroad to the west and to upgrade the structures to be 286k lb.-capable.
- There are several looming issues related to potential bottlenecks caused by the lack of 286k lb.-capable rail in Connecticut.
 - The Pan Am line transports a significant and increasing amount of propane fuel on 260k lb.-capable rails. Safety regulations now under consideration would require that operators use more puncture-resistant steel jackets, thermal insulation, and heavy steel-reinforced fuel tanks. These regulations could require upgrades to 286k lb.-capable rail.
 - The Strategic Rail Corridor Network (STRACNET) is a 36,000-mile system of rail corridors considered most important to national defense. In Connecticut, portions of the system, especially along the I-91 corridor (including the Connecticut River bridge) are not 286k lb.-compatible. There are no funds available currently time to upgrade the routes to meet the military's potential needs in times of emergency

Rail Bottlenecks

To understand the location and cause of bottlenecks on the Connecticut freight rail system, the team interviewed major freight rail operators in person, and followed up by phone to verify the information.

8.3 WATER TRANSPORTATION

Connecticut's port system faces dredging and access issues that are explained in Section 10, *Trends, Needs and Issues*.

8.4 AIR CARGO

Connecticut has taken steps to ensure that Bradley International Airport remains accessible and that it has adequate capacity to handle cargo freight for the immediate future. Section 10, *Trends, Needs and Issues* provides more information on potential air cargo needs.

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9. STAKEHOLDER ENGAGEMENT

Moving goods to, in and through the state’s compact and heavily utilized transportation network efficiently, safely and at a reasonable cost, is key to state’s economic well-being and to the state’s competitiveness in the decades to come. One of the principal objectives of the Freight Plan is to identify and prioritize investments in the state’s multi-modal freight transportation system (truck, rail, marine, and air). This is best achieved through a cooperative and collaborative process where the public and freight stakeholders are involved in the plan’s development.

Public and stakeholder involvement is critical to ensuring that the plan addresses current and future needs and challenges unique to the movement of goods and commodities. To facilitate this involvement, CTDOT reached out to hundreds of individuals to help create this plan. The goals of this outreach were to:

- Understand the importance of the movement of freight to the state’s economy
- Establish, and build on existing, private sector relationships in an ongoing dialogue about freight system needs, and opportunities to create efficiencies in freight movements
- Identify the condition, deficiencies and needs of the freight network
- Identify ways that CTDOT can make businesses and communities more competitive – whether through capital improvement projects or policy changes
- Allow stakeholders and the public to weigh in on what freight projects are of highest priority for the State

9.1 PUBLIC INVOLVEMENT DURING THE FREIGHT PLAN’S DEVELOPMENT

This Freight Plan was developed concurrently with the Connecticut Long-Range Statewide Transportation Plan (LRSTP). The public outreach and stakeholder engagement processes of the LRSTP were (and continue to be) the most collaborative and comprehensive public involvement program ever conducted by CTDOT. The LRSTP encouraged engagement via interactive study websites; formal and informal surveys; the use of social media to elicit citizen response to ideas and to alert the public to the availability of draft plans and outreach meetings or events; numerous, face-to-face, small group meetings and webinars with stakeholders and public officials; live events including visioning sessions, public informational meetings, and open houses; informal “pop-up meetings” at community events; and, the creation and widespread distribution of press releases, fact sheets, and informational brochures.

Several LRSTP outreach events included break-out sessions, “Councils” or focused discussions specifically on the topic of freight. These freight-focused sessions were targeted to freight providers,

businesses that heavily rely on freight, and freight advocates – including truck freight, freight rail, marine freight, and air cargo. The input received during these freight-focused sessions produced valuable information about the condition and performance of the freight network and guided the development of capital improvement, policy and strategic implementation recommendations.

9.2 FREIGHT PLAN STAKEHOLDER OUTREACH

Beyond the outreach efforts initiated by the LRSTP, additional stakeholder outreach was conducted to engage freight-related organizations and private enterprises. These outreach efforts included stakeholder interviews with representatives of freight network users such as trucking, port, and railroad associations; logistics directors; shipping managers; economic development professionals; local, state and regional planners, and business leaders. Additional outreach was conducted using truck driver surveys and an online survey. The stakeholder input guided the development of the prioritized project list and policy recommendations. Metropolitan Planning Organizations (MPOs) assisted in the identification of stakeholders.

9.2.1 Key Freight Stakeholder Interviews

CTDOT conducted numerous interviews and grassroots meetings with leaders in freight-related services including manufacturing, retail and wholesale sales, logistics, and local, regional, national and international freight carriers. Discussions centered on the strengths and weaknesses of the current freight network, current and future demands on the network, and investments needed to improve the network and meet future demands. A list of stakeholders interviewed is provided in **Table 9-1**.

Table 9-1: Stakeholder Interviews

Stakeholder	Date	Location
Teamsters	3/11/16	Stratford, CT
Genesee & Wyoming Railroad	3/24/16	CTDOT HQ
O&G Industries and Rawson Materials	3/24/16	CTDOT HQ
Housatonic Railroad Company	3/28/16	CTDOT HQ
Motor Transport Association of CT, UPS, Bozzuto's Inc.	3/30/16	CTDOT HQ
CT Public Transportation Commuter Council	3/30/16	CTDOT HQ
Town Fair Tire and Capitol Region Council of Governments	4/6/16	CTDOT HQ
Nora Huvane (marine)	4/8/16	Stamford, CT
CT Business & Industry Association	4/8/16	CTDOT HQ
Gerdau Steel, Capitol Region Council of Governments	4/11/16	Plainville, CT
Santa Energy, Santa Fuel Inc., and Inland Fuel Terminals	4/13/16	Bridgeport, CT
Next Trans Trucking and CT Courier Group	3/30/16	
CT Maritime Coalition	4/12/16	Essex, CT
Bridgeport Port Authority, CT Maritime Association, CT Maritime Coalition, Bridgeport/Port Jefferson Ferry, New Haven Port Authority, CT Ship Pilots, GZA, Logistec, Port Security Services	4/13/16	Bridgeport, CT
Pratt & Whitney – United Technologies	4/15/16	CTDOT HQ
CT Construction Industries Association	4/19/16	CTDOT HQ
Tilcon Connecticut	5/2/16	New Britain, CT
Bridgeport Port Authority, City of Bridgeport, Connecticut Metropolitan Council of Governments	5/23/16	Bridgeport, CT
CT Airport Authority, Capitol Region Council of Governments	5/11/16	Windsor Locks, CT
Buckeye Partners/Jetlines	5/25/16	CTDOT HQ
Town Fair Tire	6/4/16	East Haven, CT
Freund Farm, CaroVail, Cargill, Inc., Laurel Brook Farm, Agi-Mark, Allyndale Limestone Corp.	6/6/16	East Canaan, CT
Hemingway's Distribution	6/8/16	CTDOT HQ

The various freight stakeholder interviews provided extensive feedback on industry concerns as well as modal issues, strengths, trends, and priorities. A summary of the input received throughout the stakeholder outreach effort is summarized below, by mode, and grouped according to the following categories: Strengths, Issues, and Trends; Location- Specific Issues; Policies, Regulations, Costs, and Other Obstacles; and Top Priorities.

Truck Freight

Strengths, Issues, and Trends

- Want more truck-only parking areas. Concerned about closure of Southington and Willington rest areas. See Jason's Law report for information on the importance of truck parking for safety.
- Shortage of drivers nationally. Specific shortage of 3rd party, contracted haulers.
- Plan for autonomous trucks. Automatic braking already in use.
- All height and weight restrictions on bridges should be clearly marked.
- Sometimes posted speed limits conflict with the information in the TomTom Opti Drive system that drivers use. Database of speed limit information should be more readily accessible to technology companies.
- Freight traffic is expected to increase as the global economy recovers.
- Online shopping and other shifts in consumer behavior are changing supply chain logistics. Expect more distribution warehouse operations by companies like Amazon.
- Need route planning assistance for oversized loads.
- Compliance, Safety, Accountability (CSA) ratings for haulers not reliable due to small inspection samples.
- Want slower speeds and greater safety in highway work zones, especially at night.

Location-Specific Issues

- Rt. 17 – Rt. 9 interchange in Middletown
- Waterbury Mixmaster
- Shippers want I-84 viaduct replacement to include overhaul of I-84/I-91 interchange. Tunnel option that would prohibit hazardous materials is unacceptable
- Congestion at crest of hill on I-84E near exit 70 in Willington
- Congestion on I-95 between East Haven and West Haven
- Entire I-95 corridor. Especially congestion in Fairfield County and accidents in New London County
- Charter Oak Bridge/I-91 interchange

- Truck routes to JFK
- Route 7 and I-84 in Danbury; traffic slow-downs start at 6 AM and can result in delays of two hours or greater. The diverge from southbound Rt. 7 to I-84 East is a problem because vehicles block left-turning vehicles.

Policies, Regulations, Costs, and Other Obstacles

- Some towns seek voluntary restrictions on truck traffic on state routes. Proliferation of “No Through Truck” signs on local streets.
- Freight equipment is subject to personal property tax in Connecticut, but not in New York.
- Claim that fuel costs and high gross receipts tax on fuel are reason why there are no truck terminals in Connecticut.
- Shippers want a greater proportion of user fee revenue to be spent on highways.
- Shipping in Connecticut is constrained by congestion in New York City.
- Onerous certification requirements for hauling potable water, transporting fuel, or gaining access to port facilities (such as TWIC³¹ card requirement).
- Align DMV rules with other states.
- Drivers may be required to move to the left-hand lanes to safely pass roadwork or other issues in the right or center lanes. They are also prohibited from using the left lane.
- DMV restrictions on the number of transactions that can be processed per visit make business owners have to take multiple unnecessary and costly trips to the DMV.
- DMV will not confirm receipt of faxed information. Status of licensure not ascertainable to client.
- Hardship on business to have to travel to Wethersfield DMV to get apportionment plates.
- Limits on gross vehicle weight a barrier to efficiency and competitiveness.
- Bridge weight limitations also inhibit efficient travel.
- Oversize and overweight deliveries take longer and are more difficult in Connecticut than in other states due to size and weight restrictions and prohibition on wet-weather travel.
- Connecticut-specific limit on trailer length conflicts with certain industries.
- Consider using “lean management” techniques (continuous improvement) to streamline construction, reconstruction, and permitting.

³¹ From the Transportation Security Administration website, “The Transportation Worker Identification Credential, also known as TWIC®, is required by the Maritime Transportation Security Act for workers who need access to secure areas of the nation’s maritime facilities and vessels.”

- Oversize load permits should allow for a second vehicle to be listed to reduce time pressure on loading and reduce risk.
- Permitting agency for oversized loads should know if there is a travel-ban on oversized loads and should not take payment for the permit for that trip if it cannot occur.
- Confusion regarding 34-hour reset requirement for driver breaks.
- Concern about potential new tolls.
- Concern about proposed increase in permit fees for individual oversized loads.
- Drivers on construction sites should be exempted from hours of service rules.
- Difficulty scheduling state police on construction sites.

Top Priorities

- Improve safety at Significant Level of Service Safety (SLOSSS) locations.
- Need map of recommended truck routes (for non-interstate highways).
- Shippers believe adding capacity will reduce travel times.
- Tolls and other demand management acceptable if paired with new capacity and efficiency³².
- Request better mitigation of construction impacts on traffic.
- Notification system for lane closures and other anticipated delays should be a real-time feed that sends location-specific “push notifications” to drivers’ phones.
- Want wider breakdown lanes to allow for safe inspection of trucks.
- Drivers should be able to easily check and track the status of their Commercial Driver Licenses online.
- Increase weight limits for priority freight routes.
- Need to make oversize/overweight travel permanently allowed on weekends (currently pilot program).

Freight Rail

Strengths, Issues, and Trends

- Rail shipping helps give Connecticut businesses access to broader markets, helping to insulate them from local swings in the economy.

³² In response to the request for comment on the Plan, the Motor Transport Association of Connecticut stated that it “...Has never supported tolling existing interstates.”

- Rail shippers believe there is capacity for more freight to shift from truck to rail.
- Upgrading of NECR to 286K standard a big opportunity.

Location Specific Issues

- Maintain access to CSX Class I terminals in New Haven and West Springfield.
- Restart operation of Maybrook Line (Derby to Maybrook, NY, via Danbury). Owner (HRRC) lacks financial wherewithal to complete repairs.
- Need to structure improvements to New Haven-Hartford-Springfield rail investments so they maintain and enhance freight access to West Springfield terminal in a way that complements rather than competes with expanded passenger service.
- Weight restriction on CT River Bridge in Windsor constricts use of CT Southern freight route on Amtrak's Springfield Line.
- Pan Am Line is not maintained to same class as line that feeds it (Springfield Line), constraining freight shipments.

Policies, Regulations, Costs, and Other Obstacles

- Difficult for rail operators that do not own tracks to obtain financing.
- Positive Train Control is unfunded mandate. The Genesee & Wyoming Railroad is laying out \$1.2 million for upgrade.
- Section 130 program for upgrading RR crossings is an unfunded mandate.
- If a shipment begins or ends on truck, it will be cheapest to do entire trip by truck.

Top Priorities

- Continue Rail Freight Improvement Program (RFIP) and expand to more predictable and robust funding scheme.
- Provide tax credits or other incentives for non-highway freight transport.
- Need better training programs to allow for hiring without employers shouldering risk of employee leaving following on-the-job training.
- New Statewide Port Authority should facilitate improvements to maritime-to-rail connections. Consider car float barges to create a freight rail connection across the Sound.
- Other states provide assistance to freight railroads for construction of new sidings

Maritime

Strengths, Issues, and Trends

- Conflicts at barge terminals over management of ice during wintertime.
- Fixed demand for petroleum terminals.
- Marketing for ethanol.
- Marketing for dry bulk goods.

Location Specific Issues

- Need dredging and other port improvements, not just deep-water ports, but also at barge terminals and smaller harbors (e.g. Stamford, Branford).
- Cedar Creek in Black Rock Harbor is severely constrained due to lack of dredging.
- A bridge over Johnsons' Creek that was destroyed by Hurricane Sandy is inhibiting the delivery of oil to the Global and Sprague terminals. This bridge is in the process of being demolished.
- Policies, Regulations, Costs, and Other Obstacles
- Jones Act (all goods transported by water between U.S. ports must be carried on U.S.-flag ships, constructed in the United States, owned by U.S. citizens, and crewed by U.S. citizens and U.S. permanent residents³³)
- Construction and union labor costs
- Fees and environmental regulations specific to the US maritime industry are greater than in other countries. (i.e., Harbor Maintenance Tax)
- Visa restrictions for foreign maritime employees, especially land-based operators.
- Ports of Bridgeport and New London rely on an aging union workforce that is not able to quickly grow or shrink in response to market volatility.
- Bridgeport and New Haven fuel terminals have shallower channel depth than competitor in Tiverton, RI.
- Dredging permit delays and seasonal restrictions on dredging.

Top Priorities

- Dredging of Bridgeport Harbor
- Utilizing marketing capacity of new Statewide Port Authority
- Work with MARAD on M-295 marine route through Long Island Sound.

Pipeline

Strengths, Issues, and Trends

- The Buckeye terminal operates over 7,000 miles of pipeline and 120 terminals nationwide. In Connecticut and Massachusetts, it operates pipelines from the Port of New Haven to Westover Air Force Base in Massachusetts. It also operates two terminals in Connecticut and one in Springfield, Massachusetts.
- Pipeline is a very efficient method to ship petroleum fuels, and can help decrease the number of delivery trucks needed on the highway system.

³³ 46. U.S.C. § 50101

Location Specific Issues

- Buckeye's terminal in Wethersfield may have unused land available for overnight truck parking.

Policies, Regulations, Costs, and Other Obstacles

- Oil terminals at Port of New Haven set their own "rack prices" per gallon, and tend to be very low. This incentivizes trucks to pick up the oil in New Haven, rather than at terminals up the pipeline, such as Springfield, that may be closer to their intended delivery points. This results in unnecessary extra truck traffic on the highways.
- Policies and regulations have positive effects, as they keep the industry honest and ensure environmental safety.

Top Priorities

- Incentivize fuel delivery companies to utilize the pipeline infrastructure to its fullest capacity, rather than driving more distance back and forth the Port of New Haven.

9.2.2 Truck Driver Surveys

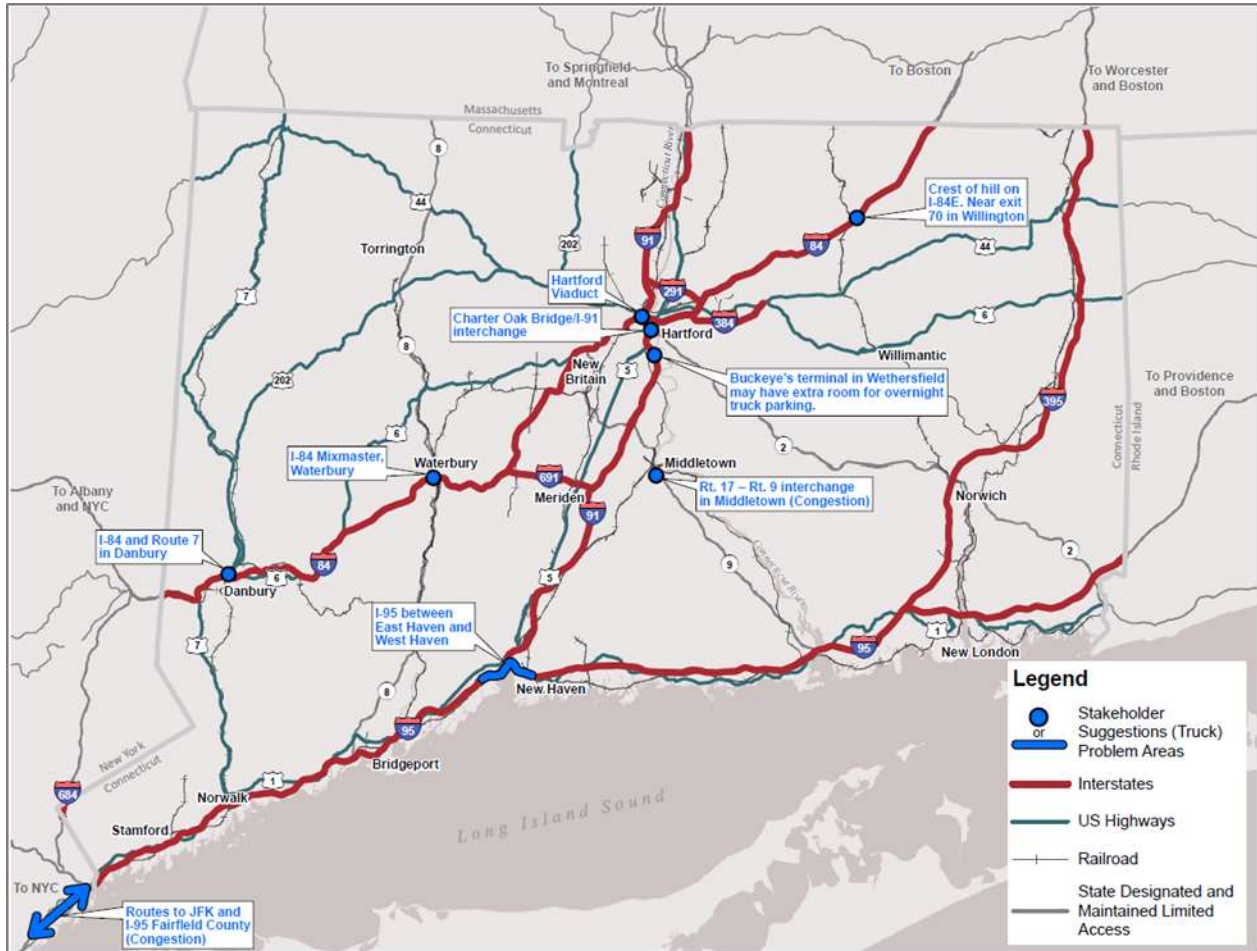
In the spring of 2016, CTDOT reached out to truck drivers via the Teamsters and Town Fair Tire to solicit their ideas for freight related improvements. CTDOT received 62 surveys, with most but not all fully completed. A summary of the truck driver input is below:

- Drivers work mainly for 1) National carriers, and 2) Local carriers
- Fleet operational coverage is mainly 1) CT/NY/MA/RI, and 2) New England
- Drivers primarily deliver at the 1) truckload, and 2) Less than truckload industry segments
- Most drivers work for companies with between 11-100 power units
- About 1/3 of drivers work for companies with 26-50 percent operating mileage within CT, and another 1/3 work for companies with 51-75 percent operating mileage within CT.
- For most drivers (35%), their route is designated by a dispatcher prior to departing. Drivers also rely on their own experience and the conditions of the road (31%) to choose routes.
- When selecting a route, drivers primarily choose the least congested routes, followed by the shortest routes, and assigned routes. Drivers also factor in the reliability of travel time estimates into their route choices.
- Most drivers agree or strongly agree that access to industrial parks, distribution centers, manufacturing sites, ports, and rail yards is relatively efficient. However, 1/3 of drivers are neutral about this issue.
- Most drivers (58%) believe that highway congestion is an issue in Connecticut.
- The clear majority of drivers (75%) believe that Connecticut does not have adequate truck parking facilities.

- Drivers are ambivalent and divided about whether trucks can efficiently and safely travel in Connecticut. About 1/3 of drivers are neutral on the question, and the remaining drivers are split: 40 percent do not agree that trucks can travel efficiently and safely through the State, and 28 percent do agree that their trucks can travel safely and efficiently through Connecticut.
- When asked to identify the most significant roadway infrastructure problem in Connecticut, drivers identified issues that fell within 5 key categories:
 - I-95, particularly the portion between the NY State Line and New Haven;
 - A need for more lanes;
 - I-84, especially issues with construction and congestion;
 - Construction and its negative impact on traffic congestion; and
 - Traffic and congestion.
- Other problems identified included road condition, parking and rest areas, and the Charter Oak Bridge.
- Presented as an open-ended question, drivers were asked which two issues they would fix. Five key issues came to the fore:
 - Parking and rest areas, and need more of both;
 - A need for more lanes;
 - Infraction enforcement, particularly for issues around distracted driving and cell phone use, aggressive driving, and tailgating;
 - Left lane issues, including requests for trucks to use the left lane and requests for better enforcement of using the left lane for passing only; and
 - The need for improvement of roadway condition.
- Finally, drivers were asked to contribute any final thoughts, and their ideas fell into four main categories:
 - Speeding;
 - Driver behavior;
 - Parking and rest areas; and
 - Road Condition.

Figure 9.1 Error! Reference source not found. summarizes the major issues identified by trucking stakeholders during the plan’s development. The trucking interests identified chokepoints that generally correspond with the results of the bottleneck analysis in **Section 9.1.4**.

Figure 9.1: Major Issues Identified by Truck Freight Stakeholders



Source: CTDOT and CDM Smith

9.2.3 Rail Interviews

Interviews with freight rail carriers were conducted in the fall of 2016 to receive input on rail network needs in Connecticut. Nine carriers were interviewed as listed in **Table 9-2**. Overall, the system appears to be functioning without downsizing, immediate challenges, or regulatory imposition. However, there is considerable concern over traffic, weight, and congestion with respect to anticipated problems on the New Haven-Hartford-Springfield (NHHS) Line. Freight rail operators including CSX, Connecticut Southern, Pan Am Southern, Central New England Railroad and Providence and Worcester voiced concerns about future access windows for rail freight. There have been substantial customer complaints regarding access windows on the Hartford Line (NHHS) and the Northeast Corridor. Additional concerns focused on the continued loss of competitiveness to trucks in the highway system upgrades compared to rail assistance, the associated enhanced tank car weights and, and assistance with the heavy capital infrastructure needs. Industry representatives emphasized that the value of rail support to the State in competitiveness, delivery, industrial development, and public benefit is substantial.

Table 9-2: Freight Rail Carrier Interviews

Freight Railroad	Representative	Date
Branford Steam Railroad	Janet Mrozowski	October 14, 2016
Central New England	A.J. Belliview	November 11, 2016
Connecticut Southern	Charles Hunter	September 26, 2016
CSX Transportation	Maurice O'Connell	November 18 & 21, 2016
Housatonic	Colin Pease	September 29, 2016
Naugatuck	Howard Pincus	October 13, 2016
New England Central	Charles Hunter	September 26, 2016
Pan Am Southern	Jim Patterson	September 29, 2016
Providence & Worcester	Frank Rogers	October 12, 2016

Freight Rail Carrier Commentary

Summaries of the freight railroad carrier interviews are listed below.

Branford Steam Rail Road

- BSRR has no issues with its railroad condition at the present time.

Central New England Railroad

- Armory Branch needs additional new cross ties and the installation of heavier rail.
- Clearance issues and weight restrictions on Amtrak's Springfield Line in Hartford inhibits the movement of certain types of freight.
- Culvert work assistance would be welcomed.

Connecticut Southern Railroad

- Amtrak's Springfield Line needs to allow freight cars to be loaded to 286,000 pounds on four axles, the national standard, for tenant freight carriers to remain competitive and to divert heavy truck traffic off Connecticut's roadway system. The weight limit of 263,000 pounds per car is chiefly due to the Amtrak-owned Connecticut River Bridge at Windsor Locks, but structural repairs and double-tracking the Connecticut River Bridge are not programmed.
- When Positive Train Control (PTC) is installed on the Hartford Line, there will be a CSO need to acquire and install PTC equipment on six locomotives.
- The former cascade of the tie and rail program that CTDOT used to distribute old crossties and rail to the freight railroads should be resumed.
- Assistance installing a higher speed turnout with signalization on the north end of Hartford Yard would help streamline operations.

CSX Transportation

- CSX needs the Hartford Line to be 286k compliant - this is a very big issue for their customers. CSX is experiencing considerable problems in getting windows for their traffic from the north and there needs to be improvements in traffic handling.

Housatonic Railroad Company (HRRC)

- Replacing the worn rail north of Canaan- last year that segment had 76 broken rails. HRRC requests continued assistance with rail replacement, particularly on sections of its Berkshire Line that are owned by the state of Connecticut, where track work is needed to operate plate F cars to be competitive in wood panel business.
- Public investment in crossing surface repair to address crossing maintenance needs to be developed.
- Development programs that promote conversion of brownfields to productive industrial development sites that could support rail freight customers should be promoted.
- Assistance in new siding and other loading facilities to promote new rail business will support rail growth and job growth in the state and is particularly needed in Canaan.
- While HRRC is rated as a 286,000-pound railroad, work will be necessary to upgrade and strengthen bridges and strengthen track structure to maintain the 286,000-pound classification.
- Work needs to be performed to upgrade tie conditions to re-institute unit train service over the Maybrook Line.
- New siding is needed at O&G Industries in New Milford for quarry and road salt.

Naugatuck Railroad Company (NAUG)

- Capital projects to repair/replace culvert and bridges are needed due to 100+ year old structures. There are several smaller culvert structures located on the railroad that will need attention/replacement with modern culvert piping materials.
- The NAUG bridge inventory is composed primarily of three major structures. One is 110 feet long, two-span (“Hancock Brook” ID #9106R), built in 1902 that is in fair condition and should be considered for replacement. The second is 234 feet long, 4-span (“Chase Bridge” ID #9108R), built 1907 that is in good condition and needs a replacement wood tie deck. The third is 267 feet long, 4-span (“Jericho Bridge” ID #9110R), built 1907 that is in good condition and needs a replacement wood tie deck. These structures also need concrete/masonry pier and abutment repairs and some associated steel repairs. The coating systems of these structures have long since failed (last documented painting was in the early 1950s). Three smaller steel deck spans (20-22 feet each) have been re-decked by NAUG over the last 9 years, and are in good condition (except for failed coating systems). One short bridge should be replaced due to age and condition.
- The southern end of the NAUG line, which is expected to have the highest freight traffic density, with heavyweight cars, has numerous sharp curves. This section should be re-laid with heavier rail on the curves.
- An Interchange yard track in Waterbury must be rehabilitated to accommodate current and near-future inbound and outbound traffic needs. Several former and existing side tracks can be extended/reconstructed to provide this storage, and assistance would be needed for this work.

- There is a desire for a regular interchange area/yard in Waterbury with PAS that does not involve leaving interchange cars on the Naugatuck Main Line. This is critical to NAUG operations, as interchange cars left on the main line prevent NAUG from completing regular, federally mandated track and switch inspections.
- Existing car storage side tracks are not sufficient to accommodate freight customers.
- Upgrading is needed for crossing signals and road surfaces at heavily traveled crossings. SR 262 highway grade crossing in Watertown needs full protection including gates and modern lights.

New England Central Railroad

- A matching grants program for capital projects should be established.
- A TIGER grant-funded project to upgrade the NECR line to 286k compliance in Connecticut is scheduled for completion by 2019. With the completion of this project, only one section of the line (in Massachusetts), which connects New London, CT to Montreal, Canada, will not be 286k- capable.
- Funding is needed for washouts.
- Reaching full double stack clearances remains a priority.

Pan Am Southern

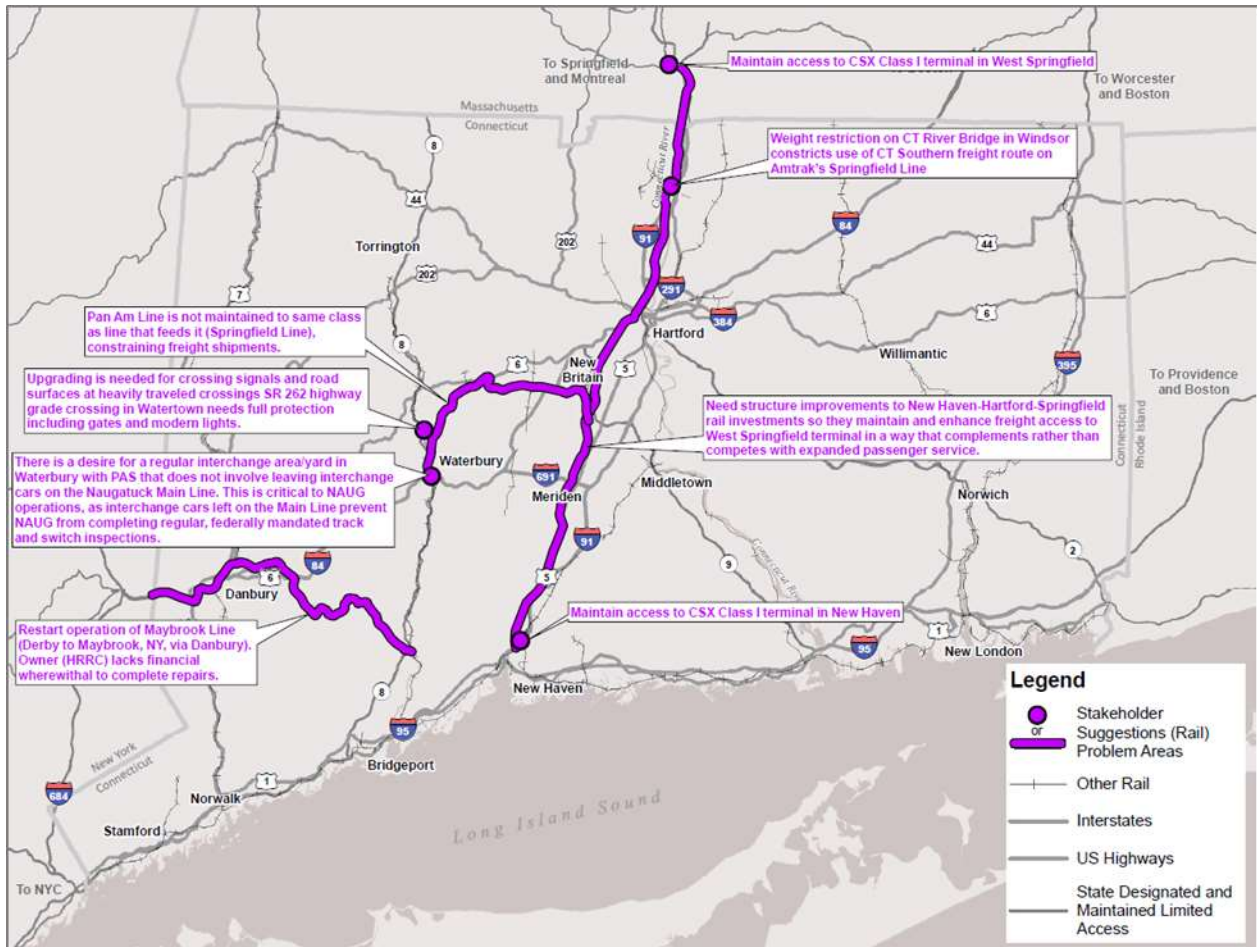
- High Amtrak car-mile charges financially affect the generation of new business. Need acceptable windows for freight traffic making necessary weight and clearance infrastructure and capacity improvements along the Hartford line project limits.
- Grade crossing and trespassing programs need assistance. Funding is needed for the Rail Preservation and Improvement Program.
- Maintain and improve the Railroad Tax Exemption Program.
- Provide access for freight rail goods movement projects that promote economic development, including third party-initiated candidate projects, industrial sidings, etc.
- Provide freight rail transportation with a seat at the table in the state and federal, development, planning, and strategy process.

Providence & Worcester Railroad

- There are concerns over adequate daytime windows on the NEC, which is increasingly congested, and in need of a coordinated growth plan.
- Plate F cars, measuring 17 feet tall, cannot be run under the overhead electrical system along the NEC.

Figure 9.2 summarizes the major issues identified by freight rail operators during the plan's development. The rail interests identified chokepoints and resource constraints that limit the ability of the rail system to capture a greater share of the goods market in Connecticut.

Figure 9.2: Major Issues Identified by Rail Freight Stakeholders



Source: CTDOT and CDM Smith

9.2.4 Online Business Surveys

In the Spring of 2016, CTDOT released an online survey, via Survey Monkey, to solicit input from private sector stakeholders on freight related improvements to the transportation system. CTDOT received 25 completed surveys, which are summarized below.

- Companies were concerned about the weight limitations on Connecticut’s highways and bridges, with 20 percent citing this as a key issue.
- Another 20 percent cited various costs and taxes, including fuel taxes, insurance costs, and property taxes as key issues.
- Hours of service issues comprised 18 percent of responses.
- Respondents noted that infrastructure improvements would help freight movement.
- There is a need to streamline the oversize/overweight permitting process.

- There is an emphasis on the need to improve the business climate through tax reduction and service improvement.

9.3 FREIGHT ADVISORY COMMITTEE

Freight planning is greatly enhanced by private sector and industry expert engagement. One mechanism of achieving this is through ongoing dialogue with operators, shippers, and users of the freight system. CTDOT conducted extensive outreach in developing this plan and will continue to do so through regular meetings with modal stakeholders. It is anticipated that CTDOT will lead ongoing meetings, annually, or more frequently as needed with the private sector including firms related to trucking, rail, waterway transportation, and aviation, as well as public sector partners. This ongoing engagement will improve freight operations and provide the state with a more detailed understanding of freight issues that the CTDOT and private industry will face in the coming years.

Maintaining a Freight Advisory Committee after the completion of the Plan can be mutually beneficial. The public sector can stay abreast of how the evolution of technology and business models may change freight needs in Connecticut and enhance the state's competitiveness from a transportation standpoint. With open lines of communication, the private sector can work with the DOT to meet transportation needs that is in the public interest to address. In the past, firms such as Pratt and Whitney have worked with CTDOT to reinforce structures on routes that bear the size and weight of heavy manufactured goods. A FAC can be a platform for a more responsive and effective freight investment decision-making process.

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10. TRENDS, NEEDS, AND ISSUES

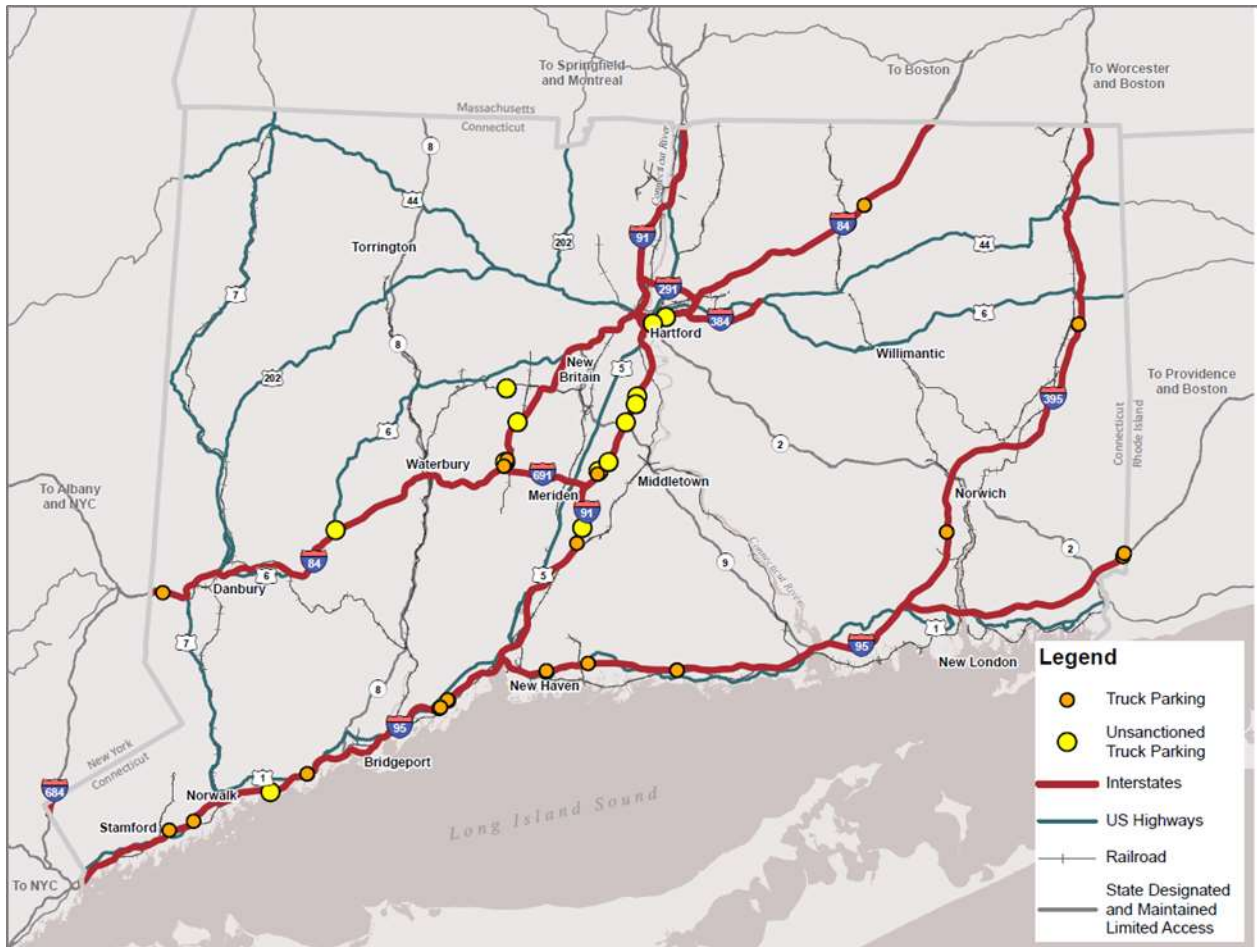
Economic, demographic, social and technological change all influence the way freight moves. While Connecticut exists in a fixed location, the state's consumer demands, its economic drivers and the way freight itself moves, especially over the last mile, are not fixed at all. This chapter summarizes the statewide and national trends and issues related to the movement of goods on Connecticut's statewide freight transportation network.

10.1 STATEWIDE ISSUES AND TRENDS

10.1.1 Trucking

- In addition to the ever-increasing number of trucks on our roadways, there is the problem of overweight vehicles. The damage caused by these vehicles can lead to premature pavement failure and is not easily quantified. Continued enforcement of maximum weight restrictions is critical to the long-term performance of highway systems (pavements and bridges).
- New England's extreme variability in weather is the largest factor beyond traffic loading that causes deterioration of pavements.
- Empty backhauls: 2013 data indicates that empty backhauls for both inbound and outbound trucks occur about 70 percent of the time. This results in higher overall costs for making deliveries in Connecticut (DEEP 2013).³⁴
- Ninety-four percent of freight is now carried by truck and the state accommodates a significant amount of through truck freight. Some investments that would make rail and waterborne travel more cost-effective could reduce or level the rate of truck freight growth. However, the flexibility and cost advantages of truck-based shipments, coupled with the very high cost of significant rail and water freight infrastructure upgrades, limits the potential diversion of truck freight shipments to alternative modes.
- Congestion on major truck routes and a lack of parking availability have led to the creation of informal parking areas, in locations such as along interstate ramps. **Figure 10.1** shows the location of these areas. Unsanctioned parking locations, especially on interstate ramps, present safety and operational concerns and are a significant issue for both law enforcement and CTDOT. A 2008 study of truck parking needs found that there was a deficit of 1400 parking spaces. There is a consensus that the deficit still exists, and that it exists mostly on the west side of the state. Land for new, additional parking adjacent to the Interstate System along I-84 and I-95 on the west side of the state is scarce. To find a solution to this issue, the state will need to work with property owners, local governments, truckers and law enforcement.

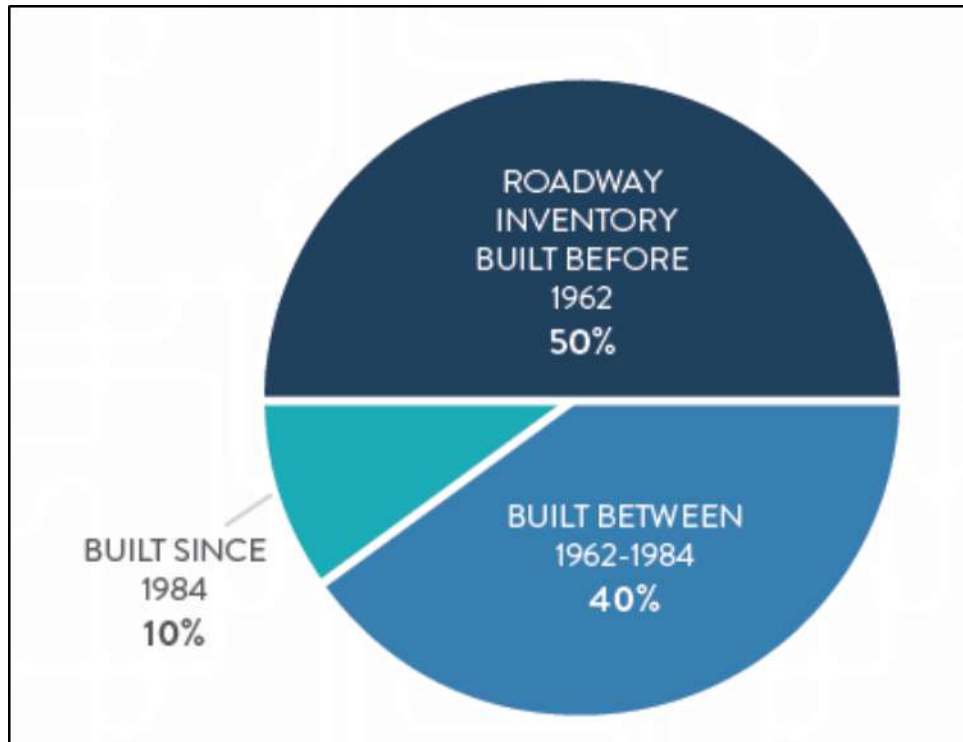
³⁴ http://www.ct.gov/deep/lib/deep/air/diesel/freightreport_03_28_2013.pdf

Figure 10.1: Locations of Sanctioned and Unsanctioned Truck Parking, 2017

Source: CTDOT and CDM Smith

Age of the Highway System

The majority of Connecticut's most vital highways – the Interstate System – was constructed in the 1950s and 1960s, and substantial portions were constructed earlier (**Figure 10.2**). Many roadways are continuously subject to greater traffic and loads than they were designed to handle. The increasing traffic volumes and heavier loads have accelerated the deterioration of the underlying layers of the pavement structure. This situation has made the subsequent rehabilitation of pavements increasingly more extensive and costly.

Figure 10.2: Age of the System

Source: Connecticut Department of Transportation

10.1.2 Freight Rail

The Federal Railroad Administration (FRA) has encouraged the railroad industry to move from a standard maximum car weight of 263,000 lbs. to one of 286,000 lbs. A more robust track structure is required to handle these heavier cars and many short lines do not have track and bridges capable of handling the heavier loads. Significant portions of Connecticut's rail lines cannot support 286,000 freight loads. These limitations result in a higher cost per ton, resulting in a disadvantage to shippers, which undermines the efficiencies of rail versus truck freight.

- Vertical and horizontal clearance issues can restrict the railroad's ability to increase services or capture additional markets. For example, the state's rail lines cannot accommodate double-stack rail cars.
- The Connecticut River Bridge between Windsor Locks and Enfield is in need of critical repairs.
- Many rail lines are old and need repair. Repairing culverts and bridge replacements are a cost burden on the smaller railroad operators.
- There is a desire for a regular interchange area/yard in Waterbury with Pan-Am Southern Railroad (PAS) that does not involve leaving interchange cars on the Naugatuck Main Line. This is critical to NAUG operations, as interchange cars left on the main line prevent NAUG from completing regular, federally mandated track and switch inspections.

- There is concern about trespassers riding all-terrain vehicles and off-road bikes along the rail line, which destroy the railroad roadbed, and endangers passengers as well as themselves. There is a need for better law enforcement and damage repair.
- High Amtrak car-mile charges financially affect the generation of new business.
- There is a need to enhance the resources available for grade crossing and trespassing programs.
- There is a need to revise the Rail Preservation and Improvement Program.
- Interviews with the various rail operators nearly universally pointed out a desire for partnering between the State railroad operations, planning, and economic development and freight railroads as a positive congestion-mitigation tool that Connecticut should be using. Rail freight operators point to the other New England States as examples of partnership solutions that help progress transportation improvements

10.1.3 Water Transportation

Connecticut's Deep-Water Port Strategy Study identified the following issues and initiatives for each port:

Port of Bridgeport Issues

- The Port of Bridgeport is hampered as a cargo port by the lack of conveniently accessible freight rail.
- Very difficult and expensive dredging challenges
- Loss of cargo markets and potential revenue streams
- Lack of consensus regarding east harbor land use
- Loss of shipyard operator
- Multiple layers of decision-making

Port of Bridgeport Initiatives

In early 2012, the Port of Bridgeport submitted a Dredged Material Management Plan to the United States Army Corps of Engineers (USACE) for review. While the USACE has acknowledged that continued maintenance dredging of Bridgeport Harbor is likely justified, the project cannot begin until federal funding is authorized, appropriated and committed to the project. The USACE has not recommended the project for funding, in part because waterfront commerce has been substantially reduced (mainly from lack of dredging).

Port of New Haven Issues

- Limited land availability
- Lack of labor compatibility for feeder service with the Port of New York/New Jersey
- Incompatible land uses
- Lack of potential public-sector revenue streams
- Multiple layers of decision-making

Port of New Haven Initiatives

- Maintenance dredging of the main channel is needed. Federal funding for the \$10 million project is being sought.
- There are U.S. Senate and House resolutions calling for a study to examine deepening the main channel to greater than 35 feet. A reconnaissance study costing about \$100,000 would be required to begin this process.
- Gateway Terminal, the most active terminal in the port, is interested in attracting new business such as the break bulk cargo or general cargo that once called on New Haven Terminal.
- Rail service to the New Haven Port District has begun with the reconstruction of a rail line along the eastern side of Waterfront Street. A series of sidings are proposed to enter the private property of various terminals. The City of New Haven has prepared final design plans and contract documents for the reconstruction of Waterfront Street. This project is estimated to cost \$6 million and will allow future construction of an estimated \$10 million worth of rail spurs across Waterfront Street to the private terminals.
- The site known as the North Yard, north of the I-95 corridor and Forbes Avenue, was identified in the Port Authority's Strategic Land Use Plan as a key site for further development to expand maritime use in the port district.

Port of New London Issues

- Loss of cargo markets and associated potential revenue streams
- Limited consumer market access
- Limited cruise industry interest

Port of New London Initiatives

- In the State Pier Needs and Deficiencies Study, significant improvements to the infrastructure at the facility are recommended; recommendations include the relocation of access roads, renovation to the piers, improvements to the bulkheads, paving of storage areas, and the construction of a new warehouse.
- Various civic and industry groups have suggested improvements to serve the regional fishing and seafood processing industries (to compete with New Bedford and Gloucester MA) as well as improvements to attract more cruise ship activity.
- CTDOT's preliminary capital plan includes approximately \$40 million for a multi-phase project to implement improvements to the State Pier, including those recommended in the State Pier Needs and Deficiencies Study.

Ferry Operations Issues

- Limited parking and queuing facilities at Bridgeport and New London port facilities.
- Need for expansion and relocation of Bridgeport Ferry to Barnum Landing.

10.1.4 Air Cargo

Air cargo is seeing an upward trend that is forecasted to continue over the next 10-15 years. A new on-airport cargo facility at Bradley International Airport is a priority and will position the airport to meet future air cargo demands. Potential areas for additional cargo facilities include:

- A 20-30-acre site located north of Runway 15-33, adjacent to the new Air Traffic Control Tower and fire school.
- A site located opposite the Aviation Facilities Company, Inc. facility east of Runway 15.
- Additional sites located on the northwest side of Runway 24 however, these sites have environmental requirements to be addressed.

10.2 NATIONAL TRENDS AND ISSUES

10.2.1 Panama Canal

The Panama Canal, completed in 1914, created one of the most important trade routes in the world, linking the Atlantic and Pacific Oceans. After nearly a century, the canal was expanded to increase capacity and accommodate larger ships at a cost of 5.25 billion. The expanded canal with new locks will allow for deeper, longer and wider “New Panamax” vessels, doubling existing throughput capacity from 5,000 20-foot equivalent units (TEU) on current vessels to (potentially) 13,000 TEU. The expansion, completed in June of 2016, is expected to reduce delays and shipper costs. The expansion may cause some waterborne shipments to shift to the Port of New York and New Jersey but it is unlikely to have a major impact on the mode or direction of freight movements in Connecticut.

10.2.2 Alternate Transportation Fuels

Compressed Natural Gas/Liquefied Natural Gas

In 2011, transportation use accounted for less than one percent of the natural gas consumed in the U.S. However, natural gas consumption in the transportation sector is expected to grow from 40 billion cubic feet (bcf) in 2012 to 850 bcf in 2040, an increase of 21-fold (U.S. Energy Information Administration (EIA)). Citigroup forecasts that 30 percent of the heavy truck fleet will shift to natural gas by the end of 2020; however, others project growth at a lower rate. Currently, the main obstacle to faster conversion from diesel and gasoline is the higher cost of natural gas-powered trucks and the lack of refueling stations for long-haul trips.

Natural gas is currently about 30 to 40 percent less expensive than diesel on a per gallon equivalent basis on the retail market. Consequently, commercial trucking fleets have begun converting to compressed natural gas (CNG) for short-haul operations and Liquefied Natural Gas (LNG) for long-haul operations. Companies with large fleets that have made commitments to CNG/LNG include United Parcel Service (UPS), Waste Management and AT&T, to name a few.

The EIA also projects that LNG will play an increasing role in powering freight locomotives in the coming years. Several major railroads are considering the use of LNG in their locomotives to lower long-term costs; however, the upfront capital cost in switching to LNG-powered locomotives is

substantial. While experts believe that a switch to LNG to some degree is inevitable, the pace of change and the penetration of change are highly uncertain. The EIA's projections on the use of LNG to meet rail freight energy needs range from a low of 16 percent in by 2040 to a high of 95 percent.

Further adoption of natural gas for transportation use will require more filling stations and widespread distribution and awareness by policy-makers. Currently, most filling stations (like those being built by UPS) are paid for and used privately. However, if demand for CNG and/or LNG fueling stations continues to grow, the State or local governments may need to consider policies to attract or allow for fueling stations so that more businesses (and, potentially, residents) can access this fuel.

Biofuels

Biofuels have the potential to reduce carbon emissions, reduce reliance on foreign oil and create rural economic development. For these reasons, biodiesel is an important biofuel for freight transportation. Increasing the use of a biodiesel blend has shown potential to be a short-term, relatively low-cost way to reduce freight-related emissions [including CO₂, nitrous oxides (NO_x), and particulate matter (PM-10)], which could be attractive to areas that are in nonattainment under Environmental Protection Agency's (EPA) air quality standards.

10.2.3 Air Quality and Regulation

The U.S. Clean Air Act regulates areas that do not meet the standards for criteria pollutants under the National Ambient Air Quality Standards (NAAQS). In nonattainment areas, federal law requires state and local governments to develop and implement plans for bringing these areas back into compliance. These areas operate under 'maintenance' state implementation plans (SIPs), which often have provisions affecting the transportation network.

As it relates to freight, project delays only prolong bottlenecks for truckers (who carry goods to other parts of the system), and restrictions on traffic in general can also affect trucks. Air quality regulation under the Clean Air Act is yet another factor driving environmental improvements in truck emissions and fuel use.

Additionally, the EPA is adopting more stringent exhaust emission standards for large marine diesel engines; the overall strategy includes adjusting Clean Air Act standards and implementing international standards. By 2030, the measures are expected to reduce annual nitrogen oxide (NO_x) emissions in the U.S. by approximately 1.2 million tons and particulate matter emissions by 143,000 tons. As trucking companies are required to retrofit exhaust systems or purchase new compliant trucks to meet more stringent requirements, the associated costs will mean higher operating expenses for shippers, which in turn will lead to higher costs to transport goods.

10.2.4 Climate Volatility

Climate volatility is likely to have more impact on the future of surface transportation than any other issue. Anticipated sea level rise, more extreme weather events, and an increase in very hot days/heat waves have the potential to severely impact the freight transportation network. State DOTs may face future challenges and implications for surface transportation such as meeting changing public expectations, adapting vulnerable transportation infrastructure, and addressing greenhouse gas (GHG) reductions.

10.2.5 Emerging Technological Trends Impacting Freight

Technological advancement is rapidly changing the nature of the freight industry. Technology can help gather data and to understand the transportation system, its operation, and opportunities for efficiencies. It can also improve operations, allowing for better movement of freight across a transportation network. Technology is perhaps the category with the greatest potential to change the transportation system in terms of freight mobility and delivery. Advances in vehicle technology and logistics operations move faster than regulatory bodies can adjust to them, so close coordination with the private sector is essential to ensure that the private sector interest in flexibility and the public-sector interest in safety and environmental protection are in balance.

Weigh-in-Motion Technology

Weigh-in-motion (WIM) is a technology that is embedded into the travel lane of an interstate or highway, and measures a truck's wheel weight as it passes over a scale pad at normal highway travel speeds. WIM can prove useful in protecting road infrastructure, enforcing limits on size and weight of trucks, and can be implemented in tandem with toll road systems. Typical primary use of WIM technology includes screening and preselection for further, more extensive enforcement and inspection actions. WIM scales are typically not accurate enough to issue an immediate citation or fine, but the technology can provide insight into certain trucks that may be near, at, or over the weight limit. This process greatly reduces the number of trucks that need to be stopped and physically weighed on a static scale at a traditional fixed weigh station, significantly elevating the mobility and efficiency of trucks traveling with legal loads and sizes.

Autonomous and Connected Vehicles

Connected and autonomous vehicles (VC/AV) are two related advances in vehicle technology aimed at making roadway travel safer and more efficient. Connected vehicles utilize short range communications and cellular networks for vehicle-to-vehicle communications [Vehicle to Vehicle (V2V)] or to the transportation network [Vehicle to Infrastructure (V2I)]. Connected vehicles are not self-driving. Autonomous vehicles use internal sensors, cameras, GPS, and advanced software to operate all functions of a vehicle without driver assistance.

The development of autonomous trucks continues to advance significantly. This type of truck uses a system called the Highway Pilot, which enables the human driver to switch control over to the truck's embedded system after entering the flow of traffic and reaching 50 miles per hour. This technology uses a combination of vehicle-to-vehicle Wi-Fi communication, radar and cameras to operate on Highway Pilot. CTDOT has confirmed that the major New England Interstate gateways (I-95/I-91/I-84) would be well suited for autonomous vehicle test bed applications.

Dedicated Freight Infrastructure

As technology advances, real-time data on parking availability, congestion, and road and weather conditions can be transmitted between vehicles, roadside units and traffic management centers.

As truck freight volumes increase, advances in Intelligent Transportation Systems (ITS) have the potential to optimize and improve the transportation network. Specifically, advances in ITS such as dedicated truck lanes and autonomous freight vehicles may improve the safety and efficiency of goods movement along roadways. One component of ITS currently used in urban areas to monitor highway

conditions and inform drivers of traffic slowdowns, delays and incidents is variable message boards/signs. Freight Advanced Traveler Information System (FRATIS) provides for the sharing of information between the terminal operator, truck dispatcher, and public with information about real-time and predicted port terminal queue time; real-time routing, navigation, traffic and weather data, and drayage.

In addition, applications can include advanced emergency management that aims to reduce congestion on major roadways through monitoring traffic incidents with closed circuit television cameras, dispatching vehicles to remove debris or hazardous materials, communicating the most direct routes to emergency vehicles to help them arrive more quickly at accident scenes and displaying information on dynamic message signs to alert travelers of any issues.

Truck platooning is an alternative to the long combination vehicles (LCVs) where trucks operate in closely-spaced, semi-automated platoons of three or more big-rigs, with two-way encrypted communications controlling their spacing. Trucks can reduce fuel usage from 5 to 10 percent by operating 50 to 75 feet apart (instead of today's mandated 300 feet). This requires a level of automation, in which the driver still controls steering but the automation controls acceleration and braking. Pilot projects are under way in several states, and several more have recently enacted legislation to enable this new technology.

A major hurdle to dedicated truck lanes and truck platooning is operating in mixed traffic. Motorists entering or exiting an interstate may have difficulty maneuvering through a "wall" of three-to five truck platoons. Large-scale platooning is anticipated to be more than a decade away. However, the timetable for planning, designing, financing, and constructing dedicated truck lanes could occur in the next 10-15 years.

Other Forms of Electronic Freight Management

The Electronic Freight Management (EFM) initiative is a USDOT-sponsored project that applies web technologies that improve data and message transmissions between supply chain partners. It promotes and evaluates innovative e-business concepts, enabling process coordination and information sharing for supply chain freight partners through public-private collaboration. In 2007, as part of its EFM program initiative, USDOT conducted an EFM deployment test in Columbus, OH with partners from a Limited Brands air cargo supply chain originating in China. Successful supply chain deployments of EFM technologies are delivering benefits such as increased efficiency and better customer service. Major users of these technologies report better integration with their partners and greater supply chain visibility.

Smart Roadside Program

The Smart Roadside program is a joint modal initiative between the FHWA and the Federal Motor Carrier Safety Administration (FMCSA). A component of the vehicle-to-infrastructure element of the USDOT connected vehicle research initiative, Smart Roadside is a system envisioned to be deployed at strategic points along commercial vehicle routes to improve the safety, mobility, and efficiency of truck movement and operations on the roadway. It is a concept where private- and public-sector motor carrier systems will continue to operate as intended and where information collected for one purpose can be shared where authorized to serve multiple stakeholders and uses. The objective is to apply advanced technologies to create more efficient and streamlined processes and to share data in real time

or near-real time to maximize its utility. The primary focus areas of Smart Roadside safety research are in various stages of operation and deployment. These are:

- **Electronic Screening (E-Screening)** is a key component of the information collection systems and communications networks that support commercial vehicle operation, referred to as the Commercial Vehicle Information Systems and Networks (CVISN). E-Screening involves automatic identification and safety assessment of a commercial vehicle in motion. With E-Screening, safe and legal vehicles are permitted to continue on their route. Enforcement resources can be used to target unsafe vehicles and carriers. Currently, E-Screening occurs at fixed stations and on-demand verification sites.
- **Wireless Roadside Inspection Program** research is being conducted to increase the number and frequency of safety inspections at the roadside and obtain data about the commercial vehicle and its driver. The program is examining technologies that can transmit safety data directly from the vehicle to the roadside and from a carrier system to a government system. The safety data being considered for transmission include basic identification data (for the driver, vehicle, and carrier), the driver's hours of service record, and sensor data that provide information on weight, tire, and brake status. Enforcement systems and staff will use this data to support E-Screening and inspections at locations such as staffed roadside sites, virtual weigh stations, and on-demand verification sites.
- **Truck Parking** research and ITS-based project deployments will provide commercial vehicle parking information so that commercial drivers can make early route planning decisions based on hour-of-service constraints, location and availability of parking, travel conditions, and loading/unloading.

The Connecticut Department of Transportation (CTDOT) and the Connecticut Department of Motor Vehicles (CTDMV) are studying the requirements and feasibility of a virtual electronic screening (e-screening) and weigh-in-motion pilot project. The study will identify the technological resources, solutions, and costs for a pilot installation of license plate reader (LPR), USDOT number reader technology and high-speed weigh in motion (WIM) technology. These tools will be used jointly by law enforcement to screen for motor carriers that may pose a particular risk to the traveling public. In addition to identifying the most appropriate and effective technologies for e-screening and weigh in motion for virtual enforcement, a research team will investigate the best methods to integrate the e-screening data with the FMCSA's Performance and Registration Information Systems Management (PRISM) program. As shown in **Figure 10.3**, Connecticut's four of the five weigh stations are located near borders with neighboring states, and one is located where I-691 and I-91 meet, near Meriden.

Figure 10.3: Locations of Weigh Stations, 2017

Source: CTDOT and CDM Smith

Additionally, State agencies will utilize the information gathered at e-screening operations for transportation infrastructure decision-making and budgeting, including pavement design, highway maintenance and rehabilitation, and freight planning and programming. If implemented, the e-screening system will be used in conjunction with a high speed virtual WIM station. The agencies envision this system to be installed at up to three potential sites:

1. Interstate 91 near the Massachusetts State Line
2. Interstate 395 near the Massachusetts State Line
3. Interstate 95 near the Rhode Island State Line

The system will screen trucks for compliance in an automated fashion and will transmit data to a nearby law enforcement vehicle. Overweight vehicles will also be flagged by the system and the data will be sent to the law enforcement officer on duty at the site. When vehicles are flagged by the system as out of compliance, enforcement officers will then pull over the vehicle and perform an inspection at a site to be determined by constraints of the pilot location. These roadside virtual weigh stations are expected to operate around the clock, capturing and transmitting the data to a centralized e-screening data capture and analysis system. The real-time data collected from these systems will be available for use in pavement design, highway maintenance and rehabilitation, freight planning and programming, and related applications.

Low Carbon and Zero-Emission Technologies

In 2015, the National Highway Traffic Safety Administration and the US Environmental Protection Agency proposed new CO₂ emissions and fuel economy standards for heavy duty tractor trailers that could produce a 24 percent reduction in carbon emissions. Tractor trailers contribute significantly to mobile-source CO₂ emissions due to the fact that they travel relatively long distances, carry heavy loads and use higher-carbon content diesel fuel. According to the proposed rule, the emissions reductions could be achieved through drive train improvements, idle reduction technologies, and vehicle components that reduce air and road friction³⁵.

10.2.6 E-Commerce and Drone Delivery

According to the U.S. Department of Commerce, online sales accounted for more than a third of total retail sales growth in 2015. When factoring out items not normally bought online such as fuel and automobiles, e-commerce accounted for more than 10 percent of all of retail sales. Web sales totaled \$341.7 billion for the year, a 14.6 percent increase over 2014's \$298.3 billion. As e-commerce or online retail purchases continue to increase, the demand for moving those shipments will also increase. E-retailers have quickly realized that last mile delivery is becoming a critical differentiator and a strategic priority. According to a survey by Accenture in 2016, two-thirds of online consumers now choose a retailer based on the number of delivery options, with another three-quarters looking at a retailer's return policy before completing an order.

Major delivery companies such as Amazon, Google, DHL, and UPS are now working on meeting the demand for faster, cheaper package deliveries by looking for efficient, time saving methods for home delivery including drone delivery. In June 2016, the FAA approved rules governing small commercial drones. Commercial uses such as package delivery are not yet allowed under the rules. However, the FAA is working to expand commercial uses for drones. Retailers and delivery companies have expectations that drone deliveries will allow drivers to make more deliveries per hour without driving additional miles. Amazon is piloting a drone delivery program called "Prime Air" that will deliver packages weighing less than 5 pounds to customers within 30 minutes from centrally located warehouses. Google parent company Alphabet and DHL are also working on their own drone delivery programs. Although drone delivery has several hurdles to overcome such as weather restrictions, FAA rules, and public acceptance; it has the potential to disrupt the trucking industry.

10.2.7 Trucking Trends

Because nearly every freight shipment travels by truck at some point in its delivery, challenges on the highway system can cause ripples through the state's freight transportation system and the economy. Delay, safety, and access issues raise costs for shippers, carriers, manufacturers and consumers alike.

Pavement and Bridge Maintenance

Substandard bridges and pavement may cause cargo damage and truck detours that increase distances and increase delivery times. The FHWA has issued a proposal to set minimum national standards for pavement and bridge conditions specific to pavement smoothness and the structural integrity of bridges.

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"EPA and NHTSA Propose Standards to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles for Model Year 2018 and Beyond", Regulatory Announcement, United States Environmental Protection Agency, June 2015

The initiative is one of three rulemakings mandated by MAP-21 that are aimed at establishing national performance management process to guide improvements on the national highway system. Once standards are adopted, states will be required to report on pavement and bridge conditions to the USDOT. If reported pavement and bridge conditions fail to meet the established minimum national standard, Connecticut will be required to dedicate highway formula funds to improve these conditions and lose the flexibility that MAP-21 and the FAST Act provide to use these funds for other priorities.

Truck Size & Weight Limits

Increases in the size and weight of vehicles may improve freight efficiency, but they may also have a lasting impact on roadway quality and state maintenance budgets and may compromise safety. In addition, heavier and larger trucks require route plans that may necessitate the need for lengthy detours due to weight limits, or vertical or horizontal clearances. The state's roadway system is relatively well equipped to handle the current truck configurations, in terms of size and weight, particularly in urban areas. Town and city roads are not built to the same standards however, and can suffer from the repeated stress of heavy truck loads. In rural areas, some infrastructure that was built decades ago may struggle to handle heavy farm loads.

Incident Management

Incident management describes the coordinated activities of transportation, emergency and law enforcement agencies to respond to accidents, highway construction, incidents and natural disasters such as hurricanes. Proper planning and investment in incident management can decrease the response times to emergencies and can help restore a corridor to pre-incident flow rates more quickly. Statewide and regional transportation planning for disasters, emergencies, and significant events provide a framework for comprehensive, multi-jurisdictional, multi-disciplinary preparedness, response, and management for a wide range of incidents that affect freight transportation systems in the state. Providing solutions that address all hazards will support transportation system management, congestion management, and emergency response preparedness. Barriers to better incident management exist within the state such as manpower, funding limitations, lack of best practices knowledge, and bureaucracy/coordination issues.

Limited Availability of Truck Parking

Hours of service regulations for truck drivers requires off-duty times for rest. The limited availability of parking may occasionally result in trucks parked on ramps and shoulders, which may present a safety risk. An inventory of parking supply conducted by a recent FHWA report notes that Connecticut has the 9th lowest number of commercial truck parking spaces (1,536) being accommodated by 20 public facilities and 16 private facilities. The location of truck parking facilities is critical especially in urban locations where the current supply may not be adequate in high demand locations.

Overall Condition and Design of Roadway Infrastructure

As the economy grows and new industries are established, the highway system will be expected to carry more freight. Heavy-use truck routes often experience rough pavement, tight turning radii, narrow lane width, short ramps, inadequate merging lanes, lane restrictions and overall capacity issues. Last mile connections on the local road systems can be particularly prone to these issues. Needs can range from small scale intersection improvements to the rebuilding and expanding of long stretches of highway links.

Improved Connectivity

Intermodal connectivity improves efficiency by increasing the mode choices and speed at which goods move throughout the State. Improving these connections can increase the velocity of freight, reduce transportation costs and positively impact freight-reliant industries.

Additional Transportation Funding Mechanisms

Connecticut is not unique in terms of transportation funding shortfalls. Transportation needs far outweigh the resources available and historically, freight needs have not received separate attention in transportation funding programs. There is a freight-specific need for additional transportation funding mechanisms, particularly for highway maintenance and construction. In addition, funding programs are often prescribed for specific types of projects or modes, limiting the ability to fund some high priority projects. Multimodal transportation funds, which can be used for transportation projects on a competitive basis regardless of mode, have begun to gain popularity in other states.

Truck Wayfinding and Routing

Truck freight routing decisions can be influenced in a number of ways. For example, events such as incidents and construction activities that occur far from a truck driver's current location can influence routing over long distances. Tolling policies and operational restrictions in one state can lead to diversions or re-routing decisions that adversely affect traffic conditions in another. Wayfinding and directional signage can have the same unintended effect. CTDOT has been particularly concerned about policies and traffic conditions that have encouraged trucks to use I-84.

There is a need for public agencies to exchange information and harmonize how trucks are managed in an operational sense. Regional and national coordinating bodies such as the American Association of State Highway Transportation Officials (AASHTO) and the I-95 Corridor Coalition offer forums for exchanging such information. More informal exchanges that lead to better coordination between public agencies is certainly desirable as well. For any exchanges to succeed, there must be a mutual recognition of the value in communicating and a way to institutionalize agreements into concrete actions.



II. FREIGHT TRANSPORTATION IMPROVEMENT STRATEGY

This chapter presents recommendations for freight investments, policies, and programs that Connecticut should implement to ensure the state's freight transportation system serves the current and future freight transportation needs of business, industry and consumers, and aligns with the national freight policy goals established under MAP-21 and FAST Act.

These recommendations are also aligned with Connecticut's long range statewide strategic multimodal transportation plan. They were carefully crafted by CTDOT and freight stakeholders to address current needs and support the major goals and objectives of this plan (as articulated in Chapter 2 of this report):

- **Goal 1: Safety and Security** – Enhance the safety and security of the freight transportation system in all modes.
- **Goal 2: Economic Competitiveness and Efficiency** – Support economic competitiveness, efficiency, and development through investment in the freight transportation system. Work with the private sector to identify needs and deficiencies.
- **Goal 3: Optimized Operations & Performance** – Ensure adequate capacity and operational efficiency of the freight system in Connecticut. Support the use of Intelligent Transportation Systems and technologies. Enhance the efficiency of the movement of goods into, out of, and throughout the State. Aim to improve the resilience of the freight system to extreme events or changes in travel demand.
- **Goal 4: State of Good Repair** – Proactively maintain freight system infrastructure to preserve CTDOT's capital investments.
- **Goal 5: Environmental Protection & Livability** – Ensure that improvements to the freight system do not negatively impact the environment and help improve the quality of life for Connecticut residents and visitors.
- **Goal 6: Program and Service Delivery** – Deliver projects and services faster, more cost-effectively and with greater customer satisfaction. Create strong partnerships with state agencies, local governments, neighboring states and the private sector to foster collaboration, improve program delivery and facilitate public-private partnerships.

The recommendations are centered on and organized under five categories including a general freight category and four categories that recognize the principal modes that the State relies upon for goods and commodities movement: truck freight, freight rail, marine freight, and air cargo. Within each category recommendations are further organized under three subcategories: infrastructure recommendations, policy recommendations and technology recommendations, where appropriate.

11.1 GENERAL FREIGHT RECOMMENDATIONS

11.1.1 Policy

- **Adopt Statewide Freight Plan.** The first step in integrating freight into CTDOT planning and project development activities is to adopt this Connecticut Statewide Freight Plan. Adoption of this plan by CTDOT, once it has been reviewed and accepted by the Federal Highway Administration (FHWA), will demonstrate the state’s commitment to address freight needs and advance effective freight transportation policies. The adoption of the Connecticut Statewide Freight Plan, along with updates every five years, will allow CTDOT to obligate National Highway Freight Program funds from December 2017 onwards.
- **Incorporate Recommendations into Statewide Rail Plan.** CTDOT is currently preparing a new plan for the state’s rail network, including freight rail. This Statewide Freight Plan, serving as the State’s freight transportation policy document, will be used to inform the Statewide Rail Plan by incorporating freight needs and recommendations, thereby improving coordination among various CTDOT departments.
- **Freight Transportation Performance Measures.** As discussed in Chapter 2, the adoption of performance-based planning for freight transportation systems is integral to enabling CTDOT to measure progress towards freight goals. The FHWA has gradually introduced a national transportation performance management system to monitor and base decisions on transportation performance. Performance-based planning is a data-driven, strategic approach to the planning and programming of future investments that prioritizes limited funding on the most strategic projects, adds accountability and transparency to the decision-making process, and improves program delivery.

Performance-based planning and programming is not only considered a best practice in the transportation industry but also is mandated by the FHWA under MAP-21 and FAST Act. The FHWA requires the use of data and other information on transportation system performance to make more effective and efficient decisions that improves resource allocation and leads to improved safety, emissions and freight movement outcomes, particularly on the National Highway System and Interstate Systems.

Following the phase-in period of federal performance management implementation and within six years, CTDOT will adapt the performance framework to be more freight-focused. The measures listed in the Goals and Objectives section of the plan should be reported for the freight-intensive network components, including the National Multimodal Freight Network, the Primary Highway Freight Network, and Critical Rural and Urban Freight Corridors. As an example, CTDOT will report on bridge condition for the “freight-intensive” highway network as a separate element. The plan recommends that CTDOT also report on those portions of the network where higher proportions of truck traffic are expected.

- Continue Dialog with Freight Stakeholders and Regional Partners.** As part of the process for developing the Connecticut Statewide Freight Plan, CTDOT engaged public and private sector freight stakeholders through a series of small group meetings held throughout the State. CTDOT will continue this program of stakeholder outreach to inform stakeholders of the status of freight projects and activities, solicit feedback, and work cooperatively to advance new policies. Connecticut will also continue to coordinate freight planning and freight-supportive land uses with Metropolitan Planning Organizations and Rural Councils of Government in Connecticut and work with the MPOs and COGs to prioritize, fund and implement freight capital improvements and institute new freight related programs and policies.

Engaging the private sector and freight stakeholders benefits CTDOT by creating an institutional framework for learning about freight trends, which are changing rapidly, and freight needs. Private sector stakeholders in turn can benefit from discussing the multiple competing objectives that public infrastructure investment addresses. During the plan's development, rail stakeholders cited a need for a point of contact to coordinate freight partnerships.

- Coordinate Freight Transportation Planning and Investment.** Connecticut will continue to coordinate transportation planning and investments among New England states, and New York State to ensure that issues impacting regional trade are identified and addressed strategically, and to avoid a scenario where one state's investment shifts a problem to another state. This is particularly important in New England where relatively small states with dense populations and transportation networks increase the likelihood of impacts spilling over state borders. Specific discussion topics include coordination and harmonization of trucking regulations, multi-state information-sharing with freight operators, tolling and value pricing policies and regionally-significant freight investment needs such as a new Hudson River freight rail crossing.

Connecticut officials participate in many regional coordination organizations, including the I-95 Corridor Coalition, the Coalition of Northeastern Governors (CONEG), the New England-New York Transportation Compact and others. Continued involvement in regional organizations such as these will allow the region's officials to collaborate on a regional vision for freight and to prioritize mutually beneficial investments.

11.2 TRUCK FREIGHT

11.2.1 Infrastructure

- Truck Parking Areas.** Increase number of truck-only parking areas.
- Truck Inspection Safety.** Construct wider breakdown lanes to allow for safe inspection of trucks.
- Implement the Investment Recommendations of the Long Range Statewide Transportation Plan.** Connecticut's Long Range Statewide Transportation Plan (LRSTP) identifies over \$79 billion in highway and bridge enhancement and state of good repair investments that will have a direct and positive effect on truck freight movement. The LRSTP addresses many of the capacity, operational and access issues identified in this freight plan.

Highways carry more than 94 percent of the State’s total freight and are therefore the most critical component of the State’s freight transportation infrastructure. Due to pervasive bottlenecks, congestion, and bridge deficiencies that have plagued many portions of the state’s highway network, highway travel times between Connecticut and regional markets are unreliable. This affects businesses and industries throughout the State and region.

Costly improvements such as additional travel lanes and extended truck climbing lanes are needed on many interstate routes and bridges on priority freight routes that do not meet the 100,000-pound weight capacity, or have substandard vertical clearances. These structures need to be reconstructed or replaced to accommodate heavy and oversize loads. In addition, real-time incident and travel information should be more widely available and the State’s oversize/overweight permitting process can be further streamlined. Addressing these deficiencies, will improve system efficiency and the reliability of truck access to and from Connecticut businesses.

The costs for improving the state’s highway network are significant, but the benefits relative to costs are also high. The state’s biggest challenge is to identify new funding sources to implement these freight-beneficial projects on a timely basis to improve travel time reliability for all users and to begin to realize the economic benefits. The highway and bridge elements of the investment recommendations are shown in **Table 11-1** and **Table 11-2**.

Table 11-1: Freight-Beneficial Highway Projects

Highway Projects	\$30,405,000,000
Statewide	\$15,965,000,000
New Truck Rest Areas Construction of new truck rest area facilities to address statewide truck parking shortage, providing safe and ample parking to meet demand.	\$500,000,000
Highway Needs - Pavement Funding needed to maintain state of good repair and achieve 0 percent poor roads on all state maintained roadways. This number represents pavement costs and not total project costs.	\$5,425,000,000
Highway Needs - Ancillary Assets Funding needed to maintain state of good repair of ancillary assets on state maintained roadways such as guardrail, lighting, signs, signals, etc. Excludes costs for major projects listed.	\$8,565,000,000
Safety Improvements on State Highway Network Fund safety improvements in addition to the safety improvements that are part of every project CTDOT undertakes.	\$50,000,000
Intelligent Transportation Systems (ITS) Project combines two federal-state initiatives that use Intelligent Transportation Systems technology to promote the safe and legal movement of commercial vehicle traffic within our state and across the nation. Through an automated system, both initiatives seek to improve highway safety by rewarding safe motor carriers, penalizing unsafe carriers and removing unsafe commercial vehicles from the roadways.	\$50,000,000
Annual Funding for Municipal Traffic Signal Program The municipal traffic signal enhancement program will be funded at a level of \$10 million per year. This is a new program proposed to assist local communities in upgrading, modernizing and improving traffic signal systems and signalized intersections in the municipalities, bringing them in conformance with the current MUTCD.	\$250,000,000

Highway Projects	\$30,405,000,000
<p>Local Transportation Capital Improvements Program (LOTICIP) This project will increase the Local Transportation Capital Improvement Program (LOTICIP) from a current funding level of \$45 million per year to an annual value of \$90 million per year. This program is established to support projects in Connecticut's municipalities.</p>	\$1,125,000,000
<p>New York to New Haven</p>	\$9,560,000,000
<p>Operationally Improve Rt. 8 Operational enhancements to the Route 8 corridor in Naugatuck Valley to address congestion. Include additional safety features, wider shoulders, longer and enhanced on and off-ramp geometrics and acceleration lanes, as well as operational lanes to improve operational safety along a portion of this corridor.</p>	\$500,000,000
<p>Reconstruct Rt. 7 from Grist Mill Road to Rt. 33 The reconstruction of existing Route 7 from Grist Mill Road in Norwalk to the intersection of Route 7 and Route 33 in Wilton will incorporate the expansion of the existing two-lane roadway to a four-lane facility, including safety improvements, geometric and operational enhancements at intersections, and appropriate left-turn lanes at critical intersections thereby enhancing safety and capacity.</p>	\$40,000,000
<p>Widen I-95 from NY State Line to Stamford These projects include the construction of an additional operational lane in each direction along I-95 from the NY State Border to Stamford. This highly congested corridor constructed in the early 1950s has outgrown its ability to serve the region and current operations present significant congestion and safety issues. The projects will enhance vehicular capacity, increase operational safety, and provide a significant benefit to the economic environment, as well as the ability of the coastal route to support tourism and recreation.</p>	\$1,660,000,000
<p>Widen I-95 from Stamford to Bridgeport These projects include the construction of an additional operational lane in each direction along I-95 from Stamford to Bridgeport. This highly congested corridor constructed in the early 1950s has outgrown its ability to serve the region and current operations present significant congestion and safety issues. The projects will enhance vehicular capacity, increase operational safety, and provide a significant benefit to the economic environment, as well as the ability of the coastal route to support tourism and recreation.</p>	\$4,085,000,000
<p>Widen I-95 from Bridgeport to Milford Connector These projects include the construction of an additional operational lane in each direction along I-95 from the Bridgeport to Milford Connector. This highly congested corridor constructed in the early 1950s has outgrown its ability to serve the region and current operations present significant congestion and safety issues. The projects will enhance vehicular capacity, increase operational safety, and provide a significant benefit to the economic environment, as well as the ability of the coastal route to support tourism and recreation.</p>	\$1,930,000,000
<p>Widen I-95 from Milford Connector to New Haven These projects include the construction of an additional operational lane in each direction along I-95 from the Milford Connector to New Haven. This highly congested corridor constructed in the early 1950s has outgrown its ability to serve the region and current operations present significant congestion and safety issues. The projects will enhance vehicular capacity, increase operational safety, and provide a significant benefit to the economic environment, as well as the ability of the coastal route to support tourism and recreation.</p>	\$1,325,000,000

Highway Projects	\$30,405,000,000
<p>Reconstruct and Reconfigure Exit 59 on Rt. 15 (Wilbur Cross Parkway) The reconstruction and reconfiguration of the existing Exit 59 interchange in New Haven/Woodbridge on Route 15 (Wilbur Cross Parkway), addressing an area which has substandard geometry.</p>	\$20,000,000
<p>New York to Hartford</p>	\$2,170,000,000
<p>Reconstruction of I-84 interchange at Route 4 and Route 6 in Farmington The reconstruction of I-84 in the Route 4 and Route 6 area in Farmington will incorporate additional operational and safety improvements amongst interchanges to provide improved access to Connecticut Route 9. Recommendations to be incorporated include the removal of the on and off ramps to Connecticut Route 4 from I-84 mainline. Access will be provided through a local collector distributor roadway. A new eastbound portion of I-84 will be constructed to carry three lanes of traffic and eliminate the right lane drop to Connecticut Route 9. A direct connection from Connecticut Route 4 and Route 9 southbound will be provided. These improvements will provide better connections to all state routes and enhance operational safety.</p>	\$130,000,000
<p>Widen I-84 from NY State Line to Danbury Exit 3 Widening of I-84 from the NY State Line to the Danbury Exit 3, with the addition of one operational lane. I-84 is heavily travelled by commercial vehicles and is a major freight corridor utilized by many of the interstate trucking routes and these improvements will provide a higher level of service for commercial operations and improved safety for all motorists increasing capacity from 2 to 3 lanes.</p>	\$150,000,000
<p>Widen I-84 from Danbury Exit 3 to Exit 8 Widening of I-84 near Danbury between Exit 3 and Exit 8, with the addition of one operational lane. I-84 is heavily travelled by commercial vehicles and is a major freight corridor utilized by many of the interstate trucking routes and these improvements will provide a higher level of service for commercial operations and improved safety for all motorists increasing capacity from 3 to 4 lanes.</p>	\$640,000,000
<p>Operational Lane Improvements on I-95 Between Exits 8 and 10- This project will provide a speed change lane on I-95 northbound from Exit 8 in Stamford to Exit 10 in Darien. This project will also include the replacement of a bridge over the New Haven Line (NHL), which is in poor condition and is one of the most constrictive bridges on I-95 between New Haven and the New York State line. The creation of speed change lanes in this area will improve operations and improve capacity to reduce congestion.</p>	\$490,000,000
<p>Widen I-84 from Danbury Exit 8 to Waterbury Exit 18 Widening of I-84 from Danbury Exit 8 to Waterbury Exit 18, with the addition of one operational lane. I-84 is heavily travelled by commercial vehicles and is a major freight corridor utilized by many of the interstate trucking routes and these improvements will provide a higher level of service for commercial operations and improved safety for all motorists increasing capacity from 2 to 3 lanes.</p>	\$720,000,000
<p>Construct operational lane on I-84 between Exits 40 & 42 in West Hartford The section of I-84 between Exits 40 and 42 has been identified as having a significant substandard roadway cross section to accommodate the current vehicular volumes and also presents a significant operational safety issue. The cross section will be improved through the addition of auxiliary lanes to be constructed on I-84 eastbound between New Britain Avenue and South Main Street and I-84 westbound between Park Road and Ridgewood Road to increase capacity and relieve congestion and improve operational safety.</p>	\$40,000,000
<p>New Haven to Springfield, Mass</p>	\$500,000,000

Highway Projects	\$30,405,000,000
Operational & Safety Improvements at Rt. 9/Rt. 17 On-Ramp Improve Route 9 northbound on-ramp from Route 7, which will incorporate an additional acceleration lane and taper distances to enhance safety and reduce accidents in this area.	\$30,000,000
Reconfigure Interchanges of Rt. 9/Rt. 66 and Rt. 9/Rt. 17 Reconfigure interchanges with Route 9 and Route 17 and 66 in Middletown to incorporate direct connections between the Arrigoni Bridge and Route 9, eliminating the existing at-grade signalized intersection on Route 9 which is currently the cause of significant congestion and a number of major accidents. These improvements will enhance operational safety and provide enhanced air quality resulting from the removal of the signalized intersections.	\$390,000,000
Operational Improvements on I-91 at I-691/Rte 15 Interchange Enhancements of the northbound and southbound I-91 area in Meriden between Exit 15 and Exit 20, incorporating an additional operational lane in each direction to allow for smoother transition of the northbound on-ramp and elimination of the continual queued right lane condition on southbound on I-91 as a result of the Wilbur Cross Parkway Route 15 off-ramp configuration. These improvements will provide a higher level of operations along this section of I-91 as well as enhanced safety reduction in accidents.	\$80,000,000
Eastern Connecticut	\$2,210,000,000
Widen I-95 from Baldwin Bridge to Gold Star Bridge (Including New I-395 / Rt. 11 Interchange) The widening initiative for I-95 from Goldstar Bridge to the Rhode Island State Line, includes the addition of an operational lane along this section. The existing corridor serves many of the intra-State and inter-State recreational and tourist areas. The widening will provide additional capacity, enhanced safety, and access throughout the corridor.	\$1,200,000,000
Widen I-95 from Branford to Baldwin Bridge Widen I-95 from Branford to Old Saybrook from 2 to 3 operational lanes in each direction. Will provide additional capacity, enhanced safety, and improved access throughout the corridor.	\$720,000,000
Widen I-95 from Gold Star Bridge to Rhode Island State Line Widen I-95 from Groton to Rhode Island State Line from 2 to 3 operational lanes in each direction. Will provide additional capacity, enhanced safety, and improved access throughout the corridor.	\$290,000,000

Table 11-2: Roadway Bridge Improvement Project

Roadway Bridge Projects	\$35,190,000,000
Statewide	\$19,200,000,000
Bridge Needs Funding needed to reach and maintain less than 10 percent structurally deficient bridges statewide (by deck area) within 20 years. This cost includes all bridges within the state, both state maintained and locally maintained bridges that are over 20 feet in length and located on a public road. The cost includes only the rehab or replacement of the bridge elements and excludes other related project components and costs. The cost to rehab and or replace the individual bridges listed in this document has been removed from this cost and represented in those individual project costs.	\$18,700,000,000

Roadway Bridge Projects	\$35,190,000,000
<p>Local Bridge Program Increase the state funded local bridge program from \$10 million per year to \$20 million per year for 25 years. As a result of a new round of inspections of municipal bridges with spans less than 20 feet (most of which have not been inspected for more than 20 years), it is anticipated that there will be a significant increase in the need for rehabilitation projects on local bridges. In addition, a substantial increase in the number and speed of delivery of federal local bridge projects is anticipated as a result of a new pilot program where project design phases are managed and funded by CTDOT under 80 percent federal and 20 percent State funds in lieu of the standard program with projects design phases funded 80 percent federal, 20 percent local, and managed by the municipalities. Construction phases will continue to be funded under 80 percent federal and 20 percent local and managed by the municipalities.</p>	\$500,000,000
<p>New York to New Haven</p>	\$360,000,000
<p>Rehab and Repair Commodore Hull Bridge on Rt. 8 This bridge, 1,600 feet in length, carries Route 8 over the Housatonic River and Route 110 in Shelton and Derby. Constructed in 1951, its structures have a failing paint system, resulting in section loss to some steel members. This project will include abrasively blasting clean all of the superstructure steel and applying a protective paint coating system, to protect the structural steel from corrosion.</p>	\$35,000,000
<p>Rehab West Rock Tunnel on Rt. 15 in Woodbridge Built in 1949, this 1/4-mile twin tunnel conveys the Wilbur Cross Parkway under the West Rock Ridge. It requires constant maintenance due to its poor condition and hazards created by falling concrete, ice, and poor illumination. Rehabilitation will use innovative means to maintain traffic flow during construction and to shorten the duration of construction.</p>	\$235,000,000
<p>Replace Stevenson Dam Bridge on Rt. 34 Replacement of this bridge that carries Route 34 over the Housatonic River in the Towns of Oxford and Monroe will address substandard, deteriorating conditions and improve road geometry which contributes to vehicular operational problems.</p>	\$90,000,000
<p>New York to Hartford</p>	\$12,335,000,000
<p>Replace I-84 Viaduct, Hartford This project will replace the I-84 viaduct (originally built between 1965 and 1967) in downtown Hartford. Known as the “Aetna Viaduct,” this one-mile long series of structures carrying 8 to 10 lanes of I-84, requires attention due to deterioration. The urban setting, critical constraints and complexities of the area requires the extension of work beyond the existing viaduct limits to improve the transportation infrastructure while lessening the highway’s impact on surrounding neighborhoods and improving community cohesion, livability and the economic vitality of Hartford.</p>	\$5,270,000,000
<p>Replace I-84 Mixmaster, Waterbury This interchange, built between 1965 and 1967, requires rehabilitation or replacement of substantial bridge structures and highway ramp improvements to expand capacity, correct operational deficiencies and enhance safety, includes expanding capacity and enhancing safety-Of the numerous structures that form the interchange, the most significant are I-84 EB (3,766 ft.), I-84 WB (2,461 ft.), Rt. 8 NB (2,634 ft.) and Rt. 8 SB (1,589 ft.). The I-84/Rt. 8 interchange is unique in Connecticut as I-84 is double-decked as it crosses Rt. 8 and the Naugatuck River. Rt. 8 is also double-decked just south of I-84.</p>	\$7,065,000,000
<p>New Haven to Springfield, Mass</p>	\$2,295,000,000

Roadway Bridge Projects	\$35,190,000,000
<p>Additional Bridge Crossing Over Connecticut River- In addition to the Arrigoni bridge, a new major bridge will be built over the Connecticut River in the Middletown area to alleviate congestion. This option will require a considerable amount of new road construction, including a new interchange at Route 9, reconfiguration of the existing interchanges on Route 9 in Middletown, and construction of connecting roads on the Portland side, and major ROW purchases.</p>	\$2,000,000,000
<p>Replace Putnam Bridge on Rte 3 over Connecticut River Project will replace the 2,400-foot-long, four-lane bridge carrying Rt. 3 over the Connecticut River between Wethersfield and Glastonbury. Constructed in 1959, the structure has been subject to multiple rehabilitation projects and emergency repairs and continues to be a maintenance liability. Due to substandard shoulder widths, maintenance efforts or emergency response results in a major impact to traffic. This is a major river crossing and provides traffic relief to the other major river crossings in Hartford and Middletown. The replacement structure will minimize maintenance needs, improve safety and traffic flow and provide relief on other river crossings. In addition, a 6' sidewalk will be added creating a much-needed pedestrian river crossing.</p>	\$295,000,000
<p>Eastern Connecticut</p>	\$1,000,000,000
<p>Replace Gold Star Bridge (Northbound Only) - I-95 Over Thames River- Replace 5,931-foot-long deck truss bridge carrying 5 travel lanes in New London/Groton. Widened in 1975 but a significant amount of the original 1943 superstructure and substructure was retained and requires replacement.</p>	\$900,000,000
<p>Safety & Capacity Improvements at Mohegan-Pequot Bridge - Route 2A over Thames River- Improve safety, relieve traffic congestion and provide better access to development around casinos as part of Route 2/2A/32 corridor improvements in Montville/Preston. Widen Route 2A from 1 to 2 lanes in each direction from Interchange 2 to Rt. 12.</p>	\$100,000,000

11.2.2 Policy

Streamline Trucking Permits and Regulations. Many freight stakeholders perceive Connecticut's regulatory environment a hindrance to operating their businesses efficiently. They complain about difficulties tracking the status of truck drivers' commercial licenses; onerous certification requirements for hauling potable water, transporting fuel, or gaining access to port facilities (such as TWIC card requirement); Department of Motor Vehicles (DMV) restrictions on the number of transactions that can be processed per visit, which requires them to take multiple unnecessary and costly trips to the DMV offices; the process of obtaining apportionment plates from the DMV; and the difficult process of getting oversize and overweight vehicle permits from CTDOT. Connecticut will engage the stakeholders and determine whether there are cost-effective ways to improve the efficiency of implementing permitting, licensing and the enforcement of regulations in general. For example, the State could develop an online system for drivers to easily check and track the status of their Commercial Drivers Licenses or obtain other licenses and permits. The State could also improve the alignment of DMV rules and regulations related to truck size, weight, and wet-weather travel with those of neighbor states and streamline the oversize/overweight vehicle permitting process. Additionally, the state would like to expand and adopt the current pilot program that allows oversize/overweight travel on weekends. Such business-friendly changes to permits and regulations would provide much needed relief to freight operators and remove barriers to efficiency and competitiveness.

11.2.3 Technology

The ability to move freight into and out of the State efficiently and reliably, regardless of incidents related to weather, construction activity and vehicular crashes, is of critical importance to the State's economy. Within the past decade, innovations in the telecommunications industry and in the development of shipping containers have enabled many companies to compete in global markets, to shift to "just-in-time" delivery of inventory, and to realize cost savings by using multimodal transportation. These technological advances benefit manufacturing and retailing and maintain competitive prices for consumers, but they can be nullified by ineffective or inefficient highway operations. Extended highway closures or incident caused delays can result in loss of revenues and contribute to industry decisions to relocate.

CTDOT is committed to maintaining highways free of obstacles created by weather or incidents and to plan construction projects to minimize impacts to peak hour travel. However, more can be done to take advantage of emerging technologies to keep highways free-flowing for the benefit of freight and passenger traffic alike, including emerging intelligent transportation systems (ITS) technologies that better monitor system performance and communicate traffic and roadway conditions directly to motor carriers and truck drivers.

Smart freight vision or freight advanced traveler information systems (FRATIS) would provide dynamic travel planning, improve on-time performance and optimize intermodal drayage operations by integrating existing Connecticut corridor data on travel times and construction activity with real-time information on travel conditions and roadside incidents. Such systems could be implemented through public-private partnerships and thus speed deployment. They might include:

- **Congestion Reduction.** CTDOT currently deploys various ITS technologies including variable message signs, web-based portals and smart phone messaging to alert travelers of travel conditions and to suggest alternate routes, but new systems are smarter and more predictive. Cutting-edge logistics technologies such as cloud-based, real-time road congestion and construction notifications will create efficiencies in the movement of cargo and decrease

bottlenecks. Real-time information targeted to truckers should be made available on variable message signs along strategic routes and via privately operated phone-based or web-based applications.

- **Truck Parking Information Services (TPIS).** TPIS is a network of commercial and public facilities that provide real-time information on the availability and reservation of truck parking. Information would be pushed directly to the driver and made available on a variety of devices.
- **Truck Alternate Routing Services (TARS).** TARS delivers a truck-specific GPS navigation solution that accounts for truck-restricted and prohibited roads. The service would provide safe and reliable navigation around congestion and accidents on roads that are safe for the truck to maneuver.
- **Truck Travel Predictive Services (TTPS).** This service would consider the driver's current location, predicted arrival time, current traffic conditions, historical traffic patterns, and estimated hours of service remaining in their hours of service log. TTPS analyzes the current traffic in comparison with the historical averages for the time of day and day of the week and considers other factors such as persistent trends (seasons, holidays, and months), temporal trends (construction), and dynamic trends (weather).
- **Truck Road Weather Travel Services (TRWTS).** TRWTS is an application that pushes roadway link-specific information on road weather to users' in-vehicle equipment or personal wireless devices. The freight traveler operating on Connecticut interstates would receive road weather alerts and warnings within a shortly after adverse conditions are detected by mobile data sources.
- **Truck Smart Roadside (TSR).** TSR solutions include technology sharing capabilities for sharing of data associated with the operation of commercial vehicles between customer business systems, roadside facilities, weight-in-motion scales systems, truck parking systems, and government systems. The data is seamlessly collected at roadsides to improve motor carrier safety, security, operational efficiency, and freight mobility.
- **Weigh-in-Motion Systems.** Truck safety depends upon various monitoring systems and enforcement programs operated and managed by CTDOT and other State agencies such as the Connecticut Department of Emergency Services and Public Protection and the Connecticut Department of Motor Vehicles. ITS programs that contribute to safer trucking include weight-in-motion systems, which estimate truck weights while vehicles are traveling at highway speeds. Connecticut's current weight-in-motion systems could be enhanced with TSR technology to improve enforcement of overweight trucks.
- **Pursue Creation of a Digital Process to Automate OS/OW Truck Permits.** Assess options for and feasibility of implementing an automated, GIS-based process to map optimal routes for oversize/overweight trucks that integrates real-time road/bridge conditions to improve outcomes and streamline the permitting process.

11.3 FREIGHT RAIL

11.3.1 Infrastructure

Much of Connecticut's freight rail infrastructure is aging and does not meet current national standards. For example, many of Connecticut's short lines and many bridges on some of its main lines cannot carry railcars loaded to 286,000 lbs., the de facto national standard; and most freight lines are limited to operating at FRA Class I and Class 2 standards. These constraints require Connecticut rail shippers and customers to under-load rail cars and travel at speeds limited to 10 to 25 miles per hour. However, there are limits to the extent to which this upgrade can be accomplished. Routes with overhead catenary (electric) lines have not been designed to accommodate double-stacking of trains.

Rail operations in Connecticut are further complicated by deferred maintenance and the fact that the regional and short line railroads operating within the state must interchange railcars with the national railroads at terminals outside Connecticut. This is often time-consuming and inefficient, making rail service even less competitive with trucking.

For freight rail to be competitive with truck freight, more investments are needed to maintain and upgrade Connecticut's rail infrastructure at Class 2 or better. CTDOT will pursue cooperative agreements with the State's private rail operators and execute public-private partnerships that would incentivize private reinvestment in freight rail and retain and attract rail-served industries.

- Upgrade all feasible lines to 286K weight-bearing capability.** As the agency responsible for the State-owned rail lines, CTDOT will work with private railroad owners to advance programs to upgrade track and bridges to safely and feasibly accommodate 286,000 lbs. railcars, as well as:
 - *Improve access to CSX Class I terminals in New Haven and West Springfield.*
 - *Reestablish operation of the Maybrook Line (Derby, CT to Maybrook, NY via Danbury, CT).*
 - *Develop a definitive plan for the New Haven-Hartford-Springfield Line to accommodate both passenger and freight rail needs. There is considerable momentum to construct improvements on the New Haven – Hartford – Springfield line including the rehabilitation of the Windsor Locks-Enfield Connecticut River Bridge to support 286,000-lb., industry-standard load and the rehabilitation of Hartford Union Station elevated track to support 286,000-lb., industry-standard load to maintain and enhance freight access to West Springfield Terminal. However, there has also been discussions about electrifying the line, which may be incompatible with double-stack freight operations.*
 - *Maintain Pan Am line to the same class as the Springfield Line that feeds into it.*
 - *Prioritize where full, double stack clearances are warranted and implement a capital investment program for bridge or catenary reconstruction to provide those clearances.*
 - *Upgrade the New England Central Railway (NECR) including replacing and increasing vertical clearances to accommodate the heights of Phase II double-stack containers between Willimantic and New London.*

- **Improve Rail Sidings and Transloading Facilities.** Identify specific locations where new sidings, interchange and off-loading areas, and railcar storage yards are warranted and prioritize their construction to improve freight movements or remove bottlenecks, particularly on freight lines that are shared with commuter rail service where daytime windows are needed for freight movements. Provide assistance to freight railroads to implement these improvements.
- **Improve Intermodal Connections Between Maritime Freight and Freight Rail.** Coordinate with the Statewide Port Authority to facilitate improvements to maritime-to-rail connections and maritime to highway connections at Connecticut’s Deepwater ports.
- The projects shown in **Table 11-3** from the Strategic Plan address many of these freight rail recommendations:

Table 11-3: Freight-Beneficial Projects Identified in Long Range Statewide Transportation Plan (LRSTP)

Rail Projects	\$12,175,000,000
New York to New Haven	\$750,000,000
Rail Freight Network Establish annual funding program to maintain state-of-good repair across state-wide rail freight network, including rights-of-way, bridges and structures, at-grade rail crossings, culverts and special projects.	\$750,000,000
New York to New Haven	\$10,225,000,000
Fixed Rail Bridges State of Good Repair Rehab and or replace all fixed rail bridges on New Haven Line (NHL) to attain state of good repair. This includes all fixed rail bridges on mainline and branch lines.	\$2,175,000,000
Moveable Rail Bridges - State of Good Repair Rehab and or replace all moveable rail bridges on New Haven Line (NHL) to attain state of good repair.	\$2,825,000,000
Rail Track Program Improvements and upgrades to existing tracks on New Haven Line (NHL) including concrete tie repair, interlocking, drainage, track, ties, rail and road bed.	\$1,680,000,000
New Canaan Branch Line Improvements Significant improvements on New Canaan branch line service between Darien and New Canaan to increase frequency and enhance service to and from mainline. Improvements include Springdale siding, platform and station improvements.	\$45,000,000
Electrify Danbury Branch Line Electrification of existing Danbury branch line service between South Norwalk and Danbury would allow for extended one seat ride service on New Haven Line (NHL).	\$400,000,000
Extend Rail Service from Danbury to New Milford This includes all the estimated capital costs associated with extending rail service from Danbury to New Milford without electrification.	\$450,000,000
Waterbury Branch Line Improvements improvements to Waterbury branch line service between Bridgeport and Waterbury to increase frequency and enhance service to and from mainline. Improvements include completion of signalization, grade crossings, sidings, and station improvements.	\$350,000,000
Track Improvements Between Milford and New Haven Restore four track capacities between Milford and New Haven to increase capacity and enhance service on New Haven Line (NHL).	\$300,000,000

Rail Projects	\$12,175,000,000
Full Capacity New Haven Line Service (NHL) Re-align Connecticut's existing tracks and stations between New Haven and New York to provide significant frequency and speed enhancements on New Haven Line (NHL). This project would result in a two-track local and two track express service on the mainline, with center island platforms at key locations between New Haven and New York. It includes communications and signal enhancements.	\$2,000,000,000
New York to Hartford	\$200,000,000
Berlin-Waterbury Rail Improvements Upgrade existing freight rail line (includes track, bridges, & Terryville tunnel). Preserve option for future passenger rail service.	\$200,000,000
New Haven to Springfield, Mass	\$580,000,000
Rehabilitation of Connecticut River Railroad Bridge This bridge is located over the Connecticut River between Windsor Locks and Enfield. Major rehabilitation and replacement of the center span is needed due to age and condition. Improvements will allow for higher load ratings and increased speeds.	\$80,000,000
Track Improvements Hartford Line improvements from Windsor to Springfield, includes double-tracking. This improvement would allow for increased rail service from 17 round trips per day to 25 round trips per day.	\$500,000,000
Eastern Connecticut	\$420,000,000
Replacement of CT River Railroad Bridge Replacement of the Amtrak moveable bridge in Old Saybrook. This project will allow for increased load ratings, greater reliability and higher speeds for both Shore Line East (SLE) commuter rail and Amtrak inter-city regional rail service.	\$220,000,000
Freight Rail Improvements in Eastern Connecticut Includes estimated capital costs to improve the existing NECR and P&W rail freight lines in Eastern Connecticut from New London north to Massachusetts, preserving options for future passenger rail service. Improvements include tracks, bridges, sidings and grade crossings.	\$200,000,000

11.3.2 Policy

- Preserve rail siding access to existing industrial sites.** Connecticut has many undeveloped, under-utilized or abandoned rail-served industrial sites; however, due to disinvestment or lack of maintenance of rail infrastructure, particularly short lines, or changes in land use, Connecticut is losing rail sidings access. When shippers and distribution centers lose their access to the rail network they must then transport goods by truck to an off-site transload facility or, more likely, the goods may be shipped by truck for the entirety of the trip. CTDOT will work cooperatively with regional partners, such as Metropolitan Planning Organizations and Regional Councils of Governments, to implement a program that identifies rail siding access to industrial sites where rail customers currently exist or where rail shippers may develop new facilities and then. This identification process would be a first step in understanding the value of rail infrastructure to better advocate for its preservation, in order to maintain rail as a viable transportation option for the State's shippers, maintain market competition with trucking and improve the freight rail market share.

- **Leverage economic development opportunities with transportation investments and improvements.** CTDOT will optimize its rail system assets by continuing to work collaboratively with state, regional and local economic development agencies to attract new freight rail dependent industries and develop new approaches to capture the public and private benefits of locating at new or redeveloped rail-served sites.
- **Public-Private Partnerships.** Institute Public-Private Partnerships (P3) between CTDOT and private freight railroad owners and operators in Connecticut covering railroad planning, operations, capital improvements, matching grant programs and economic development to:
 - Effect fair and transparent governance of rail lines to improve safety, reduce trucks on state roads, and mitigate highway congestion.
 - Reduce barriers to funding for rail operators that do not own tracks.
 - Provide tax incentives or credits for non-highway freight transport.
 - Facilitate the conversion of brownfields adjacent to freight rail lines to productive industrial development sites that could support rail freight customers.

11.3.3 Technology

- **Positive Train Control (PTC).** According to the Federal Railroad Administration (FRA), Congress required Class I railroad main lines handling poisonous-inhalation-hazard materials and any railroad main lines with regularly scheduled intercity and commuter rail passenger service to fully implement PTC by December 31, 2018. PTC uses communication/processor-based train control technology that prevents train-to-train collisions, overspeed derailments, incursions into established work zone limits, and the movement of a train through a main line switch in the wrong position. CTDOT will ensure private freight rail operators in Connecticut comply with these requirements.
- **Rail Bridge Database.** Upgrade CTDOT's highway and rail bridge database to provide reliable and complete vertical and horizontal clearance information.
- **Modernize At-Grade Crossings.** Upgrade at-grade crossing signals with full protection including gates and modern lights.

11.4 MARITIME FREIGHT

11.4.1 Infrastructure

- **Intermodal Connectivity.** Prioritize and construct identified intermodal connectivity improvements between freight rail and ports (e.g. new sidings and improved tracks) and between truck freight and ports (e.g. truck staging areas/lay down areas and improved connections between ports and the Interstate System) in the ports of New London, New Haven and Bridgeport.

- **Dredging and Maintenance.** Work with CT DEEP, the US Coast Guard, and the Army Corps of Engineers to fund and execute the dredging and maintenance of Connecticut’s navigable waterways and deepwater channels.
 - New Haven is the state’s most important cargo facility and its current business is threatened by shoaling and poor channel maintenance.
 - Scores of smaller marinas, which provide economic, tourism and recreational benefits to the State, need dredging.

Table II-4 presents Long Range Statewide Transportation Plan (LRSTP) projects that would improve maritime freight movements in Connecticut

Table II-4: Freight-Beneficial Port Projects Identified in Long Range Statewide Transportation Plan (LRSTP)

Port Improvement Projects	\$711,000,000
New London Thames River Dredging Authorized depth of Thames River Federal Navigation Project (FNP) is 35 feet though United States Navy (USN) maintains most of channel at 40 feet. Project will provide consistent FNP leading into State Pier Facility of 40+ feet.	\$11,000,000
Port of New London/State Pier Repairs State Pier repairs and minor improvements such as dock levelers, LED lighting, etc.	\$40,000,000
Port of Bridgeport Dredging Project would remove shoaling thus return the authorized depth of the Federal Navigation Project (FNP) to 35 feet.	\$54,000,000
Harbor Maintenance Maintenance dredging of small to midsize ports and harbors at \$5 million per year for 25 years. This investment will ensure the on-going economic viability and allow for safe passage of vessels.	\$125,000,000
Rocky Hill-Glastonbury Ferry Maintenance Dredging Remove sediment from ferry landings on both sides of the CT River.	\$1,000,000
Ferry Improvements Rehab and replacement of existing vessels, tugs/barges, docks, piles, etc.	\$50,000,000
Port of New Haven Improvements Includes completion of rail link to terminals, additional trackage and sidings, and deepening of channel.	\$130,000,000
Port of New London/State Pier Improvements Port of New London/State Pier infrastructure improvements including relocation of access roads, renovation to the piers, improvements to the bulkheads, paving of storage areas, and the construction of a new warehouse-State Pier Strategic Infrastructure Improvement project deepens all berths, realigns entrance gate, removes hillock improves rail access to piers. East and West wharves repaired/replaced as Phase 4 and 6 respectfully. Purchase of specialized cargo handling equipment and investments to incentivize private infrastructure investments.	\$300,000,000

11.4.2 Policy

- **Increase dry bulk and break-bulk cargoes**
 - Extend the service areas of ports into competitive regional markets.
 - Explore cost sharing opportunities with the private sector to expand port operations.

- Revise State Pier solicitation process to seek a long-term public-private partnership. Existing short-term leases and rent structures do not incentivize/reward cargo growth.

11.5 AIR CARGO

Air freight provides transportation for high-value and extremely time sensitive cargo. While air freight tonnage is low compared to the tonnage carried by truck and rail, air transport serves businesses shipping high-value electronics, aerospace, bio-medical and business parcels.

Bradley International Airport (BDL), which is owned and operated by the Connecticut Airport Authority (CAA), in Windsor Locks, CT, on State Route 20, three miles west of I-91. BDL is the largest airport in the state and in 2014, was ranked the 54th busiest airport in the country based on passengers enplaned. In addition to passenger service, the airport also handles air cargo, and is the primary air cargo airport in Connecticut.

In 2015, BDL was ranked 30th in cargo landed weight, nationally. Three quarters of BDL's air freight currently moves on flights operated by U.S. domestic integrated carriers including FedEx and UPS. It is expected that BDL's strategic location between two international gateways, John F. Kennedy International Airport in New York City and Logan International Airport in Boston, will result in cargo tonnage continuing to increase.

11.5.1 Infrastructure

- **Improve Truck-to-Air Connections at BDL.** Work with the CAA to facilitate improvements to truck-to-air connections at BDL via the CAA, such as, and work with the CAA to identify freight supportive lands near BDL that might require road improvements to facilitate air cargo access or staging areas for air cargo truck deliveries.
- **Prioritize Improvements on Roads Leading to BDL.** Explore whether CT Route 20 should be part of the National Highway Freight network to facilitate improved truck access to BDL.

11.5.2 Policy

- **Enhance Access to Airport Oriented Development.** Work with the CAA and the Connecticut Department of Economic and Community Development to enhance access to the Bradley Airport Development Zone (BADZ) located in the towns of East Granby, Windsor, Windsor Locks, and Suffield. The BADZ extends enterprise zone tax incentives to airport-related firms utilizing BDL. The zone was created by the CAA to increase BDL's force as an economic driver within the region. The BADZ zone has been instrumental in building manufacturing and other production likely to increase air freight in the future.

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12. FREIGHT INVESTMENT PLAN

Connecticut's Freight Investment Plan approach is to apply FAST Act freight funding for federal fiscal years (FFY) 2017 to 2026 to existing projects addressing freight bottlenecks and congestion on the Primary Highway Freight System. The freight-supportive projects identified previously in this plan were ranked according to the following criteria:

- Is project located on a major interstate (I-84, I-91, or I-95)?
- Is project located in a freight bottleneck area?
- Does project add capacity to the freight network?
- Does project increase the bridge load rating?
- Does project make an operational improvement?
- Does project provide freight data?

A yes answer for each question equals 1 point. The minimum score is 0 points and maximum score is 6 points. Three projects were chosen for use of National Highway Freight Program (NHFP) funds and are listed in **Table 12-1**.

Table 12-1: Freight Projects Chosen for NHFP Funds

Freight Projects	Total Cost	*Sources of Funds	*Funds Programmed							
			Total	Previous Years	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Proj. No. 0151-0273 I-84 Waterbury Upgrade Expressway (Phase 3)	\$342,883,302	NHFP Funds	\$59,478,537	\$27,930,454	\$14,844,689	\$16,703,394	\$0	\$0	\$0	\$0
		Other Federal Funds - NHPP	\$102,570,798	\$102,570,798	\$0	\$0	\$0	\$0	\$0	\$0
		Other Federal Funds - STPA	\$15,239,199	\$15,239,199	\$0	\$0	\$0	\$0	\$0	\$0
		Other Federal Funds - EBS	\$1,618,940	\$1,618,940	\$0	\$0	\$0	\$0	\$0	\$0
		Other Federal Funds - EBE	\$149,060	\$149,060	\$0	\$0	\$0	\$0	\$0	\$0
		Other Federal Funds - REPF	\$761,812	\$761,812	\$0	\$0	\$0	\$0	\$0	\$0
		Other Federal Funds - REPS	\$5,710,989	\$5,710,989	\$0	\$0	\$0	\$0	\$0	\$0
		Other Federal Funds - NHPP-Exempt	\$8,737,307	\$0	\$8,737,307	\$0	\$0	\$0	\$0	\$0
		State Funds - 41400 & 41404	\$148,616,660	\$148,616,660	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$342,883,302	\$302,597,912	\$23,581,996	\$16,703,394	\$0	\$0	\$0	\$0		
Proj. No. 0102-0295 I-95 Norwalk NHS - Median Barrier / Resurfacing	\$70,000,000	NHFP Funds	\$37,099,248	\$0	\$0	\$0	\$10,000,000	\$27,099,248	\$0	\$0
		Other Federal Funds - NHPP	\$1,600,752	\$0	\$0	\$0	\$0	\$1,600,752	\$0	\$0
		State Funds - G-95 & 41400	\$31,300,000	\$0	\$0	\$0	\$31,300,000	\$0	\$0	\$0
		Total	\$70,000,000	\$0	\$0	\$0	\$41,300,000	\$28,700,000	\$0	\$0
Proj. No. 0056-0316 I-95 Greenwich / Stamford Improvements from NY State Line to Exit 7	\$157,532,000	NHFP Funds	\$37,099,248	\$0	\$0	\$0	\$0	\$0	\$18,549,624	\$18,549,624
		Other Federal Funds - NHPP	\$104,679,552	\$0	\$0	\$0	\$0	\$34,000,000	\$35,339,776	\$35,339,776
		State Funds - 41400	\$15,753,200	\$0	\$0	\$0	\$0	\$15,753,200	\$0	\$0
		Total	\$157,532,000	\$0	\$0	\$0	\$0	\$49,753,200	\$53,889,400	\$53,889,400

* The sources and amounts of funds programmed represents a snapshot in time (as of November 1, 2017) and may be revised at any point based on funding availability, project deliverability, changes in priorities, etc.



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