Urban Freight Case Studies: New York

NOVEMBER 2009

Prepared for:
U.S. Department of Transportation
Federal Highway Administration
Office of Freight Management and Operations

U.S. Department of Transportation
Federal Highway Administration

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URBAN FREIGHT CASE STUDIES

The Federal Highway Administration (FHWA), Office of Freight Management and Operations, developed the Urban Freight Cases Studies as a way to document notable practices in urban goods movement. These case studies provide information on freight-related initiatives that mitigate congestion and improve the safety and efficiency of commercial vehicle travel in urban areas. New York City is one of four urban areas selected for study. The other areas are Los Angeles, Orlando, and Washington, DC.

In order to develop the most useful case studies, FHWA conducted an extensive review of freight-related projects and strategies that provide practical information and transferable solutions to the challenges that confront urban goods movement. The project team also conducted site visits and interviews with organizations involved in project implementation, including state departments of transportation (DOTs), metropolitan planning organizations (MPOs), city governments, and private-sector businesses. The results of the site visits and interviews are highlighted here.

NEW YORK CITY

As one of the nation's largest commercial centers, New York City moves more freight than any other metropolitan region in the United States.[1] To move goods efficiently, the City makes improvements and adjustments to the management and operations of the transportation network on a continuous basis.

The primary elements of New York City's freight management, operations, planning, and implementation activities include:

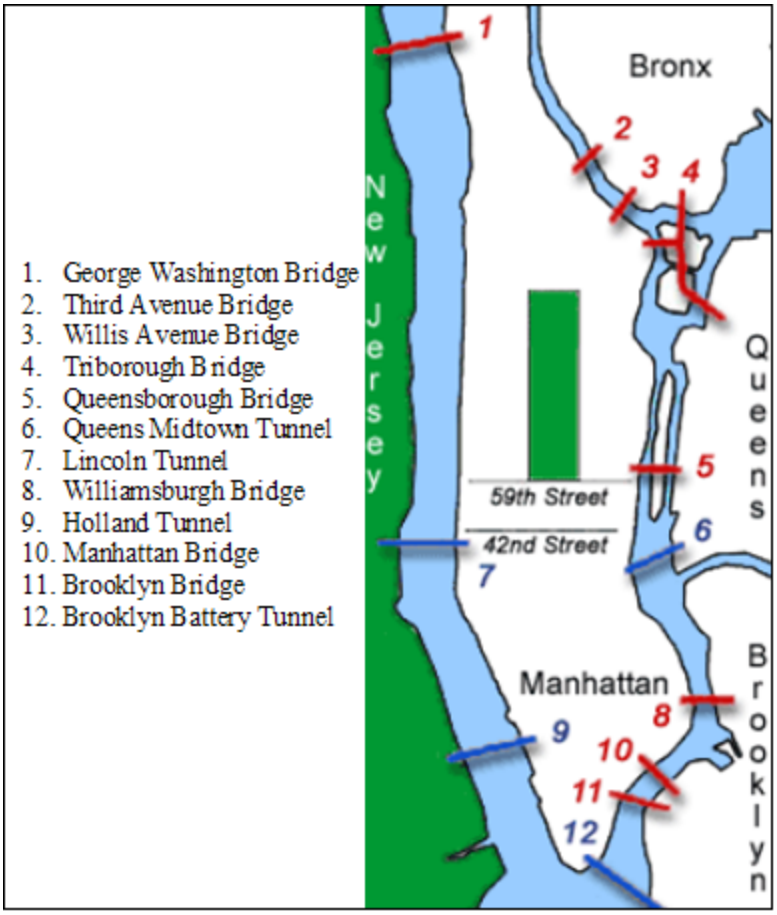
- The *Commercial Vehicle Parking Plan* that addresses curbside management issues.
- The *THRU* Streets Program that improves traffic flow and provides additional curbside parking for commercial vehicles.
- The *Truck Route Management and Community Impact Reduction Study* that proposed improvements to the City's existing truck route network, including routing alterations, signage improvements, and public outreach efforts.

[1] New York Metropolitan Transportation Council, *NYMTC Regional Freight Plan: Task 2* (New York City, NY: 2004), prepared by Cambridge Systematics.

Geographic Description

New York City consists of five boroughs: The Bronx, Brooklyn, Manhattan, Queens, and Staten Island. Manhattan, which has a land area of only 22.96 square miles and a population of 1.63 million, has the largest central business district in the United States.[2] As shown in Figure 1, roadway connections to this borough include three bridges and one tunnel to/from Brooklyn, two tunnels and one bridge to/from New Jersey, three bridges to/from the Bronx and two bridges and one tunnel to/from Queens. Vehicles entering or leaving these access points experience heavy traffic on bridges and tunnels.

Figure 1: Manhattan Bridge and Tunnel Crossings



Source: NY.com, *NYC Bridge and Tunnel Crossings*, available at http://www.ny.com/transportation/crossings/ as of June 2, 2009.

[2] U.S. Department of Commerce, Census Bureau, *New York County Quickfacts* (Washington, DC: 2008), available at http://quickfacts.census.gov/qfd/states/36/36061.html as of June 3.

Geographic Description (continued)

New York City's grid pattern and its one-way street system usually provide a good foundation for efficient traffic operations. However, the amount of activity and competition for road capacity and curb space has created inefficiencies for truck movements throughout the City.

Institutional Involvement

NEW YORK METROPOLITAN TRANSPORTATION COUNCIL

In 2004, the New York Metropolitan Transportation Council (NYMTC) completed the *NYMTC Regional Freight Plan,* which focused on freight needs and recommended policy, program, and infrastructure improvements in various jurisdictions throughout the region. The *Plan* developed a list of short-term, mid-term, and long-term projects that local agencies could implement to reach regional freight movement goals. For each project, the report identified agencies responsible for implementation and emphasized the importance of coordination among various organizations.

NEW YORK CITY DEPARTMENT OF TRANSPORTATION (NYCDOT)

NYCDOT is the lead agency for many of the proposed projects in NYMTC's *Regional Freight Plan*. Each project required different levels of effort, involvement, and responsibility.

Considering the importance of goods movement to the City, NYCDOT created the Office of Freight Mobility in Spring 2007. The Office, which is housed in the Division of Planning and Sustainability, helps focus the efforts of various organizations throughout the region. It works closely with other agencies, including New York State DOT and the Port Authority of New York and New Jersey (PANY/NJ), on freight issues affecting the City. The goal of the Office of Freight Mobility is to serve as the point of contact for freight-related issues and provide educational materials and services to the trucking industry, business community, and general public on issues relating to the truck route network. Additional tasks assigned to this Office include improving the management of trucks in the City.

NOTABLE PRACTICES

Curbside Management

Midtown Manhattan is one of the nation's most active commercial centers. Many deliveries and pickups must be made to and from this thriving district by means of a physically constrained transportation system. To maintain the efficient flow of goods and services throughout this district, NYCDOT implemented several curbside management strategies indentified in its *Commercial Vehicle Parking Plan*. Commercial vehicles contribute to traffic congestion in Midtown Manhattan and are affected by it as well. The limited number of loading/unloading zones available, in addition to the number of vehicles using the spaces for long-term parking, has forced many trucks and other large vehicles to double-park, thereby reducing the capacity of the affected street by one lane of traffic.

To improve traffic flow, the *Commercial Vehicle Parking Plan* recommended providing additional curbside spaces for commercial vehicles, reducing the amount of time these spaces are occupied, and increasing enforcement. By improving the management of loading/unloading zones in the Midtown area, NYCDOT decreased the number of double-parked vehicles, which resulted in a reduction in congestion. Initial implementation focused on the streets between 43rd and 59th and Fifth Avenue and Seventh Avenue. Because of the program's success, implementation was expanded to cover the streets between Second and Ninth Avenues as shown in Figure 2.

Curbside Management (continued)

Figure 2: NYCDOT Midtown Commercial Vehicle Parking Program

Source: New York City Department of Transportation, *Traffic Rules* (New York City, NY: 2009), chapter 4.

In the newly designated commercial vehicle loading zones, New York City has replaced single-space parking meters with ticket dispensing "Muni-meters" (Figure 3). These meters, located along each block of restricted curb space, allow commercial vehicle operators to purchase prepaid parking tickets for up to three hours. Payments can be made with quarter and dollar coins or NYC Parking Cards. Some machines now accept credit cards.

Curbside Management (continued)

Figure 3: Muni-meter on New York City Street

Source: Street Smarts, New York City, NY 2006.

In the past, curb spaces were reserved for commercial vehicles from 7 a.m. to 6 p.m to provide access to businesses during the busiest hours of the day. However, the allocation of these loading/unloading zones alone could not accommodate the volume of trucks that carry goods or provide services to and from the region on a daily basis. In addition, the amount of time that each vehicle was occupying a space needed to be reduced.

To ensure curb-space turnover, and, therefore, increase parking availability to a larger number of users, NYCDOT implemented a pricing strategy through the Muni-meter program. An escalating rate structure of $2.00 for one hour, $5.00 for two hours and $9.00

for three hours was designed to encourage shorter dwell times. As a result, the strategy has led to a significant reduction in dwell times for curbside loading spaces.

COST/BENEFITS OF CURBSIDE MANAGEMENT PROJECTS

Costs related to the curbside management projects discussed above include Muni-meters, new signs, and the creation of New York City Parking Cards. These cards were not necessary, but made the transactions more convenient to commercial vehicle operators. The City anticipates that the revenue collected from the meters will eventually cover the capital costs.

Some skeptics of the program have voiced concerns that a decrease in parking fines will reduce City revenues. In 2005, New York City collected $102 million in commercial vehicle parking fines.[3] This accounted for 3 percent of the $18.5 billion the finance department collects each year.[4] However, revenue from Muni-meters can help balance the potential loss from parking fines. In addition, other indirect costs could be avoided through the implementation of curbside management strategies. For example, increasing parking turnover rates and providing additional parking capacity can reduce the number of parking citations issued and administrative costs associated with contested tickets. On average 7,000 tickets are issued to commercial vehicles alone, and administrative costs for contested parking violations are extremely high. A 2005 initiative by the City offered reduced fines to offenders in exchange for the agreement not to contest a ticket. This agreement resulted in the elimination of 94 judges and a savings of $2,000,000 in administrative costs.[5]

According to NYCDOT's post-implementation studies, the curbside management program has accomplished its goal of enhanced curbside efficiency. Results show that the percentage of occupied curb space has dropped from an average of 140 percent (meaning that all spaces were occupied, with double parking occurring at 40 percent of

[3] "Delivery firms' big ticket item: Parking Fines"; http://www.msnbc.com/id/14602712/; 09/01/2006

[4] "Delivery firms' big ticket item: Parking Fines"; http://www.msnbc.com/id/14602712/; 09/01/2006

[5] Jo Craven McGinty and Ralph Blumenthal, "City Will Slash That Parking Fine, If You Ask", *The New York Times*, January 1, 2009.

these locations) to 95 percent. As a result of the City's curb-space pricing strategy, average duration of curbside occupancy has decreased from 160 minutes to 45 minutes and that only about 25 percent of these commercial vehicles are occupying spaces for more than one hour.

With the reduction in occupancy rates and dwell times, commercial vehicles encounter less difficult locating available parking spaces and, therefore, do not have to travel around the block multiple times. Eliminating this recirculation has many benefits, including reductions in congestion, air pollution, noise, and fuel consumption.

To ensure acceptance of its curbside management program, NYCDOT reaching out and providing information on benefits to commercial vehicle operators and businesses. One important benefit was the ability to deduct the cost of parking as a business expense. Parking violations cannot be deducted as an expense.

THRU Streets Program

Historically, midtown Manhattan has suffered from congestion. As a result, the City has developed strategies to improve traffic conditions. Average travel speeds of about four to five miles per hour along cross-town streets with little travel time reliability led to the implementation of a traffic operations improvement program called *THRU* Streets. The basic philosophy of this program, which was implemented in Fall 2002, is to designate specific streets (*THRU* Streets) for cross-town travel and institute policies to facilitate cross-town travel along these designated *THRU* Streets. Other streets were classified as "non-*THRU*" streets and policies including the designation of curbside areas for truck loading/unloading were instituted on these streets. Reducing the friction caused by turning movements and ensuring that effective moving lanes were provided on *THRU* Streets were important elements of this initiative. The *THRU* Streets initiative has helped New York City improve traffic flow within the Program area and has reduced conflicts between turning vehicles and pedestrians.

NYCDOT designated five one-way street pairs to serve as *THRU* Streets. The *THRU* Street system consisted of 36th and 37th, 45th and 46th, 49th and 50th, 53rd and 54th, and 59th

THRU Streets Program (continued)

and 60th Streets bounded by Sixth Avenue to the west and Third Avenue to the east as shown on Figure 4. These roads provide links between major Midtown destinations. The program restricts vehicles from turning off these sections of road between the hours of 10 a.m. and 6 p.m., which reduces congestion caused by motorists decelerating to make safe turns. It also reduces bottlenecks caused by the conflict between turning vehicles and pedestrians that often block through roads from proceeding. Vehicles may turn onto these streets from any intersection.

After initial implementation, slight modifications were made to adjust for observed conditions. These improvements included the removal of 59th Street from the program and the allowance of turns onto Park Avenue from any of the *THRU* Streets due to the importance of access to this two-way corridor.

Although the *THRU* Streets Program focused on moving all traffic through the area, several components of the plan directly affected commercial vehicle movement. Improved traffic flow on the *THRU* Streets caused a shift in volumes from several non-*THRU* Streets to the designated *THRU* Streets. Because of the reduced demand on non-*THRU* Streets, NYCDOT was able to add more commercial vehicle parking spaces. By adding Muni-Meters and parking restrictions to both sides of streets that previously had parking on one side, the City created 150 additional spaces for loading and unloading.

The *THRU* Streets Program was implemented in two phases: 1) a trial period that introduced the program to motorists and pedestrians and to monitor changes and make needed modifications; and 2) full project implementation, which commenced in November 2002.

THRU Streets Program (continued)

Figure 4: *THRU* Streets Area Map

Source: New York City Department of Transportation, *Thru Streets: An Innovative Approach to Managing Midtown Traffic* (New York City, NY: 2004).

COST/BENEFIT OF THE THRU STREETS PROGRAM

NYCDOT implemented the *THRU* Streets program with minimal costs. The costs associated with the Program included new signs, signal upgrades, and the development and implementation of an educational program.

COST/BENEFIT OF THE THRU STREETS PROGRAM (continued)

The *THRU* Streets program has greatly benefited traffic conditions in Midtown Manhattan. Specifically, the program has:

- Improved Traffic Flow and Reduced Travel Times. NYCDOT successfully improved traffic flow and reduced travel times for designated *THRU* Streets. Travel times were reduced by 24.7 percent from an average of 8 minutes and 40 seconds to an average of 6 minutes and 31 seconds. The number of vehicles per hours increased from 4,187 to 4,854 vehicles on all nine of the designated streets.
- Reduced the number of crashes during cross-town trips. The *THRU* Streets program also offered safety benefits in the form of reduced crash frequency. The number of crashes on designated streets declined from 279 to 193, a reduction of 31 percent.[6]
- Enhanced loading and unloading on non-*THRU* Streets.
- Created an additional 150 commercial vehicle parking spaces.

It should be noted that although the *THRU* Streets program started strong by improving traffic flow and adding commercial vehicle parking capacity to the physically constrained Midtown district, its benefits have begun to decline. Because of inconsistent enforcement, turning-restriction violations have increased and travel-time improvements have diminished.

Truck Route Management and Community Impact Reduction Study

Changes in land use, regulations, and the nature of goods movement have brought about the need for improvements to the truck route network in New York City. As a result, the *Truck Route Management and Community Impact Reduction Study* was undertaken and published in May 2007. Through this study, the City performed an extensive analysis of the roadway network and developed a set of recommendations to improve efficiency of goods movement through its five boroughs. The recommendations included routing modifications, transportation policy changes, roadway signage improvements, enhanced enforcement, and educational initiatives.

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[6] New York City Department of Transportation, *Thru Streets: An Innovative Approach to Managing Midtown Traffic*, March 2004, pp. 5 and 34.

TRUCK ROUTING ANALYSIS

The infrastructure of New York City has long been established, and substantial modifications to physical structures are not likely. Changes in zoning have initiated significant redevelopment with many of the commercial and industrial districts of the past being rezoned, resulting in an influx of residential development. These changes have generated quality of life concerns from residents with respect to truck movement through their neighborhoods. In response to these concerns, NYCDOT developed a methodology to analyze the routing system and to reassess the truck route network that was last updated in 1982.

NYCDOT collected data on several characteristics of goods movement in its five boroughs. They are:

- Vehicle Dimension and Weight Restrictions
- Land Use
- Mobility (volume to capacity ratio)
- Truck Origin and Destination Forecast
- Accident Data
- Truck Summonses Issued
- Truck-Generating Facilities and Areas
- Stakeholder Issues[7]

NYCDOT used the above data to analyze the system's efficiency and to develop solutions to existing problems. The appendix provides a short description of each data element.

BEST PRACTICES MODEL

NYMTC developed the Best Practices Model (BPM) to forecast future travel patterns in relation to changes in land use and demographics in the study area, which included 28 counties in New York, New Jersey, and Connecticut.[8] For more accurate results, commercial vehicle travel was modeled separately from person trips for assignment of

[7] New York City Department of Transportation, *Truck Route Management and Community Impact Reduction Study,* May 2006, page 4.
[8] New York Metropolitan Transportation Council, NYMTC Best Practice Model (New York City, NY: 2002).

BEST PRACTICES MODEL (continued)

vehicle trips onto the highway network. Model inputs for this analysis included vehicle classification counts, Origin/Destination (O/D) trip interchanges and O/D trip end estimates. The output provided from this model was commercial trip data by time of day for morning and evening peak periods.[9] These data were then added to the model, along with other data, to produce the predicted travel patterns for the region.

GEOCODING[10]

For this project, the addresses of truck crash locations were geocoded and displayed on truck route maps. Each intersection was assigned an x and y value so that it would be represented on the map as a point feature. Information on the number of crashes at a specific location and whether the location was on a designated truck route was stored in a reference dataset so that the data could be analyzed for patterns relating to geography.

IMPLEMENTATION

By the time NYCDOT's report was completed, two route changes had been made: a portion of the truck route network in the Bronx and one in Brooklyn had been realigned. The realigned truck routes improved the efficiency of goods movement and removed truck traffic from residential neighborhoods.

Additionally, intersections with more than 15 crashes over a three-year period were flagged for improvements. Manhattan had reported 13 of the 15 crashes. Strategies to improve the safety of these intersections included signal timing adjustments, additional signage, and roadway geometric changes.

INSTITUTIONAL AND COORDINATION ISSUES

While collecting information on truck size and weight regulations in the City, NYCDOT discovered that various segments of the truck route network were managed by different agencies. In many cases NYCDOT, New York State DOT, PANY/NJ, and NYMTC did not coordinate with each other. This caused confusion among commercial vehicle

[9] New York Transportation Council, *Transportation Models and Data Initiative: Technical Memorandum No. 1.22, Final Model Structure and Framework*, June 25, 1997, p. 315.
[10] Geoding is the process of assigning coordinate values to datasets in order to represent information graphically

operators and enforcement officials throughout the area. To mitigate this confusion caused by numerous regulatory agencies and rules, NYCDOT proposed the formation of the Office of Freight Mobility. This office, created in 2006, oversees the management and implementation of the Truck Route Study and related activities. Its responsibilities include, but are not limited to, educational initiatives aimed at informing truckers and the public about the truck route network, training of enforcement officials, and management of other goods movement. The development of such a department has alleviated confusion regarding freight regulations and serves as a contact for all truck-related concerns.

SIGN IMPROVEMENTS

The age of New York City infrastructure reflects older standards for street lane widths and curb radii. The truck route network was developed to guide large vehicles through the City on roads that can accommodate them. A system of both positive and negative signs delineates these paths through the city.

In accordance with the *Truck Route Management and Community Impact Reduction Study*, NYCDOT initiated an improved signage program that provides easily identifiable, consistent direction to commercial vehicle operators in the area. As shown in Figure 5, the proposed truck-route signs will use the truck silhouette that has been in place in New York City for years and is used throughout the country. The city will introduce a color to the black and white truck route sign and use a new font in order to improve recognition and legibility. The positive signs—signs that assure truckers that they are on a designated route—will have a green circle around the truck. The negative signs will remain black and white to match the existing standard used elsewhere and will show the truck silhouette superimposed with the international sign for "do not." The positive truck route sign was conditionally approved. NYCDOT is waiting for full approval from FHWA.

NYCDOT also will establish the consistent placement of signs. Three types of signs will be used: 1) directional signs, 2) advance signs, and 3) on-route signs. Table 1 provides a description and location for each proposed sign type. NYCDOT indicates that signage improvements will reduce reaction time, which will improve the traffic flow and safety.

Figure 5: Sample Positive Truck Route Sign

Source: New York City Department of Transportation, *Truck Route Management and Community Impact Reduction Study* (New York City, NY: 2007), Technical Memorandum 3: Truck Signage Program.

Table 1: Truck Route Signs and Locations

Type of Sign	Description	Location
Directional	Signs pointing to truck routes where decisions about travel direction can be made (i.e., intersections).	• All intersections • Points at which truck routes turn left or right at intersections with non-truck routes. • At base of exit ramps • At tunnel and bridge exits
Advance	Signs in advance of intersection at which trucks may have to change lanes to turn onto truck route.	• 150 feet before intersection
On-route	Signs reassuring drivers that they are on a truck route.	• All truck routes • One-half mile increments

NYCDOT estimates that program implementation will cost $4.13 million.[11] The cost includes the fabrication and installation of over 11,000 signs throughout the City's five boroughs. The City expects to realize significant safety and operational benefits from the improved signage.

It should be noted that the signage program has not yet been implemented. NYCDOT is working closely with FHWA to finalize a pilot project that will test the signage program in the Bronx.

[11] New York City Department of Transportation, Truck *Route Management and Community Impact Reduction Study, Technical Memorandum 3*, May 2006, p. 53.

EDUCATIONAL PROJECTS

NYCDOT developed a truck-focused Web page that provides information on truck-route rules and regulations. Truck-route maps also can be accessed on the site. In addition, more than 30,000 truck-route maps were mailed to the truck industry in 2007 to provide drivers with better information about New York City truck routes and truck size and weight limits.

Another very simple, but effective, NYCDOT educational strategy addresses the truck-route information needs of the New York City Police Department (NYPD). Pocket-sized truck-route memo inserts were created and distributed to NYPD officers. Each memo insert, as shown in Figure 6, provides a truck-route map of an officer's precinct, truck-route regulations, and other enforcement information so that enforcement officials can better inform commercial vehicle operators about truck routes and restrictions. The Truck Route program is active in all 76 NYPD precincts.[12]

Figure 6: Sample Truck Route Memo Insert

Source: New York City Truck Route, 110th Precinct

[12] New York State Police, Commercial Vehicle Enforcement Unit, personal communication, May 20, 2009.

MAJOR FINDINGS AND CONCLUSIONS

New York City has made strides in improving the operation of its goods movement system. The following strategies and practices identified in this case study can be implemented in other areas around the country.

- **Develop a pricing strategy to accelerate the turnover rate of commercial parking spaces.** This strategy can be implemented with Muni-meters or with existing single-space meters.
- **Implement time-of-day restrictions on parking spaces**. A time limit may be established to increase turnover, as is done in Manhattan. For jurisdictions only experiencing commercial vehicle parking issues during certain time periods, time-of-day restrictions may be implemented allowing general use during non-peak hours.
- **Enforced time restrictions can help clear spaces more quickly.** NYCDOT learned that simply reserving sufficient parking for commercial vehicles does not completely solve the problem. Enforcement is an important component of a successful curbside management program.
- **Reserve spaces for commercial vehicles.** Smaller jurisdictions may want to consider designating several blocks or even individual spaces for commercial vehicles by erecting parking restriction signs.
- **Conduct freight studies**. Although New York City required substantial resources to conduct studies and implement recommendations, this does not have to be the case for other jurisdictions wishing to improve goods movement. Jurisdictions can select any combination of the data collection techniques and analysis tools used by NYCDOT to analyze their truck route network. Jurisdictions also may conduct field observations of roadways with high truck volumes, land-use patterns, and the location of truck-generating activities.
- **A stakeholder group should be set up early in the study.** NYCDOT realized early in the study process that it could not implement solutions without the coordination and support of many regulatory agencies and stakeholders.
- **Consider truck route changes.** In some cases where truck routes do not already exist, stakeholder concerns, truck volumes, land use patterns and other information

may warrant the designation of a portion or all of a roadway as a truck route. In other cases, truck restrictions and other improvements may be sufficient. By implementing regulations, such as nighttime restrictions in residential areas, agencies can help improve the quality of life for area residents while minimizing impacts on the pickup and delivery of goods.

- **Benefits to commercial vehicles and communities must be balanced.**
- **Multi-jurisdictional coordination needed.** Although the study was limited to New York City, multi-jurisdictional coordination was needed between each of the five boroughs. The need to continue truck routes through to the next borough could be applied to truck routes crossing city, county, or state boundaries. This study helped bring together officials from each of the boroughs to look at the freight system in its entirety. Multi-jurisdictional coordination helped to identify discontinuous truck route locations, realign existing routes, and propose delineation of new truck routes. Coordination among regulatory agencies also was needed to maintain regulatory control over truck handling facilities. Other jurisdictions could benefit from initiating coordination between these agencies and individuals. The creation of a centralized freight office or the establishment of a task force will help with coordination.
- **Consider adequate signage, including consistency of design, and place a high priority on freight operations.** For those currently maintaining a system of designated truck routes, adequate signage should be considered a high priority. NYCDOT determined that strategies such as consistent design and placement of signs are important characteristics of an effective signage system.
- **Dissemination of information is an extremely important component of any goods movement educational program.** Any city that maintains a system of designated truck routes should offer some level of educational programs similar to those of New York City. These cost-effective tools can help commercial vehicle operators, enforcement officials, business owners and the general public understand the truck route designations as well as the importance of restrictions.
- **Opposition to truck route restrictions may be overcome with simple educational tools.** By developing an educational program that considers the issues raised by

MAJOR FINDINGS AND CONCLUSIONS (continued)

concerned stakeholders, freight planning and operations staff can help minimize resistance and even foster support for the truck route system.

- **It is important to understand how trucks are moving through an area and what can be done to improve the efficiency of truck movements while minimizing their impact on the environment.**

APPENDIX

For the truck routing analysis portion of the *Truck Route Management and Community Impact Reduction Study*, NYCDOT collected data on the following characteristics of each of the borough's roadways:

- **Vehicle Dimension and Weight Restrictions**

  To better understand truck size and weight restrictions, data was gathered on existing regulations as well as physical restrictions. The size regulations, established by the City of New York, were noted and taken into consideration. Information on restrictions due to overhead obstructions also was collected.

- **Land Use**

  Land use also plays an important role in the location of truck routes. In the past 25 years since the City had updated its truck route system, New York City has experienced a growth in residential neighborhoods. This change has decreased the need for commercial-vehicle access in several locations, as well as increased resistance to truck traffic on roadways that were previously appropriate for trucks.

  To assess the effectiveness of the existing truck route network and its impact on surrounding developments, NYCDOT produced maps illustrating land use patterns and truck routes for each of the boroughs. The agency analyzed the connectivity of the truck route network and identified potential areas of concern. Based on this analysis, the existing truck route network in each of the boroughs provided sufficient access to the commercial, industrial and manufacturing parcels located in the region. To determine whether some routes should lose their truck route designation, the agency looked more closely at roads that traveled through neighborhoods that were primarily residential (>75%).[13] In some cases, these roads were removed from the network. However, in areas such as Manhattan, where a variety of land uses are found along the same block, the distinction between residential areas and commercial/industrial areas could not be made. In these mixed-use areas, extensive networks of local truck routes remained unaffected.

- **Mobility**

  To ensure that the truck route network will serve future demand, NYMTC's Best Practices Model (included in the Regional Freight Plan) was used to estimate the

[13] New York City Department of Transportation, *Truck Route Management and Community Impact Reduction Study, Technical Memorandum 2*, May 2006, p. 63.

volume-to-capacity ratio for all of the City's roads. These estimates measured the ratio of the demand flow rate to the capacity of each facility during the AM peak period for the year 2025. The model, which focuses on travel patterns based on changes in the study area's land uses, helped to illustrate which of the existing truck routes were expected to experience severe congestion and, therefore, might require further investigation as to whether or not they should lose their designation as part of the truck network.

- **Truck Origin and Destination (O&D) Forecast**

  To better understand future truck travel, NYCDOT studied the origins and destinations of truck trips by Transportation Analysis Zone (TAZ). For analysis purposes, the department developed maps illustrating the existing truck route network compared to predicted truck traffic demand. These maps, which displayed the truck route network overlaid with graphics representing the number of truck trips generated by each TAZ, helped the City to analyze the current network's ability to serve the demands of estimated future truck traffic. Figure A-1 illustrates an example of the Truck Trip Ends map developed for the Borough of Brooklyn.

  Using this technique, NYCDOT discovered several inefficiencies in the Through Truck Route network. The location of through routes in Brooklyn is one example of inefficiency. With only 50 miles of Through Truck Routes spanning along the western and northern borders of the borough, commercial vehicles are forced to use the 148 miles of Local Truck Routes for a majority of their trips. By designating additional through routes, NYCDOT could improve the efficiency of the through route network while rerouting truck traffic from local roads.

- **Safety Data**

  Information on crashes involving trucks and trucking violations were collected for this analysis: 1) data of the location of all crashes in which trucks were involved over a three-year period, from 1999 to 2001; and 2) data of on-route and off-route crashes.

  Using the three-year data, NYCDOT determined he location of crashes involving trucks and developed a list of the top 20 and top 100 locations. Analysis showed that these incidents were dispersed throughout the City. In fact, NYCDOT reported

that 61 percent of intersections experienced one crash. The top 20 crash locations, ranging from 18 to 35 incidents during the three-year period, only accounted for 2.9 percent of the total number of crashes.[14] Therefore, few locations stood out as requiring significant attention.

To better understand the safety history as well as the general usage of truck routes, crashes involving trucks were analyzed in relation to the truck route network. Using ArcView, the City's Geographic Information System software, NYCDOT developed a map that showed the number of truck-involved crashes and their locations throughout the City during a two-month period (from October to November 2003). By geocoding each crash site into the map, NYCDOT was able to determine the number of incidents that occurred at locations on and off the designated truck routes. The results indicated that a significant percentage (35 percent) of truck crashes during this period occurred at off-route locations.[15] NYCDOT concluded that a considerable amount of truck traffic travels on restricted roads. This information was considered in the routing process and the development of other improvements.

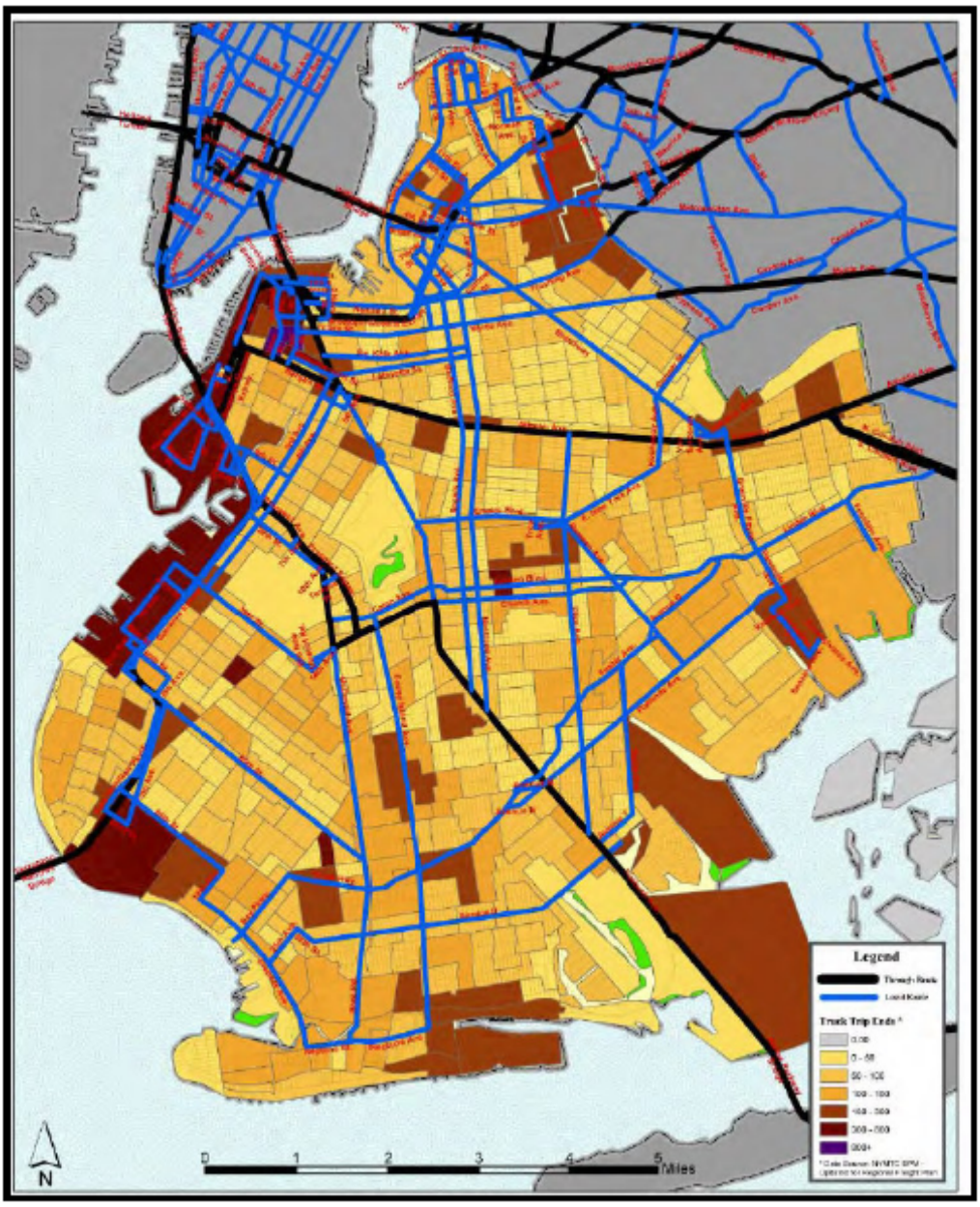
- **Truck Summonses Issued**

  To evaluate the nature of trucking violations in the City, NYCDOT obtained two sets of violation data from NYPD. The first dataset included a spectrum of violations including, but not limited to, trucking violations. Violations that could not be attributed to trucks were removed from the dataset. The second dataset included information on the location of displaced and over-height vehicles on or near parkways. Data collected by officers included the date, time, and location of the violation; trip O/D; where the truck entered the roadway; and the source of directions as reported by the driver.

[14] New York City Department of Transportation, *Truck Route Management and Community Impact Reduction Study*, May 2006, p. 13.
[15] New York City Department of Transportation, *Truck Route Management and Community Impact Reduction Study*, May 2006, p. 15.

APPENDIX (continued)

Figure A-1: Brooklyn Truck Trip Ends



Source: New York City Department of Transportation, *Designated Through and Local Truck Routes by Borough* (New York City, NY: 2009).

- **Truck-Generating Facilities and Areas**

  NYCDOT conducted analyses of the movement of trucks in the vicinity of truck-generating sites. Because of the study area size and project scope limitations, every truck-generating site could not be analyzed in detail. From stakeholder input and lists of "hot spots," the agency identified 71 truck-generating facilities. NYCDOT

narrowed this list down to ten representative sites that would reflect the characteristics of similar sites throughout each of New York's five boroughs. The agency used criteria such as geography, type of use, safety history, and percentage of truck traffic for the sample.

These sites, which included distribution centers and commercial and industrial uses, were analyzed for their ability to efficiently move goods with minimal impact on the surrounding areas. Other factors analyzed include land use, zoning, the location of community facilities, access to truck routes, critical intersections, traffic operations, network capacity constraints, and crashes. Recommendations were developed specific to the problems of each of the ten selected sites. These recommendations included improved signage, designation of new truck routes, time restrictions, and intersection improvements.

- **Stakeholder Issues**

  Input from various stakeholders was a key to the success of the *Truck Route Management and Community Impact Reduction Study*. NYCDOT involved individuals and groups with different viewpoints and concerns. Borough Commissioners were asked to share their knowledge of the area by identifying "hot spots" for truck activity. The Commissioners used their knowledge and input from many stakeholders, including local businesses, elected officials, policy precincts, and community groups to identify the hot spots. Once locations were identified, NYCDOT analyzed them and treated them as individual case studies.

  The general public also was offered an opportunity to voice concerns and offer suggestions through various outreach efforts. Through open houses, phone, mail and email communications, surveys and other data collection efforts, NYCDOT received over 1,000 public comments.[16] According to NYCDOT, meetings were held throughout the study to generate support from the community. Public involvement effort was an important component in the study.

[16] New York City Department of Transportation, *Truck Route Management and Community Impact Reduction Study*, May 2006, p. 16.

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TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. FHWA-HOP-10-019	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle *Urban Freight Case Studies—New York*		5. Report Date November 2009
		6. Performing Organization Code
7. Author(s) Marsha Anderson Bomar, AICP Erika P. Becker, AICP Edward R. Stollof, AICP		8. Performing Organization Report No.
9. Performing Organization Name and Address Street Smarts, 3160 Main Street, Suite 100, Duluth, Georgia 30096 Institute of Transportation Engineers, 1099 14th Street NW, Suite 300 Washington, DC 20005		10. Work Unit No. (TRAIS)
		11. Contract or Grant No.
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Highway Administration Office of Freight Management and Operations 1200 New Jersey Avenue, SE Washington, DC 20590		13. Type of Report and Period Covered
		14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

This report documents notable practices in urban goods movement. New York is one of four urban areas selected for study. The other areas are Los Angeles, Orlando, and Washington, DC.

The case studies provide information on freight-related initiatives that mitigate congestion and improve the safety and efficiency of commercial vehicle travel in urban areas. To develop the most useful case studies, FHWA conducted an extensive review of freight-related projects and strategies that provide practical information and transferable solutions to the challenges that confront urban goods movement. FHWA also conducted site visits and interviews with organizations involved in project implementation, including state departments of transportation, metropolitan planning organizations, city governments, and businesses.

17. Key Word Urban goods movement, trucks, curb space management, parking regulation and enforcement, designated truck routes, GIS, congestion	18. Distribution Statement Available on web. http:/www.ops.fhwa.dot.gov/freight/		
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 30	22. Price

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized.

TECHNICAL REPORT DOCUMENTATION PAGE (continued)

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November 2009
FHWA-HOP-10-019

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NOVEMBER 2009

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November 2009
FHWA-HOP-10-019