



Cargo ship unloading at port facilities in Howland Hook, Staten Island.

APPENDIX 8: *REGIONAL FREIGHT PLAN UPDATE: INTERIM PLAN SUMMARY REPORT*

REVISED FEBRUARY 2014



PLAN 2040

Appendix 8: Regional Freight Plan Update

REVISED FEBRUARY 2014

1. Introduction	8-3
Background	
Foundation of the Regional Freight Plan Update Interim Plan	
Organization of the Report	
2. Regional Freight Plan Context	8-5
Synopsis of Resource Scan	
Status of 2004 Plan Recommendations	
Freight GIS Highlights	
3. Market Overview	8-9
Commodity Flow Summary	
Top Commodities	
Top Trading Partners	
4. Regional Freight Network and Infrastructure	8-12
Freight Highway Network	
Freight Highway Network Components	
Freight Highway Network Existing Conditions	
Freight Rail Network	
Ports and Waterborne Freight Network	
Containerized Cargo	
Bulk and Breakbulk Cargo	
Maritime Support Services	
Air Cargo Network	
Intermodal Network	
5. Challenges and Opportunities	8-22
Freight System Challenges	
Constrained Capacity	
Physical Challenges	
Access	
Climate Change Vulnerability	
System Redundancy	
Truck Management	
Interagency Coordination	
Opportunities	
6. Next Steps	8-27

1. INTRODUCTION

BACKGROUND

At the time it was published in 2004, the New York Metropolitan Transportation Council (NYMTC) Regional Freight Plan was generally considered to be one of the premiere, state-of-the-art urban and regional freight planning undertakings. The Regional Freight Plan provided, for the first time in this region, a comprehensive understanding of commodity flows, relative importance of major freight corridors, key infrastructure deficiencies and needs, and a series of outreach materials designed to help stakeholders and the public understand why freight is present in their communities and the activities it supports.

In the years since 2004, NYMTC staff and member agencies have pursued many of the recommendations set forth in the Regional Freight Plan, having conducted a study of truck rest stops throughout the region, truck routes in New York City and Rockland County, and the feasibility of freight villages in the region, among other efforts. Freight plans and studies are underway or have recently been completed by the Port Authority of New York and New Jersey, North Jersey Transportation Planning Authority, and New Jersey Department of Transportation, and have identified freight volumes and trends, freight needs, and a plan for prioritizing projects and policies that benefit freight transportation in a way that is consistent with other regional goals and policies. These projects and plans have or are currently investigating opportunities to improve freight transportation system conditions and efficiency, ways to improve the core highway network on which the vast majority of freight moves in the region, and opportunities to move more goods by alternative modes such as rail and water.

Significant changes have occurred in the regional and national economies and in global logistics patterns in light of the 2008-2009 economic recession and subsequent recovery. Demand for all goods and services is only now getting back to or exceeding pre-recession levels. Growth in household disposable income (and hence, consumer product demand) is generally expected to grow more slowly than pre-recession forecasts had estimated. Fluctuations in the price of fuel, currency values, and labor availability and cost are changing production and raw materials sourcing locations. These changes impact the volume, origins and destinations, and modes by which freight travels.

In addition, the state of the planning practice has changed, with more Federal emphasis and grant selection criteria placed on coordinated freight planning, freight performance measures, coordination with economic development goals, and advancing technology-based and operational strategies. Moving Ahead for Progress in the 21st Century (MAP-21), the current federal surface transportation law passed in 2012, recommends that states and MPOs prepare or update their freight plans to describe how their plans support national freight goals, develop freight performance measures, describe freight trends and issues, inventory needs and bottlenecks, and develop freight improvement strategies. In addition, MAP-21 recommends that states and MPOs that have already developed an initial freight plan can update their existing plan by:

- Linking the plan to national freight goals, which include:
 - Improving the contribution of the freight transportation system to economic efficiency and com-

petitiveness;

- Reducing congestion on the freight transportation system;
- Improving the safety, security, and resilience of the freight transportation system;
- Improving the state of good repair of the freight transportation system;
- Using advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight transportation system; and
- Reducing adverse environmental and community impacts of the freight transportation system.

- Developing freight performance measures;

- Refreshing data and trends, especially post-recession; and

- Refreshing freight projects and policies to be consistent with current local and long-range plans, and to include innovative technologies and operational strategies.

FOUNDATION OF THE REGIONAL FREIGHT PLAN UPDATE INTERIM PLAN

The recent developments so far described necessitate an evaluation of the progress made toward implementing the recommendations of the 2004 Regional Freight Plan, for developing a fresh understanding of goods movement trends and forecasts in the NYMTC Region, and for developing a new program of projects

and policies to advance regional freight planning goals.

The Regional Freight Plan Update 2015-2040 Interim Plan (hereafter “Interim Plan”) offers the first step toward achieving this objective. The Interim Plan is an information- and data-supported planning effort, with emphases on agency and stakeholder outreach, data gathering, and analysis. The Interim Plan includes a review of planning studies and projects that have recently concluded or are on-going, an analysis of commodity flow data, assessment of the components and condition of the region’s multi-modal freight network, and documentation and outreach materials that clearly and simply explain a very complex regional freight system to community stakeholders and the public at large. These activities are aimed at establishing a foundation from which NYMTC can address freight in its update of the Regional Transportation Plan (RTP) and in the next phase of the Regional Freight Plan Update, which will identify and evaluate potential freight projects, policies, and strategies, and develop a plan for implementing them.

It should be noted that the Interim Plan is not intended to be a stand-alone modeling exercise, rather it fits into a multifaceted planning approach that will support NYMTC’s ongoing planning and outreach activities. The Interim Plan establishes a fresh assessment of existing conditions and serves as a convenient launching pad from which the next phase of the Regional Freight Plan Update can advance specific project and programmatic recommendations.

The Interim Plan is organized in four tasks, including:

- Task 1: Regional Freight Planning Context. This task includes a thorough review of recently-completed and on-going plans and studies undertaken at the local, regional, state, and national levels that provide valuable new insight into freight, transportation infrastructure, economic, and other issues that impact goods movement in the region. Task 1 also includes an assessment of the status of recommendations published in the 2004 Regional Freight Plan and the development of a geographic information system (GIS) database containing geographic freight, transportation, and land use data from various cooperating agencies.
- Task 2: Description of Freight Transportation in the region. This task includes an analysis of commodity flow data and evaluation of specific logistics patterns and needs of several of the region’s key industries; an assessment of the components of the region’s multi-modal freight transportation network (including highway, rail, waterborne, air cargo, and intermodal networks) and a description of their existing condition; and an analysis of the markets for three potential freight village sites.
- Task 3: Outreach. This task includes the outcome of focus groups and surveys to support the analysis tasks, and the development of outreach materials, such as an updated Freight Data Wheel, “Basics of Freight Transportation” brochure, and website content that clearly and concisely describe the importance of freight to the region and to its component counties individually.
- Task 4: Interim Deliverables Package. This task calls for the development of a Summary Report and package of data and analysis products that summarize the work completed for the Interim Plan and serve as the starting point for later continuation of the Regional Freight Plan Update.

ORGANIZATION OF THE REPORT

This Summary Report concisely describes the findings of the Interim Plan work completed to-date. A brief description of the sections of the Report follows:

- Section 2 provides a brief synopsis of public and private sector freight planning activities completed or launched since the completion of the 2004 Regional Freight Plan, thereby providing an up-to-date regional freight planning “context” in which NYMTC’s Regional Freight Plan Update is being developed.
- Section 3 summarizes the results of the commodity flow analysis, including freight volumes, top commodities, direction of movement (inbound, outbound, through, and intra-regional), mode shares, and top trading partners.
- Section 4 describes the components and existing condition of the region’s multi-modal freight transportation network, including strategic freight highways, freight rail network, ports and waterborne freight network, air cargo facilities, and intermodal facilities throughout the NYMTC Region, and in neighboring areas of New York State and New Jersey.
- Section 5 summarizes the challenges and opportunities facing the region’s freight transportation network.
- Section 6 describes next steps that will be undertaken to complete the Interim Plan and the subsequent tasks of the Regional Freight Plan Update.

The Interim Plan will be included by reference in NYMTC’s overall Regional Transportation Plan (RTP). All of the detailed technical material upon which this summary report is based can be found on the NYMTC website at www.nymtc.org.

2. REGIONAL FREIGHT PLANNING CONTEXT

The first step toward completing the Regional Freight Plan Update Interim Plan aimed at understanding the current freight planning context in the NYMTC Region. As described in the Introduction to this report, NYMTC's member agencies have advanced a number of the projects and strategies recommended in the 2004 Regional Freight Plan. Also, new global logistics trends and new opportunities have developed in recent years, which may have changed the priorities of public and private sector stakeholders. To understand the current freight planning context in the NYMTC Region, three key tasks were undertaken—a scan of recent plans and studies, an evaluation of the status of the recommendations of the 2004 Regional Freight Plan, and collection of freight and geographic information systems (GIS) data from public and private sources.

SYNOPSIS OF RESOURCE SCAN

A review of 35 plans and studies completed by NYMTC member agencies, agencies in neighboring regions, Federal agencies, private sector stakeholders, and research organizations was undertaken to gain an understanding of emerging key freight issues that should inform the development of the Regional Freight Plan Update. The results of this analysis are detailed in the Task 1.1 Technical Memorandum titled, “Resource Scan Summary.”

Some reports deal exclusively with freight issues, while others treat freight as one of many topics or mention freight issues intermittently throughout the text. In the latter case, the key points related to freight activity are highlighted. The documents reveal a number of recurrent

themes that the NYMTC Region has been grappling with for many years, such as the following:

- The predominance of trucking for freight deliveries;
- The lack of modern rail freight infrastructure east of the Hudson;
- A lack of available funding for dredge disposal;
- Clearance issues for delivery vehicles;
- Competition with and priority for passenger rail services in the use of the rail infrastructure for freight purposes; and
- Fragmented rail operations and lack of supporting infrastructure for rail.

The reports are listed by type of report, and in chronological order (oldest to newest) within each report category. Categories are multistate and state/regional.

STATUS OF 2004 PLAN RECOMMENDATIONS

Goal 1. Improve transportation of freight by removing burdensome government regulations and restrictions.

Strategy A. Improve management of truck routes

Action 1. Complete NYCDOT Truck Route Management Study. Status: The NYCDOT Truck Route Management and Community Impact Reduction Study was completed in 2007. The study recommended adjustments to the City's truck route network, signage program, and outreach and education programs. NYCDOT is currently working to implement the recommendations of

the study, by completing detailed studies of truck routing in specific neighborhoods, addressing community impacts, and finding new and more effective ways to communicate truck route rules with commercial vehicle operators.

Action 2. Assess alternatives for providing greater access to national standard 53' long, 102-inch wide trailers. Status: A study completed in 2012 by PANYNJ and the NYC Economic Development Corporation (NYCEDC) examined access to JFK Airport and recommended the removal of the restriction on 53-foot trailers on the Van Wyck Expressway.

Strategy B. Improve the management of commercial vehicle loading and unloading zones.

Action 1. Expand the commercial parking program in Manhattan and further assess impacts. Status: NYCDOT has examined and piloted several loading zone management schemes since the completion of the Truck Route Management Study. Recently, a pilot of the Delivery Windows Program on Church Avenue in Brooklyn, Fordham Road in the Bronx, and 1st and 2nd Avenues in Manhattan, has had some success and support from community and business representatives. The Delivery Windows Program is not a one-size-fits-all solution, and must be planned block-by-block with community board, BID, and public participation.

Strategy C. Expand the application of ITS to commercial vehicle operations.

Action 1. Automate commercial vehicle permitting, credentialing, and enforcement. Status: NYSDOT launched its “NYPERMITS” online oversize/overweight permitting service (www.dot.ny.gov).

ny.gov/nypermits). MTA accepts online applications for overdimensional permits on its bridges (<http://mta.info/bandt/traffic/trucker.html>); the applications are processed by NYCDOT. NYCDOT permits are accepted by mail and online.

Action 2. Expand integrated incident management system in the NYC area. **Status:** The New York Integrated Incident Management System was deployed across all five boroughs of New York City in 2003. Between 2003 and 2007, additional IIMS units were deployed throughout the City's limited-access highway network. A USDOT evaluation project completed in 2007 concluded that the IIMS provides interoperable real-time communications, the system can be considered "successful" due to multiple agencies using the system for a broad range of purposes, and that the IIMS has been "mainstreamed" within the city and state agencies that maintain the system.¹

Action 3. Continue experimentation with value pricing of toll facilities. **Status:** Several programs experimenting with value pricing of toll and parking facilities have been studied since 2004, including congestion pricing in Manhattan and NYCDOT's parking pricing pilot program. NYCDOT's PARK Smart program has had success in managing curbside parking/loading area supply in several neighborhoods, but requires a significant amount of community and business community participation to properly tailor the program to the needs of the neighborhood. PANYNJ has introduced an overnight truck toll discount at its six NY-NJ bridges and tunnels to encourage off-peak scheduling of truck movements. Per-axle truck tolls are lower between 10 PM and 6 AM.

Goal 2. Improve the physical infrastructure of the transportation system for freight related transport between shipping and receiving points.

Strategy A. Use marine connections to enhance access to key distribution points.

Action 1. Port Inland Distribution Network (PIDN). Transport port containers by barge and rail to out-of-region transshipment facilities. **Status:** The PIDN pilot program consisted of a barge service from Port Elizabeth in New Jersey to the Port of Albany. The service was short-lived, as it was not cost-competitive with trucking without a significant subsidy. Longshoreman labor, Jones Act and Harbor Navigation Act requirements represent a significant component of the higher cost of shipping by barge. Also, shipping lines generally desire control of their containers, which limits the potential for loaded backhaul.

Action 2. Assess feasibility of regional truck ferries. **Status:** NYMTC published the Hunts Point Waterborne Freight Assessment in 2004 and Long Island Sound Waterborne Transportation Plan in 2005, which examined the feasibility of freight ferries between Hunts Point and various locations throughout the region. The two studies examined a number of potential ferry links, and recommended further study of a truck ferry link between Hunts Point and New Jersey, and between New Haven and Long Island.

Strategy B. Use rail connections to enhance access to key distribution points.

Action 1. Restore service on Staten Island Railroad. **Status:** The Arthur Kill Lift Bridge improvements linked Staten Island to the national rail network in 2006. Conrail now provides service to New York Container Terminal and on

the Travis Branch on the West Shore of Staten Island.

Action 2. Improve First Avenue rail tracks in South Brooklyn Waterfront. **Status:** NYCEDC conducted a study of the rail access needs of the South Brooklyn waterfront. Extension of the First Avenue line into South Brooklyn Marine Terminal is currently under construction.

Goal 3. Improve the reliability of overall movement of freight in the region by encouraging multimodal shipment.

Strategy A. Reduce barriers to East-of-Hudson rail service.

Action 1. Provide a minimum of 17'9" TOFC clearance; eliminate weight and clearance restrictions on plate F cars and tri-level auto carriers (19'-6") and expand eventually to 23-foot double-stack clearance. **Status:** Plate E clearance (15'-9") exists on the Lower Montauk Branch from Maspeth Yard to Fresh Pond, Plate F clearance (17'-0") exists on the LIRR Main Line from Fresh Pond to just west of Ronkonkoma, on the Bay Ridge Branch from Fresh Pond Yard to 65th Street Yard, and on the Fremont Running Track from Oak Point Yard to Fresh Pond Yard. The 1st Avenue Rail Line in Brooklyn has Plate J (19'-0") clearance from the Float Bridge at 65th Street Yard north of the End-of-Line at about 25th Street. Plate J clearance (19'-0") has been achieved on the Hudson Line to just north of Tarrytown, TOFC clearance (17'-9") as far as Harlem River Yard, and then Plate F (17'-0") to Oak Point Yard. Plate H (20'-3") exists on the River Line. All other lines and branches have Plate C (15'-6") clearance or less. Achieving TOFC clearance in Oak Point Yard, on the Fremont Running Track from Oak Point Yard to Fresh Pond Yard, on the Montauk Branch and LIRR Main Line

from Fresh Pond Yard to potential intermodal rail yard sites in eastern Long Island remains a reasonably attainable goal. Clearance for Plate J (19'-0") enclosed multilevel railcars could be achieved to Harlem River Yard with the removal of the vertical clearance constraint at the former General Motors assembly plant in Tarrytown. Plate H (20'-3") clearance is not achievable until a solution to the constraint posed by the electrified third rail in Metro-North and LIRR territory is resolved. Further, removing vertical clearances throughout New York City and Long Island to achieve this goal, though not yet estimated, is likely to be prohibitively expensive.

Action 2. Reduce operational conflicts between passenger and freight service on region's railroads. Status: Passenger and freight conflicts remain a relevant issue in the region.

Strategy B. Evaluate the further expansion of freight yards and warehouses.

Action 1. Assess potential to develop Harlem River as an intermodal yard. Status: Harlem River Yard is being used primarily as a solid waste transfer station, where waste is exported out-of-state. Distribution centers on the property are generally truck-served.

Action 2. Assess potential to develop Pilgrim State Hospital in Deer Park as a bulk and/or intermodal facility. Status: NYSDOT released a Design Report and Draft Environmental Impact Statement (DEIS) in 2007. No further action has been taken.

Action 3. Assess potential to develop Phelps Dodge site and adjacent areas in Maspeth, Queens into a bulk or intermodal facility. Status: This site was proposed as an intermodal terminal to support the Cross Harbor tunnel in the 2004 NYCEDC-led EIS. Currently,

PANYNJ is leading a new Cross Harbor Freight Program EIS. Though a preferred alternative has not been selected, the program's alternatives are dependent upon a more dispersed system of supporting yards and terminals.

Action 4. Assess potential to further develop existing yard at 65th Street, Brooklyn for bulk, intermodal and/or port-related traffic. Status: In 2012, PANYNJ began using 65th Street Yard as the eastern terminus of the NYNJ Rail carfloat service, and a 14-acre bulk transload facility is on site. NYCEDC owns the yard and it is operated by NYNJ Rail.

Action 5. Conduct regional feasibility study to identify additional intermodal freight sites. Status: No such study has been completed for this specific purpose. Brookhaven Rail Terminal emerged as a new key freight rail facility on Long Island when it opened in 2011, and the facility's owners have plans to expand to handle new commodities.

Strategy C. Improve Cross-Hudson Rail Service.

Action 1. Improve existing float bridges at Greenville, NJ. Status: PANYNJ purchased the only rail car float service operating in the harbor and secured FHWA approval to commit federal earmark resources, with PANYNJ local matching funds, to rehabilitate the facilities in Brooklyn and Jersey City. The existing float bridges in Jersey City were destroyed by Superstorm Sandy in October 2012, but service has been restored with interim repairs, including the relocation of the 51st Street Pontoon Bridge from Bush Terminal in Brooklyn to Jersey City, with the permission of NYSDOT. With FHWA oversight, PANYNJ has revised the planned capital investment to support continued growth in volume and to coordinate with related rail improvements on both sides of the harbor.

Action 2. Assess cross-harbor rail freight tunnel. Status: PANYNJ is completing an EIS to identify a preferred alternative for facilitating freight movement across New York Harbor. Potential alternatives include an enhanced rail carfloat service and a rail tunnel with several potential operating scenarios.

Goal 4. Improve the reliability and overall movement of freight in the region by expanding alternatives for trucks.

Strategy A. Improve Northern Corridor Crossing (I-95/George Washington Bridge).

Action 1. Assess improvements to the Highbridge Interchange. Status: In 2009, rehabilitation of the Highbridge Interchange and Alexander Hamilton Bridge was begun. The project consists of replacing the concrete deck of the bridge, retro-fitting the steel arch and supports of the bridge, and re-decking and/or retro-fitting of bridges on several of the interchange ramps. The project is scheduled to be completed by the end of 2013.

Action 2. Assess completing a continuous connector road system on the Cross-Bronx Expressway. Status: Since the 2004 publication of the Bronx Arterial Needs Major Investment Study, which recommended the inclusion of a continuous connector road system in several packages of alternatives, this strategy has not been studied further.

Action 3. Improve Sheridan-Bruckner Interchange. Status: NYSDOT engaged in a DEIS to study alternatives for improving the interchange between the Bruckner and Sheridan expressways, which did not advance to a Record of Decision. The NYC Department of City Planning's on-going Sheridan-

Hunts Point Land Use and Transportation Study's draft recommendation calls for the construction of new ramps from the Bruckner Expressway into Hunts Point, the introduction of two to three signalized intersections along the Sheridan Expressway, closure of the southbound exit ramp at Westchester Ave. and the northbound exit ramp at Edgewater Road. The public comment period remains open through June 2013.

Strategy B. Improve Southern Corridor Crossing (I-278/Verrazano-Narrows Bridge).

Action 1. Assess upgrading crossing at the Goethals Bridge. Status: PANYNJ studied alternatives for upgrading the crossing and completed an EIS in 2011. In April 2013, PANYNJ awarded a public-private partnership contract to design, build, finance, and maintain a new bridge, which PANYNJ will operate. The new bridge will have 12-foot wide lanes (3 in each direction), wider shoulders, and a sidewalk/bikeway. As an independent improvement project, PANYNJ also has initiated planning for a project to provide more direct access for trucks traveling between Staten Island's New York Container Terminal and the new Goethals Bridge.

Action 2. Assess completing a continuous bus/HOV system on the Staten Island Expressway and related improvements. Status: The Staten Island Expressway portion of the HOV system is complete. MTA awarded a contract for reconstruction of the upper deck of the Verrazano-Narrows Bridge, which will include a reversible HOV lane and complete the HOV system between Staten Island and the Hugh L. Carey Tunnel.

Strategy C. Improve Eastern Corridor (I-278).

Action 1. Assess removing clearance restriction at the Brooklyn-Queens Expressway. Status: The vertical clearance restrictions on the BQE remain in place, though NYCDOT's Brooklyn Bridge rebuilding project will increase the vertical clearance under the bridge. This project is expected to be completed in 2014.

Action 2. Assess feasibility of off-peak truck use of Gowanus HOV lane. Status: This alternative has not been studied as part of the South Brooklyn TIS or Gowanus EIS.

Strategy D. Improve JFK Airport/Industrial Access Corridor.

Action 1. Assess options for improvements to the major routes in the corridor. Status: A study completed in 2012 by PANYNJ and the NYC Economic Development Corporation (NYCEDC) has examined access to JFK Airport and recommended the removal of the restriction on 53-foot trailers on the Van Wyck Expressway. The Hunts Point Waterborne Freight Study evaluated the potential to use truck ferries to reach JFK Airport from the Bronx, but found the service to be non-competitive with trucking via highways, with respect to time and cost savings.

FREIGHT GIS HIGHLIGHTS

To develop as complete an analysis of multi-modal transportation networks, socioeconomic characteristics, industry clusters, and land use compatibility, NYMTC requested the use of geographic information system (GIS) data from its member agencies. Among the GIS data requested were:

- Highway network line shapefiles;
- Rail network line shapefiles;
- Intermodal terminal point or polygon shapefiles;
- Business location/business inventory point shapefiles; and
- Land use polygon shapefiles.

With data from most member agencies in hand, the individual shapefiles and feature classes were modified to conform to the coordinate system and projection used by NYSDOT (North American Datum 83/UTM Zone 18N), and imported into a single geodatabase. This geodatabase was used as a key analysis tool in the Regional Freight Plan Update Interim Plan, and to generate the maps contained in this Report. The geodatabase will be maintained and used for future analysis for the benefit of the Regional Freight Plan Update, and, with the consent of the data owners, may be maintained by NYMTC as a data analysis product beyond the life of the Regional Freight Plan Update project.

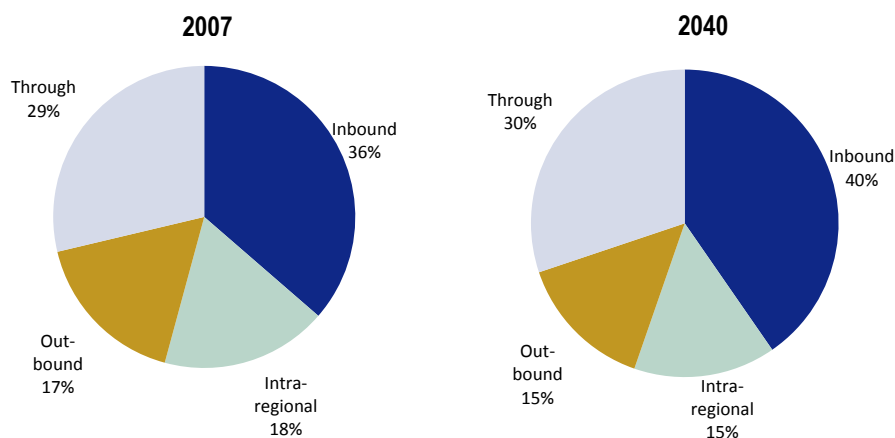
3. MARKET OVERVIEW

The data source for the analysis in this report is the IHS Global Insight's TRANSEARCH database² provided by NYMTC for truck, air, water, rail³ and other freight movements. TRANSEARCH is a database that estimates domestic flows of freight into, out of, and within the 10-county NYMTC Region by annual tonnage, annual value, commodity, trade type (domestic, Canadian or Mexican trade, or other international import or export), origin, and destination. The base year for this database was 2007 and the forecast year was 2035. Given the impact of the recession, current volumes are probably similar to those in 2007. Although the base year was 2007, the forecast was developed in 2010, and takes into account the impact of the 2007-2009 economic recession on global and regional freight demand. A detailed description of this analysis can be found in the Task 2.2.1 Technical Memorandum titled, "Commodity Flow Analysis," and the Task 2.2.2 Technical Memorandum titled, "Estimation of Municipal Solid Waste Flows."

COMMODITY FLOW SUMMARY

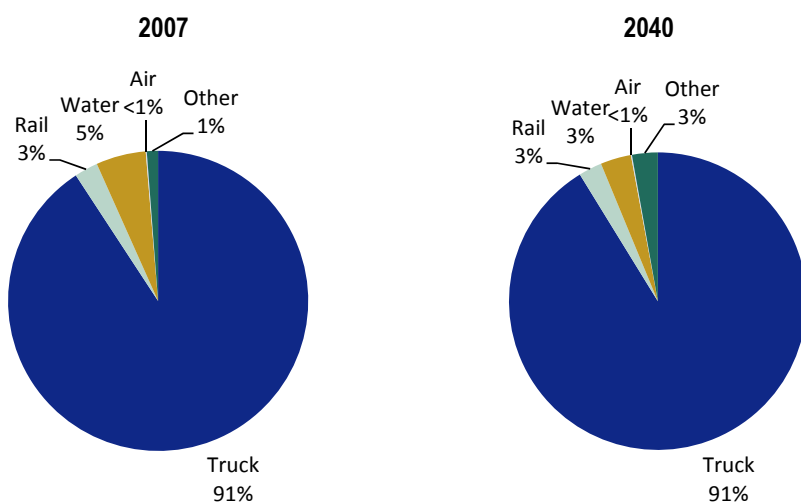
- More than 405 million tons of inbound, outbound, intraregional, and through freight moved over the NYMTC region's transportation network in 2007. Thirty-six percent of this traffic was inbound, 17 percent was outbound, 19 percent was intraregional, and 29 percent was through traffic.
- By 2040, inbound, outbound, intraregional and through freight is expected to increase to 592 million tons - a 46 percent increase. Forty percent of this traffic is expected to be inbound, 15 percent outbound, 15 percent intraregional, and 30 percent through traffic.

Figure 3.1 Direction of Total Freight Flows by Weight, 2007 and 2040



Source: Cambridge Systematics with 2007-2035 IHS Global Insight TRANSEARCH data, and 2035-2040 FHWA's Freight Analysis Framework v3.4 (FAF3.4) Forecast.

Figure 3.2 Mode Share by Weight, 2007 and 2040⁴



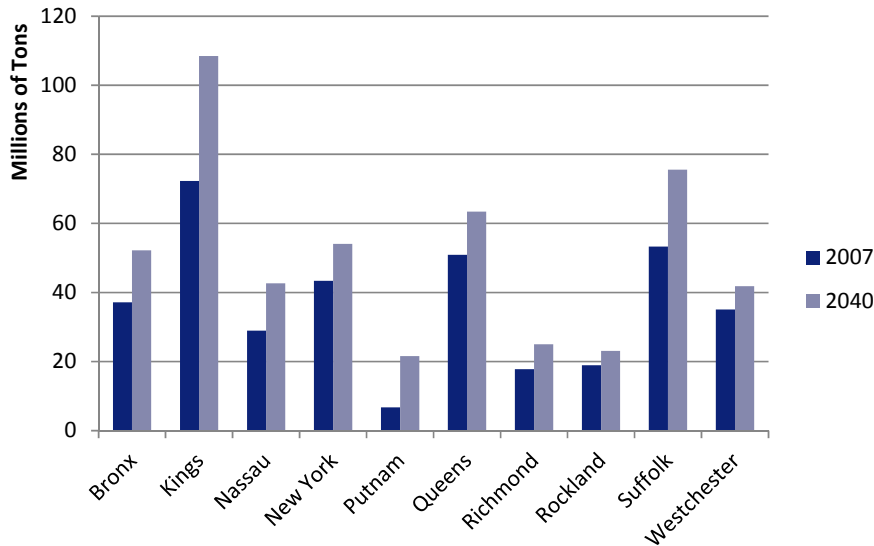
Source: Cambridge Systematics with 2007-2035 IHS Global Insight TRANSEARCH data, and 2035-2040 FHWA's Freight Analysis Framework v3.4 (FAF3.4) Forecast.

- When measured by weight, in 2007, 91 percent (368 million tons) of the regional freight moved by truck, 5 percent (22 million tons) by water, 2.5 percent (10 million tons) rail, and less than 1 percent (3 million tons) by each air and other modes.
- In 2040, the freight transportation mode

split is expected to change slightly, with water declining in share from 5 percent to 3 percent, and other modes increasing in share from 1 percent to 3 percent.

- When measured by value, in 2007, \$1.34 trillion of inbound, outbound, intraregional, and through freight moved in the NYMTC region. Ninety-eight

**Figure 3.3 Change in Freight Tonnage by County
2007-2040**



Source: Cambridge Systematics with 2007-2035 IHS Global Insight TRANSEARCH data, and 2035-2040 FHWA's Freight Analysis Framework v3.4 (FAF3.4) Forecast.

percent (\$1.32 trillion) moved by truck, 1 percent (\$11 billion) by water, 1 percent (\$9 billion) by rail, and less than 1 percent (\$7 billion) by air and other modes.

- By 2040, the total value of the inbound, outbound, intraregional, and through freight is expected to increase 77 percent to \$2.38 trillion. Truck will continue to carry 98 percent (\$2.34 trillion) of freight by value; rail, water, and air will carry about 0.5 percent of freight by value (between \$12 and \$13 billion each), and other modes will carry 0.2 percent (\$4 billion) by other modes.

- Kings County (Brooklyn) is the largest freight generator and receiver within the region. In 2007, it accounted for 26 percent (18 million tons) of all outbound tonnage and nearly 22 percent (31 million tons) of all inbound tonnage. Kings County is projected to account for 32 percent (27 million tons) of the 2040 outbound tonnage and 21 percent (48 million tons) of the inbound tonnage in the region.

- Bronx, New York, Queens, and Suffolk

counties each received 12 to 14 percent (17 to 20 million tons) of the incoming freight to the region in 2007. By 2040, Suffolk County is expected to account for 15 percent of inbound tons (34 million tons), Bronx and New York counties are expected to account for 13 percent (29 to 30 million tons) each, and Queens

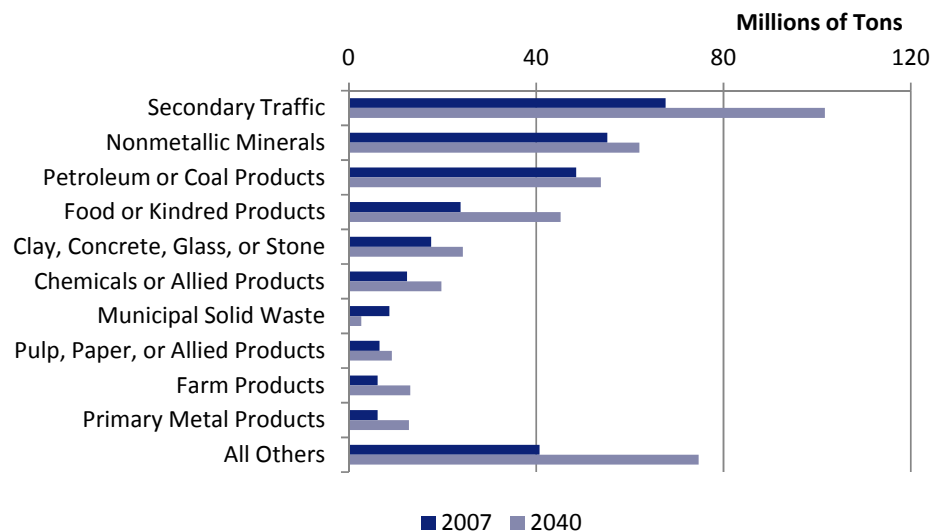
County is expected to receive 12 percent (28 million tons) of the region's inbound freight in 2040.

- Eighty-four percent of the tonnage moved into, out of, within, or through the study region traveled less than 500 miles in 2007, and this share is expected to be 80 percent in 2040.

TOP COMMODITIES

The top five commodity groups moving inbound, outbound and intraregionally in both 2007 and 2040 are secondary traffic (defined here as freight flows to and from distribution centers or via intermodal facilities and typically represents consumer goods), nonmetallic ores and minerals, petroleum and coal products, food and kindred products, and clay, concrete, glass and stone products. Together they account for more than 73 percent of total commodities by weight both currently and in the future.

**Figure 3.4 Top 10 Commodities by Weight – Inbound, Outbound and Intraregional
2007-2040**



Source: Cambridge Systematics with 2007-2035 IHS Global Insight TRANSEARCH data, 2035-2040 FHWA's Freight Analysis Framework v3.4 (FAF3.4) Forecast.

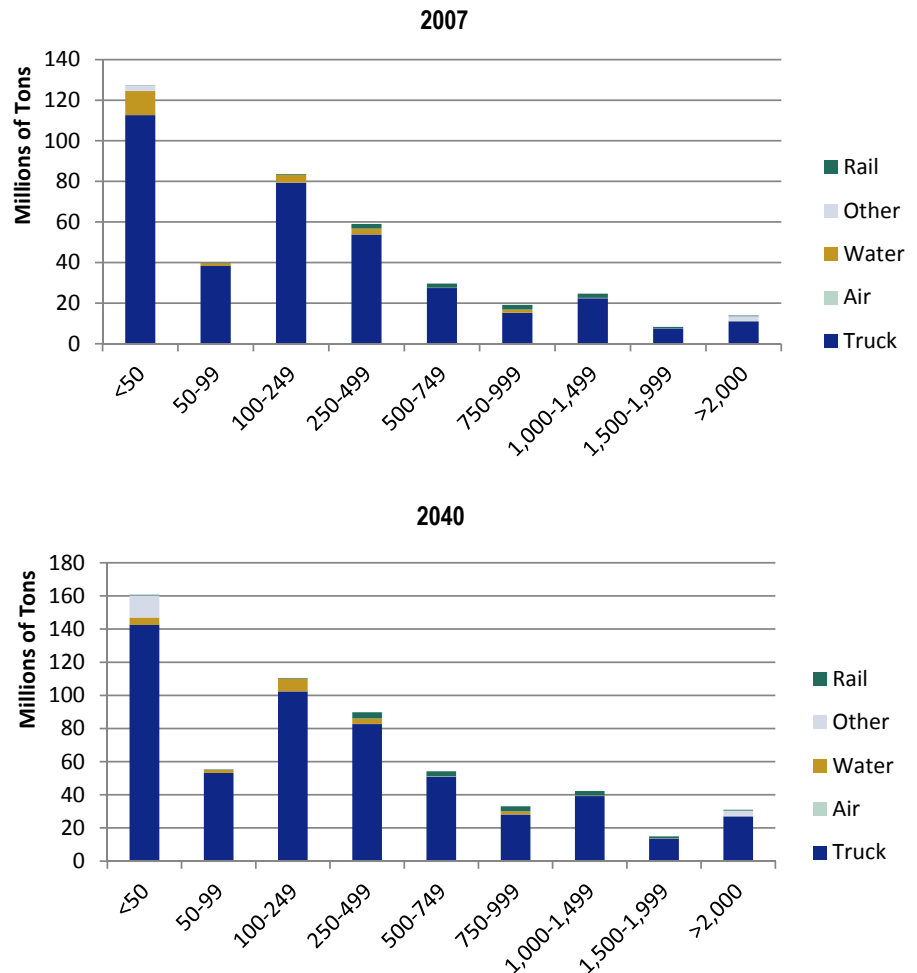
TOP TRADING PARTNERS

- Domestic freight constituted 87 percent of the tonnage moving into, out of, within and through the region in 2007. By 2040, domestic freight is expected to account for 80 percent of the region's freight tonnage. International trade related (including NAFTA trade related) freight tonnage moving into, out of, within and through the region is expected to grow at a significantly higher rate than domestic freight tonnage.

- The top three trading partners of the study region – Northern New Jersey, Rest of New York State, and the South Atlantic states – account for about 60 percent of total inbound and outbound freight flows by weight in 2007, and will make up about 54 percent of the region's trade volume by 2040.

- Eighty-four percent of the tonnage moved into, out of, within, or through the study region traveled less than 500 miles, and this share is expected to be 80 percent in 2040. Trucks carry the majority of the freight tonnage across all mileage segments. Domestic water's share of the freight tonnage moved in the region is largest for shipments traveling less than 50 miles (9 percent of all tons traveling less than 50 miles); these are predominantly intraregional moves and moves between the NYMTC region and Essex, Hudson and Middlesex counties in New Jersey. Rail's share of tonnage increases as distance increases reaching its peak with hauls between 750 and 999 miles long, where rail carries 12 percent of the tonnage. By 2040, assuming continuation of current economics, public policies, and relatively balanced investments across the modes, distribution of tons by distance is expected to remain similar. Truck is expected to achieve a

Figure 3.5 Mode Share by Distance (in tons), 2007 and 2040



Source: Cambridge Systematics with 2007-2035 IHS Global Insight TRANSEARCH data, 2035-2040 FHWA's Freight Analysis Framework v3.4 (FAF3.4) Forecast, and Oak Ridge National Laboratory (ORNL) Distance Matrix.

slight increases in moves over 500 miles. Waterborne is expected to lose mode share for trips under 50 miles (9 percent in 2007 compared to 3 percent in 2040), and gain share among trips 100-249 miles long (5 percent in 2007 compared to 7 percent in 2040). Other modes are expected to increase their share among trips under 50 miles (2 percent in 2007 compared to 8 percent in 2040), but lose share among trips over 2,000 miles (16 percent in 2007 versus 10 percent in 2040).

4. REGIONAL FREIGHT NETWORK AND INFRASTRUCTURE

The NYMTC Region is home to transportation infrastructure that carries freight by highway, rail, water, and air. Each of these modal networks have their own unique infrastructure, operational characteristics, regulations and institutional arrangements. In this section, the components and existing conditions of each modal network are summarized. In addition, the network of intermodal terminals—places where freight shipments are transferred from one mode to another—are identified and described as well. More detailed descriptions of these networks can be found in the technical memoranda for Task 2.1.1 “Highway Network and Infrastructure,” Task 2.1.2 “Rail Network and Infrastructure,” Task 2.1.3 “Ports and Waterborne Network and Infrastructure,” Task 2.1.4 “Air Cargo Network and Infrastructure,” and Task 2.1.5 “Intermodal Network and Infrastructure.”

FREIGHT HIGHWAY NETWORK

Freight in the 10-county NYMTC Region is carried predominantly by truck. While nationally in the year 2010 (according to USDOT’s Freight Analysis Framework, version 3.4 database), about 30 percent of freight tonnage in the United States was carried by modes other than truck (including waterborne, rail, and air), less than 10 percent of freight tonnage in the NYMTC Region is carried by modes other than truck. Consequently, the highway system in the region is crucial to the efficient movement of freight into, out of, through, and within the region. Further, the efficient operation in the face of chronic congestion in many parts of the network

and maintenance of a state of good repair on this network is vital to the region’s economy. The fact that there are many limited-access highways in the region barred to trucks or with size and weight limits more restrictive than federal standards, makes freight access to, and travel within, the region even more difficult.

Freight Highway Network Components

A subset of the region’s highway network, identified as “Strategic Freight Highways,” is of particular importance to freight. Strategic Freight Highways are highways that serve as major freight gateways into and out of the region, connect the region to major freight-generating facilities such as seaports and rail intermodal terminals in New Jersey, and connect major industrial clusters to the Interstate Highway System. In addition, several strategic routes in New York City were used to convey oversized equipment and supplies to assist in the relief and recovery effort in the aftermath of Superstorm Sandy in 2012.

Components of the Strategic Freight Highway network include five classifications of highways, which are described in detail below:

1. The Interstate Highway System in and surrounding the NYMTC Region serves as the primary gateway through which trucks enter and exit the region, and complete inter-county trips within the region;
2. Other Strategic Freight Highways. State highways throughout the NYMTC Region, which carry Interstate-type levels of truck traffic, and state highways

outside of the NYMTC Region that provide connections to key freight facilities, such as the Hudson River crossings into Manhattan, Port Newark and Port Elizabeth in New Jersey, Newark Liberty International Airport, and major rail intermodal terminals.

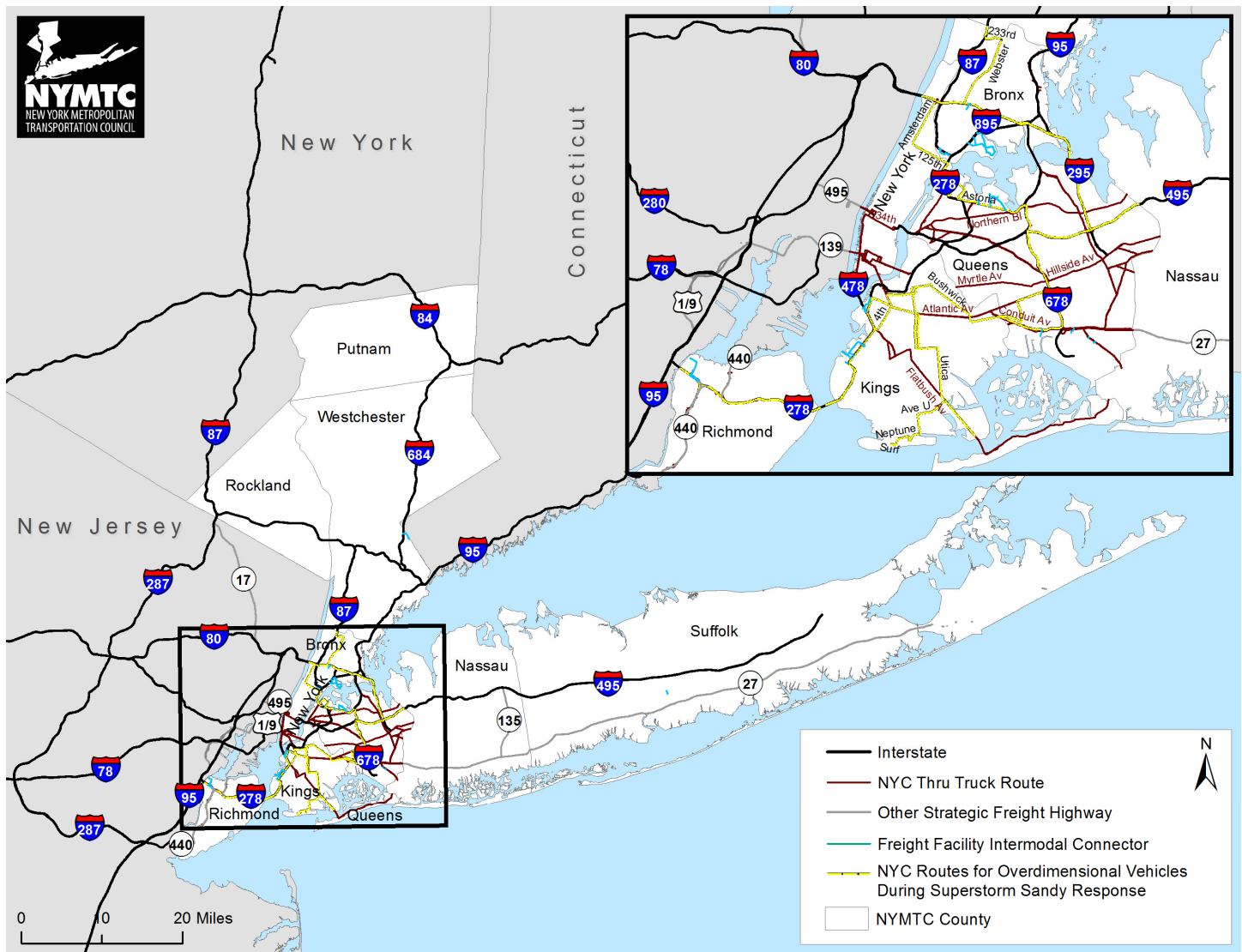
3. The New York City Through Truck Routes as designated by the New York City Department of Transportation, which are allowable routes for inter-county truck trips (note that Interstate Highways within New York City are part of this system);

4. Designated National Highway System Intermodal Connectors serving freight facilities; and

5. Oversized Emergency Response Routes, which were used to help with Sandy relief efforts, including movement of generators and other equipment, delivery of food and supplies, and debris removal. Because many of the loads that had to be delivered to some of the hardest-hit areas were over 120,000 lbs., transportation agencies such as NYSDOT, NYCDOT, and PA-NYNJ, had to work closely with FEMA and other relief effort coordinators and individual truck drivers to be sure trucks used the limited number of appropriate routes capable of handling the loads.

Figure 4.1 on the following page illustrates the Strategic Freight Highway Network within and surrounding the NYMTC Region.

Figure 4.1 Strategic Freight Highway Network, NYMTC Region and Surrounding Areas



Freight Highway Network Existing Conditions

Truck Volume

A critical highway segment for the movement of goods is the portion of I-95 including the George Washington Bridge (GWB), Trans-Manhattan and Cross Bronx expressways, and CBE/Major Deegan Expressway (Exwy) interchange. In 2010, the Port Authority of New York and New Jersey reported carrying approximately 102.4 million vehicles across the GWB, of which 7.6 million were trucks, making the GWB one of the busiest bridges in the world. Other

major freight crossings include the Verazano-Narrows Bridge (I-278), where approximately 1.9 million trucks crossed in 2010, and the Tappan Zee Bridge (I-87/I-287), which about 1.5 million trucks crossed.

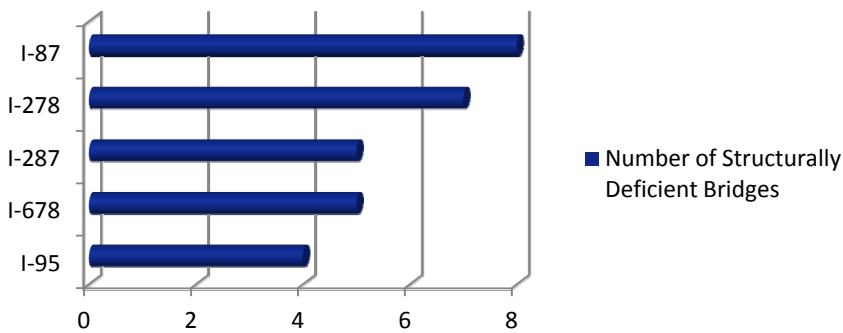
Congestion

According to the Texas Transportation Institute (TTI), the largest transportation research agency in the United States, in 2011 the New York metropolitan area ranked first in total annual delay and annual truck delay when compared to other very large urban areas. Analysis of the NYMTC Best Practices Model (BPM)

shows that the most congested segments of the Strategic Freight Highways Network include:

- I-95 between the George Washington Bridge and the Sheridan Exwy;
- I-495 between Glen Cove Road and the Brooklyn-Queens Exwy. (I-278);
- I-87/I-287 between Suffern and the Tappan Zee Bridge;
- I-287 near White Plains in Westchester County;
- Sunrise Highway east of the Southern State Parkway in Suffolk County;
- Several sections of I-678 (Whitestone Exwy./Van Wyck Exwy.) between

Figure 4.2 Top 5 Strategic Freight Highways by Number of Structurally Deficient Bridges



Source: Federal Highway Administration, National Bridge Inventory, 2012.

Table 4.1 Top Strategic Freight Highways by Number of Truck-Involved Fatal Crashes, 2007-2011

Highway	2007	2008	2009	2010	2011	Total
I-495	2	3	1	2	4	12
NY Route 27	1	4	0	3	1	9
I-87	3	0	1	0	1	5
I-278	0	2	0	0	2	4
I-95	1	0	2	0	1	4
Atlantic Ave., Kings County	2	1	0	0	1	4
Canal St., New York County	0	1	1	0	1	3
Delancey St., New York County	0	0	0	0	2	2

Source: National Highway Traffic Safety Administration

the Whitestone Bridge and Atlantic Avenue;

- I-278 (Brooklyn-Queens Exwy./Gowanus Exwy./Staten Island Exwy.) between the Long Island Exwy. (I-495) in Queens County and the MLK Exwy. (NY-440) in Richmond County;
- The Holland Tunnel and its approaches in lower Manhattan; and
- Rockaway Blvd/Nassau Exwy. adjacent to JFK International Airport.

Safety

During the 5-year period between 2007 and 2011, 62 truck-involved crashes resulting in fatalities occurred on the Strategic Freight Highways in the 10-county NYMTC Region. Nearly one-third of those crashes, 19, occurred in Queens County, and 10 crashes occurred in each Bronx County and Nassau County. Table 4.1 lists the nine Strategic Freight Highways on which more than one fatal truck-involved crash occurred between 2007 and 2011, arranged by number of truck-involved fatal crashes.⁵

Pavement Condition

Pavement condition refers to the level of distress observed on the road surface due to wear and tear resulting from years of aging, high traffic volume, heavy vehicle loads, and cycles of freezing, thawing, and heat stress. Of the approximately 655 highway miles for which condition data are available along Strategic Freight Highways in the 10-county NYMTC Region, 14 miles are classified to be in “Poor” condition (meaning distress is frequent and severe), including approximately:

- 4.1 miles of NY Route 27, Montauk Highway, in Suffolk County;
- 3.5 miles of I-684 in Putnam County;
- 3.0 miles of I-684 in Westchester County;
- 2.3 miles of Route NY 25, Queens Boulevard, in Queens County;
- 0.6 miles of I-278 in Queens County; and
- 0.5 miles of I-87 in Bronx County.

Bridge Condition

By highway corridor, as shown in Figure 4.2, Interstate 87 has the greatest number of structurally deficient bridges, with 8. “Structurally deficient” means that the condition of the bridge includes a significant defect, which often means that speed or weight limits must be put on the bridge to ensure safety. Interstates 278, 287, 678, and 95 are also among the top five Strategic Freight Highways with the highest number of structurally deficient bridges.

Truck Stops

To ensure safety on highways, the United States Department of Transportation regulates the number of daily and weekly hours which truck drivers can spend driving and working, and the minimum amount of time drivers must spend resting between driving shifts. During periods of rest, truck drivers need safe and available truck parking. The NYMTC Multi-State Truck Stop Inventory and Assessment⁶ Study found that truck parking supply is insufficient to meet the demands that currently exist during peak overnight hours, and that parking facilities nearest to the urban core of the region are generally the most overcrowded, as shown in Table 4.2.

With an anticipated increase in freight movement expected in the future, the truck parking supply shortfall will rise unless existing facilities are expanded or new facilities are built. One new truck stop facility is currently under construction at JFK Airport. This facility will include 50 truck parking spaces, restaurants, a convenience store, truck washing facility, dry cleaning, and quick lube/light repair services.⁷ Though a welcome addition, this new facility does not satisfy the region's truck parking shortfall on its own.

FREIGHT RAIL NETWORK

Most of the rail freight activity within the New York Metropolitan region takes place near the western shores of the Hudson. The largest carload freight yards, intermodal terminals, rail-served industries and distribution centers that serve the NYMTC region are located in North Jersey. East of the Hudson River, freight rail volumes are lower, yet rail serves an important role in carrying bulk commodities such as stone, sand, and liquids. Three Class I railroads operate in the New York Metropolitan Area, including:

Table 4.2 Existing (2007) and 2030 No Build Truck Parking Capacity and Utilization by Freight Corridor

Regional Freight Corridor	2007			2030 No-Build		
	Truck Parking Capacity	Peak Utilization (%)	Peak Demand	Truck Parking Capacity	Peak Utilization (%)	Peak Demand
I-87/NYS Thruway	225	159	384	225	331	801
I-95 (CT)	208	203	147	208	419	282
I-78	267	124	342	267	232	638
NJ Turnpike	432	116	517	432	214	955
I-80	273	98	277	273	184	517
I-84/I-684	315	88	285	315	184	598
I-495/LIE	36	154	57	36	323	120
Regional Total	1,756	118	2,009	1,756	236	3,911

Source: "Multi-State Truck Stop Inventory and Assessment," NYMTC, 2009.

- CSX, which operates along the River Line in Rockland County, Hudson Line in Putnam, Westchester, and Bronx counties, the Hell Gate Line and Fremont Secondary from Bronx County into Queens County. CSX also provides local industry service to customers along the New Haven Line and to the Hunts Point Distribution Center in Bronx County;

- Norfolk Southern (NS), which only serves the New York Metropolitan region from the south and west, and its lines do not directly enter the NYMTC counties; New Jersey freight rail access to the NYMTC region depends on the cross-harbor float; and

- Canadian Pacific Railway (CP), which until 2010, operated carload train service east of the Hudson to Oak Point Yard and Fresh Pond Yard, CP has established a haulage agreement with CSX, with CSX handling CP traffic in their trains south of Albany. CP retains the right to resume trackage rights operations in lieu of the haulage agreement. CP's intermodal operations continue at a modest level over the NS Lehigh Line in New Jersey to Oak Island Yard in Newark.

In addition, Conrail Shared Assets, a switching carrier jointly owned by NS and CSX, operates in much of Northern New Jersey and over the Arthur Kill Lift Bridge to Arlington Yard and the Travis Industrial Track in Richmond County (Staten Island).

Rail customers in the NYMTC Region are also served by six short line railroads, including:

- The Housatonic Railroad (HRRC), which holds presently unused freight rights over Metro-North's Beacon Line, from Beacon east through Hopewell Junction to the New York-Connecticut state line.

- The New York and Atlantic Railway (NYA) has held an exclusive franchise to provide freight service over trackage owned by the Long Island Rail Road (LIRR) since 1997. The NYA operates from a hub at Fresh Pond Junction in Queens. NYA serves Brooklyn via the freight-only Bay Ridge Branch, and points west, east, and south on Long Island via the Lower Montauk Branch, Main Line of the Long Island Railroad (LIRR), Montauk Branch, and Port Jefferson Branch.

- New York New Jersey Rail, LLC (NYNJ), which is owned by the Port Authority of New York and New Jersey, operates a carfloat bridge route between Greenville Yard in Jersey City, NJ and the 65th Street Yard in Brooklyn.

- The P&W accesses New York through trackage rights over the freight operating rights held by CSX (as successor to Conrail and PC) on Metro-North's New Haven route. The only regular move by P&W on this route is the handling of crushed rock in unit train service to Fresh Pond Junction on Long Island, which is the only com-

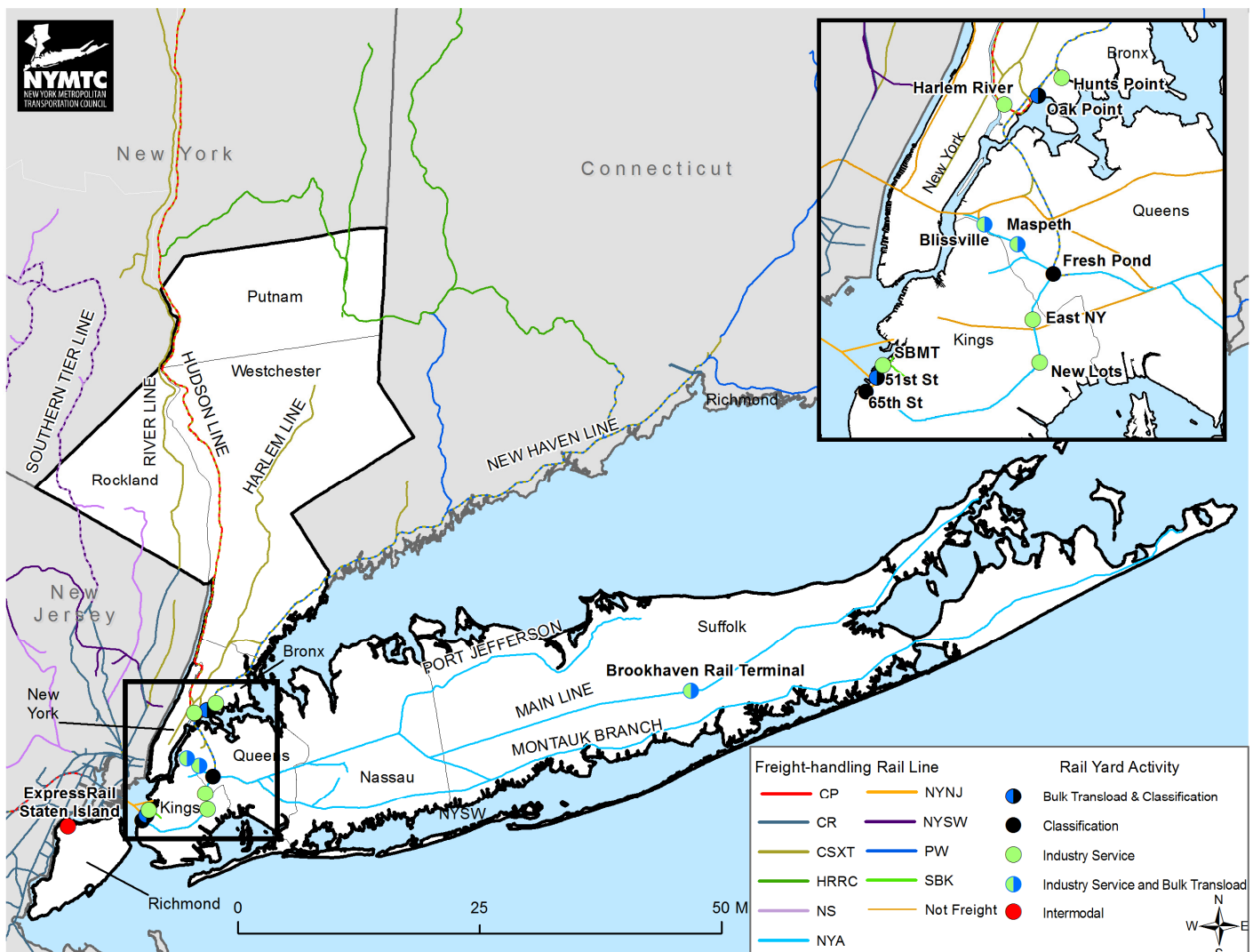
modity permitted under P&W's limited trackage rights.

- The South Brooklyn Railway (SBK) is a freight carrier owned by the MTA/ New York City Transit that presently consists of isolated segments of track at 39th Street and 3rd Avenue and at NYCT's Coney Island Yards.

- The Brookhaven Rail Terminal (BRT) is located along the LIRR Main Line in Yaphank, Suffolk County. Opened in August 2011, BRT functions as a transloading facility for construction aggregates and building

materials traveling between quarries in the Capital District of New York and central and eastern Long Island, in addition to soybean diesel, flour, semolina, and fencing materials. Brookhaven Rail LLC, a stand-alone Class III railroad, provides service over 3.4 miles of track on the property. A 200,000 square-foot warehouse serves as a distribution center for The Home Depot, which will receive 1,820 railcars annually. A map of the lines where freight railroads own or have operating rights, and associated terminals, is shown in Figure 4.3.

Figure 4.3 Freight Rail Lines and Major Rail Yards in the NYMTC Region



Source: Cambridge Systematics, using I-95 Corridor Coalition Integrated Corridor Analysis Tool.

Within the NYMTC Region, only a handful of carload service freight yards and terminals remain, with most previous facilities either converted to non-rail or non-freight rail uses. Each of the active terminals is mapped in Figure 4.3, coded by their type of use. Terminals and yards can be divided into three categories, which are as follows:

- **Industry Service yards** are designed to stage cars for the purpose of serving nearby industry. The largest industry yard in terms of activity is Hunts Point, which is located in New York City's Hunts Point Peninsula. A thriving industrial area in the South Bronx, it is best known as the primary food distribution center for produce which often arrives by rail. There are 670 businesses which collectively employ over 13,000 people.
- **Bulk Transload terminals** provide access to the rail network for shippers that do not have a rail siding next to their facility(ies). A recent addition is the new Brookhaven Rail Terminal, which has been designed to handle construction materials and other bulk goods destined for central and eastern Long Island.
- **Carload Classification/Interchange yards** sort rail cars by destination for assembling into outbound blocks and trains. Oak Point and Fresh Pond Junction yards are the primary classification/interchange yards in the NYMTC Region.
- **Intermodal yards** accommodate the transfer of intermodal containers, such as domestic trailers or international shipping containers, from truck to rail or vice versa. The only intermodal yard located in the NYMTC Region is the ExpressRail Staten Island facility, which handles the transfer of international shipping containers that arrive and depart from New York Container Terminal, from ship to rail.

PORTS AND WATERBORNE FREIGHT NETWORK

The Port of New York and New Jersey (PONYNJ) has achieved and maintained the status of the top port on the United States' East Coast. Within the Port, the Port Authority of New York and New Jersey (PANYNJ) manages six marine terminals that receive imported containerized, bulk (oil, cement, etc.), and breakbulk (steel pipe, concrete blocks, etc.) cargoes, and send U.S. exports to markets around the world. In addition, domestic breakbulk and bulk cargoes are shipped inbound and outbound through nearly 200 public and private marine terminal facilities located throughout the NYMTC Region. The facilities that handle bulk and breakbulk cargoes are located within New York City, along the North Shore of Long Island, and along the Hudson River in Westchester and Rockland counties, as well as in New Jersey.

Containerized Cargo

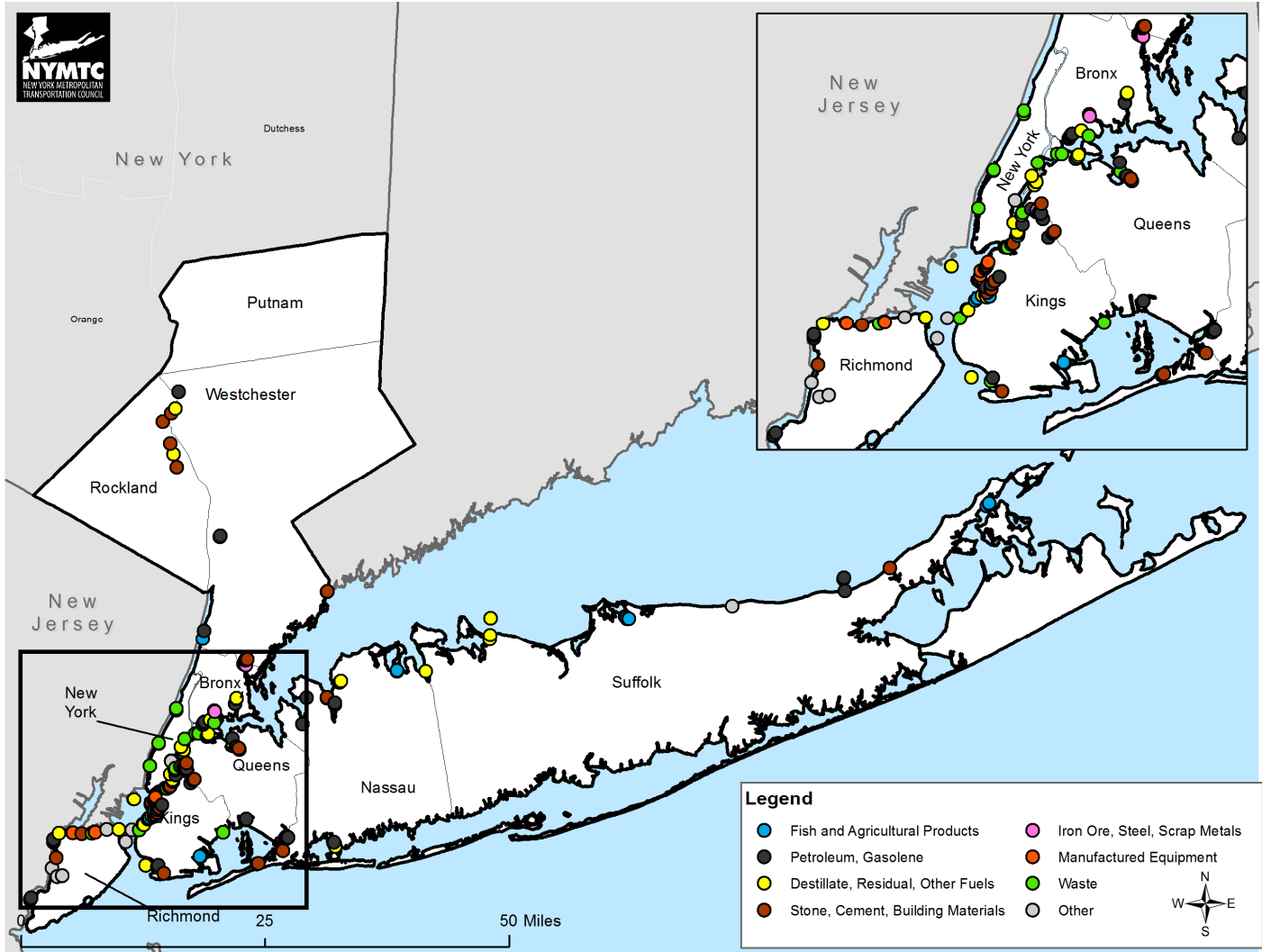
The PONYNJ serves as a major international gateway for imports and exports consumed and produced in the NYMTC Region. In addition, the Port serves a primary market area consisting of seventeen states in the Northeast, Mid-Atlantic, and Midwest. In 2011, 3.2 million containers, or 5.5 million twenty-foot equivalent units (TEUs) passed through the six container terminals in the Port. About 62 percent of loaded TEUs are imports, while 38 percent contain goods that are being exported. Top international trading partners are China, which accounted for 28 percent of the Port's trade in 2011, India (7.1 percent), Italy (5.2 percent), and Germany (5.0 percent). The top commodities traveling through the Port included furniture (263,000 TEUs), beverages (183,000 TEUs), apparel (170,000 TEUs), and menswear (133,000 TEUs).⁸ Figure 4.4 is a map of the locations of all six container-handling terminals.

Figure 4.4 Container Terminals at the Port of New York and New Jersey



Source: Port Authority of New York and New Jersey.

Figure 4.5 Bulk and Breakbulk Waterborne Terminals by Primary Commodity Handled, NYMTC Region



Source: U.S. Army Corps of Engineers, 2012

Bulk and Breakbulk Cargo

Bulk and breakbulk cargoes are an important part of the business activity of Port Authority marine terminals. Although containers are the predominant method of handling for most cargo types, especially finished goods like clothes and electronics, many types of cargo are handled in bulk or noncontainerized breakbulk. This type of cargo is also known as “general cargo” and may include such things as construction materials (cement, gypsum, paving stones, etc.), salt, food/juice/edible oils, and petroleum products. In addition to PANYNJ bulk and

breakbulk terminals, there are numerous private terminals along various New York waterways handling a variety of cargo such as sand and gravel, petroleum products, paper products, etc. Figure 4.5 below shows all port facilities listed in the U.S. Army Corps of Engineers ports database, which are located in the NYMTC Region, by primary commodity handled.

Maritime Support Services

Services that support the waterborne freight operations include:

- Support vessels, such as assist tugs, pilot boats, launch boats, derricks, and pollution response vessels;
- Anchorages and layberths;
- Vessel repair facilities; and
- Tie-ups for auxiliary activities such as crew changes, fueling, re-supply, and removal of bilge and gray water.

Facilities that provide these services are located throughout New York Harbor, Long Island Sound, and along the Hudson River.

AIR CARGO NETWORK

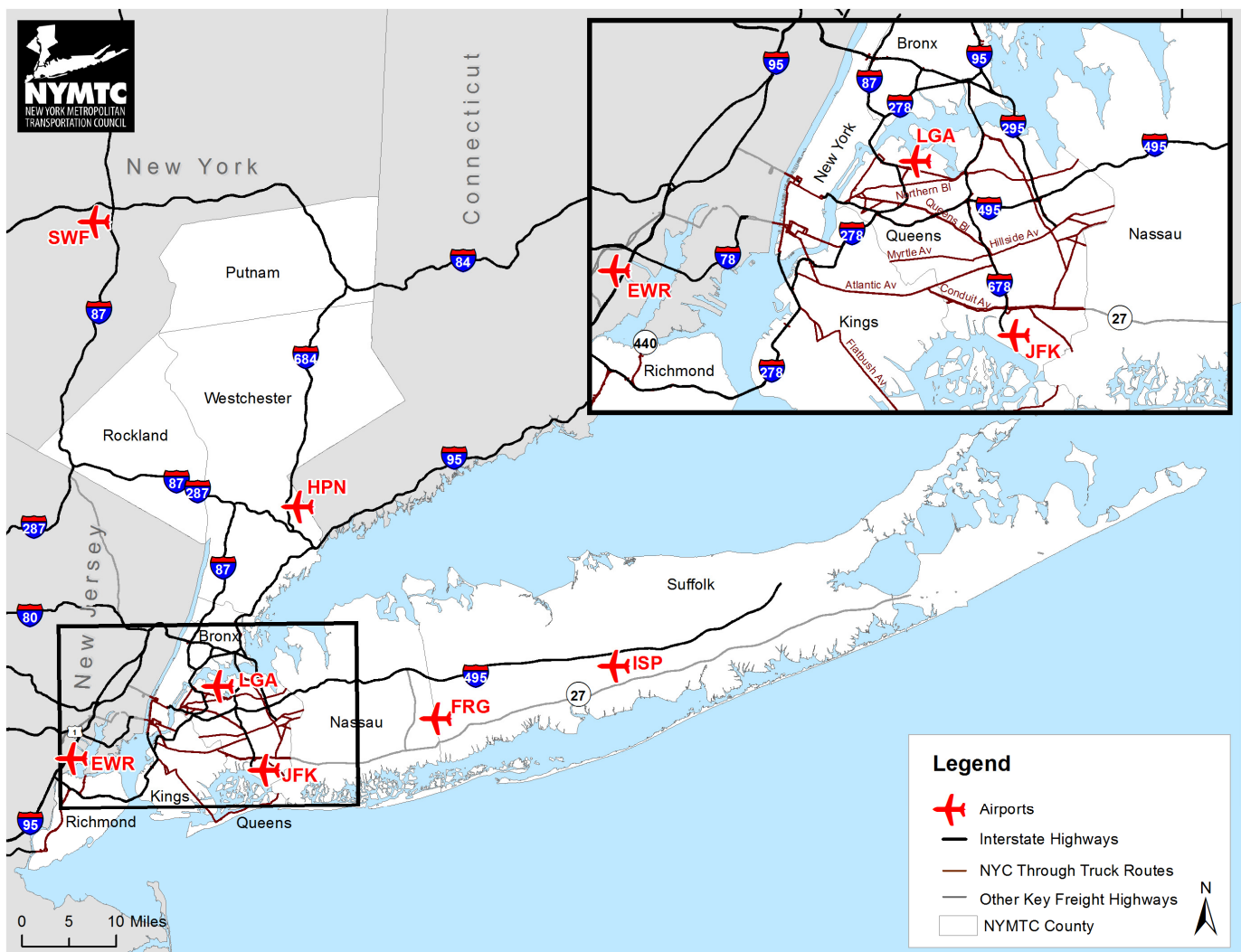
Of the New York area airports in the NYMTC region— John F. Kennedy International Airport (JFK), LaGuardia Airport (LGA), Westchester County Airport (HPN), Long Island MacArthur Airport (ISP) and Republic Airport (FRG), only JFK has significant air cargo activity and it is ranked among one of the top air cargo gateways in the country. LGA, while handling significant domestic passenger traffic, does not handle any significant amount of air cargo. HPN is a regional commercial and general aviation airport and any cargo is incidental to the passenger and charter services operated there. As part of the New York metropolitan area, Stewart International

Airport (SWF), and Newark Liberty International Airport (EWR) are key components of the international and domestic air traffic around New York City. Both airports have significant air cargo volumes. Airports in the NYMTC Region are shown in Figure 4.6.

Among Port Authority-owned airports (JFK, LGA, EWR, and SWF) cargo tonnage for year 2012 fell for the second year in a row, declining by 6 percent following a 2.5 percent decline in 2011 with only SWF registering an increase due to FedEx activity. Cargo tonnage was down 8.8 percent and 4.6 percent at EWR and JFK respectively. The decline is attributed to slow economic growth, substitution of truck for air transport, weak-

ened competitive position due to airline initiatives to expand operations at other airports, and strategic decisions by operators to shift to the Midwest and West to improve proximity to Asian markets for westbound traffic. Other impacts are fuel surcharges for air shipping, recession in the Eurozone economy, and a further shift from air to sea transport.⁹ Europe and Asia were the two largest markets for international cargo by weight and were approximately equal in the import/export movements. Top air trade commodities by weight for import/export were machinery, electrical machinery, optical-medical instruments, plastic, woven apparel, fish/seafood, knit apparel, pharmaceutical products, iron and steel, and vehicles (nonrailway).¹⁰

Figure 4.6 Major Airports In and Near the NYMTC Region



INTERMODAL NETWORK

Intermodal freight infrastructure includes the terminal facilities at which freight is transferred or transloaded from one transportation mode to another. Examples of intermodal facilities include rail/highway container or trailer transfer facilities, rail/highway bulk transload facilities, municipal solid waste (MSW) transfer facilities from barge to rail or barge to highway, water/highway ferry terminals, water/rail container transfer facilities at several of the region's marine terminals, and air cargo facilities on or near major air cargo airports.

Types of intermodal facilities in and near the NYMTC Region include:

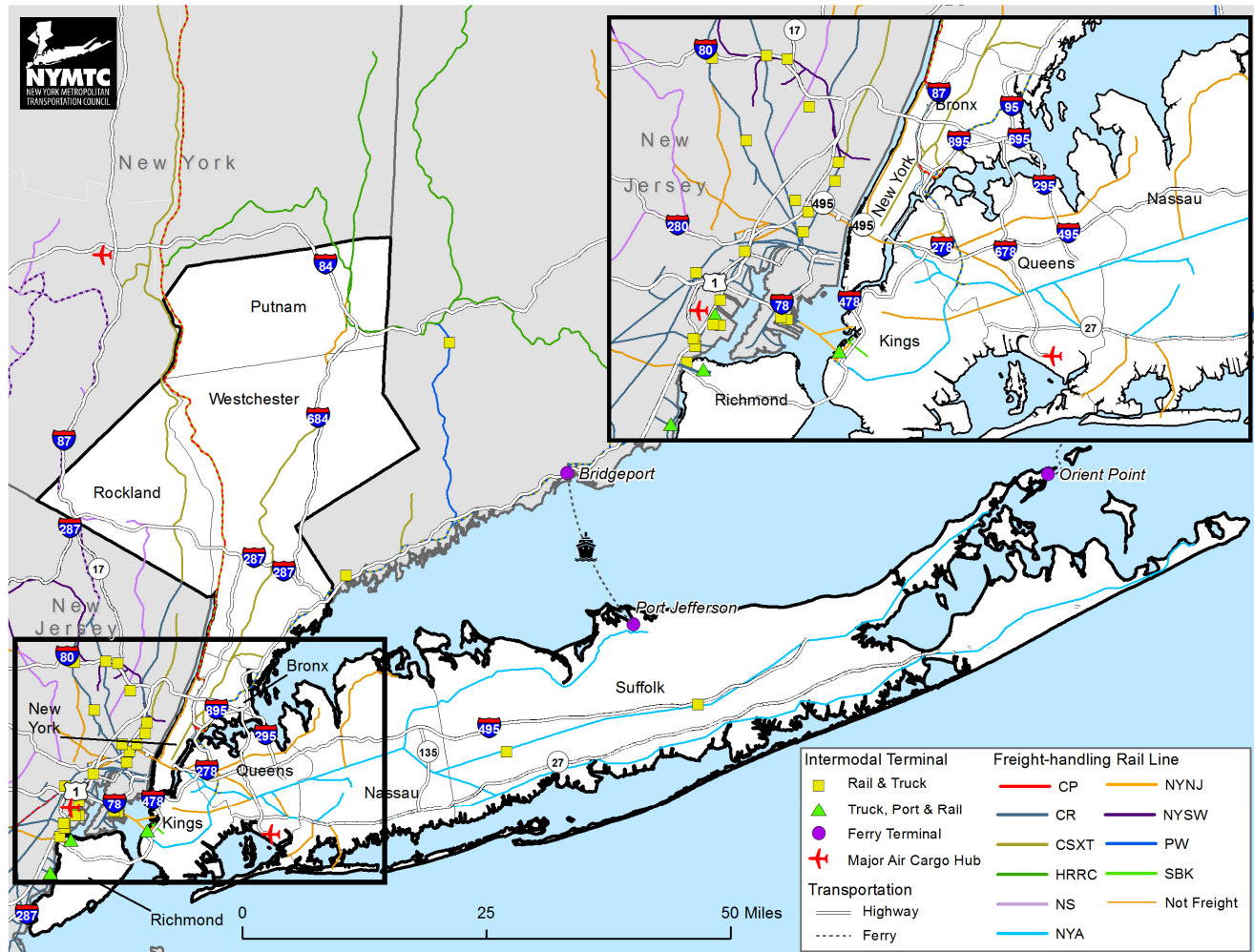
- **Rail/Highway – Intermodal Containers and Trailers.** In a multimodal supply chain, trains carrying international or domestic containers and domestic trailers represent one link in the intermodal chain that connects shippers with receivers, together with container ships and trucks. Due to the history and geometric characteristics of the rail network in the region, most intermodal rail trips begin or end at one of several terminals in New Jersey, with trucks hauling (“draying”) the trailers or containers between the terminals and the NYMTC member counties.
- **Rail/Highway – Transload of Bulk Goods.** Bulk commodities are often transloaded between railroads and trucks at rail yards and other facilities throughout the region. These bulk transload terminals provide access to the rail network for shippers that do not have a rail siding next to their facility(ies).
- **Highway/Rail and Barge – MSW Transload.** Trucks collect municipal solid waste (MSW) across the region and transport it to MSW transload facilities in sealed containers. The containerized MSW is transferred from truck to rail or truck to barge and shipped out of the region.
- **Water/Highway – Long Island Sound Ferries.** Car ferries operating on Long Island Sound also accommodate trucks, but the volumes are relatively low. Currently, the existing year round ferry services carrying trucks in the NYMTC Region include the Bridgeport–Port Jefferson Ferry, the New London–Orient Point Ferry, and the North Ferry serving Shelter Island.
- **Water/Rail.** Marine terminals and ports with on-dock rail access in northern New Jersey and the NYMTC Region move containers, railcars, and bulk commodities between New Jersey and New York by rail and barge.
- **Air/Highway.** The main purpose of air cargo facilities is to move cargo to and from landside to airside, from truck to aircraft efficiently. The types of air cargo facilities present in the region include general air cargo facilities, freight forwarders and integrators, logistics centers, and mail centers.

Table 4.3 summarizes the intermodal facilities, including rail yards and ferry terminals that are relevant to the region's intermodal system. For each facility, the table details the operating railroad when applicable, county where the facility is located, and the intermodal connections available. Figure 4.7 shows the locations of the region's intermodal freight infrastructure.

Table 4.3 Intermodal Facilities in the NYMTC Region

Terminal Name	Operating Railroad	County	Rail/ Highway	Rail/ Water	Water/ Highway	Bulk Transload	MSW Transload
65th Street Yard	NYNJ	Kings		✓		✓	
Bridgeport & Port Jefferson Steamboat Co.	N/A	Suffolk			✓		
Brookhaven Rail Terminal	U.S. Rail	Suffolk				✓	
Bush Terminal Yard (51st Street Yard)	NYNJ	Kings		✓		✓	
Harlem River Yard	CSX	Bronx					✓
Hunts Point	CSX	Bronx				✓	
New London to Orient Point Ferry	N/A	Suffolk			✓		
New York Container Terminal and Arlington Yard	Conrail	Richmond		✓			
South Brooklyn Marine Terminal	NYA	Kings		✓			

Figure 4.7 NYMTC Intermodal Network



Sources: I-95 Corridor Coalition ICAT Rail Network, Bureau of Transportation Statistics National Transportation Atlas Database, 2012; US Census Bureau; Cambridge Systematics, Inc.

5. CHALLENGES AND OPPORTUNITIES

The conclusions of recent plans and studies, commodity flow data and forecast, and evaluation of the existing conditions on the modal networks, together lead to the identification of several key challenges that NYMTC's member agencies face with regard to maintaining the region's multi-modal freight transportation system in a state of good repair and efficient operation. These key challenges include:

- Constrained capacity;
- Sub-optimal physical condition of some components of the network;
- Limitations on shippers' and receivers' access to components of the network;
- Vulnerability of the network to the effects of climate change;
- Lack of strategic redundancy;
- Need for improved management of truck movements; and
- Complex public and private institutional relationships.

Despite these large, complicated challenges, the region's stakeholders can take advantage of several opportunities, including on-going capital improvements, industry and technology trends, and common-ground issues that could be the foundation of consensus building and coordinated planning.

Although recommendations for strategies and projects that will address specific problems and issues will be developed in a subsequent phase of the Regional Freight Plan Update, the challenges and opportunities presented in this section summarize, at a high level, some of the key take-away themes from the Interim Plan efforts completed to-date. Further outreach to public and private stakeholders and future analysis tasks will further define and vet the nuances of these themes.

FREIGHT SYSTEM CHALLENGES

Constrained Capacity

The commodity flow analysis described in Section 3 anticipates the volume of freight moving into, out of, through, and within the NYMTC Region will increase 48 percent by 2040. This greater volume of freight will have to compete with greater volumes of passenger traffic on the region's highways, rail lines, ferry and air terminals, and many of these facilities already are congested during much of the day due to current passenger and freight volumes. Congestion limits the capacity of major rail, port, and air terminals that depend on trucks for final goods delivery, and (in combination with tolls, parking tickets, and labor) has an impact on drayage rates in the NYMTC Region, which are among the highest in the nation. Capacity constraints on each of the modal networks include:

- Highway capacity constraints are especially evident at some of the region's well-known bottlenecks, such as the George Washington Bridge-Cross Bronx Expressway segment of I-95 and the Gowanus Expressway-Brooklyn-Queens Expressway segment of I-278. Trucks have few route options due to the limited number of Hudson River, East River, and Long Island Sound crossings, and many streets and highways, especially in New York City, do not have the appropriate width and height geometries to accommodate larger national standard trailers. There are few places for truck drivers to park overnight to meet hours of service regulations or stage for local deliveries. Curbside parking and loading is difficult, especially in New York City and urban city, village and hamlet centers throughout the region, due to competition for

available curb space.

- Rail capacity challenges are different in the West of Hudson area, East of Hudson area, and for cross-Hudson rail traffic.

– West of the Hudson, capacity constraints can be found both on the freight main lines as well as terminals. Thus far, these constraints have been generally addressed as they have occurred, with CSX, NS and Conrail, along with NJT, NJDOT, and the PA-NYNJ, making investments to facilitate the growth of traffic.

– East of the Hudson, particularly over the long-term, capacity constraints are more daunting. With all of the major freight access routes being primary passenger routes as well, expected growth in passenger train volumes make it more difficult to handle increased freight volumes.

– Cross Hudson connectivity also impedes capacity. With the nearest available Hudson River bridge or tunnel approximately 132 miles upriver from New York City, freight rail service is circuitous and inefficient between the east-of-Hudson region and origins and destinations in the southeastern and south-central states. The present barge service is not a competitive option for most cross-Hudson shipments. Capacity limitations on the Newark Bay Bridge and National Docks Secondary between Oak Island and Greenville, and limited capacity at 65th Street Yard, in its current configuration, represent constraints to the capacity on the NYNJ float system to handle potential growth in volume in the future. Programmed improvements include expanded barge capacity, operations at 51st St. and 65th St. in Brooklyn, and a permanent float bridge at Greenville.

- On the waterborne network, limitations on the throughput of container terminals are not an immediate concern, rather a long-term considerations to be addressed as needed. Capacity can be expanded through improving the operational efficiency of the terminals (by investing in state-of-the-art equipment), and by deepening one of the 43-foot berths to 50 feet at Global Marine Terminal.

- Air cargo activity is subject to the same constraints as overall air service. A 2013 joint NYCEDC/PANYNJ JFK cargo industry assessment foresees significant growth potential if plans are implemented to upgrade on-airport cargo facilities and address longstanding impediments to efficient truck access on the regional roadway network.

- Current real estate industry and land use policy trends do not favor development of new intermodal terminals. This constraint limits efficient multimodal exchanges and fosters the dependence on trucks for freight mobility in the region.

Physical Challenges

The freight network infrastructure in the region is aging, in need of repair in some locations, and in many instances lacks the capability to accommodate state-of-the-industry freight equipment. Most critically, freight movements over both rail and highway systems are restricted in locations where inadequate dimensional envelopes prevent the passage of modern rail cars or truck trailers (e.g., trucks above 55' length overall in NYC). Beyond the size limitations, deficiencies in infrastructure result in circuitous routes, and for trucks, a lack of available on-street parking and loading areas during peak delivery periods (daytime hours in most of the region), resulting in frequent and expensive parking tickets.

- According to the NYSDOT Pavement Condition Ratings, a significant portion

of the region's facilities have either poor or fair pavement condition, including facilities that form the major gateways and conduits into the region for the movement of freight. In many cases, trucks loaded beyond the legal weight limits contribute to the poor pavement and bridge conditions. Worsening physical conditions on these facilities in turn lead to longer delivery times, increased maintenance needs of trucks, congestion, and increased transportation costs for shippers and receivers. The highest-volume freight corridors are also the corridors that contain the greatest concentrations of structurally deficient bridges and poor pavement condition.

- In addition to the insufficient availability of freight tracks and yards, another physical constraint facing the NYMTC Region's rail network relates to weight limits and horizontal and vertical clearance limits that prevent the use of some modern equipment, thereby diminishing the potential economic advantages of freight rail. Weight limits along the New Haven main line and most branch lines on Long Island, in Westchester, and Putnam counties are constrained to 263,000-lb. railcars, which is under the national standard of 286,000-lb. railcars. Horizontal clearance is affected by the presence of third rail on the LIRR and Metro-North, which precludes the use of double-stack well cars in those territories. Vertical clearance is generally insufficient for double stack equipment throughout the east-of-Hudson region, with the exception of the Hudson Line.

- On the waterborne network, maintenance of a healthy waterborne freight system is impacted by a significant shortage of support services infrastructure in New York Harbor, which is expected to worsen in the future. Insufficient dry dock capacity in the Harbor, and a shortage of skilled labor, results in long repair queues and vessels being transported to other states for emergency repair.

Access

A critical factor that impedes the use of freight rail, waterborne, and air cargo networks is access to those networks.

- Access to the rail network, via intermodal terminals and line-side industry access, is limited, particularly in the east-of-Hudson region. Effects of intermodal facilities on local communities, which may include increased rail and highway traffic, may make them undesirable neighbors and thus very difficult to site.

- On the waterborne network, channel and berth depths and air draft clearances pose existing or potential constraints.

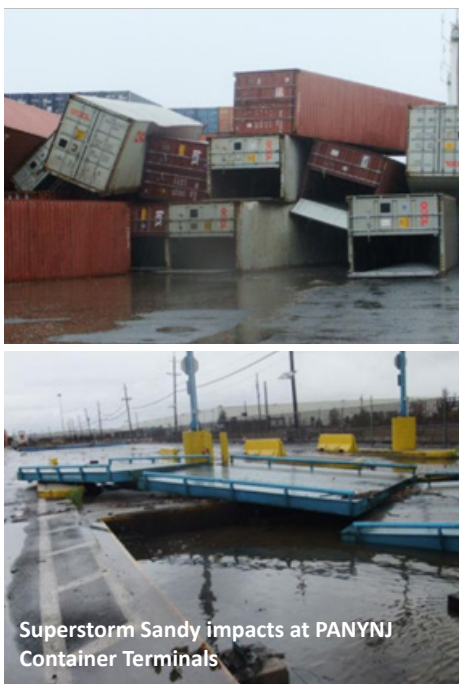
- Currently, the Port Authority and U.S. Army Corps of Engineers are working together to deepen to 50 feet the channels on the approaches to Port Newark, Port Elizabeth, Global Marine Terminal, and New York Container Terminal. This depth is necessary to accommodate Post-Panamax vessels that are expected to call on the Port after the Panama Canal is widened in 2015. For independent bulk and breakbulk facilities, channel and berth depths are also a constraint notably in Eastchester Creek, and in the Mariners Harbor section of the North Shore of Staten Island. Many berths and piers are out-of-use due to insufficient water depths resulting from insufficient maintenance dredging.

- Air draft clearance also poses an access constraint in the Port. The Bayonne Bridge, which crosses Kill Van Kull 151 feet above the water's surface, is too low to allow passage of the largest container ships currently in service in other parts of the world. The Port Authority recently secured federal approval for a project to raise the roadbed of the Bayonne Bridge to 215 feet above the channel.

- Highway access to the region's airports, especially JFK, is made difficult due to a limited number of routes available for trucks to use, recurring congestion, and the prohibition of 53-foot trailers.

Climate Change Vulnerability

The effects of climate change, such as sea level rise, and susceptibility to storm surge associated with hurricanes and nor'easters, present additional threats to many of the region's freight facilities. Superstorm Sandy interrupted waterborne trade in the region, as cleanup and emergency repairs were required to restore many terminals to operating order. Flooding rains during Tropical Storm Irene washed out many highways and some rail lines, which were out of service for weeks or months after the storm. Although long-term preparedness, "smart" land use, and construction strategies are currently debated, Sandy and Irene demonstrated the region's vulnerability to natural disasters, and set new benchmarks for the potential impacts of future storms.



Superstorm Sandy impacts at PANYNJ Container Terminals

Source: Anne Strauss-Wieder, Inc., 2013

System Redundancy

There are limited alternative routes for freight movement through the region due both to physical and regulatory constraints. This limitation requires that existing facilities function continuously without failing or being constrained due to crashes, extreme weather, terrorist threats, or other emergencies. Lack of alternatives also constrains scheduling of essential reconstruction on key links. This is a strategic deficiency of the region's freight infrastructure.

Truck Management

The regulation of truck size and weight in the NYMTC Region presents major challenges due to the physical limitations of key truck routes, and the large number of overlapping regulatory jurisdictions including New York City, New York State, Metropolitan Transportation Authority, New York State Thruway Authority, the Port Authority of New York and New Jersey, and the U.S. Department of Transportation.

Within New York City, tractor-trailer combination vehicles operating on most truck routes and interstate highways may not exceed 55 feet in total length. Trucks with 53-foot trailers, which are today's standard trailer length nationally, may only travel on the portions of I-95, I-695, I-295, and I-495 that cross the city between the Bronx-Westchester County line and Queens-Nassau County line for through movements to and from Nassau and Suffolk counties, and are not permitted to serve locations in the five NYC boroughs. This issue represents a cost to shippers and receivers in New York City who must receive shipments by smaller-than-standard tractor-trailer combinations. In practice, tractor-trailers exceeding the 55-foot limit are a frequent sight serving a range of NYC businesses despite the risk of summons.

The need for improved efficiency in managing truck movements and enforcing regulations is demonstrated by reported instances of bridge strikes¹¹, pavement and bridge damage, the use of improper or unsafe places to park while resting or while loading/unloading.¹² The region's capacity to enforce the truck route network, truck size and weight, and truck parking and loading regulations is limited by the resources available in law enforcement agencies and the development and deployment of technologies that can assist in enforcing such regulations.

Interagency Coordination

Institutional challenges can hamper the freight planning efforts undertaken in the region. The NYMTC Region is part of a larger interdependent tri-state metropolitan area that includes parts of New Jersey and Connecticut. Further, the mix of cooperative and competitive relationships between three Class I railroads (NS, CSX, CP), regional, short line, and passenger railroads add complexity to the planning process. While NYMTC can only directly address projects originating within the region, the movement of freight does not recognize arbitrary political boundaries. In order for multimodal freight projects to have resonance in the larger region, numerous planning agencies (e.g., NYMTC, NYSDOT, PANYNJ, MTA, NJTPA, NJDOT, and CTDOT) are required to work together and coordinate the implementation.

Parallel to the institutional complexity of government in the tri-state region, is the institutional complexity of the private and public rail system and terminal operators in the region. Multiple operators and ownership – particularly for east of Hudson access – increase cost, complexity and degrade performance to levels that make intermodal services uncompetitive for many types of shipments. Institutional issues directly affecting the

rail industry detailed in the Task 2.1.2 rail system memorandum directly affect the intermodal system.

Preservation of waterfront industrial land for marine industrial use is another challenge in the region. As waterfront residential and mixed-use development remains popular and desirable in many communities, for example, the potential exists for encroachment upon and/or elimination of maritime industrial facilities. The coordination of many public and private stakeholders is necessary to address this issue in the land use and transportation planning processes.

OPPORTUNITIES

Coordinated Planning

Take freight and passenger needs into account when planning highway and rail capacity improvements, through comprehensive corridor planning that includes the involvement of all service providers operating in the corridor. Such a planning process was exemplified by the Hudson Line Railroad Corridor Transportation Plan, which identified a program of capital investments along the Hudson Line corridor that would improve performance for all rail service providers in the corridor.¹³

Truck Management

Deployment of technologies to manage truck movements in the region can help NYMTC's member agencies avoid bridge strikes, pavement and bridge damage, and unsafe parking and loading practices. Examples of such technologies include electronic weigh-in-motion (WIM) sensors that collect vehicle weight data and camera-based sensors that monitor parking space or curbside loading-zone occupancy. Improving management of the freight highway system can be one way in which the region's

transportation agencies can protect the infrastructure and facilitate safe and efficient operations.

Upgrading of infrastructure to handle modern equipment.

For publicly owned rail infrastructure, consideration should be given to the needs of modern freight equipment in capital projects. While certain types of equipment would be very difficult to accommodate due to the presence of electrified third rail, etc., there should be a general requirement to allow for 286K maximum weight railcars, and expansion of the clearance envelope to 22' for new structures, where economically feasible. Metro-North, LIRR, and Amtrak all have programs underway to increase weight limits on their routes. As weight limits are largely driven by bridge conditions, completion of these modifications is primarily being done as part of larger capital projects. Many of these bridges are quite old and require close examination to ensure their safety and performance under the higher limit. Furthermore, it is also evident that the higher weight limits do increase wear on track, which imparts additional costs to maintain the track in proper condition.

Regional Freight System Planning and Management

Momentum is growing for more extensive and coordinated cross-jurisdictional planning to meet the freight needs of the greater metropolitan region and to support its role as an international trade gateway and crossroads of domestic goods movement. These include a partnership planning effort among NYS-DOT, NJDOT, and PANYNJ to develop a regional freight strategy, new federal mandates for freight planning in MAP-21, and expanded exchanges on freight issues among NYMTC, the neighboring North Jersey Transportation Planning

Authority (NJTPA), and other nearby metropolitan planning organizations. These efforts can provide a framework and context for freight planning by the region's MPOs and local government agencies.

Institutional

When major public investments to freight operations are being considered (such as New York Cross Harbor improvements), the institutional manner in which service would be provided should be considered. The full benefit of such investments can only be realized if the service utilizing the investments is structured efficiently. These efficiencies can be facilitated by well designed agreements with operating entities, and avoiding complex operating arrangements that diminish service performance and increase costs.

Enhance access for freight on the multimodal regional network

A range of options should be considered for adoption, including reducing track access ("trackage rights") fees for freight trains (effectively to incentivize use of publicly owned rail lines for freight), land use planning for areas around rail lines that supports rail-oriented industrial and terminal uses in targeted locations, and ensuring that freight rail operators gain efficient access to the publicly owned network. For critical highway and arterial routes, continued efforts by concerned agencies can achieve, over time, more reliable operations, relief to bottlenecks, and targeted improvements to address "last mile" constraints.

Maintain the Southern Rail Gateway

A specific priority should be placed on improving cross-Hudson connectivity. These improvements could take several forms, including upgraded cross-Hud-

son barge service as is being considered as part of the Port Authority's Cross Harbor study, and participation in new combined rail/highway bridge schemes, such as the Tappan Zee Bridge Replacement Project.

Airport Redevelopment

Airport redevelopment initiatives and ongoing capital investment at JFK and SWF, including planned cargo area expansion, provide the opportunity to preserve and grow the region's share of international air cargo trade, and could improve the efficiency and reduce costs for shippers in the region and beyond. Easier ground access to JFK is an important corollary to on-airport cargo improvements.

Panama Canal Expansion

The expansion of the Panama Canal, expected to be completed in 2015, will improve all-water access between the East Coast of the United States and East Asia, and could result in re-routing of some East Coast and Midwest cargo from West Coast ports to East Coast ports. This change in travel pattern could result in increased volume of containers traveling through PONYNJ, and a change in the direction of container travel on the region's highway and rail networks, as some West Coast-based land-bridge traffic could shift to an East Coast-based distribution pattern to other parts of the country.

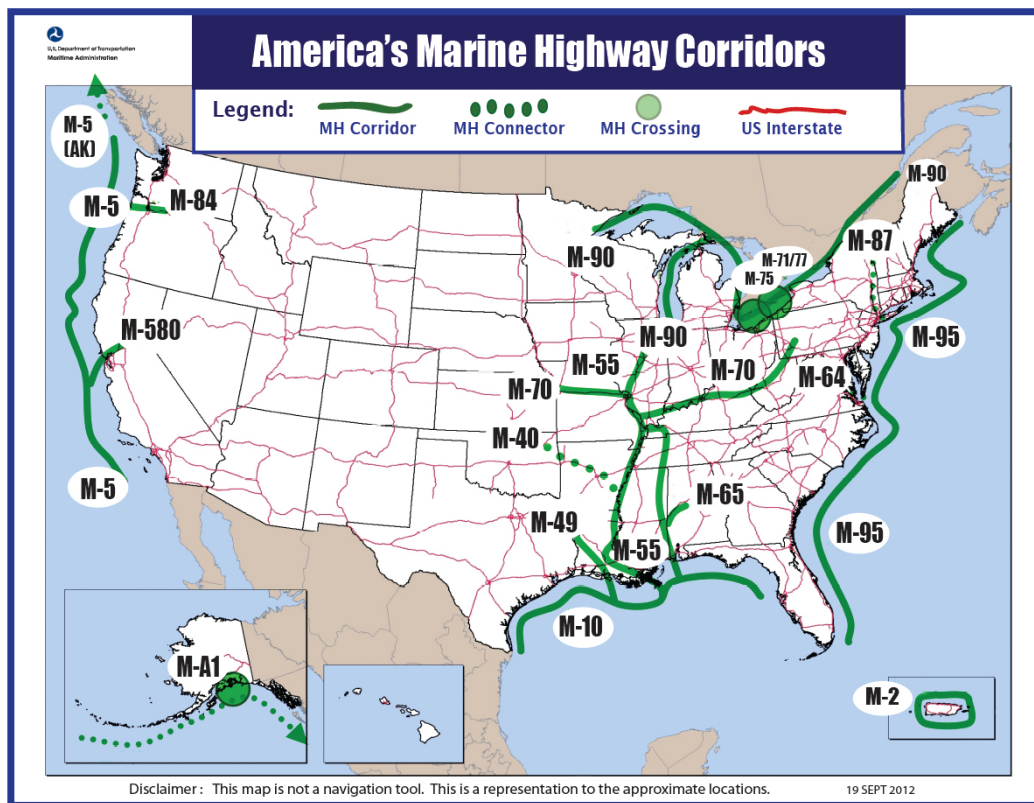
Marine Highways

The U.S. Maritime Administration (MARAD), in partnership with transportation agencies throughout the country, has designated 11 "marine highway" corridors throughout the country, including two that traverse the NYMTC Region, M-87 and M-95, shown in Figure 5.2. Marine highways are navigable waterways that support or relieve congested landside transportation systems. Currently, 8 projects and 6 initiatives are underway along designated marine highway corridors, aimed at studying the feasibility of potential services, starting new services, or expanding existing services. Projects and initiatives impacting the NYMTC Region include:

- Cross Sound Enhancement Project, which aims to improve existing ferry services across Long Island Sound, increasing capacity to accommodate an additional 3,000 trucks per year between Connecticut and Long Island;
- Trans-Hudson Freight Connector Project, which aims to expand the quality and capacity of the Cross-Harbor rail float service between New Jersey and Brooklyn; and
- Hudson River Food Corridor Initiative, which aims to study the feasibility of transporting fresh produce from agricultural regions in North-Central New York near the Hudson River and Long Island to the New York-Newark Metropolitan Area.

These projects offer the potential to support the region's maritime economy, complement landside transportation services, and relieve landside congestion.

Figure 5.2 Marine Highway Corridors



Source: U.S. Department of Transportation

6. NEXT STEPS

The findings presented in the previous sections of this report are only the beginning of the process to update NYMTC's Regional Freight Plan. Several work steps remain to be completed as part of the Regional Freight Plan Update Interim Plan, and a second phase of the Regional Freight Plan Update must be undertaken to develop a complete plan.

The remainder of the Interim Plan will focus on outreach activities for the purposes of:

- Confirming or revising preliminary findings regarding existing conditions, challenges and opportunities; and
- Developing new media that NYMTC and its member agencies can use to communicate the importance of freight to the region's economy and quality of life.

To confirm or revise preliminary findings, a series of focus groups will be convened with private sector shippers, receivers, logistics professionals, and freight transportation service providers, to discuss the marketing needs to advance three potential freight village sites in the region and to discuss strategies to support intermodal rail in the region. The focus groups will provide the necessary background information needed to develop a survey that will be distributed to a larger sample of industry representatives throughout the region.

New communications media will be developed and released, including an updated Freight Transportation Info Wheel (with current socioeconomic data and forecasts, and the commodity flow analysis findings summarized in Section 3 of this Report), an updated "Basics of Freight Transportation in the NYMTC

Region" brochure (also updated with recent socioeconomic and commodity flow data summaries), and County Freight Profile documents for each county in the NYMTC Region. Each County Freight Profile document will describe at the county level, in four pages, population and employment trends, volume of goods, top commodities, top trading partners, and mode splits now and in the future.

Upon the completion of the Interim Plan, NYMTC will advance the remaining tasks of the Regional Freight Plan Update, including:

- Identification of goals and objectives for the Regional Freight Plan Update that align with the goals set forth in NYMTC's Regional Transportation Plan;
- Definition of freight performance measures that will be used to track the region's progress toward achieving the goals and objectives;
- Development of a complete list and assessment of physical, operational, and institutional needs;
- Identification, evaluation, and recommendation of projects, programs, and policies that NYMTC member agencies can advance in order to make progress toward achieving the goals and objectives;
- Description of the "direction forward," including implementation steps, stakeholder roles and responsibilities, potential financing, and challenges that may complicate implementation; and
- Continued public and stakeholder outreach activities.

ENDNOTES

- 1 “New York Integrated Incident Management System Evaluation Project,” U.S. Dept. of Transportation ITS Joint Program Office, 2007, available from: <http://ntl.bts.gov/lib/30000/30900/30995/14479.htm>.
- 2 Cambridge Systematics made several adjustments and enhancements to the TRANSEARCH database to ensure the data more closely matched other freight data sources and observed traffic data. The methodologies employed to make these adjustments are described in the Task 2.2.2 “Commodity Flow Analysis” technical memorandum.
- 3 Surface Transportation Board (STB) Full Carload Waybill Sample was processed by IHS Global Insight for the rail flows.
- 4 About 80 percent of the tonnage moving by “other” modes consists of crude petroleum, natural gas, and gasoline (STCC 13) moving into the NYMTC Region from Alberta, Canada. This commodity travels primarily by pipeline. Tons of STCC 13 moving by a combination of pipeline and water are reported as traveling by water in TRANSEARCH.
- 5 National Highway Traffic Safety Administration, Fatality Analysis Reporting System (FARS), available from: <http://www.nhtsa.gov/FARS>.
- 6 NYMTC Multi-State Truck Stop Inventory and Assessment, 2009
- 7 “JFK International Airport Plaza,” Airport Plazas, LLC, available from: <http://www.airportplazas.com/project-jfk.php>.
- 8 “Trade Statistics,” Port Authority of New York and New Jersey.
- 9 Year in Review: Traffic and Cargo Activity at the Port Authority Airports in 2012, The Port Authority of New York and New Jersey.
- 10 2011 Airport Traffic Report, The Port Authority of New York and New Jersey, April 2, 2012 (excludes Teterboro).
- 11 “Bridge Strike Mitigation in the New York City Region,” Regional Bridge Strike Task Force, 2010, available from: http://www.nyc.gov/html/dot/downloads/pdf/hodge_bridgestrike-mitigation_trb2010.pdf.
- 12 “Multi-State Truck Stop Inventory and Assessment Study,” NYMTC, 2009, available from: http://www.nymtc.org/project/freight_planning/truck_stop/TruckStop_Study.pdf
- 13 New York State Rail Plan 2009: Strategies for a New Age, pp. 66-67.