

Reducing the External Costs of Last-Mile Freight Systems in the Newtown Creek Area



Prepared for: Lisa Bloodgood and Willis Elkins - Newtown Creek Alliance

By: Geoff Storr

December 16, 2020

**THE
NEW
SCHOOL**

NCA
NEWTOWN CREEK ALLIANCE

**RESTORE
REVEAL
REVITALIZE**

Table of Contents

<i>Executive Summary</i>	2
<i>Introduction</i>	4
<i>Background and Literature Review</i>	5
<i>Research Methodology</i>	24
<i>Nature of the Problem</i>	25
<i>Evaluative Criteria</i>	32
Policy Options to Reduce Truck VMT	
i. <i>City Development of Cargo Bike Framework</i>	33
ii. <i>Road and Curb Pricing, Expand Commercial Loading Zone Framework</i>	36
iii. <i>City Support for Consolidated Last-Mile Hubs</i>	40
iv. <i>Uptake of Maritime and Rail Freight Initiatives</i>	43
Policy Options for Industrial Land Use Rules	
i. <i>City Update of the Industrial Zoning Code</i>	49
ii. <i>Implementation of Special Use Permit and Environmental Review Rules</i>	53
<i>Recommendations and Conclusion</i>	58
<i>Appendix A: Charts and Tables</i>	60
<i>Appendix B: Urban Consolidation Center Description</i>	67
<i>Appendix C: Bibliography</i>	69

Executive Summary

The number of last-mile distribution facilities in New York City is sharply increasing. Growing demand for home delivery of consumer goods and groceries is driving a steady flow of development of new delivery facilities in industrial zones within the city's outer boroughs. The increasing commercial truck traffic arising from last-mile delivery activity causes adverse quality of life and environmental outcomes for residential communities, particularly those in close proximity to Industrial Business Zones (IBZs). Further, this as-of-right development is encroaching significantly on scarce industrial space inside the city's IBZs.

Central Policy Issue

How can the localized quality of life, environmental and economic burdens caused by the proliferation of last-mile distribution operations in the Newtown Creek industrial area, and other industrial areas in New York City, be mitigated?

Background

The ramp up of last-mile delivery activity in New York City has been coupled with a commensurate increase in commercial truck traffic on local roads. Demand for 'next day' and 'same day' delivery leads to a constant stream of small trucks and vans on the city's roads delivering parcels throughout the business day. Over 40% of all truck trips that take place in New York City are for the purpose of last-mile deliveries.¹ Minority and low-income communities adjacent to IBZs bear the brunt of the adverse effects of last-mile trucking activity. Residents who live in close proximity to the IBZs around Newtown Creek suffer from elevated levels of air particulates, of which truck exhaust is a primary cause.

Under constant threat from residential and commercial property interests, industrial space in New York City is a vital resource that supports an ecosystem of independent industrial and manufacturing firms. These firms in turn provide stable, well-paying jobs for local working-class communities. The vast majority of the city's industrial areas lie inside and adjacent to its Significant Maritime Industrial Areas (SMIAs). Newtown Creek SRIA, at over 780 acres, is the second-largest SRIA and supports the highest number of jobs out of all industrial areas in the city.² Firms that make up the city's valuable industrial sector are at increasing risk of displacement as the cost and scarcity of space for industrial activities rise.

¹ New York Metropolitan Transportation Council, "[NYMTC Regional Freight Plan Update 2015-2040](#)," Published April 17, 2014, Accessed September 30, 2020

² New York City Department of Planning, "[Vision 2020 Waterfront Plan: Appendix B](#)" (2010)

Research Methodology

The following methods and sources were relied upon in order to obtain a foundational understanding of last-mile delivery systems in New York City, to frame the analysis of sustainability and urban development issues relating to urban last-mile freight and to formulate alternatives assessed in this PDR:

- Interviews with client stakeholders
- Academic literature, case studies, news articles
- Policy and research documents produced by government agencies, schools and planning groups
- Geo-spatial, geographic and census data

Evaluative Criteria

The policy options discussed in this PDR will be evaluated for their effectiveness in addressing the central policy issue, the extent to which they result in more equitable human health and environmental outcomes for local Brooklyn and Queens communities, and other neighborhoods in close proximity to the city's IBZs, as well as the feasibility of their implementation or enactment by the City.

Recommendations

Among the alternatives proposed in this PDR, it is recommended that Newtown Creek Alliance pursue the following policy options and strategies with the City and its local partner organizations, listed in order of priority:

Recommendations to Reduce Truck Vehicle Miles Traveled

- 1. Road & Curb Pricing, Expand Commercial Loading Zone Framework**
- 2. Uptake of Maritime and Rail Freight Initiatives**
- 3. City Development of Cargo Bike Framework**
- 4. City Support for Urban Consolidation Centers**

Recommendations for Industrial Land Use Rules

- 1. City Update of Industrial Zoning Code**
- 2. Implementation of Special Use Permit and Environmental Review Rules for Last-Mile Distribution Facilities**

Introduction

Throughout its history as a commercial maritime corridor, Newtown Creek has been home to a diverse array of industrial activities that reflect the contemporary nature of economic activity in New York City. Today, the industrial areas around the creek and elsewhere in the outer boroughs are becoming home to a growing network of last-mile distribution centers that facilitate the final leg of the freight journey for deliveries to homes and businesses in the city. With growing demand for home delivery of consumer goods and groceries, e-commerce and shipping firms are building large-scale fulfillment and warehouse facilities within urban areas in order to meet demand for ‘next day’ and ‘same day’ shipping.

These facilities are permitted as-of-right³ within the city’s Industrial Business Zones (IBZs). The economic, human health and environmental impacts of their siting and the truck traffic they generate are not subject to scrutiny during the development process. Further, the development of each new last-mile distribution center contributes to the loss of land within IBZs for true industrial and manufacturing uses. Currently, 90% of all freight volume that originates within, enters, or passes through the New York City metropolitan area is transported by truck.⁴ It is estimated that this freight volume will grow from 365 million tons in 2012 to around 610 million tons by 2045.⁵ Without meaningful action to manage the city’s freight flows, New York City is at risk of becoming flooded with trucks and other delivery vehicles. The proliferation of last-mile delivery facilities also diminishes the future viability of local independent industrial firms by driving up industrial land costs and reducing the availability of suitable space for industrial activities.

This Professional Decision Report (PDR) has been prepared for Newtown Creek Alliance. It proposes a series of policy options that Newtown Creek Alliance can use to formulate its own policy and advocacy positions. The aims of the proposed policy alternatives are to account for and reduce the impact of last-mile freight activity around Newtown Creek and other industrial areas in New York City, and to bolster the viability of local industrial businesses and activities. The policy alternatives would be enacted and implemented by New York City’s administration, City Council and City agencies. The PDR comprises a background section, a description of the research methodology and an analysis of the nature of the

³ “As-of-right development complies with the regulations found in the Zoning Resolution and does not require any review by the Department of City Planning or any approval by the City Planning Commission and the City Council. The Department of Buildings reviews the building plans to confirm compliance with the Zoning Resolution and the Building Code and issues building permits accordingly.” See the following [link](#).

⁴ New York City Department of Transportation, [“Improving the efficiency of truck deliveries in NYC.”](#) (2019)

⁵ New York Metropolitan Transportation Council, [“Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8”](#) (2017)

problem. This is followed by a discussion and assessment of proposed policy options and strategies. Information and data related to the discussion and analysis of the PDR is contained in the appendices.

Background and Literature Review

History of Newtown Creek

Prior to European settlement and colonization of the area now known as New York City, Newtown Creek was home to the Mespeatches Native American people. The Mespeatches were part of the larger Lenni-Lenape tribe whose territory extended from Delaware, through eastern Pennsylvania and northern New Jersey, and up along the southern portion of the Hudson River. Alongside other tribes who inhabited western Long Island, southern New York along the Hudson River and northern New Jersey in the Delaware River region, the Mespeatches spoke the Algonquian dialect of Munsee. The creek was a source of food, providing fish and oysters, and was also used as a transportation route.⁶ As European settlers began to populate areas around the creek in the early- to mid-17th Century, fighting, treaties and land purchases led to the conversion of land to farmland. Newtown Creek continued to be utilized as a transportation and commerce route in the region.

From the onset of the Industrial Revolution, Newtown Creek became the epicenter of industrialization in New York City. Home to shipbuilding, ironworks, copperworks, glass-making factories, tanneries, oil and kerosene refiners, and sugar refiners throughout the 19th and 20th centuries, it became a key freight conduit that supported city commerce. By 1870 there were over 50 oil and petroleum refineries located along the creek.⁷ Many of these were consolidated within the Standard Oil Trust, and were later owned and operated by Standard Oil Company, the precursor of Mobil. Industrial activity began to blight the waterways and surrounding lands. Early petroleum refinery and distillation facilities that were developed in the area drove New York City's rise to economic prominence, but further exacerbated pollution and contamination of Newtown Creek's water and shorelines. By the 1960s, most local petroleum firms had left New York City. The last refinery, operated by Mobil, was closed in 1966, however bulk fuel storage facilities are still in operation along the creek.

In 1978, the U.S. Coast Guard discovered what would come to be likely the largest oil spill in U.S. history in the water and land underneath Greenpoint.⁸ Estimated at between 17-30 million gallons, the spill covers an area greater than 50 acres and in some parts is up to 25 feet thick. Starting around Penny Bridge and extending south and west in the soil underneath residential areas in the northern end of

⁶ Newtown Creek Superfund Community Advisory Group, "[About Newtown Creek](#)"

⁷ New York State Department of Environmental Conservation, "[Greenpoint Petroleum Remediation Project](#)"

⁸ *ibid.*

Greenpoint, it contains methane, benzene, and a range of carcinogens that can be found just a few feet below street level.⁹ Studies have reported high rates of stomach cancer and childhood leukemia in the Greenpoint-Williamsburg area.¹⁰ To date, 13 million gallons of oil product have been removed from the plume,¹¹ and oil removal and remediation work at the site is ongoing. A settlement agreed between New York State and ExxonMobil over the spill led to the creation of the Greenpoint Community Environmental Fund, a program whose aim is to fund environmental remediation projects in the Greenpoint area. Several of these projects have been led by Newtown Creek Alliance.



Newtown Creek - Author Photo

Today, a mix of waste management, recycling, energy, cement, lumber, freight and transportation businesses operate in the Newtown Creek industrial zone.¹² In particular, there is a high concentration of city-operated and private waste transfer stations located along the creek and in the Williamsburg-Greenpoint area.¹³ In addition to the existing mix of businesses located around Newtown Creek, there is a growing number of distribution centers operating in this zone from which

shipping, e-commerce and consumer goods businesses manage the last-mile component of their delivery processes for the New York City area. These distribution centers and other trucking-related businesses tend to cluster around Newtown Creek due to its close proximity to major road thoroughfares, excellent connectivity with maritime and rail freight infrastructure and a lack of adequate sites with suitable zoning designations elsewhere in the city.¹⁴

Newtown Creek Alliance

Newtown Creek Alliance (NCA) is a community-based organization whose mission is to drive the rehabilitation and revitalization of Newtown Creek and its adjoining areas.¹⁵ The organization works to

⁹ Evitar, Daphne, [“The Ooze,” New York Magazine](#), Published June 1, 2007

¹⁰ McFadden, Robert D., [“Survey finds high cancer rate in 2 neighborhoods in Brooklyn.” The New York Times](#), May 23, 1992

¹¹ New York State Department of Environmental Conservation, [“Greenpoint Petroleum Remediation Project”](#)

¹² New York City Department of City Planning, [“North Brooklyn Vision Plan.”](#) (2018) Accessed September 30, 2020

¹³ *ibid.*

¹⁴ New York City Department of City Planning, [“North Brooklyn Vision Plan”](#)

¹⁵ Newtown Creek Alliance, [“Our Mission”](#)

clean up polluted parts of the creek, expand access to public spaces along the shoreline, and implement projects to bolster the resilience of the creek and its surrounds. NCA partners with city agencies and local organizations to oversee ventures that support local economic activity and environmental revitalization for neighborhoods in north Brooklyn and south-western Queens.

NCA works with community groups, environmental groups, schools, universities and local residents across its project and community development efforts. It also works closely with city agencies on local remediation projects. NCA assists with the construction of green roofs atop buildings in the area, and actively promotes their usage. They have overseen planning and construction of several ecologically beneficial sites. NCA also manages garden areas and other open spaces around Newtown Creek, including the green space at Penny Bridge. Their environmental remediation work includes the reintroduction of native plants, grasses and other flora via the Living Dock project and the Intertidal Wetlands project. The organization also monitors water, air and soil quality metrics on the creek and shoreline, and measures the presence of local wildlife. They are the driving force behind proposals to transform other areas of the shoreline in partnership with local organizations, including the Dutch Kills Loop, Maspeth Marsh, and the northern end of North Henry Street. In 2018, NCA published its ‘Vision Plan’,¹⁶ a comprehensive outline and analysis of its priorities and proposed projects.

Urban Freight and the Environment

Freight systems are vital to the functioning of the economy. Businesses need deliveries of goods and materials to run their day-to-day operations. The goods required by households, offices and firms, retail and hospitality businesses, for construction and manufacturing, and for the operation of essential utilities and infrastructure, are almost entirely shipped into cities from elsewhere. Congestion or stoppages in supply chains would wreak havoc on the economy. If urban supply chains were to become blocked, assembly lines would cease to function within 6-12 hours, hospitals would run out of essential supplies within a day, and grocery stores would run out of perishables within 72 hours.¹⁷ Without efficient methods for transporting freight into cities, entire regions would be unable to function properly.

The majority of freight is moved by truck. The prevalence of truck traffic in urban environments causes significant environmental and human health impacts. In New York City, trucks contribute the largest share of on-road fine particulates (PM₂₅) in the atmosphere.¹⁸ The fine particulates emitted by vehicles

¹⁶ Newtown Creek Alliance, [Newtown Creek Vision Plan](#) Accessed September 29, 2020

¹⁷ U.S. DOT Federal Highway Administration, [“Keeping the global supply chain moving video and transcript”](#)

¹⁸ Kheirbek, Iyad, Jay Haney, Sharon Douglas, Kazuhiko Ito, and Thomas Matte, “The contribution of motor vehicle emissions to ambient fine particulate matter public health impacts in New York City: a health burden assessment,” *Environmental Health* 15 (1) (2016): 89

contribute to over 300 deaths and almost 900 hospitalizations each year within the city.¹⁹ Evidence shows that air pollutant levels in New York City are positively correlated with traffic density, proximity to solvent-use industries, and building density.²⁰ Levels of on-street air pollution are higher than those experienced off-street.²¹

A key cost optimization factor for last-mile logistics firms is facility location. The distance between the warehouse and the customer market determines the distance and length of time of truck trips required to perform deliveries. However, land and construction costs tend to increase with proximity to the urban core of a metropolitan area.²² The siting of the warehouse will usually take into account several factors, each of which contributes to the efficiency of the delivery process. The availability and cost of suitable space, distance from the target market and access to key highways and roads are some of the most important considerations for logistics firms in determining where to base their warehouse facilities. The siting of the warehouse will in turn help to determine the type of truck that will be used to perform deliveries, and the size of the delivery fleet.²³

Congestion makes up the largest portion of external costs associated with trucking.²⁴ Last-mile logistics is the least-efficient component of the delivery process and comprises around 28% of total shipping cost.²⁵ Small trucks contribute to congestion, emissions and infrastructure damage to a greater degree than larger trucks because they tend to operate at slow speeds on local roads within urban areas.²⁶ The fragmented nature of last-mile logistics means that the final leg of shipping in urban environments tends to be uncoordinated. Firms who ship goods to customers utilize a variety of different logistics service providers

¹⁹ ibid.

²⁰ Kheirbek, Iyad, Sarah Johnson, Zev Ross, Grant Pezeshki, Kazuhiko Ito, Holger Eisl, and Thomas Matte, "Spatial variability in levels of benzene, formaldehyde, and total benzene, toluene, ethylbenzene and xylenes in New York City: a land-use regression study," *Environmental Health* 11 (1) (2012): 51

²¹ Matte, Thomas D., Zev Ross, Iyad Kheirbek, Holger Eisl, Sarah Johnson, John E. Gorczynski, Daniel Kass, Steven Markowitz, Grant Pezeshki, and Jane E. Clougherty, "Monitoring intraurban spatial patterns of multiple combustion air pollutants in New York City: design and implementation," *Journal of exposure science & environmental epidemiology* 23 (3) (2013): 223-231.

²² Björklund, Maria, and Henrik Johansson, "Urban consolidation centre—a literature review, categorisation, and a future research agenda," *International Journal of Physical Distribution & Logistics Management* (2018)

²³ Jaller, Miguel, and Anmol Pahwa, "[Analytical Modeling Framework to Assess the Economic and Environmental Impacts of Residential Deliveries, and Evaluate Sustainable Last-Mile Strategies](#)," UC Davis, (2020)

²⁴ Piecyk, Maja, Alan McKinnon, and Julian Allen, "Evaluating and internalizing the environmental costs of logistics." *Green Logistics: Improving the environmental sustainability of logistics*, McKinnon, A., S. Cullinane, A. Whiteing, and M. Browne (2010): 68-99

²⁵ Ranieri, Luigi, Salvatore Digiesi, Bartolomeo Silvestri, and Michele Roccotelli, "A review of last mile logistics innovations in an externalities cost reduction vision," *Sustainability* 10 (3) (2018): 782

²⁶ Piecyk, Maja, Alan McKinnon, and Julian Allen, "Evaluating and internalizing the environmental costs of logistics." *Green Logistics: Improving the environmental sustainability of logistics*, McKinnon, A., S. Cullinane, A. Whiteing, and M. Browne (2010): 68-99

to perform deliveries. While individual firms may optimize routing for their own freight volumes, this will not necessarily reduce route duplication among firms.



An Amazon truck parked in a bike lane on a local road in Long Island City - Author Photo

The modern nature of the last-mile market exacerbates many of these issues. Retailers offer free shipping, free returns, ‘same day’ or ‘next day’ delivery and occasionally rush delivery. They also provide delivery time windows within which a customer can expect to receive delivery of their parcel. The implementation of time windows and delivery deadlines usually necessitates the siting of the distribution center close to the market, to reduce delivery travel time and to minimize transportation costs.²⁷ As the number of orders

grows, the typical response by logistics firms is to shrink delivery size and increase the frequency of truck trips.²⁸ This leads to low load factors on delivery trucks, which in turn results in duplication of common routes, higher vehicle miles traveled and greater last-mile externalities.²⁹ Without time window constraints for deliveries, a logistics firm might optimally locate its warehouse on the outskirts of its metropolitan customer zone.³⁰

New York City Freight Initiatives

New York City’s transportation and planning agencies have proposed numerous plans and strategies that are intended to reduce the number of truck trips occurring in New York City each day, however few of these plans have reached the implementation stage. Two initiatives that have gained traction and wide support are the Department of Transportation’s (DOT) Off-Hours Delivery program (OHD) and its Hunts Point Clean Trucks program. The DOT ran an off-hours delivery pilot program from 2007-2010 to measure the effects of shifting deliveries to off-peak hours (between 7:00pm and 6:00am) on truck traffic and road congestion during business hours, air quality and business operations.³¹ Shippers and receivers

²⁷ Jaller, Miguel, and Anmol Pahwa, “[Analytical Modeling Framework to Assess the Economic and Environmental Impacts of Residential Deliveries, and Evaluate Sustainable Last-Mile Strategies](#),” UC Davis, (2020)

²⁸ Viu-Roig, Marta, and Eduard J. Alvarez-Palau, “The Impact of E-Commerce-Related Last-Mile Logistics on Cities: A Systematic Literature Review,” *Sustainability* 12 (16) (2020): 6492

²⁹ Ranieri, Luigi, Salvatore Digiesi, Bartolomeo Silvestri, and Michele Roccotelli, “A review of last mile logistics innovations in an externalities cost reduction vision,” *Sustainability* 10 (3) (2018): 782

³⁰ Jaller, Miguel, and Anmol Pahwa, “[Analytical Modeling Framework to Assess the Economic and Environmental Impacts of Residential Deliveries, and Evaluate Sustainable Last-Mile Strategies](#),” UC Davis, (2020)

³¹ New York City Department of Transportation, “[Improving the efficiency of truck deliveries in NYC](#),” (2019)

who participated in the program reported shorter truck trip times and lower delivery costs.³² There are currently around 120 local businesses enrolled in the program.³³ The DOT expects to expand it to include new businesses in Manhattan, Downtown Brooklyn and the Flushing and Jamaica commercial corridors through 2021.³⁴

The Hunts Point Clean Trucks program was established in 2012 and has so far resulted in the replacement of almost 600 trucks.³⁵ It is a voluntary program that offers rebates to incentivize the purchase of EPA-compliant trucks and alternative fuel trucks. Funding is also available for the retrofitting of existing trucks, and truck scrapping.³⁶ The program has been expanded across the city, and is now available for any business that is either located within, or operates within an IBZ.³⁷

Several other initiatives to improve freight management in New York City have been proposed by City agencies. The DOT has examined and recommended an evaluation and reformulation of the NYC truck route map, last amended in 2015.³⁸ It is supportive of growing rail and maritime freight infrastructure, in order to reduce the truck freight mode share.³⁹ It is also in favor of improving the management of curb space to allow for greater curb access for commercial delivery activities. This includes limiting the use of City-issues parking placards and the development of a commercial loading zone framework.⁴⁰ A commercial loading zone pilot program established in 2019 failed in the face of local community opposition,⁴¹ however the DOT has recently established a new ‘Neighborhood Loading Zones’ pilot program,⁴² designating commercial loading zones in a small number of locations throughout the city.

The DOT has also expressed an interest in exploring options for off-street consolidation of deliveries, including utilizing private garages to consolidate packages into fewer vehicles.⁴³ This would lead to higher truck load factors and fewer truck trips, and would also allow for alternative methods to be employed for the final stage of the delivery process, namely cargo bikes and other low-emission modes of transportation. The DOT supports the implementation of a variety of road pricing schemes, including

³² Holguín-Veras, Jose, Kaan Ozbay, Alain Kornhauser, Anthony Shorris, and Satish Ukkusuri, “Integrative freight demand management in the New York City metropolitan area,” (2010)

³³ Rhoads, Anna, et al., [“No easy answers as NYC searches for better ways to get freight into a crowded city.”](#) *City Limits*, August 21, 2019

³⁴ New York City Department of Transportation, [“Improving the efficiency of truck deliveries in NYC.”](#) (2019)

³⁵ New York City Department of Transportation [New York City Clean Trucks Program](#) (2020)

³⁶ Kamga, Camille, Alison Conway, Nadia Aslam, and Penny Eickemeyer, [“A conference on last mile freight delivery: Use of cleaner mobility vehicles.”](#) University Transportation Research Center (2014)

³⁷ New York City Department of Transportation [New York City Clean Trucks Program](#) (2020)

³⁸ New York City Department of Transportation, [“Improving the efficiency of truck deliveries in NYC.”](#) (2019)

³⁹ *ibid.*

⁴⁰ *ibid.*

⁴¹ Greene, Leonard, [“City pumps breaks on controversial parking program.”](#) *New York Daily News*, August 15, 2019

⁴² New York City Department of Transportation, [“Neighborhood Loading Zones”](#)

⁴³ New York City Department of Transportation, [“Improving the efficiency of truck deliveries in NYC.”](#) (2019)

congestion pricing in the Manhattan CBD (Manhattan south of 60th Street), and charging truck through-traffic whose origin and destination fall outside of the city for the use of city roads in their delivery route. The DOT has also stated its intention to work with Business Improvement Districts (BIDs) to facilitate the local consolidation of delivery volumes and to improve the efficiency of parcel and goods deliveries with the owners and managers of large buildings.⁴⁴

Rail and maritime freight systems handle around 8% and 2% of New York City's total freight volume, respectively.⁴⁵ There are few exchange points connecting roads and other modes to facilitate the movement of freight via multimodal networks. The only direct intermodal rail freight connection point within New York City is the ExpressRail facility on Staten Island, which handles rail transfers for the international container terminal.⁴⁶ The only direct rail to highway transfers of freight occurring within the New York metropolitan area take place at terminals in New Jersey.⁴⁷ The freight rail network in New York City handles predominantly bulk commodities including scrap metal, building products, coal, lumber, stone, fuel and waste.⁴⁸

Within Brooklyn, Queens and the Bronx there are nine rail service yards attached to freight lines. The dominant freight rail line within the city is the New York and Atlantic (NYA) line, which runs over tracks that are owned by Long Island Railroad (LIRR). The largest industry service yard, located in Hunts Point, is used to deliver produce to food distribution businesses located there.⁴⁹ There are three rail yards located in south-western Queens: Wheelspur, Blissville and Maspeth, each of which allows for the management and storage of freight. They provide access to the freight line, nearby barges and commercial trucking routes.^{50,51} The Blissville facility mainly handles waste products.

There are close to 200 private port facilities that are used to manage waterborne cargo on New York's waterways.⁵² These facilities primarily handle the transportation of bulk goods including sand, gravel, construction materials, petroleum products and waste. In Newtown Creek, there are several operations

⁴⁴ ibid.

⁴⁵ New York City Economic Development Corporation, "New York Works Industry Spotlight: Creating good jobs in freight"

⁴⁶ New York Metropolitan Transportation Council, "[Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8](#)" (2017)

⁴⁷ ibid.

⁴⁸ ibid.

⁴⁹ ibid.

⁵⁰ HDR, Inc., "[Wheelspur Multimodal Facility and Freight Yard](#)," Accessed November 17, 2020

⁵¹ New York Metropolitan Transportation Council, "[Rail freight yard requirements: Land assessment for the east of Hudson area,](#)" (2003) Accessed November 7, 2020

⁵² New York Metropolitan Transportation Council, "[Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8](#)" (2017)

that transport gasoline and kerosene, petroleum products, scrap metal, sand, gravel and stone and waste products via barge.⁵³

In 2018, the New York City Economic Development Corporation (EDC) launched Freight NYC, a comprehensive multimodal freight management framework. The stated goals of Freight NYC are to: create up to 5,000 new local jobs in the freight sector over the decade beginning 2018, expand maritime and rail freight capacity, develop new distribution facilities within the five boroughs, and improve air quality outcomes arising from the city's freight supply chain activities.⁵⁴ The plan calls for the development of barge terminals in the Bronx, to service the Hunts Point Food Distribution Center, and at Sunset Park. It also includes an intention to provide regular dredging of key waterways, including Newtown Creek, to support greater volumes of marine shipping. In 2018, the EDC signed a long-term lease agreement with Red Hook Container Terminal and Industry City, to redevelop the South Brooklyn Marine Terminal for the facilitation of both bulk freight and consumer logistics.⁵⁵ While the EDC released a request for proposal seeking potential operators of the anticipated barge facility at Hunts Point in early 2019,⁵⁶ no information has been publicly released regarding the selection of a preferred operator or a development timeline for the site.

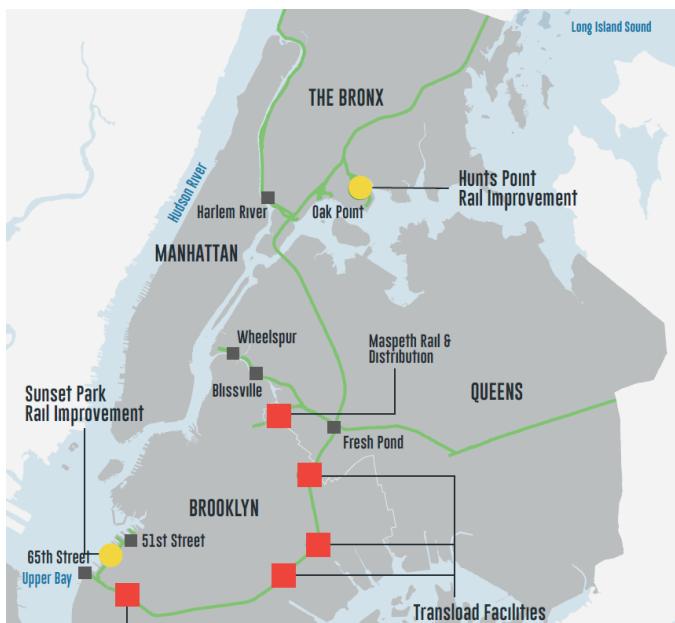


Figure 1. NYC Freight Rail Facilities.

Source: NYCEDC 'Freight NYC' Plan

In the rail space, the EDC calls for the development of new rail line spurs, sidings and rail-adjacent loading facilities in Brooklyn and Queens, to leverage existing freight rail lines in connecting industrial and food businesses to highways and to the national freight rail network.⁵⁷ The EDC has identified the Maspeth rail yard as one of five yards it will target for upgrades in order to increase transfer capacity between rail and road freight infrastructure, with the end goal of developing

⁵³ ibid.

⁵⁴ New York City Economic Development Corporation, "[Freight NYC](#)," Accessed September 29, 2020

⁵⁵ New York City Economic Development Corporation, [Press Release](#), Published May 8, 2018

⁵⁶ New York City Economic Development Corporation, [Press Release](#), Published March 22, 2019

⁵⁷ New York City Economic Development Corporation, "New York Works Industry Spotlight: Creating good jobs in freight"

Maspeth into a high-capacity multimodal freight hub (See Figure 1.).⁵⁸

The Port Authority, in the latest phase of its Cross Harbor Freight Program⁵⁹ announced in 2017, declared that increasing the capacity of its existing barge system, and building a freight rail tunnel under the Hudson River connecting New Jersey and Brooklyn, were its two preferred freight improvement alternatives.

Urban Freight in the COVID-19 Pandemic



Last-mile logistics in Manhattan. Source: 86th Street Assoc.

The COVID-19 pandemic has caused households in the United States to drastically shift their consumer spending towards e-commerce retail. As consumers are unable to carry out their regular shopping routines, truck-based delivery is expected to surge through the holiday season and into 2021. United Parcel Service (UPS) reported that in the early months of the pandemic, home deliveries accounted for over 70% of its domestic deliveries, up from 54% for all of 2019.⁶⁰ Their deliveries

have also become more time-consuming, and less efficient. Truck load factor is 33% lower than in 2019, and drivers are driving further, and making more stops, in order to complete their home delivery routes.⁶¹ Other retailers, including Walmart, Target and Amazon have reported surging e-commerce sales.⁶²

Larger shipping firms and regional couriers alike are hiring tens of thousands of courier and warehouse staff across the country ahead of the 2020 holiday season.⁶³ Holiday season e-commerce sales are expected to be at least 25% higher than in 2019.⁶⁴ Demand for home delivery is likely to exceed shipping capacity, prompting a market expectation of extra shipping surcharges for customers, and an increase in click-and-collect shopping, where customers purchase goods online, and then collect items at the store.⁶⁵

⁵⁸ New York City Economic Development Corporation, [“Freight NYC.”](#) Accessed September 29, 2020

⁵⁹ Port Authority New York New Jersey, [Cross Harbor Freight Program](#), Accessed November 17, 2020

⁶⁰ Ziobro, Paul, [“UPS slashes spending, halts stock buybacks as coronavirus upends business.”](#) *The Wall Street Journal*, April 28, 2020

⁶¹ *ibid.*

⁶² Corkery, Michael, and Sapna Maheshwari, [“As customers move online, so does the holiday shopping season.”](#) *The New York Times*, November 23, 2020

⁶³ Smith, Jennifer, [“Warehouse, parcel operators add thousands of jobs ahead of holidays.”](#) *The Wall Street Journal*, October 2, 2020

⁶⁴ Thomas, Lauren, [“Holiday spending will depend on how much the rich splurge and the poor cut back, Deloitte says.”](#) *CNBC*, September 15, 2020

⁶⁵ Ovide, Shira, [“Brace for holiday ‘shipageddon’.”](#) *The New York Times*, October 16, 2020

Waste Equity in New York City and National Environmental Justice Laws

The concentrated and inequitable distribution of waste management facilities throughout New York City has attracted concerted legislative efforts to disperse the footprint and adverse effects of these facilities. The City has taken powerful steps to mitigate the excessive impacts of waste management systems on the hardest-hit communities, particularly South Bronx, North Brooklyn and Jamaica. The siting of waste transfer stations is limited to manufacturing districts (M-zones) throughout the city. Around 40% of the city's total residential and commercial waste is processed in facilities located along Newtown Creek.⁶⁶ The city's M-zones lie adjacent to residential communities that tend to be made up of lower income households and communities of color at higher proportions than elsewhere in the city.

The City's Waste Equity Bill (LL Intro 157c), passed in 2018, limits the amount of waste that can be processed in these waste-burdened neighborhoods.⁶⁷ It reduces by 50 percent the amount of waste that transfer stations in North Brooklyn can process, and by 33 percent for waste transfer stations in South Bronx and Southeast Queens.⁶⁸ Previously, North Brooklyn had received 7,000 tons of waste each day, while South Bronx and Jamaica had received over 6,000 tons, and 1,700 tons, respectively.⁶⁹ The law prohibits the construction of new waste facilities in areas that already handle more than 10% of the city's waste. However, it also provides capacity allowances for facilities that manage waste via rail or barge.

In 2017, community districts in New York City were served by upwards of 50 private commercial carters, with north Brooklyn and western Queens reporting among the highest number of individual carters operating within their bounds.⁷⁰ This resulted in inefficient, duplicated trips being performed by trucks whose routes often spanned multiple boroughs, pushing up VMT and exacerbating poor air quality and road safety outcomes across neighborhoods. To counter the unorganized spread of private carting and reduce unnecessary waste traffic, the City passed a Commercial Waste Management Plan (LL 199) in 2019, which defines geographic areas in which carters can operate and limits the number of carters allowed to operate in each defined area, with all licenses allocated via a competitive tender process.⁷¹

The State of New Jersey has recently enacted a comprehensive environmental justice law (S232), which is designed to prevent the development of polluting and environmentally damaging facilities in

⁶⁶ Newtown Creek Alliance, [“Waste Transfer Stations.”](#) Accessed September 30, 2020

⁶⁷ New York City Office of the Mayor, [Press Release](#), Published August 16, 2018. Accessed October 5, 2020

⁶⁸ New York City Department of Sanitation, [“Commercial Waste Zones - Appendix”](#) Published 2018, Accessed November 3, 2020

⁶⁹ City of New York, [Press Release](#), Published August 16, 2018, Accessed October 11, 2020

⁷⁰ New York City Department of Sanitation, [“Commercial Waste Zones”](#) Published 2018, Accessed November 3, 2020

⁷¹ New York City, [“Commercial Waste Zones.”](#) Published February 7, 2020. Accessed October 5, 2020

‘overburdened’ communities who have historically suffered to the highest extent the harmful effects of heavy industrial and waste management activities.⁷² The law defines overburdened communities as those with high proportions of low-income households, minority households and households with low English proficiency. It clearly codifies the types of facilities that are subject to the law, namely waste and sludge transfer, processing and incineration facilities, sewage, recycling and landfill sites, power generation facilities and any other site that is a major cause of air pollution.⁷³

The legislation compels the New Jersey Department of Environmental Protection to reject a development application if the facility will cause a greater impact on an overburdened community than other, non-burdened communities. Only if the facility will serve a “compelling public interest in the community where it is to be located”⁷⁴ may the ‘disparate impact’ component of the law be overridden. Other states, including New York, California and Connecticut have environmental justice laws that mandate environmental studies and assessments for new developments as a procedural step. New Jersey, however, is now the only state where the outcome of the study will directly prevent a new development if its findings show disproportionate human health and environmental impacts on overburdened communities.

At the federal level, the Federal Government has rolled back many environmental regulations since 2017,⁷⁵ including rules governing environmental review studies of new projects. However, New Jersey Senator Cory Booker has recently reintroduced legislation to enact an environmental justice law that, similar to the New Jersey state law, would implement environmental impact review requirements and environmental law compliance rules at the federal level.⁷⁶ The incoming Administration has signaled its intention to pursue nationwide environmental justice legislation and initiatives broadly in line with those proposed by Sen. Booker and enacted in New Jersey.⁷⁷ The intent of these plans is clear: industries and land uses that cause high levels of pollution and environmental damage, while essential to the functioning of the economy, should not be designed so as to ignore external costs, or to disproportionately impose their adverse effects on minority and low-income communities who historically have borne the brunt of high-impact industrial activity.

⁷² State of New Jersey, [“Governor Murphy signs historic environmental justice legislation.”](#) Published September 18, 2020, Accessed November 17, 2020

⁷³ State of New Jersey Department of Environmental Protection - Office of Environmental Justice, [“Environmental justice law, policy and regulation.”](#) Accessed November 17, 2020

⁷⁴ State of New Jersey Department of Environmental Protection - Office of Environmental Justice, [“New Jersey Environmental Justice Law”](#)

⁷⁵ Harvard Environmental and Energy Law Program, [“Regulatory Rollback Tracker.”](#) Accessed November 17, 2020

⁷⁶ Senator Booker, Cory, [“Booker reintroduces sweeping environmental justice bill.”](#) Published July 24, 2019, Accessed November 21, 2020

⁷⁷ Biden for President, [“The Biden plan to secure environmental justice and equitable economic opportunity.”](#) Accessed November 21, 2020

Urban Industrial Land Use and Industrial Employment

There are several reasons why city governments consider industrial space to be an important part of the land use mix in urban areas. Industrial businesses occupy a critical place within the urban supply chain. They transform raw materials into finished goods required by other industries. In New York City, residential and commercial building construction, restaurants, bars, cafes, cultural institutions, the fashion industry and the advertising sector all count on a dependable supply of manufactured, durable goods as inputs within their own business operations. Many parts of the creative manufacturing economy rely on being in close proximity to one another, in order to share space, resources and ideas.⁷⁸ Networking and relationship-building among peer firms is much more feasible in a concentrated industrial setting.⁷⁹ Knowledge and products developed by the creative economy feed to other parts of the economy in the form of product and design innovation.⁸⁰ The entrepreneurship fostered within the ‘maker economy’ not only drives the development of craft and artisanal products, but presages early adoption of innovations and specialization that filter through to larger-scale industrial and commercial product development.

Moreover, small industrial firms desire to be close to their customers.⁸¹ Marketing, sales and shipping are simplified when the customer base can interact with and purchase directly from the producer. The high cost of running operations in a large urban environment can be offset by being in close proximity to customers who have high disposable incomes and who value the quality and uniqueness of smaller scale production.⁸²

Industrial use tends to earn a lower rate of return than commercial and residential uses.⁸³ However, in order for a city to sustain its creative spark, it must maintain a diversity of space, and must set aside space for creative expression.⁸⁴ Cities throughout the United States and elsewhere have attempted to preserve

⁷⁸ Schrock, Greg, Charles Heying, Stephen Marotta, Marc Doussard, Max Eisenburger, and Laura Wolf-Powers, “The maker economy in action: Entrepreneurship and supportive ecosystems in Chicago, New York and Portland,” (2016)

⁷⁹ ibid.

⁸⁰ Grodach, Carl, Justin O’Connor, and Chris Gibson, “Manufacturing and cultural production: Towards a progressive policy agenda for the cultural economy,” *City, culture and society* 10 (2017): 17-25

⁸¹ Dempwolf, C. Scott, “An evaluation of recent industrial land use studies: Do theory and history make better practice,” *Unpublished paper* (2010)

⁸² Schrock, Greg, Charles Heying, Stephen Marotta, Marc Doussard, Max Eisenburger, and Laura Wolf-Powers, “The maker economy in action: Entrepreneurship and supportive ecosystems in Chicago, New York and Portland,” (2016)

⁸³ Friedman, Adam, [“What makes the city run: Preserving space for critical economic activities.”](#) Pratt Center for Community Development (2016)

⁸⁴ Friedman, Adam, “Transforming the city’s manufacturing landscape,” *From disaster to diversity: What’s next for New York City’s economy* (2009): 21-37

industrial land using a range of methods, and with varying degrees of success.⁸⁵ Portland, Oregon, has developed an industrial land preservation policy that includes both specialized employment districts⁸⁶ and freight districts.⁸⁷ Its employment districts are designed to support industrial employment, with restrictions placed on the usage and intensity of non-industrial activities. Chicago has designated Planned Manufacturing Districts on the periphery of its downtown area which are intended to preserve space for industrial use.⁸⁸ In practice, however, non-industrial uses are competing for land in these zones, and industrial jobs have not been well-protected.⁸⁹

In San Francisco, Production, Distribution and Repair (PDR) districts were created in 2010 in an attempt to preserve industrial space and set land use standards.⁹⁰ As has occurred elsewhere, the city has struggled to prevent displacement of industrial firms and jobs, and the encroachment of commercial and tech firms within these areas.⁹¹ Furthermore, smaller firms have a hard time finding suitable spaces to operate within PDR districts, and industrial space is in high demand from e-commerce firms seeking to build logistics facilities.⁹² Boston has implemented zoning restrictions within the Newmarket District to protect industrial uses while implementing building size restrictions and emission and environmental impact standards.⁹³ Since 2004, Baltimore has had designated Maritime Industrial Districts which are designed to preserve space along the waterfront for industrial uses.⁹⁴ The districts have been shown to perform well in maintaining well-paying industrial jobs,⁹⁵ especially for firms that are involved in maritime activities or that rely on port infrastructure. Minneapolis is developing a ‘2040’ plan,⁹⁶ which calls for a review and implementation of policies to protect locally-based industrial and production jobs.

⁸⁵ Grodach, Carl, and Chris Gibson, “Advancing manufacturing?: Blinkered visions in U.S. and Australian urban policy,” *Urban Policy and Research* 37 (3) (2019): 279-293

⁸⁶ City of Portland, [“Employment and industrial zones.”](#) Published August 10, 2020, Accessed November 17, 2020

⁸⁷ Levinson, Herbert S., and Erica Levine Powers, [“Freight trip generation and land use handbook.”](#) Rensselaer Polytechnic Institute (2012)

⁸⁸ City of Seattle Department of Planning and Development, [“Industrial lands survey: investigation of comparable cities”](#) (2007)

⁸⁹ Jordahl, Haley, “Zoning for industry in a post-industrial era: the legacy and potential of Chicago’s Downtown Planned Manufacturing Districts,” *Master’s Thesis* (2016)

⁹⁰ San Francisco Department of Planning, [“Eastern Neighborhood Plans - Zoning”](#)

⁹¹ Dineen, J.K., [“Offices intruding on SF space zoned for industrial use.”](#) *San Francisco Chronicle*, March 14, 2016

⁹² Chapple, Karen, [“Industrial land and jobs study for the San Francisco and Bay Area.”](#) University of California Transportation Center (2017)

⁹³ City of Boston, [“Newmarket industrial-commercial neighborhood district.”](#) Published January 22, 2014, Accessed November 20, 2020

⁹⁴ City of Baltimore, [“Maritime industrial zoning overlay district: summary and evaluation.”](#) Published 2010, Accessed November 20, 2020

⁹⁵ The Abell Foundation, [“Maritime industrial zoning overlay district study.”](#) (2008) Accessed November 20, 2020

⁹⁶ City of Minneapolis, [“Minneapolis 2040.”](#) Accessed November 20, 2020

Zoning and land use rules often do not keep pace with a morphing business and industrial landscape, or with market conditions.⁹⁷ When land use policy and economic development policy are not in alignment, a city's economic development goals may supersede rules designed to preserve industrial land. Land use policy that sets aside land for industrial use can support urban entry and expansion for smaller firms, however land use policy that is disconnected from economic policy goals can lead to encroachment by competing uses, and ultimately to the displacement of independent and creative industrial concerns.⁹⁸ Chapple argues that reacting to and accommodating developer sentiment may produce sub-optimal land use outcomes.⁹⁹ Furthermore, the conversion of parcels of land within industrial zones for higher-return uses, including hotels, hospitality, housing and logistics, can signal that an area is ripe for change, which may invite land speculation.¹⁰⁰ Forward expected demand for land for particular uses attracts developers and speculators who may warehouse land indefinitely for future use. In New York City, warehousing of land is difficult to measure, and its effects on the true availability of industrial land within the city are hard to ascertain.¹⁰¹

Industrial Land Use and Employment in New York City

In New York City, the overall decline of land available for industrial purposes has been mirrored by a sustained decline in manufacturing jobs throughout the 20th Century. The New York City Zoning Resolution of 1916 designated 'Residence Districts', 'Business Districts', and 'Unrestricted Districts'.¹⁰² Heavy industrial activities were prohibited in business districts. For most of the 20th Century, manufacturing land use was confined to central and southern Manhattan, and along the waterfront and freight rail lines in the outer boroughs.¹⁰³ Just after World War II there were more than a million people employed in manufacturing in New York City,¹⁰⁴ representing over half the workforce. In 1961, the City further refined its zoning codes. Manufacturing districts were split into three categories: M1 'light

⁹⁷ Chapple, Karen, "The highest and best use? Urban industrial land and job creation," *Economic Development Quarterly* 28 (4) (2014): 300-313

⁹⁸ Dempwolf, C. Scott, "An evaluation of recent industrial land use studies: Do theory and history make better practice," *Unpublished paper* (2010)

⁹⁹ Chapple, Karen, "The highest and best use? Urban industrial land and job creation," *Economic Development Quarterly* 28 (4) (2014): 300-313

¹⁰⁰ Pratt Center for Community Development, "[Non-profit real estate development toolkit: Stable, affordable space for manufacturing.](#)" (2014)

¹⁰¹ New York City Council, "[Engines of Opportunity: Reinvigorating New York City's Manufacturing Zones for the 21st Century,](#)" Published November 2014

¹⁰² City of New York, "[Building Zone Resolution \(1916\).](#)" Accessed November 12, 2020

¹⁰³ New York City Council, "[Engines of Opportunity: Reinvigorating New York City's Manufacturing Zones for the 21st Century,](#)" Published November 2014

¹⁰⁴ The New York Times (author unattributed), "[New York City's decline in manufacturing gained momentum in 1980.](#)" *The New York Times*, March 22, 1981

manufacturing', M2 'medium manufacturing', and M3 'heavy manufacturing'.¹⁰⁵ While the 1961 Zoning Resolution has been amended and updated over time, much of the code relating to manufacturing land use and permitted activities remains untouched.

Global economic forces, the growth of new road networks within the city and new national highway construction throughout the 1970s and 1980s combined to draw manufacturing away from New York City. Cheaper labor could be had in markets outside of the north-eastern United States, and manufacturers could increasingly rely on truck transport to ship goods into urban centers, negating the need to be physically located within the city's boundaries. Between 1975 and 2000, manufacturing employment in New York City fell by more than half from over 500,000 to less than 250,000 (See Figure 2.).¹⁰⁶

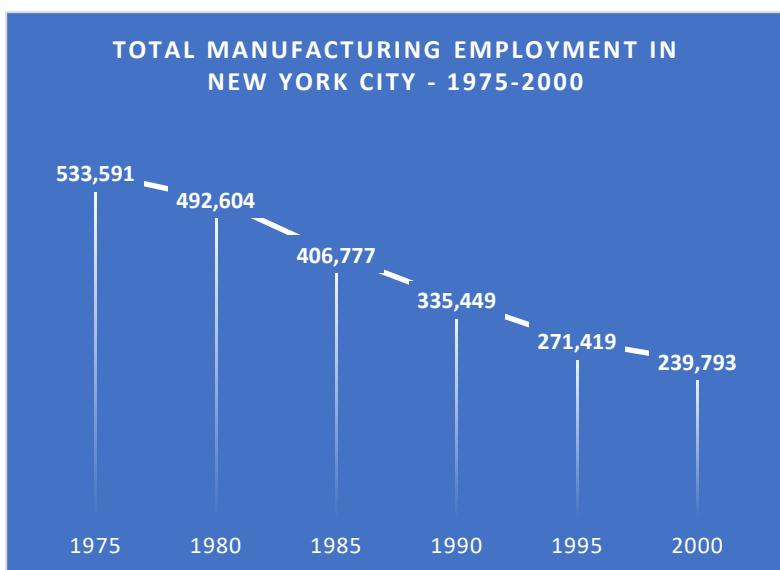


Figure 2. Manufacturing Employment in New York City 1975-2000. Source: New York State Department of Labor

New York City land use policy in the early 2000s was characterized by large-scale rezoning of industrial areas for residential development, and the construction of large condo buildings along parts of the city's waterfront that had historically been industrial hubs.¹⁰⁷ Prior to 2000, the Center for an Urban Future had raised the alarm on industrial displacement and speculative warehousing of industrial land in outer boroughs for residential and commercial development.¹⁰⁸ The maintenance of an industrial and manufacturing presence became a priority for New York City as competing uses began to infringe upon designated manufacturing districts. In particular, demand for housing pushed new housing developments increasingly into previously industry-heavy areas in Brooklyn and Queens. Residential rezoning occurred along the waterfront in Long Island City and the Greenpoint-Williamsburg area. Many areas adjacent to manufacturing districts¹⁰⁹ (M-zones) have been zoned as mixed-use districts

¹⁰⁵ City of New York, "[Zoning Maps and Resolution \(1961\)](#)," Accessed November 12, 2020

¹⁰⁶ New York State Department of Labor, "[Historical employment and wages 1975-2000](#)," Accessed November 12, 2020

¹⁰⁷ Friedman, Adam, Joan Byron, and Jenifer Becker, "[Making room for housing and jobs](#)," Pratt Center for Community Development (2015)

¹⁰⁸ Bowles, Jonathan, "[The Big Squeeze](#)," Center for an Urban Future (1999)

¹⁰⁹ NYC land zoned as either M-1, M-2 or M-3

(MX-zones), where residential, hotel, entertainment and industrial uses are permitted and may exist side by side.

The diminishment of land area available for manufacturing and other industrial uses within New York City has been well documented by the City government and within the literature.^{110,111,112} While New York City's industrial policies focus on workforce development and protection of smaller industrial firms, its outdated zoning codes and permitted use rules limit the power of these policies.

In 2005, in response to growing non-industrial demands and encroachment on industrial-zoned land within the city, the City created sixteen new 'Industrial Business Zones' (IBZs) across Brooklyn, Queens and the Bronx.¹¹³ The boundaries of the IBZs effectively mirrored the city's SMIA boundaries. The IBZs were designed to preserve existing industrial space, retain existing industrial firms and encourage firms to move into these zones. Residential and certain commercial uses were banned in IBZs.¹¹⁴ Industrial and manufacturing businesses both small and large desire to be located within the city, in close proximity to their customer base.¹¹⁵ Small firms who are involved in specialty manufacturing and artisan trades produce inputs for local cultural, entertainment and hospitality businesses. Larger industrial firms need space to manage heavy machinery, physical plant and inventory. However, around a third of the businesses who have been awarded City incentives when moving into an IBZ are non-industrial firms.¹¹⁶ Rising rents within M-zones driven by increasing demand for space by non-industrial firms have raised the risk of displacement for smaller industrial firms.¹¹⁷

Industrial and Manufacturing Space by Borough (Acres)			
	2010	2020	Diff
Queens	1,844	1,771	-73
Brooklyn	1,732	1,513	-219
Staten Island	859	816	-43
Bronx	802	880	78
Manhattan	223	56	-167
Total	5,460	5,036	-424

Figure 3. Change in land area used for Industrial and Manufacturing Uses in NYC 2010-2020. Source: NYC PLUTO

¹¹⁰ Davis, Jenna, 'NYC's Industrial Business Zone program: Examining the intersection between economic development and land use policy,' American Planning Association (2018)

¹¹¹ Friedman, Adam, Joan Byron, and Jenifer Becker, "[Making room for housing and jobs.](#)" Pratt Center for Community Development (2015)

¹¹² New York City Council, "[Engines of Opportunity: Reinvigorating New York City's Manufacturing Zones for the 21st Century.](#)" Published November 2014

¹¹³ City of New York, Office of the Mayor, "[Protecting and growing New York City's industrial job base.](#)" Published January 2005

¹¹⁴ Davis, Jenna, 'NYC's Industrial Business Zone program: Examining the intersection between economic development and land use policy,' American Planning Association (2018)

¹¹⁵ Friedman, Adam, "[What makes the city run: Preserving space for critical economic activities.](#)" Pratt Center for Community Development (2016)

¹¹⁶ Davis, Jenna, 'NYC's Industrial Business Zone program: Examining the intersection between economic development and land use policy,' American Planning Association (2018)

¹¹⁷ Friedman, Adam, Joan Byron, and Jenifer Becker, "[Making room for housing and jobs.](#)" Pratt Center for Community Development (2015)

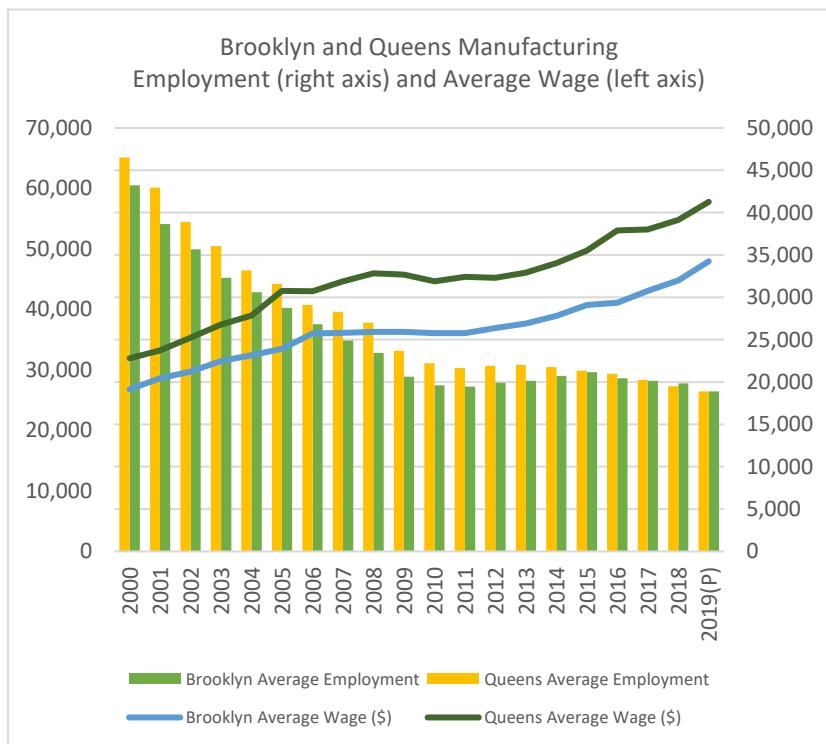


Figure 4. Source: NYS Department of Labor QCEW ((P) denotes provisional number)

is a function of both falling employment numbers and rising total wages in the manufacturing industry, suggesting that the existing manufacturing positions in Brooklyn and Queens are becoming increasingly specialized and more highly-skilled.

At the same time, employment in transportation services in the city continues to climb. As of the end of 2019, there were more than 11,000 people employed in either courier or messenger operations, or in warehousing and storage, across Brooklyn, Queens, and the Bronx (See Figure 5.).¹²⁰ The majority of these workers are employed in couriers and messenger services in Queens.

After 2000, manufacturing employment continued to fall in New York City before stabilizing in the mid-2010s. Over the last five years, however, manufacturing employment levels again declined. As of the end of 2019, fewer than 19,000 people were employed in manufacturing in each of Brooklyn and Queens (See Figure 4.).¹¹⁸ Over the same period, average wage has increased considerably, approaching \$50,000 and \$60,000 average annual salary in Brooklyn and Queens, respectively.¹¹⁹ This

¹¹⁸ NYS Department of Labor QCEW 2000-2019

¹¹⁹ ibid.

¹²⁰ ibid.

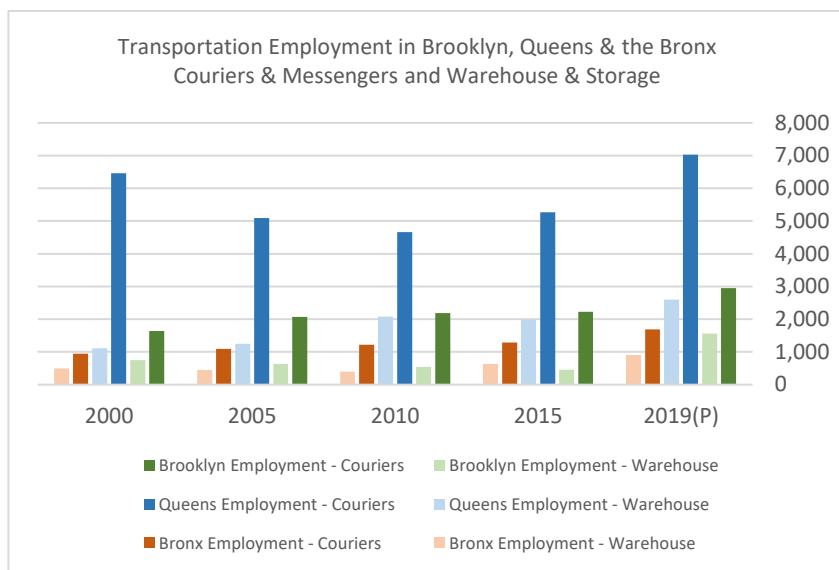


Figure 5. Source: NYS Department of Labor QCEW 2000-2019 ((P) denotes provisional number)

Manufacturing businesses provide well-paying jobs for residents who may not have a high school diploma or a university degree.¹²¹ Specialized manufacturing and other industrial activities provide long-tenured jobs with opportunities to upskill and specialize. These jobs pay better than retail and hospitality jobs in Brooklyn and Queens (See Figure 7.) Friedman contends that small scale

manufacturing tends to be high value-add in New York City in particular, necessitated by operating in a high-cost environment. In these cases, worker wages will tend to be higher, reflective of the value that labor adds to the finished product. Smaller industrial firms with low head-count tend to be better-able to add jobs and expand than larger, more mature firms.¹²² Small manufacturers in New York City, Chicago and Portland have expressed a desire or intention to grow their operations within their current location.¹²³ Industrial jobs are also predominantly performed by minority and immigrant workers who live in the outer boroughs.¹²⁴ These jobs are placed in jeopardy as the risk of displacement for small independent industrial firms grows.

Manufacturing Jobs in Kings, Queens, and Bronx Counties		Q1 2016	Q1 2020	Change	% Change
Total Manufacturing Jobs		47,394	41,271	-6,123	-13%
Transportation Jobs in Kings, Queens, and Bronx Counties					
NAICS 493 Warehousing and storage		3,390	6,120	2,730	81%
NAICS 492 Couriers and messengers		9,577	14,037	4,460	47%
Total Warehousing, Storage, Courier Jobs		12,967	20,157	7,190	55%

Figure 6. Source: U.S. Bureau of Labor Statistics QCEW 2016-2020

¹²¹ Friedman, Adam, "Transforming the city's manufacturing landscape," *From disaster to diversity: What's next for New York City's economy* (2009): 21-37

¹²² Chapple, Karen, "The highest and best use? Urban industrial land and job creation," *Economic Development Quarterly* 28 (4) (2014): 300-313

¹²³ Schrock, Greg, Charles Heying, Stephen Marotta, Marc Doussard, Max Eisenburger, and Laura Wolf-Powers, "The maker economy in action: Entrepreneurship and supportive ecosystems in Chicago, New York and Portland," (2016)

¹²⁴ Friedman, Adam, "Transforming the city's manufacturing landscape," *From disaster to diversity: What's next for New York City's economy* (2009): 21-37

January 2020 NAICS Sector	Kings County		Queens County	
	Employment	Avg. Annual Wage (\$)	Employment	Avg. Annual Wage (\$)
Manufacturing, Wholesale trade Transportation/Warehousing, Utilities	63,487	50,235	111,867	72,373
Retail Trade	77,187	37,960	62,919	36,660
Accommodation and Food Services	52,869	27,872	50,668	27,040

Figure 7. Source: U.S. Bureau of Labor Statistics QCEW 2020

NAICS Sector	Kings County Avg. Employees per Firm	Queens County Avg. Employees per Firm
Manufacturing	11	15
Wholesale Trade	7	8
Transportation and Warehousing	15	34

Figure 8. Source: U.S. Bureau of Labor Statistics QCEW

The average manufacturing business in Brooklyn and Queens employs 11 and 15 workers, respectively (See Figure 8). Producers of artisanal and craft goods in particular tend to be small operations who prefer to operate out of small workspaces. A 2016 study by Schrock et al. found that craft

manufacturers in New York City, Chicago and Portland tend to have less than 10 employees.¹²⁵

New York City's independent manufacturing and industrial businesses face three broad issues in acquiring and maintaining space in which to operate:¹²⁶ there is a lack of space for industrial businesses who want to be located in the city, outdated zoning rules allow non-industrial uses inside industrial zones, which feeds land speculation, and there is a mismatch between the spatial needs of smaller firms, and the attributes of older buildings within industrial zones. Older building stock tends to be made up of large-scale structures best suited for high-volume production by a single firm.¹²⁷ Manufacturers and smaller producers usually require small spaces with specific layouts and attributes, including natural light.¹²⁸ Embarking on subdivisions of older building stock is costly and risky,¹²⁹ particularly when the risk of building sale and displacement is high. Often lacking the technical expertise required to find and develop

¹²⁵ Schrock, Greg, Charles Heying, Stephen Marotta, Marc Doussard, Max Eisenburger, and Laura Wolf-Powers, "The maker economy in action: Entrepreneurship and supportive ecosystems in Chicago, New York and Portland," (2016)

¹²⁶ Friedman, Adam, "Transforming the city's manufacturing landscape," *From disaster to diversity: What's next for New York City's economy* (2009): 21-37

¹²⁷ Schrock, Greg, Charles Heying, Stephen Marotta, Marc Doussard, Max Eisenburger, and Laura Wolf-Powers, "The maker economy in action: Entrepreneurship and supportive ecosystems in Chicago, New York and Portland," (2016)

¹²⁸ Pratt Center for Community Development, "[Non-profit real estate development toolkit: Stable, affordable space for manufacturing,](#)" (2014)

¹²⁹ ibid.

suitable space,¹³⁰ and to navigate the leasing process, independent industrial firms rely on assistance from non-profit industrial incubators and business support groups, including Maspeth Industrial Business Association, Evergreen Exchange, and Greenpoint Manufacturing and Design Center.¹³¹

Research Methodology

This project relied on a variety of sources to both frame the central policy issue, and to formulate and examine alternatives to address the nature of the problem.

- a) Interviews with client stakeholders were conducted in order to obtain an on-the-ground view of the impacts of ‘last mile’ operations and delivery activity in the Newtown Creek area on nearby communities and the local business landscape. These interviews also served to give direction to the creation and design of policy options and strategic alternatives. Interviews were conducted with local business support organizations, staff of local council members and members of City agencies.
- b) Policy and research documents produced by local governments, city agencies, think tanks, planning groups and schools inform the background of the issue. These documents also present proposals for future policies governing land use and urban freight networks.
- c) The academic literature, select case studies and news articles provide an analysis of sustainability and urban development issues relating to urban last-mile freight. These sources also offer examples of leading practice and innovation in the fields of urban freight and last-mile logistics. Policy, strategy and design implementations discussed in the literature, and that have taken place in other cities, form the foundation of many of the alternatives assessed in this PDR.
- d) Geospatial and geographic data was used to formulate and assess alternatives. Publicly available maps, census data, NYC Open data and self-designed maps provide data to support policy arguments and to make final recommendations.

¹³⁰ ibid.

¹³¹ Schrock, Greg, Charles Heying, Stephen Marotta, Marc Doussard, Max Eisenburger, and Laura Wolf-Powers, “The maker economy in action: Entrepreneurship and supportive ecosystems in Chicago, New York and Portland,” (2016)

Nature of the Problem

Freight in New York City

Freight in New York City is dominated by trucking and is characterized by congested local roads and inadequate parking for freight vehicles. An average of more than 1.4 million truck deliveries take place in the New York metropolitan area each day.¹³² Over 40% of households in New York City receive a delivery at home at least once a week.¹³³ While only around 12% of all daily truck trips that occur in New York City originate within the five boroughs, fully one-third of these internally-originated last-mile trips begin in and around the Newtown Creek Significant Maritime Industrial Area (SMIA). Around 14% of all internal trips commence in North Brooklyn, 12% commence in Maspeth, and close to 7% begin in Long Island City.¹³⁴

Each day, there is an average of 126,000 truck entries into Manhattan, and an average of 74,000 truck entries into Brooklyn.¹³⁵ Almost 90% of New York City freight is transported by truck,¹³⁶ and approximately 40% of all truck trips in New York City are for last-mile delivery.¹³⁷ Deliveries of non-perishable goods to businesses, offices and homes are increasingly performed by smaller box trucks and vans that may commence the final leg of the delivery journey from a fulfillment center located either within or outside the city.

The quantity of freight that enters New York City each year is expected to grow significantly over coming decades. The New York Metropolitan Transportation Council (NYMTC) estimates that the annual total freight volume that enters, originates within, or passes through its local planning area, which includes New York City and Long Island, as well as Westchester, Putnam and Rockland counties, will grow from 365 million tons in 2012 to around 610 million tons by 2045.¹³⁸ Without significant growth in non-truck freight methods, the proportion of freight transported via truck within NYMTC's local planning area is expected to remain steady at just under 90% of all freight tonnage.¹³⁹ The yearly external cost of truck

¹³² Holguín-Veras, José, Cara Wang, and Jeffrey Wojtowicz, [“Off-hour delivery trusted vendor program,”](#) Rensselaer Polytechnic Institute (2019)

¹³³ New York City Department of Transportation, [“New York City Mobility Report,”](#) (2019)

¹³⁴ New York City Department of Transportation, [“Smart Truck Management Plan,”](#) (2018)

¹³⁵ New York City Department of Transportation, [“Improving the efficiency of truck deliveries in NYC,”](#) (2019)

¹³⁶ *ibid.*

¹³⁷ New York City Economic Development Corporation, “New York Works Industry Spotlight: Creating good jobs in freight”

¹³⁸ New York Metropolitan Transportation Council, [“Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8”](#) (2017)

¹³⁹ *ibid.*

congestion to the general community in New York City is estimated to be \$850 million.¹⁴⁰ The cost to trucking firms of congestion on the national highway system in the New York City, Newark, and Jersey City area is \$4.9 billion each year.¹⁴¹

There is a dearth of parking available for commercial vehicles throughout the city, particularly in the densest parts of Manhattan, Brooklyn and Queens. There are ten zip codes in Manhattan where there is insufficient parking to handle truck deliveries throughout the day.¹⁴² Delivery trucks tally unnecessary VMT throughout the day as they search for parking spots. The NYC Department of City Planning estimates that there are 85,930 metered on-street parking spaces throughout the city, and 102,000 off-street spaces in the Central Business District (Manhattan below 60th Street),¹⁴³ however many of these are long-term parking spaces and are not accessible to commercial vehicles. Double parking by delivery trucks and vans is rife, causing congestion and delays along major thoroughfares and local residential streets alike.

Within the city, trucks account for 12% of the fine particulate matter in the atmosphere.¹⁴⁴ Air quality is particularly poor in neighborhoods that experience high volumes of truck traffic, or that are in close proximity to industrial areas (See Appendix A. Figures A3, A4, A5.). Low-income communities and communities of color bear the brunt of truck-related noise and pollution, particularly in the Bronx, Brooklyn, and Queens.¹⁴⁵ The Greenpoint and Williamsburg neighborhoods in north Brooklyn, and the neighborhoods of Long Island City, Ridgewood and Maspeth in Queens suffer from high levels of fine particulates and other harmful air pollutants.¹⁴⁶ Further, these neighborhoods have experienced among the lowest rates of reduction in the levels of these pollutants over the decade to 2018, relative to other areas in New York City.¹⁴⁷ Exposure to high levels of fine particulates creates an elevated risk of asthma, lung cancer, and cardiovascular disease. Residents in north and central Brooklyn suffer from high rates of

¹⁴⁰ New York City Economic Development Corporation, “New York Works Industry Spotlight: Creating good jobs in freight”

¹⁴¹ American Transportation Research Institute, [“Cost of congestion to the trucking industry: 2018 update.”](#) (2018)

¹⁴² Jaller, Miguel, José Holguín-Veras, and Stacey Darville Hodge. “Parking in the city: Challenges for freight traffic.” *Transportation research record* 2379 (1) (2013): 46-56

¹⁴³ Holguín-Veras, José, Johanna Amaya, Trilce Encarnacion, Sofia Kyle, and Jeffrey Wojtowicz, [“Impacts of freight parking policies in urban areas: the case of New York City.”](#) Rensselaer Polytechnic Institute (2016)

¹⁴⁴ Kheirbek, Iyad, Jay Haney, Sharon Douglas, Kazuhiko Ito, and Thomas Matte, “The contribution of motor vehicle emissions to ambient fine particulate matter public health impacts in New York City: a health burden assessment,” *Environmental Health* 15 (1) (2016): 89

¹⁴⁵ ibid.

¹⁴⁶ [The New York City Community Air Survey: Neighborhood Air Quality 2008 - 2018](#), Published 2018, Accessed September 30, 2020

¹⁴⁷ ibid.

asthma and cardiovascular illnesses.¹⁴⁸ Unless meaningful steps are taken to reduce freight truck traffic levels on local roads, the near doubling of freight tonnage expected for the New York metropolitan region between now and 2045, in conjunction with an unchanged road infrastructure, will lead to a significant escalation of air pollutant levels, and an exacerbation of poor community health outcomes.

Growth of Last-Mile Distribution Facilities in New York City

New York City residents make approximately \$16 billion in e-commerce purchases each year.¹⁴⁹ Prologis, a large commercial property developer who specializes in modern last-mile distribution facilities, estimates that e-commerce retailers require around 1.2 million square feet of last-mile distribution space for every \$1 billion of online sales.¹⁵⁰ As online and mobile phone purchases of consumer goods and groceries increase as a share of all retail consumption, demand for warehouse space by e-commerce firms continues to grow. Despite the City's proclaimed intentions to overhaul its freight systems, there has been little discernible progress on the goals outlined in the EDC's Freight NYC plan and in DOT's truck management plans. In the meantime, the private sector is making moves to significantly expand the footprint of last-mile distribution facilities within the city's Industrial Business Zones. Traditional shipping companies including FedEx and UPS operate large distribution facilities within IBZs and manufacturing zones throughout the city. Food and beverage distributors and makers of industrial and construction products similarly operate distribution facilities in these areas. Lately, however, commercial property developers have made a concerted push to purchase large lots within IBZs with the express purpose of developing state-of-the-art last-mile logistics centers. Recent purchases of land have occurred in the Bronx, within the Hunts Point¹⁵¹, Port Morris¹⁵² and Zerega¹⁵³ IBZs, in Red Hook,¹⁵⁴ within the Southwest Brooklyn IBZ, in East New York,¹⁵⁵ and in the Maspeth^{156,157} IBZ. Amazon, or another large e-

¹⁴⁸ The Brooklyn Hospital Center, "[The need for caring in central and north Brooklyn](#)," Published January 2013, Accessed September 30, 2020

¹⁴⁹ Bimschleger, Curt, and Ketul Patel, "[Urban fulfillment centers: helping to deliver on the expectation of same-day delivery](#)," Deloitte (2019)

¹⁵⁰ Thuermer, Karen E., "[State of industrial real estate: it's crunch time](#)," *Logistics Management*, March 1, 2018

¹⁵¹ Garcia Conde, Ed, "[Coming soon to the Bronx: New York City's largest last-mile warehouse](#)," *Welcome2TheBronx*, February 25, 2020

¹⁵² Turnbridge Equities, "[Bronx Logistics Center](#)"

¹⁵³ Garcia Conde, Ed, "[Watch how the Whitestone movie theater will be transformed into a modern, futuristic warehouse](#)," *Welcome2TheBronx*, February 6, 2019

¹⁵⁴ JLL, "[640 Columbia Street](#)"

¹⁵⁵ Matsuda, Akiko, "[Amazon inks major warehouse deal in East New York](#)," *The Real Deal*, November 18, 2020

¹⁵⁶ RXR Realty, "[55-15 Grand Ave](#)"

¹⁵⁷ "[Prologis acquires 18-51 Flushing Avenue](#)," *Real Estate Daily Beat*, Published January 27, 2020

commerce retailer, is expected to be the tenant at each of these sites.^{158,159} The majority of these sites will be developed into multi-story last-mile logistics centers. At the same time, private firms are developing urban micro-hubs within the city to manage groceries and other last-mile freight deliveries for retail clients.¹⁶⁰



UPS last-mile distribution center in New York City - Author Photo

In 2019, before the COVID-19 pandemic hit the United States, e-commerce fulfillment and warehouse facilities were ranked as the most desirable investment and development prospects in the United States among all commercial land uses, and this was particularly true for New York City.¹⁶¹ As of 2019, there was a total of 3 million square feet of space being utilized for last-mile distribution facilities within New York City's industrial zones, up from 2.2 million square feet in 2016.¹⁶² A further 3.8 million square feet of space for new distribution facilities is under development.¹⁶³

Regardless of the City's stated freight management aims, commercial property developers and e-commerce firms are pushing ahead with a vision for last-mile distribution in New York City that is built around traditional trucking, with a high volume of delivery trips originating within the city's IBZs. The net result of the proliferation of last-mile facilities is that the design and implementation of last-mile delivery networks in New York City is being dictated solely by private enterprise. These firms optimize operations in order to minimize delivery time and financial cost. There is little consideration given to external costs and social impacts arising from these developments. Large volumes of tractor-trailers and delivery vans will enter and depart these facilities using local roads that run through predominantly low-income and minority communities adjacent to the IBZs. The City has a clear role to play in mandating the recognition and mitigation of the externalities that arise from endless streams of delivery vehicles running duplicate routes, double parking, idling and unloading freight on sidewalks throughout the day.

¹⁵⁸ Young, Liz, [“Amazon signs another warehouse lease in New York City,”](#) *New York Business Journal*, Published June 24, 2020

¹⁵⁹ Young, Liz, [“Exclusive: Amazon confirms more new leases in New York City - and sources say there’s more to come.”](#) *New York Business Journal*, Published October 28, 2020

¹⁶⁰ Smith, Jennifer, [“Smaller is bigger in new e-commerce warehouses.”](#) *The Wall Street Journal*, November 8, 2020

¹⁶¹ pwc, [“Emerging trends in real estate: United States and Canada 2019.”](#) (2019)

¹⁶² New York City Economic Development Corporation, [“Freight NYC.”](#) Accessed September 29, 2020

¹⁶³ ibid.

With each purchase and redevelopment of space for last-mile distribution facilities within these IBZs, the amount of land available for specialized industrial and manufacturing activities declines. Manufacturing zones make up less than 15% of the city's total land area, and less than a third of that area is deployed for job-intensive manufacturing uses.¹⁶⁴ New last-mile distribution facilities are making significant incursions in the city's IBZs.

In 2011, the average asking rent for industrial space in the outer boroughs was \$11.50 per square foot.¹⁶⁵ In 2013, the average prevailing asking rent was \$14.25 per square foot.¹⁶⁶ By 2018, the average asking lease rate for industrial space in New York City had risen to around \$21.50 per square foot.¹⁶⁷ As of mid-2020, the average city-wide asking lease rate had climbed over \$23 per square foot.¹⁶⁸ Brooklyn has the most expensive industrial space on average, leasing for over \$25 per square foot, while average asking rents for industrial space in Queens and the Bronx sit around \$22 per square foot.¹⁶⁹ In terms of land value, industrial space in both Brooklyn and Queens is currently priced at just under \$450 per square foot, however there are transactions taking place for land destined to be utilized for last-mile distribution at a price of \$600 per square foot.¹⁷⁰

Top Industrial Lease Transactions in New York City - Q2 2020

Size (Sq. Ft.)	Tenant	Address	Market	Submarket
366,375	E-Commerce tenant	1500 Bassett Avenue	Bronx	Westchester Heights
300,000	Amazon	55-15 Grand Avenue	Queens	Maspeth
205,409	Amazon	1055 Bronx River Avenue	Bronx	Soundview
47,900	E-Commerce tenant	1080 Leggett Avenue	Bronx	Hunts Point
47,850 (E)	Maquette	48-49 35 th Street	Queens	Long Island City

Renewal (R), Expansion (E), Renewal and Expansion (RE).

Source: CBRE Research, Q2 2020.

Figure 9. Source: CBRE Marketview New York City Industrial Q2 2020

¹⁶⁴ New York City Council, "[Engines of Opportunity: Reinvigorating New York City's Manufacturing Zones for the 21st Century,](#)" Published November 2014

¹⁶⁵ New York City Council, "[Engines of Opportunity: Reinvigorating New York City's Manufacturing Zones for the 21st Century,](#)" Published November 2014

¹⁶⁶ ibid.

¹⁶⁷ Lee & Associates, "[Q3 2018 Market Reports,](#)" (2018)

¹⁶⁸ CBRE, "[Marketview New York City Industrial Q2 2020,](#)" (2020)

¹⁶⁹ ibid.

¹⁷⁰ Bockmann, Rich, "[Buy a Warehouse. Lease it to Amazon. Triple your money,](#)" *The Real Deal*, May 10, 2019

Major Under-Construction and Planned Industrial Projects in New York City as of Q2 2020

Project	Size (Sq. ft)	Type	Market	Submarket	Estimated Completion
Last Mile Logistics Facility	83,000	Warehouse/Distribution	Brooklyn	Red Hook	Q3 2020
Building IV – Matrix Global Logistics Park	975,000	Warehouse/Distribution	Staten Island	Mid-Island	Q4 2020
Terminal Logistics Center	262,119	Warehouse/Distribution	Queens	Ozone Park	Q1 2021
2505 Bruckner Blvd	968,000	Warehouse/Distribution	Bronx	Zerega	Q2 2022
Sunset Industrial Park	1,300,000	Warehouse/Distribution	Brooklyn	Sunset Park/Greenwood	TBD
280 Richards St	305,000	Warehouse/Distribution	Brooklyn	Red Hook	TBD

Source: CBRE Research, Q2 2020.

Figure 10. Source: CBRE Marketview New York City Industrial Q2 2020

The largest industrial construction projects occurring in New York City today are exclusively logistics and last-mile distribution facilities. The most sizeable new leases within the city's Industrial Business Zones are all for last-mile fulfillment and warehousing activities, including a new lease signed for a 300,000 square foot space at 55-15 Grand Avenue in Maspeth, Queens, which will be occupied by Amazon. Rising lease costs and the diminishment of space for true industrial uses within IBZs puts existing industrial businesses at significant risk of displacement.¹⁷¹ For businesses who want to move into an IBZ, it also reduces the likelihood of finding space that is affordable and that can be secured with a long-term lease. The viability of small-scale, independent industrial firms is severely diminished as the purchase and lease costs of industrial land increase. While older, large scale buildings in IBZs may be difficult to convert to multi-use spaces where several firms can operate next to one another, the construction of large, state-of-the-art logistics facilities totally eliminates the possibility of these spaces being utilized for industrial activities. This amounts to the permanent removal of significant land area from IBZ stock that might have otherwise become usable for future development into multi-purpose manufacturing or creative industrial uses by a manufacturing firm, a not-for-profit industrial incubator, or the City itself.

¹⁷¹ Schrock, Greg, Charles Heying, Stephen Marotta, Marc Doussard, Max Eisenburger, and Laura Wolf-Powers, "The maker economy in action: Entrepreneurship and supportive ecosystems in Chicago, New York and Portland," (2016)

A Deloitte study of last-mile distribution costs in New York City found that the siting of a last-mile fulfillment center within the city is cheaper than running distribution at a location outside of the city.¹⁷² The lower transportation costs associated with delivery of parcels to New York City residents from a location within the five boroughs more than offset the higher land and labor costs that are incurred within the city. The city location also makes tight delivery windows and same-day delivery pledges much more feasible for e-commerce firms. From a facility located in the Bronx, around 90% of the city is accessible within a 60-minute truck or van trip.

The key objectives the project seeks to address through the proposed policy options are:

- 1. Reduce the human health impacts of last-mile trucking activity on communities that are in close proximity to the Newtown Creek IBZ.**
- 2. Reduce the congestion impacts of last-mile trucking activity on roads, other municipal infrastructure, and the natural environment around Newtown Creek.**
- 3. Protect space inside the Newtown Creek IBZ (and other NYC SMIA/IBZs) for occupation by industrial and manufacturing firms, and maintain the affordability of space inside the Newtown Creek IBZ for independently-owned businesses.**

¹⁷² Bimschleger, Curt, and Ketul Patel, [“Urban fulfillment centers: helping to deliver on the expectation of same-day delivery.”](#) Deloitte (2019)

Evaluative Criteria

The following criteria have been devised in order to evaluate the anticipated outcomes of the proposed alternatives:

1.

a) **Effectiveness (Reduce Truck VMT)**: How well does the proposal reduce the effects of last-mile trucking activity on local communities, and natural and built environments, in the Newtown Creek area?
Measurement: Maximize the truck VMT that will be eliminated from local roads.

b) **Effectiveness (Preserve Industrial Space for Industrial and Manufacturing Uses)**: How effectively does the proposal allow for the long-term preservation of affordable space inside the Newtown Creek IBZ for industrial and manufacturing firms?

Measurement: Maximize the amount of space inside the Maspeth, North Brooklyn, and Long Island City IBZs that can be protected from conversion to last-mile distribution facilities.

2.

Equity: Does the proposal cause the diffusion of last-mile trucking impacts away from historically overburdened communities of color that are adjacent to IBZs?

Measurement: Minimize the impact of last-mile delivery activity (facility siting and trucking) on IBZs and adjacent areas, while also minimizing these impacts on other areas in New York City.

3.

Feasibility: Is the proposal politically and logically feasible for the City to implement or enact?

Measurement: Does the proposal require involvement by few, or many parties in order to implement? Are there few, or many legislative and regulatory hurdles that must be met in order to implement or enact the proposal?

The policy options will be assigned a ranking of HIGH, MEDIUM or LOW for each criterion in the final assessment matrix.

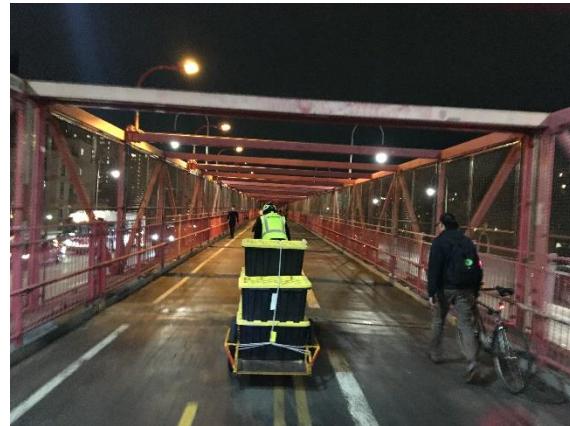
Policy Options

Reducing Truck VMT

City Development of Cargo Bike Framework

Under this proposal, the City would expand upon its initial cargo bike pilot program. In December 2019, New York City announced a cargo bike pilot program for the Manhattan central business district (Manhattan south of 60th Street).¹⁷³ The program is limited to only 100 cargo bikes operated by UPS, Amazon and DHL, 90 of which are operated by Amazon. Cargo bike capacity and networks should be expanded beyond southern Manhattan, to incorporate the rest of Manhattan and the other boroughs.

The current pilot program allows for cargo bikes to operate on both roadways and bike lanes, at a maximum speed of 12 miles per hour. An expanded program would likely only operate in areas with adequate road infrastructure to support safe passage for cargo bikes. The coverage area would likely be confined to areas where cargo bike trip efficiency is high, and may include only areas that can be reasonably accessed by human-powered cargo bikes.



Cargo bike on the Williamsburg Bridge - Author Photo

Proposal Evaluation

The immediate benefit of rolling out cargo bikes in New York City is that bike trips can replace certain freight truck trips. This reduces the number of trucks on the road, and reduces overall truck miles traveled. Utilization of cargo bikes allows for more precise sorting and consolidation of freight volumes among vehicles, based on specific delivery areas. The consolidation of freight volume can create both direct cost savings and improved environmental outcomes, as truck trips are replaced by more efficient cargo bike trips.¹⁷⁴ The utilization of cargo bikes reduces demand for commercial parking and loading space. Cargo bikes consume less space than trucks and vans, and are able to travel along routes and reach destinations that trucks cannot reach, due mainly to roadway restrictions in place in dense downtown

¹⁷³ City of New York, [Press Release](#), Published December 9, 2020, Accessed October 23, 2020

¹⁷⁴ McLeod, F. N., T. J. Cherrett, Tolga Bektas, Julian Allen, Antonio Martinez-Sykora, Carlos Lamas-Fernandez, Oliver Bates et al., "Quantifying environmental and financial benefits of using porters and cycle couriers for last-mile parcel delivery," *Transportation Research Part D: Transport and Environment* 82 (2020): 102311

areas.¹⁷⁵ This means that cargo bikes can park closer to delivery destinations, spend less time searching for parking, and can perform deliveries more quickly once parked, than trucks and vans.

Analysis of cargo bike deliveries in New York City¹⁷⁶ and Seattle¹⁷⁷ reveal that cargo bikes complete fewer deliveries per hour than trucks. This is largely a function of cargo bike capacity, which is around a quarter of the capacity of a small van, or one fifteenth of the capacity of a larger box truck.¹⁷⁸ A typical UPS cargo bike has a capacity of 95 cubic feet, and can carry up to 400 lbs. worth of freight.¹⁷⁹ However, analysis of cargo bike operations indicates that cargo bike travel speeds are competitive with truck travel speeds. Conway demonstrates that cargo bikes travel at similar speeds to trucks in the Manhattan central business district, and that cargo bikes are particularly competitive when traveling crosstown.¹⁸⁰



Cargo bikes parked outside Wholefoods on Delancey Street - Author Photo

Furthermore, the use of cargo bikes to replace truck trips leads directly to reductions in the level of air particulates caused by truck traffic.¹⁸¹ The environmental benefits are greatest in high-congestion areas where trucks normally travel at low speeds.¹⁸² While the environmental, cost and spatial benefits of cargo bikes are clear for dense, congested urban areas, these benefits are not so clear for less dense areas. Cargo bike performance suffers over longer distances, particularly as drivers become fatigued.¹⁸³ Consideration

should also be paid to labor costs, since the operation of cargo bikes may require the hiring of more drivers than for a traditional truck fleet. Cargo bikes tend not to be cost-competitive with trucks overall,

¹⁷⁵ Conway, Alison, and Camille Kamga, [“Freight tricycle operations in New York City.”](#) City College of the City University of New York (2014)

¹⁷⁶ ibid.

¹⁷⁷ University of Washington - Supply chain transportation and logistics center, [“Cargo e-bike delivery pilot test in Seattle.”](#) (2020)

¹⁷⁸ Conway et al. (2014)

¹⁷⁹ UPS, [Press Release](#), October 25, 2018

¹⁸⁰ Conway, Alison, Jialei Cheng, Camille Kamga, and Dan Wan, “Cargo cycles for local delivery in New York City: Performance and impacts,” *Research in transportation business & management* 24 (2017): 90-100

¹⁸¹ McLeod et al. (2020)

¹⁸² Conway et al. (2017)

¹⁸³ Conway et al. (2014)

however their cost-competitiveness increases in urban areas where congestion pricing schemes, low-emission zones, or delivery time restrictions are in effect.¹⁸⁴

The development of related transportation and freight systems is critical to the successful uptake of cargo bikes. The roll-out of a multi-borough cargo bike system will likely require significant new investment by the City in bike lane capacity, reach and safety measures. Cargo bikes can be most effective when utilized within a consolidation micro-hub framework (See *Urban Consolidation Center* analysis). In this case, the use of cargo bikes would allow for the maximization of the environmental benefits and load efficiency gains associated with the use of small urban freight hubs. This is demonstrated via the success of combined urban freight hub and cargo bike frameworks seen in both London and Paris.¹⁸⁵

Based on an analysis of cargo bike networks in European cities, cargo bikes have the potential to replace up to 30% of truck trips.¹⁸⁶ The effectiveness of cargo bikes in replacing trucks is greatest for short trips, their efficacy is limited beyond a 2-3 mile radius from trip start point.¹⁸⁷ However, the elimination of truck trips is key to achieving a more equitable urban freight system, where the reduction of truck trips emanating from last-mile facilities does not lead to an increase in VMT elsewhere.

The feasibility of cargo bikes in New York City will depend on the outcome of the ongoing pilot program. FedEx and USPS are not participating in the program and neither service currently has cargo bike capacity.¹⁸⁸ The likelihood of cargo bike network expansion will likely be a function of the prioritization of alternative freight systems by the new mayor, which will become known after the local elections in 2021. Attempts to install on-street cargo bike storage infrastructure within the city have faced community board opposition.¹⁸⁹ However, growth in cargo bike capacity has the potential to spur collaboration between e-commerce and shipping firms, and community-based organizations and elected officials who support expansion of bike lane infrastructure. The development of wide, well-protected bike lanes throughout the city would attain much-needed impetus with the support of logistics providers.

¹⁸⁴ Conway et al. (2017)

¹⁸⁵ Conway, Alison, Pierre-Emmanuel Fatisson, Penny Eickemeyer, Jialei Cheng, and Diniece Peters, “Urban micro-consolidation and last mile goods delivery by freight-tricycle in Manhattan: Opportunities and challenges,” In *Transportation Research Board 91st Annual Meeting* (2012)

¹⁸⁶ Lenz, Barbara, and Ernst Riehle, “Bikes for urban freight? Experience in Europe,” *Transportation Research Record* 2379 (1) (2013): 39-45

¹⁸⁷ Sheth, Manali, Polina Butrina, Anne Goodchild, and Edward McCormack, “Measuring delivery route cost trade-offs between electric-assist cargo bicycles and delivery trucks in dense urban areas,” *European transport research review* 11 (1) (2019): 11

¹⁸⁸ Colon, Dave, and Gersh Kuntzman, [“Analysis: New city cargo bike delivery program is absolutely perfect except...”](#) Streetsblog, December 5, 2019

¹⁸⁹ Colon, Dave, [“Manhattan panel kills proposed cargo bike corral to save five parking spots.”](#) Streetsblog, October 22, 2020

Road and Curb Pricing, Expand Commercial Loading Zone Framework

Under this proposal, the City would implement a comprehensive tolling, commercial parking, peak-charge and clean fuel framework that prices and apportions the external costs imposed on the city by commercial trucking activity. This framework would be built on top of the city's congestion pricing implementation, and includes:

Implementation of Low-Emission Zones

Tolling on Truck Through-Traffic

Expansion of existing commercial loading zone framework

Peak Period Container Access Charge

Consumption of road infrastructure and fees for road usage are poorly aligned in the United States.¹⁹⁰ Truck through-traffic, where the point of origin and destination both lie outside the city, comprises a significant volume of total freight on New York City roads. Total through-freight transported via truck is expected to rise to 126 million tons by 2045, from 76 million tons in 2012.¹⁹¹ The majority of truck through-traffic enters the city via the George Washington and Tappan Zee/Mario Cuomo bridges, each of which see more than 5,000 truck entries each day. Key interstate highways both within and to the north of the city see more than 3,000 daily truck through trips.¹⁹² This trucking activity does not currently attract any form of tolling beyond existing bridge and road tolls.

Analysis by the New York City Independent Budget Office¹⁹³ reveals that in 2018, the City collected over \$47 million in fines from trucking firms under its Stipulated Fine Program, which offers discounted fines for parking violations under a no-contest agreement. UPS and FedEx paid the highest amounts of fines, \$14.4 million on over 250,000 violations, and \$6.9 million on 114,000 violations, respectively. This

¹⁹⁰ Conway, Alison, and C. Michael Walton, "Policy options for truck user charging," *Transportation research record* 2115, (1) (2009): 75-83

¹⁹¹ New York Metropolitan Transportation Council, "[Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8](#)" (2017)

¹⁹² ibid.

¹⁹³ New York City Independent Budget Office, "[How does the city collect parking fines from delivery companies and other businesses?](#)," Published February 5, 2019

amounts to tacit approval of illegal parking and loading activities by delivery firms, and can be simply factored into the cost of doing business in the city for these delivery firms. It does not encourage behavioral change or improve the efficiency of commercial truck routing.



A UPS truck parked in Brooklyn - Author Photo

Further, the City and State continue to allow ‘toll arbitrage’ where vehicles are able to avoid tolls when traveling between Manhattan and Brooklyn and Queens by traversing the City-owned East River bridges, which are free to use. In order to avoid the tolled roadways, including the Hugh L. Carey Tunnel and the Queens-Midtown Tunnel, cars and trucks travel along local roads in Brooklyn and Queens in order to access, or exit from, the Brooklyn, Manhattan, Williamsburg and Queensboro Bridges. The Manhattan,

Williamsburg and Queensboro Bridges experience approximately 16,700, 13,100 and 20,800 truck and van crossings each day, respectively. This equates to hundreds of truck trips each hour, many of which utilize local roads in central and north Brooklyn, and western Queens. A table of truck trip data for select bridges and tunnels is available in Appendix A, Figure A2.

If pricing schemes are to be effective in reducing the economic and social costs of traffic congestion and double parking, the pricing and allocation of these external costs towards the actors who contribute to them should prioritize behavioral change and equity above mere revenue-raising.

Congestion pricing rationale is well-established.¹⁹⁴ Its ability to alleviate congestion and discourage inefficient single-occupancy car trips has been proven in London and Stockholm. Research by faculty at CUNY and Cornell demonstrates that a toll of \$20 to enter the designated congestion zone south of 60th Street in Manhattan would cut traffic congestion within the area by 40% and would reduce greenhouse gas emissions by almost 200,000 tons annually.¹⁹⁵ Further, reducing automobile traffic on the city’s roads will ease congestion and increase the availability of loading zones for commercial traffic, lowering time costs for commercial deliveries. Similarly, low-emission zones (LEZs), deployed in cities throughout Europe, have proven effective within urban areas in altering trucking behavior, improving truck route

¹⁹⁴ Jones, Christopher et al., [“Congestion pricing in NYC: getting it right.”](#) Regional Plan Association (2019)

¹⁹⁵ Baghestani, Amirhossein, Mohammad Tayarani, Mahdieh Allahviranloo, and H. Oliver Gao, “Evaluating the Traffic and Emissions Impacts of Congestion Pricing in New York City,” *Sustainability* 12 (9) (2020): 3655

efficiency and reducing emissions and air pollutants caused by trucks.¹⁹⁶ The Regional Plan Association found that the implementation of LEZs reduced commercial VMT and congestion because it caused shipping firms to consolidate their truck loads with greater efficiency.¹⁹⁷ However, the efficiencies LEZs introduce have been shown to cause job losses in the urban freight industry.

As an alternative to LEZs, loading zone policy might incentivize freight consolidation and clean fuel truck uptake, if pricing tiers or parking allocation were designed to favor energy-efficient trucks.¹⁹⁸ This type of framework would have the effect of ‘pricing’ the external costs of gasoline- and diesel-powered trucks and vans by making commercial parking spaces less accessible for those vehicles. The incentive this provides to firms to transition to a clean energy or electric vehicle fleet may complement and support the City’s Clean Trucks rebate program. Ideally, the shift to cleaner trucking would be stimulated through pricing for behavioral change, rather than solely through an expensive rebate program. This type of policy would require strict enforcement to prevent circumvention.

In 2005, the ports of Los Angeles and Long Beach introduced a scheme to incentivize off-peak freight deliveries within Los Angeles. Under the West Coast Terminal Operators Agreement, the ports increased capacity of off-peak receipt and delivery of containers and implemented a peak-period ‘traffic management fee’ charged for the unloading of containers at the port on weekdays between 3:00am-6:00pm.¹⁹⁹ The current fee is \$33.47 per twenty-foot equivalent unit (TEU) and \$66.94 for all other container sizes.²⁰⁰ The fee has been shown to incentivize a shift to off-peak trips, and the cost of running extra off-peak shifts at the terminal is nearly fully offset by the fee. While this type of scheme would not directly impact the scheduling of last-mile van deliveries, it would be a valuable tool that could be replicated at New York area ports to incentivize a shift to off-peak periods for other trucks entering the city, including tractor-trailer trips that supply the last-mile facilities, particularly as the existing Off-Hours Delivery program is likely to end its direct financial incentive feature.²⁰¹

In addition to these pricing and spatial measures, other ideas have been proposed to both price and alter trucking activity within the city. Funding for environmental mitigation, or sustainable freight frameworks, might be generated via the creation of a ‘freight fund’ paid into by developers of commercial and

¹⁹⁶ European Union Charging, [Low Emission Zones, other Access Regulation Schemes](#)

¹⁹⁷ Barone, Richard, and Emily Roach, [“Why good movement matters: Strategies for moving goods in metropolitan areas.”](#) Regional Plan Association (2016)

¹⁹⁸ WXY Architecture and Urban Design, [“Integrated strategies to address emerging freight and delivery challenges in New York City.”](#) (2017)

¹⁹⁹ West Coast MTO Agreement, [FAQ](#)

²⁰⁰ West Coast MTO Agreement, [Press Release](#)

²⁰¹ New York City Department of Transportation, [“Improving the efficiency of truck deliveries in NYC,”](#) (2019)

residential buildings who cannot satisfy the City's commercial loading rules.²⁰² This might be combined with a developer incentive structure, where building concessions are offered in exchange for payment into the fund. As a starting point, a 'freight fund' should be funded by fines collected as part of the City's Stipulated Fine Program. This program should be maintained, but should form part of a broader road pricing framework that more accurately accounts for external costs imposed on residential communities and city quality of life by firms who operate truck delivery fleets.

Proposal Evaluation

New York City DOT has expressed support for both congestion pricing and an expansion of commercial loading zones throughout the city.²⁰³ An effective road pricing scheme would seek to accurately account for the infrastructure wear and emissions caused by truck trips. It would likely alter driver and firm behavior,²⁰⁴ producing more efficient truck routing. The addition of an emissions component to a road pricing scheme would likely incentivize greater uptake of clean fuel trucks.²⁰⁵ In large cities, delivery trucks typically spend more than half of their trip time parked.²⁰⁶ Trip efficiency declines with decreases in availability of parking. Further, trucks tend to spend more time in a parking spot, and service multiple dispersed customers from a single parking spot, when the availability of parking is limited or uncertain.²⁰⁷ Inadequate commercial parking throughout New York City has been identified as a key source of unnecessary VMT and inefficient delivery routing.²⁰⁸

While the implementation of congestion pricing awaits approval by the federal government, commercial loading space falls under the purview of the City and a city-wide framework could be implemented quickly and at low cost. Both schemes face significant resident pushback, particularly from communities with high car ownership rates.²⁰⁹ Community resistance due to the loss of parking has stalled previous commercial loading zone programs, however there are few other obstacles to such a program. Further, effective time-based charging for use of curb space, to accurately price supply and demand for the curb

²⁰² ibid.

²⁰³ New York City Department of Transportation, "[Improving the efficiency of truck deliveries in NYC](#)," (2019)

²⁰⁴ Conway, Alison, and C. Michael Walton, "Policy options for truck user charging," *Transportation research record* 2115, (1) (2009): 75-83

²⁰⁵ ibid.

²⁰⁶ Allen, Julian, Maja Piecyk, Marzena Piotrowska, Fraser McLeod, Thomas Cherrett, Karen Ghali, Thuba Nguyen et al. "Understanding the impact of e-commerce on last-mile light goods vehicle activity in urban areas: The case of London," *Transportation Research Part D: Transport and Environment* 61 (2018): 325-338

²⁰⁷ Thompson, Russell G., and Lele Zhang. "Optimising courier routes in central city areas," *Transportation Research Part C: Emerging Technologies* 93 (2018): 1-12

²⁰⁸ Jaller, Miguel, José Holguín-Veras, and Stacey Darville Hodge. "Parking in the city: Challenges for freight traffic." *Transportation research record* 2379 (1) (2013): 46-56

²⁰⁹ Kuntzman, Gersh, "[DOT: We are not backing down on neighborhood loading zones](#)," *Streetsblog*, August 22, 2019

throughout the day, cannot occur unless there is sufficient loading zone capacity available for truck deliveries to take place.²¹⁰ The costs associated with implementation of ‘green’ loading zone initiatives may conceivably be shared between the City and large shipping and e-commerce firms. The feasibility of this type of funding arrangement would improve as private firms realize time and cost benefits associated with other initiatives designed to reduce congestion on the city’s roads.

New York City residents generally oppose congestion pricing.²¹¹ Proposals to expand on-street commercial loading space and to prioritize energy-efficient vehicles in parking policy would likely face similar levels of opposition. However, when similar schemes were implemented in London, Stockholm and elsewhere and their congestion benefits were realized, public sentiment swayed in their favor.²¹²

Road usage and curb pricing frameworks may not on their own lead to a dispersal of truck VMT. However, a comprehensive road pricing framework is vital to the successful uptake of other sustainable urban freight strategies in New York City. Transporting freight by truck is cheap, and involves minimal human input throughout the journey from factory, warehouse, or shipping terminal to the distribution center and final destination. More sustainable, lower polluting forms of freight transportation, including rail, barge and cargo bikes require freight volumes to be moved from one mode to another. Shipping and e-commerce firms optimize operations for time and cost, however they are not required to consider external and social costs in this equation. Only when externalities are priced at levels that equate to costs imposed, and are targeted specifically towards the causes of these costs so as to encourage operational change, will alternative forms of freight be able to compete with traditional, low-cost truck and van fleets.

City Support for Urban Consolidation Centers

The City would explore the feasibility of developing urban consolidation centers (UCCs) (See Appendix B for full description). The development of shared UCCs would likely occur under a public-private partnership model and would require the provision of subsidies by the City, via the Economic Development Corporation, in order to maintain financial viability. The model would necessitate participation by many logistics firms in order to realize meaningful benefits of freight consolidation.

Upon the setup of a partnership and funding model, the City would engage with relevant private commercial development firms to assess the suitability of locations throughout the city for the siting of

²¹⁰ Thompson et al. (2018)

²¹¹ [Quinnipiac University Poll](#), April 2, 2019

²¹² Domonoske, Camila, “[City dwellers don’t like the idea of congestion pricing - but they get over it,](#)” *NPR*, May 7, 2019

these facilities. The primary purpose of these facilities would be to accept freight arriving from outside the city and consolidate freight volume into fewer vehicles, with high load factors. This would ensure lower duplication of last-mile trips to commercial areas and residential neighborhoods. It also would offer the opportunity to transfer freight from trucks and vans to more sustainable modes of transportation, including electric-powered vans and cargo bikes.

Depending on the exact nature of facility operations, these facilities may be located both inside and outside industrial areas in New York City. For example, if a UCC performs the transfer and consolidation of goods from small trucks and vans to low-carbon vehicles, namely cargo bikes, the low-intensity nature of this trucking activity may raise the possibility of locating the UCC in a mixed-industrial or commercial zone. However, if the facility simply consolidates freight volume among gasoline- or diesel-powered vehicles, this reduces the feasibility of siting the UCC outside of an industrial zone.

Proposal Evaluation

The overall effectiveness of the development of UCCs in New York City will depend primarily on how many UCCs could reasonably be constructed to handle the city's growing last-mile freight volumes, and whether or not the UCC infrastructure is developed in tandem with sustainable modes of freight transportation. While UCCs can reduce truck VMT and congestion by improving the efficiency of last-mile dispatch, the benefits of this proposal would be limited unless electric-powered vans and cargo bikes perform at least part of the final, post-consolidation delivery step. UCCs operating in Paris and London reported reducing CO₂ and other air pollutants by over 50%, through the use of electric vans and cargo bikes for last-mile delivery.²¹³ To fully realize the potential of these modes of transportation in New York City would likely require legislative action and street infrastructure improvements. Electrification of logistics vehicle fleets would require the development of a 'clean truck' mandate, and expansion of existing clean truck rebate programs. The feasibility of cargo bikes would depend on the development of new bike lane infrastructure that would allow these bikes to co-exist safely with people on bicycles, and to reach parts of the city that do not currently have sufficient bike lane access.

A full implementation of UCCs sufficient to consolidate a large fraction of daily last-mile freight activity in New York City would have two outcomes. Firstly, the placement of UCCs at suitable locations throughout the city would disperse the highly concentrated last-mile activity of the logistics industry in its current form. Rather than driving to large, centralized logistics centers operated by individual firms, trucks operated by different logistics firms would enter the city and would perform shared consolidation activities at the UCCs that are closest to the destination of their freight load. Secondly, the transfer of

²¹³ Conway et al. (2012)

freight from trucks to sustainable modes of transportation will significantly reduce truck and van VMT, vehicle carbon emissions and fine particulates, as well as pressure on road infrastructure from heavy vehicle use.²¹⁴

The development of a UCC network will require significant long-term cooperation among logistics firms and the city. It will also likely require ongoing investment by the City to support UCC viability. The sharing of space for the consolidation of freight will necessitate the agreement of an operating model by all participating shipping firms, as well as the successful mixing of leadership, management, and cultural attitudes among firms. Information sharing between firms that is required for optimal operation of a consolidated facility may harm a competitive advantage that exists among these firms in other markets.²¹⁵ Furthermore, the success of UCCs would likely depend in large part on the degree to which privately-run large-scale logistics centers are entrenched within last-mile operating models for New York City. Recent evidence of the uptake of industrial land for last-mile logistics presented earlier in the paper would suggest that private e-commerce and shipping firms are implementing comprehensive last-mile distribution networks using facilities with large floor areas. The operating and cost optimization taking place via these facilities would become increasingly difficult to counter with the implementation of UCCs, as the number and scale of the larger facilities grows.

Privately-run micro-consolidation centers in New York City and elsewhere in the United States tend to be built on lots sized between 7,500 - 10,000 square feet and can handle over 1,000 orders per day.²¹⁶ At a prevailing annual rent of \$25 per square foot, the lease cost for one UCC might be expected to be around \$185-250,000 a year. Given that an average of over 1.4 million truck deliveries occur in the metropolitan New York area each day,²¹⁷ around 140 UCCs would be required to handle even 10% of this number of deliveries. The prevailing cost of construction for a 10,000 square foot state-of-the-art private micro-fulfillment center in the United States is approximately \$3 million.²¹⁸ As an example, if New York City was to fully fund the construction of ten UCCs, and fully cover the annual rent bill, a reasonable approximation of this total cost would be: \$30 million up-front construction cost, \$2.5 million annual lease cost. This high-level analysis ignores labor, fleet and other operating costs. Evidence from other UCC development programs indicates that public support for UCCs is essential, and some programs

²¹⁴ Panero, Marta, and Hyeon-Shic Shin, and Daniel Polo Lopez "[Urban distribution centers: A means to reducing vehicle miles traveled.](#)," NYU Rudin Center for Transportation Policy and Management (2011)

²¹⁵ Cleophas, Catherine, Caitlin Cottrill, Jan Fabian Ehmke, and Kevin Tierney, "Collaborative urban transportation: Recent advances in theory and practice," *European Journal of Operational Research* 273 (3) (2019): 801-816

²¹⁶ Smith, Jennifer, "[Smaller is bigger in new e-commerce warehouses.](#)" *The Wall Street Journal*, November 8, 2020

²¹⁷ Holguín-Veras, José, Cara Wang, and Jeffrey Wojtowicz, "[Off-hour delivery trusted vendor program.](#)"

Rensselaer Polytechnic Institute (2019)

²¹⁸ Smith, Jennifer, "[Grocery delivery goes small with micro-fulfillment centers.](#)" *The Wall Street Journal*, January 27, 2020

failed when public subsidies ceased.²¹⁹ Securing adequate, well-sited spaces for UCC sites would likely be a significant barrier to the creation of an extensive UCC network. Private parking garages at suitable locations could be ideal spaces for repurposing as off-street freight consolidation centers.

Uptake of Maritime and Rail Freight Initiatives

This proposal involves the City enacting particular components of the rail and maritime freight initiatives proposed by the EDC, the NYNJ Port Authority, and the Regional Plan Association.²²⁰ Each of these organizations, as well as other planning groups, have proposed numerous strategies to increase the share of rail and maritime freight in New York City. This paper formulates a proposal based on these plans that offers a combination of high upside and reasonable feasibility.

The EDC has identified five railyards along the New York and Atlantic's (NYA) Bay Ridge and Lower Montauk branch lines it wishes to designate for upgrades and conversion to transload facilities.²²¹ Rail yards along NYA lines are used to facilitate the transfer of bulk commodities for shippers who do not have direct access to the freight rail or maritime network from their warehouse or production facilities. The creation of new mode exchange points will allow increased volumes of freight to be brought into the city via train, either from terminals in New Jersey and Staten Island, or from other interstate locations. The rail analysis in this proposal centers on the Maspeth Rail Yard, which sits on the Lower Montauk NYA line.

This paper will examine the barge float operated by the Port Authority and NYA as a method to meaningfully improve freight connectivity between the shipping terminals at Port Elizabeth, New Jersey, and in Staten Island, and the freight rail network in south Brooklyn. It will propose a barge float framework that incorporates Newtown Creek.

An analysis of NYC PLUTO data shows that there are sizeable parcels of City- and State-owned land adjacent to rail yards at Maspeth and Fresh Pond. In Maspeth, four lots with direct connectivity to the rail line comprise a total of over 900,000 square feet of space (See Figure 11.). Two of the four lots are currently used for surface parking of fire department vehicles and NYCT vehicles. The largest lot (Lot C) is a two-story NYCT warehouse. These lots are directly next to a new Amazon last-mile facility that is

²¹⁹ Panero et al. (2011)

²²⁰ Regional Plan Association, “[The Triboro,](#)” (2016)

²²¹ Transload facilities are any exchange point where freight can be transferred from one mode to another.

due to begin construction. Last-mile distribution centers operated by UPS and FedEx also lie within a quarter of a mile of the rail yard.

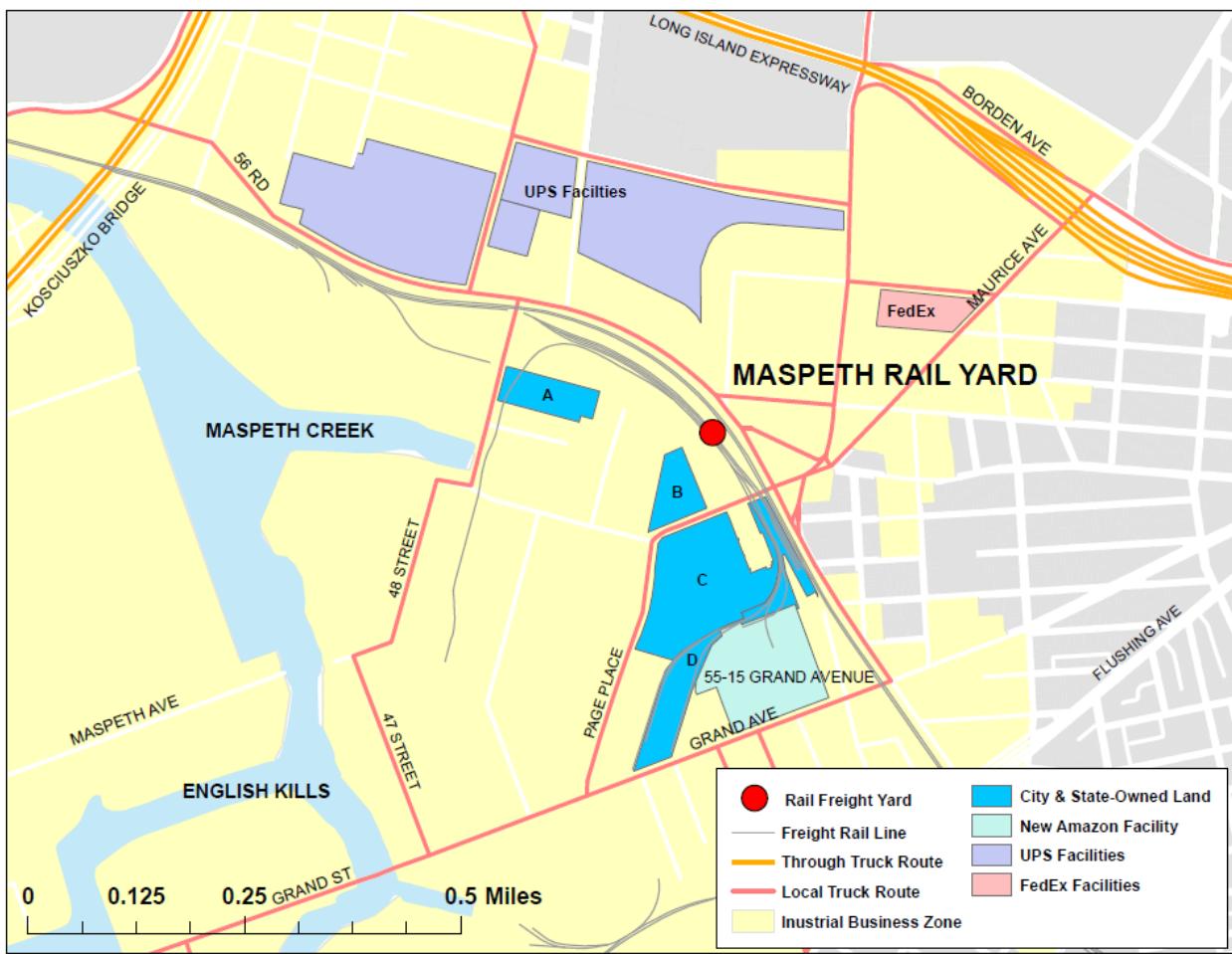


Figure 11. City- & State-Owned Land and Last-Mile Distribution Facilities adjacent to Maspeth Rail Yard. Source: NYC PLUTO

A City-driven freight management plan to leverage and grow the city's existing freight rail network to accommodate non-bulk freight goods could utilize these spaces to build transload facilities with direct rail access. This could feasibly take place via either sale of the land, or under a public-private partnership model.

Lot	Owner	Size (Acres / Sq.Ft.)	Current Use
A	NYC Department of Environmental Protection	2.83 / 123,218	FDNY Parking Lot/Maintenance
B	NYC Transit Authority	2.30 / 100,209	NYCT Parking Lot
C	NYC Transit Authority	10.32 / 449,450	NYCT Logistics Warehouse/Storeroom
D	MTA - LIRR	5.78 / 251,608	Privately-Operated Lumber Transload Facility

Figure 12. City- & State- Owned Lots and Last-Mile Distribution Facilities adjacent to Maspeth Rail Yard

These City- and State-owned sites adjacent to Maspeth rail yards are of similar size to those that are currently being developed into last-mile distribution centers in Maspeth and in other IBZs throughout the city. At Fresh Pond, the publicly-owned parcels of land adjacent to the rail yards are a park, and a lot that is abutted on three sides by housing. As a result, analysis of that site was not considered here.

Proposal Evaluation

This proposal would provide a high-capacity mechanism for facilitating inbound and intra-city movement of freight. Existing freight rail networks and maritime freight facilities provide excellent connectivity to shipping terminals in Staten Island and New Jersey, as well as to distribution facilities located in Lehigh Valley, Pennsylvania (See Appendix A. Figure A11.). The development of modern, expansive transload facilities at the Maspeth Rail Yard, in conjunction with rail upgrades at key exchange points, would eliminate a significant amount of inbound freight volume on the city's roads.

The EDC estimates that full implementation of the rail component of their Freight NYC initiative would reduce annual truck VMT on city roads by 500,000 miles. Freight rail lines in the New York metropolitan area primarily handle bulk goods including stone, sand, waste, scrap materials, food, coal, lumber, building products and fuel.²²² However, modifications to the proposed development of transload facilities in Queens and Brooklyn may permit the shipping and transloading of non-bulk durable goods, including consumer products and other retail goods. In this case, new transload facilities might feasibly become urban consolidation centers, at which e-commerce and shipping firms receive goods via train, rather than on trucks. Sorting, consolidation, and dispatch of goods for last-mile residential and commercial deliveries could conceivably be handled at such facilities. The EDC states that New York's freight rail infrastructure has "significant untapped capacity."²²³ The inclusion of non-bulk goods in this plan would drive down truck VMT, emissions and air particulate levels significantly further than EDC estimates.

²²² New York Metropolitan Transportation Council, "[Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8](#)" (2017)

²²³ Kilgannon, Corey, "[The Pizza-and-Beer Train: New York City's hidden railroad,](#)" *The New York Times*, April 7, 2019

A maritime freight network with good connectivity to key freight exchanges in Southwest Brooklyn, Hunts Point and New Jersey could also be expected to improve non-truck freight capacity in the city. The incorporation of barge capacity in Newtown Creek within a broader urban freight management plan might also reasonably increase the capacity of an upgraded freight rail line and facilities connecting New Jersey and Brooklyn. Maritime freight, as well as rail freight, provide reliability in the timing of journeys.²²⁴ Maritime freight systems can provide freight-carrying capacity in their own right. Newtown Creek has several storefront barge facilities that enable the shipping and receipt of bulk commodities by private firms and City waste management facilities.²²⁵

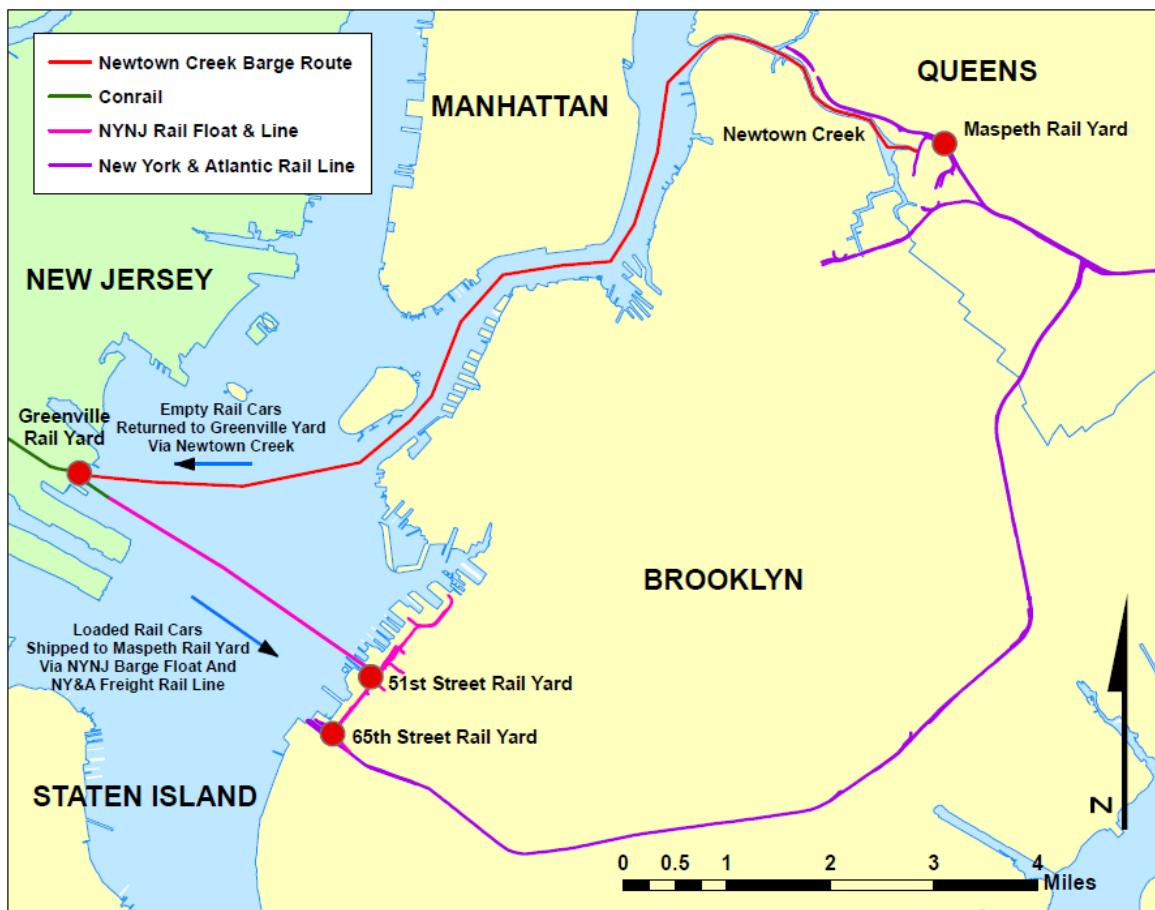


Figure 13. One-Directional Rail and Barge Freight Flows connecting New Jersey, South-West Brooklyn and Maspeth.

²²⁴ McKinnon, Alan, Michael Browne, Anthony Whiteing, and Maja Piecyk, eds. *Green logistics: Improving the environmental sustainability of logistics*, Kogan Page Publishers, 2015

²²⁵ New York Metropolitan Transportation Council, "[Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8](#)" (2017)

These barge facilities provide direct connectivity to major truck routes. Waterborne freight systems are extremely fuel efficient relative to both truck and rail systems.²²⁶ Rail and barge freight systems emit 7-10 times fewer greenhouse gases than truck freight systems emit on a ton-miles basis.²²⁷

Flow of Freight	Advantages	Costs
One-Directional	Simplifies the flow of goods; Requires only construction of a facility to load rail cars onto barge	May not result in maximum utilization of rail and maritime capacity
Bi-directional	Allows for most efficient utilization of freight line and barge route capacity	Requires construction of sophisticated waterfront logistics facility

Figure 14. Advantages and Costs of One-Directional and Bi-Directional Freight Flows passing through Maspeth and Newtown Creek.

This paper considers a scenario where Newtown Creek barge capacity serves to support a cycle of freight management that connects shipping terminals in New Jersey and Staten Island with last-mile distribution

centers in Maspeth via rail (See Figure 13.). This scenario involves a one-directional flow of freight rail cars. Rail cars that arrive in Maspeth via the NYNJ barge float and the NYA line could be returned to New Jersey via Newtown Creek. This would mean that the NYA line could be used predominantly to deliver freight to the city, since most freight rail activity is confined to overnight and off-peak periods. It would mean that Newtown Creek could become an integral part of the alternative freight supply chain, without having to build sophisticated receiver facilities right on the shoreline. Instead, the creek would be used only to ship empty rail cars back to the Greenville yard, alleviating the need to send the cars back via the NYA line. Alternatively, if it were to become feasible for a barge-to-truck transload facility to be built on the shoreline of Maspeth Creek, abutting the Maspeth Rail Yard, bi-directional flow of rail freight along both the NYA line and Newtown Creek would become possible. The practicability of the site described in Figure 11 for facilitating the loading and unloading of rail cars on barges would also depend on the dredging of Maspeth Creek inlet to a depth suitable for commercial barge operations.

Currently, a rail car barge float operated by NYA runs between Greenville Rail Yard in New Jersey and transload facilities in the Southwest Brooklyn IBZ. The yard at Greenville is connected by rail to major shipping terminals in New Jersey and on Staten Island, and to major freight hubs in the north-east, including Lehigh Valley. With the anticipated purchase of new barges, NYA expects the NYNJ barge float capacity to grow from 100 to 500 rail cars per week.²²⁸

²²⁶ Texas A&M Transportation Institute, “[A modal comparison of domestic freight transportation effects on the general public: 2001-2014.](#)” (2017)

²²⁷ ibid.

²²⁸ Kilgannon, Corey, “[The Pizza-and-Beer Train: New York City’s hidden railroad.](#)” *The New York Times*, April 7, 2019

Most of the NYA line between Southwest Brooklyn and Maspeth is for the exclusive use of freight trains. However, the majority of freight is moved along the line during off-peak and overnight periods. Most standard rail cars and flatbeds can carry between 70-100 tons of freight.²²⁹

NYA Bay Ridge Line Railcar Freight Capacity Analysis	
Railcar Capacity	70-100 tons
Railcars/Week (NYA Projection)	500
Railcars/Year	25,000
Baseline Annual Freight Volume	1.75 - 2.50 million tons
Annual Truck Trip Equivalent	100,000

Figure 15. NYA Bay Ridge Line Baseline Freight Capacity Analysis

via the George Washington Bridge, while almost 11,000 large trucks make the reverse crossing (See Appendix A. Table A2.). The NYNJ barge float is the only freight crossing on the Hudson River south of Albany. As the prospects of a Hudson River freight tunnel recede, a renewed focus by the City and the Port Authority to meaningfully upgrade multimodal transfer facilities at Port Elizabeth and Southwest Brooklyn, as well as the freight rail lines on both sides of the river, could significantly increase the capacity of this network beyond the EDC and NYA estimates.

When EDC's Freight NYC plan was announced in 2018, the City budgeted a total funding amount of \$100 million for the project.²³¹ Full implementation of the rail and maritime freight components of this plan would likely require investment that is several times the original budget amount. However, the sale of City- and State-owned land for the purpose of enacting this plan may well alleviate budget constraints. Such a plan would require extensive collaboration between private firms and the City, DOT, Departments of City Planning, Small Business Services and the EDC. It would require the construction of large last-mile UCCs within a new transload facility structure at Maspeth Rail Yard. New York City's freight lines run through and close by many of its IBZs, including those located in Southwest Brooklyn, Central Queens, East New York, Maspeth, Long Island City and in the Bronx. A rail freight program centered on Maspeth that successfully processed high volumes of non-bulk cargo while cutting truck VMT might serve as a demonstration that could then be replicated along other parts of the rail network within the city, as well as for freight destined for eastern Long Island, much of which passes through New York City on trucks.

The EDC estimates that the capacity of one rail car is equivalent to four tractor-trailer trucks.²³⁰ So under current projections, NYA may carry the equivalent of 2,000 truckloads of freight between New Jersey and the rail yards at Southwest Brooklyn each week. For context, an average of 8,000 large trucks enter New York City *each day*

²²⁹ CSX, [“Railroad Equipment”](#)

²³⁰ New York City Economic Development Corporation, [“Freight NYC.”](#) Accessed September 29, 2020

²³¹ New York City Economic Development Corporation, [Press Release](#), Published July 16, 2018

Industrial Land Use Rules

City Update of Industrial Zoning Code

This proposal is a summary of similar plans put forward by both the New York City Council²³² and the Pratt Center for Community Development.^{233,234} These plans call for the following changes to zoning rules for M-zones and IBZs, in order to better protect industrial businesses in New York City:

Overlay Industrial Employment Districts

Relax FAR restrictions in IBZs/M-zones; Eliminate Parking Requirements

City follow-through of proposal to mandate manufacturing set-aside in commercial developments within IBZs

New York City Council's report, published in 2014, depicts the threat of non-industrial uses encroaching on designated industrial land. This demand for land from both residential and commercial uses drives up land lease costs and diminishes the space available for smaller, independent businesses. It increases the risk of displacement for existing businesses and the well-paying industrial jobs they provide. It may also cause businesses looking for an urban location to turn away from New York City. Moreover, the unquantifiable warehousing of land within IBZs further imperils the ability of industrial and manufacturing businesses to find suitable space within the city. However, this report was published prior to the recent growth in demand for 'next day' and 'same day' e-commerce shipping. Reports produced by the Pratt Center for Community Development similarly highlight the likely impacts on industrial space caused by competing non-industrial uses. The lack of suitable protections for IBZ space and the conflicting aims of the City's IBZ and economic development policies lead to a scenario where long-term availability of space for true industrial and manufacturing uses is placed at risk.

²³² New York City Council, "[Engines of Opportunity: Reinvigorating New York City's Manufacturing Zones for the 21st Century](#)," Published November 2014

²³³ Friedman, Adam, Joan Byron, and Jenifer Becker, "[Making room for housing and jobs.](#)" Pratt Center for Community Development (2015)

²³⁴ Friedman, Adam, "[What makes the city run: Preserving space for critical economic activities,](#)" Pratt Center for Community Development (2016)

There has been little recognition of or attempts to quantify the anticipated effects of last-mile distribution facility development on the availability and cost of land in IBZs, and M-zones more broadly, in the outer boroughs of New York City. Last-mile fulfillment and warehouse facilities are a relatively new type of land use. While traditional market players including UPS and FedEx have operated distribution facilities in New York City for many years, the current and anticipated future development of facilities by newer market participants, including Amazon, will likely consume many multiples of the land area currently used for last-mile delivery activity. This proposal presents ideas and strategies to reformulate existing zoning rules for manufacturing districts in order to strengthen support for true industrial and manufacturing uses within the zoning code.



Southside Design and Building; a business operating at Greenpoint Manufacturing and Design Center. Source: GMDC

a) Overlay Industrial Employment Districts

The creation of Industrial Employment Districts overlaying the city's IBZ boundaries would allow for employment metrics to form a key component of assessments of non-industrial development within IBZs. The knock-on effects of space reallocation on industrial employment are often neglected in the development of as-of-right non-industrial uses. The development of self-storage and last-mile facilities, for example, will lead to jobs that are likely to pay less than existing manufacturing and other industrial jobs. Courier jobs pay less and offer less job security than typical industrial roles. The conversion of space for a higher returning non-industrial purpose signals to nearby landowners the possibility of further demand for non-industrial uses, causing a repricing of space in anticipation of a sale for commercial use. This creates uncertainty in the market for industrial space and inhibits the confidence of industrial firms who seek long-term security of location.²³⁵ It may also prompt industrial landlords to cease building maintenance and upgrades.²³⁶

b) Relax FAR restrictions in IBZs/M-districts; Eliminate Parking Requirements

Development in M-zones in New York City is subject to strict building and parking requirements. Floor-area-ratio rules prevent most forms of high-density and multi-story construction.²³⁷ Most manufacturing

²³⁵ Friedman, Adam, Joan Byron, and Jenifer Becker, "[Making room for housing and jobs.](#)" Pratt Center for Community Development (2015)

²³⁶ ibid.

²³⁷ New York City Department of City Planning, "[Manufacturing Districts: Overview](#)"

and industrial uses require the provision of one parking space for every 1,000 feet of floor area, or one space per three employees, whichever is larger.²³⁸ These onerous restrictions prevent the establishment of the small scale, purpose-built structures desired by smaller firms at the densities at which development might be financially attractive. It also prevents renovations and upgrades to increase density in older building stock that would allow for special-purpose usage by many different firms operating in a single building.²³⁹ This proposal should also include a retail variance provision that permits the opening of retail space for manufacturers who desire to market to customers on-site.

c) City follow-through of proposal to mandate manufacturing set-aside in commercial developments within IBZs

New York City Council has proposed a rule requiring the set-aside of floor area in new commercial developments that fall within M-zones.²⁴⁰ In its self-storage land use text amendments of 2017, the City requires that for most developments of self-storage facilities with a lot area of 50,000 square feet or greater, floor or cellar space constituting at least 25% of floor area must be set aside for industrial activities.²⁴¹ The City should create similar rules governing other non-industrial developments within IBZs, including last-mile distribution centers.

Proposal Evaluation

The inclusion of metrics for industrial employment impacts of non-industrial developments will crystalize and highlight the impacts of new development on the industrial job sector. The industrial sector supports jobs in low-income and minority communities throughout the city (See Appendix A; Figures A7 and A8). It is a vital job sector for neighborhoods in central and eastern Queens, south Bronx and northern Manhattan. The share of immigrants in the manufacturing workforce in New York City, while declining in recent years, is still around 50%.²⁴² IBZs were developed to preserve space for industrial uses and the jobs they provide. The addition of employment analysis in IBZ development approvals will make for a more rigorous planning process that can be leveraged to support other initiatives to preserve and increase available space for industrial uses.

²³⁸ NYC Zoning Resolution Chapter 4, [44-21](#)

²³⁹ New York City Council, [“Engines of Opportunity: Reinvigorating New York City’s Manufacturing Zones for the 21st Century.”](#) Published November 2014

²⁴⁰ New York City Council, [“Engines of Opportunity: Reinvigorating New York City’s Manufacturing Zones for the 21st Century.”](#) Published November 2014

²⁴¹ New York City Department of City Planning, [“Self-Storage Text Amendment”](#) (2017)

²⁴² Office of the New York State Comptroller, [“New York City Employment Trends”](#) (2020)

Relaxation of the FAR and parking requirements in M-zones would permit greater sharing of common structures by multiple small firms, as well as the realization of productivity and resource-sharing benefits from cohabitation. Small and artisanal industrial firms typically do not have the resources to perform a comprehensive search for suitable space. While non-profit industrial developers are able to pursue redevelopments of existing buildings with the support of City and State subsidies and tax credits,²⁴³ allowances and incentives that permit additional FAR for manufacturing and industrial uses would improve the financial viability of new developments, making industrial space investments more feasible and attractive for developers and incubators.

The mandating of industrial space set-asides in new non-industrial developments within IBZs would increase the availability of industrial space, and would allow for the creation of modern spaces for specialized uses. It would provide an opportunity for commercial property developers to work with non-profit industrial developers and incubators on the design and layout of industrial space created as set-asides within these new developments. Rather than squeezing out existing businesses and reducing the space available for potential new entrants, new large-scale developments in IBZs could instead become hubs for independent industrial and manufacturing activities. This proposal would likely work best for lighter manufacturing and low-impact industrial activities.²⁴⁴

City and private sector support for this initiative would likely depend on the agenda of New York City's next mayor. A proactive mayor who supports action to preserve and grow industrial space within the city could push for the initiatives proposed here and by the City Council in their 2014 report. Given the fast pace of new last-mile facility development occurring within IBZs, the City should move quickly to implement these rules.

²⁴³ Mohamed, Carlotta, "[New Ozone Park Industrial Center offers affordable rental space for small businesses and entrepreneurs](#)," *Qns*, January 16, 2020

²⁴⁴ Friedman, Adam, Joan Byron, and Jenifer Becker, "[Making room for housing and jobs](#)," Pratt Center for Community Development (2015)

Implementation of Special Use Permit and Environmental Review Laws for Last-Mile Distribution Facilities

Last-mile distribution facilities that are under construction, or planned for New York City today are large-scale, multi-story facilities for which there is no official public accounting of anticipated truck volumes. Similar to other relatively new land uses, there is no consideration paid to last-mile distribution facilities in existing City zoning rules, much of which remains unchanged since the last update of New York City's Zoning Resolution in 1961. This proposal involves the development of rules pertaining specifically to the approval process for last-mile distribution facilities in New York City and includes the following components:

Creation of a special use permit, administered by the City Planning Commission (CPC), for all proposed last-mile fulfillment and warehouse facility developments on lots of area greater than 25,000 square feet

Requirement to conduct an Environmental Impact Study as part of the special use permit approval

Requirement to perform analysis of potential uses of alternative freight modes at proposed last-mile distribution development sites

Requirement to perform analysis of potential stormwater and flooding impacts for proposed developments located within a flood plain or close to waterways

The proposal is limited to a special use permit under the purview of CPC due to the vast footprint of last-mile facilities already developed or under construction. A more strict and rigorous proposal, which might also mandate all of the study requirements proposed here, would be to route the development approvals via City Council's Uniform Land Use Review Procedure (ULURP), as is the case for certain self-storage warehouse developments.²⁴⁵

In the absence of enforceable environmental impact outcome standards in State-level laws, as have been enacted in New Jersey, the City should set its own environmental standards in the special use permit

²⁴⁵ New York City Department of City Planning, "[Self-Storage Special Permit IBZ](#)," (2017)

approval process for last-mile distribution facilities. These standards should cover the anticipated environmental and human health impacts of both the siting of the facility and the resulting increase in truck traffic and congestion. Similar to the City's waste equity rules and New Jersey's environmental justice laws, a test for concentration of impacts, particularly on neighborhoods with a high proportion of minority and low-income households, should form part of the analysis. As with the City's new private carting laws, tests for freight volume routing and efficiency across multiple firms should also be included in the analysis metrics. This process would include an examination of the additive impacts on route duplication, truck congestion, emission and particulate levels and noise levels for each new development. These impacts should carry significant weighting in the approval decision process. This will force recognition and measurement of expected truck traffic and its impacts. It will also ensure that the external costs of a development will be considered before it is approved, meaning that the interests of the local community, who may not have the time or resources to contribute to the process, will be suitably considered.

The permit process should require an analysis of the potential for rail and maritime freight functionality for any leases of land for the purpose of last-mile fulfillment and warehousing. For example, Amazon has recently signed lease agreements for lots in Queens at 55-15 Grand Ave, Maspeth, and at Metro Mall on Metropolitan Avenue in Middle Village. Each of these lots has a freight rail spur, and they are directly adjacent to the Maspeth and Fresh Pond rail yards, respectively. New last-mile developments at 640 Columbia Street and 280 Richards Street in Red Hook lie directly adjacent to commercial pier infrastructure with access to New York Harbor. However, there is no City plan to test the feasibility of rail or maritime freight for any of these sites at the current time.

Further, for any proposed new development located within the city's 100-year floodplain or within some threshold distance of a waterway, the permit process should require stormwater mitigation certification. Last-mile facilities tend to comprise of large building structures and parking areas. These impervious surfaces are among the largest contributors of polluted stormwater runoff that ends up in major urban waterways.²⁴⁶ New builds are an ideal



*Kingsland Flowers green roof at 520 Kingsland Ave, Brooklyn.
Source: Curbed NY*

²⁴⁶ Lemus, Judith D., Joseph Devinny, Achva Stein, Sourojit Dhar, and Fethiye Ozis, "[Stormwater mitigation for architects and developers](#)," University of Southern California Sea Grant Program (2003)

opportunity for the City to mandate the implementation of stormwater mitigation infrastructure in line with Best Management Practices. Indeed, the stormwater infrastructure implemented within the new last-mile facility at 640 Columbia Street in Red Hook comprises only underground piping,²⁴⁷ constituting the bare minimum of stormwater mitigation per New York City's guidelines.²⁴⁸ The City should also explore the development of an incentive scheme to promote green roof infrastructure for large lots within IBZs. This would improve stormwater mitigation outcomes and would also fit with the City's own climate change and carbon emission goals.

Proposal Evaluation

The wave of last-mile distribution facilities either already in existence, or soon to be developed within New York City's M-zones and IBZs threatens to blanket the city with last-mile truck and van traffic. Currently, last-mile distribution facilities are permitted in M-zones and inside IBZs as-of-right, and thus are not subject to scrutiny by City Council via the ULURP process or by the Department of City Planning. These developments, and the environmental impacts and other external costs they impose upon nearby communities, are currently not subject to any kind of review or analysis at the City level. Beyond cursory, general assessments performed by City agencies including DOT, the City has little grasp of the anticipated spatial, environmental and human health impacts of the impending development of millions of square feet of distribution centers. The expected disparate impact of new last-mile facilities has recently been raised in Red Hook.²⁴⁹



Rendering of a new last-mile facility due for development at 55-15 Grand Ave, Maspeth. The facility will be 5 stories and will comprise 1.1 million square feet of logistics space.
Source: RXR Realty



Construction of the last-mile facility at 55-15 Grand Ave, Maspeth
Author Photo

²⁴⁷ Bohler Engineering, [“Beginning with the site for last mile distribution”](#)

²⁴⁸ New York City Department of Environmental Protection, [“Guidelines for the design and construction of stormwater management systems.”](#) (2012)

²⁴⁹ Verde, Ben, [“Amazon leases Red Hook warehouse as fears of unsustainable truck traffic rise,” Brooklyn Paper,](#) November 10, 2020

A traffic evaluation performed in September 2020 by an independent engineering firm for a new, 300,000 square foot last-mile distribution facility in Lawrence, New Jersey, estimates the following truck traffic flows:²⁵⁰

Truck Type	Trip Count	Detail
Tractor-Trailer	24; 12 trips in, 12 trips out	Most trips would take place between 6:00pm - 6:00am
Delivery Vans	114; 114 out, 114 in	Depart facility after morning peak-hour, return after evening peak-hour
Other Delivery Vehicles	31; 31 out, 31 in	Evening peak-hour deliveries
Employee Vehicles	222	Report assumes all employees will drive personal vehicles to and from the facility each day

Figure 16. Anticipated Traffic Volumes for new Amazon last-mile distribution center in Lawrence, NJ. Source: Langan Engineering

This would indicate that 114 delivery vans are each on the road making deliveries for at least 10 hours a day. If this data were to be extrapolated to just the eleven last-mile distribution facilities that are listed in CBRE's 2020 industrial real estate reports, it would mean that New York City has no accounting of the

impact of at least 125 overnight tractor trailer round-trips, and a minimum of 1,200 day-long trips performed by delivery vans and other vehicles. It is likely that these estimates are conservative. Indeed, it is estimated that larger facilities within the city would facilitate up to 50 tractor-trailer trips each day,²⁵¹ and likely larger numbers of intraday van trips than for the Lawrence case. Proper accounting for these truck trip statistics is essential for quantifying the impact that these facilities will have on the health outcomes of city residents.

This proposal is also reflective of the City's ability to change zoning rules in furtherance of its decarbonization goals. The City has the capacity to examine the environmental impacts of these facilities before they are built, and also to create actionable environmental mitigation rules. If the City were to mandate exploration of rail and maritime freight functionality for sites that lie adjacent to these networks, this would be a powerful lever in encouraging the development of sustainable modes of freight. While on its own this might cause property developers to shy away from sites that would fall under this rule, a complementary incentive or tax credit scheme could be devised to encourage participation. City expenditure and involvement in this type of plan would constitute meaningful action in meeting its decarbonization targets. It would also likely be a 'primer' that could spur uptake of sustainable freight modes by the private sector.

²⁵⁰ Langan Engineering and Environmental Services, "[Traffic Evaluation](#)"

²⁵¹ Parrott, Max, "[New Staten Island Amazon facility could exacerbate truck traffic.](#)" *City & State New York*, September 28, 2018

Similarly, the construction of a multitude of state-of-the-art logistics facilities presents the City with an opportunity to mandate the inclusion of sustainable stormwater drainage systems within these developments. New York City's stormwater guidelines specifically highlight structures with flat roofs, where the roof covers a large proportion of the total impervious area of the structure, as ideal for the siting of green roofs.²⁵² The roofing and outside areas of these large lots present a blank canvas that the City could target with a green roof infrastructure rule and incentive framework.



Rendering of a new multi-story last-mile distribution facility at 640 Columbia Street, Red Hook. Source: JLL

The environmental, human health and congestion impacts of the vast proliferation of last-mile distribution centers have not been rigorously studied. There has been no attempt by the City to quantify these impacts, or to implement methods for their mitigation. These new developments present an opportunity for the City to assess these unreported external impacts and to strengthen its emissions reduction credentials by implementing forceful initiatives like those discussed above, to both encourage sustainable freight modes, and to add green infrastructure to last-mile facilities. Above all, any new rules developed under this proposal must result in enforceable actions for last-mile logistics facilities, rather than becoming a procedural step masquerading as zoning policy.

²⁵² New York City Department of Environmental Protection, "[Guidelines for the design and construction of stormwater management systems,](#)" (2012)

Recommendations

The following table presents recommendations in priority order and includes the rankings of each policy option against the evaluative criteria:

Recommendation Rankings and Assessment

Policy Goal	Policy Option	Priority	Effectiveness	Equity	Feasibility
Reduce Truck VMT	Road & Curb Pricing, Commercial Loading Zones	1	HIGH	MEDIUM	HIGH
	Uptake of Marine and Rail Freight Initiatives	2	HIGH	HIGH	MEDIUM
	Cargo Bike Framework	3	MEDIUM	HIGH	HIGH
	Urban Consolidation Centers	4	LOW	HIGH	LOW
Improve Industrial Land Use Rules	Update Industrial Zoning Code	1	HIGH	MEDIUM	HIGH
	Special Use Permit, Environmental Review Rules for Last-Mile Distribution Centers	2	MEDIUM	HIGH	MEDIUM

Conclusion

The growth and evolution of e-commerce retail in the United States is driving the expansion of last-mile distribution facilities in urban areas. Demand for ‘next day’ and ‘same day’ shipping, as well as the transportation cost reductions that can be achieved by locating closer to the customer market, are prompting e-commerce and shipping firms to seek out scarce inner-city space in which to operate. In New York City, last-mile facilities currently operating or soon to begin development comprise millions of square feet of space within the city’s IBZs. Permitted as-of-right with no City oversight of their siting, these facilities are expected to generate thousands of tractor-trailer and van trips on local roads each day. Neighborhoods in close proximity to these facilities, which tend to be made up of lower-income households and communities of color, will bear the brunt of this surge in truck traffic. Last-mile delivery routing tends to ignore the external costs associated with traffic congestion and truck emissions. Further, the space within industrial areas that will be dedicated to last-mile logistics activities will be removed from the stock of land available for industrial and manufacturing uses. Already under pressure from other competing uses, the cost and scarcity of space within the city’s IBZs is expected to increase markedly as lots are developed into state-of-the-art multi-story last-mile facilities. New York City’s zoning policies do not offer strong protections for the independent industrial and manufacturing businesses who operate in

the outer boroughs and the specialized jobs they provide for working-class communities. The city is at risk of becoming overwhelmed with last-mile trucking activities and congestion.

This PDR presents a range of strategies and policy options that the City can pursue to mitigate the external costs of last-mile distribution facilities and trucking activity around Newtown Creek and other industrial zones throughout New York City. While each could be enacted on its own, it is intended that these alternatives form a comprehensive framework for incorporating the external costs associated with last-mile delivery systems into the City's planning agenda. E-commerce retailers and shipping firms optimize their delivery networks in order to minimize delivery time and cost. This is achieved by minimizing the human or manual interventions required to transport goods to the end consumer. Without pricing external costs effectively, trucks and vans are the cheapest way of moving goods in an urban environment. The pricing of road usage and curb space is essential for alternative forms of freight to become viable. Large-scale uptake of cargo bikes, and significant investment in rail and maritime freight infrastructure, will likely only occur with the implementation of an emissions-focused road and curb usage pricing scheme that is targeted towards New York City's climate change goals. Similarly, the environmental and efficiency benefits of rail and maritime freight systems are enhanced when combined with other initiatives, including the use of UCCs and low-emission vans, trucks and cargo bikes.

The initiatives proposed in this paper to alter land use rules for Industrial Business Zones address two distinct issues related to the as-of-right development of last-mile distribution facilities. The implementation of an Industrial Employment District overlay would lead to more rigorous analysis of the impacts of non-industrial activities on employment outcomes in IBZs. The relaxation of M-zone building design restrictions will make it more feasible for commercial and not-for-profit developers and industrial incubators to construct buildings and create flexible workspaces for true industrial uses. These initiatives will assist smaller, independent industrial firms in particular, whose activities do not require heavy machinery and ground-level loading facilities. A special use permit for last-mile distribution facility developments within the city will create a system of accounting for the environmental, spatial and human health impacts of delivery activity generated by these facilities. However, given the existing rate of development of last-mile facilities within IBZs throughout the city, this proposal will only be impactful if it is enacted soon. A period of two years elapsed between the City's proposal of a special use permit for self-storage warehouse developments, and its enactment. A special use permit for last-mile facilities would likely need to be developed within a similar time frame in order to be effective. Successful implementation of the initiatives discussed in this PDR will depend in part on the prioritization of environmental justice, climate change action, human health outcomes and industrial zoning policy by the next New York City mayoral administration.

Appendix A

Appendix A contains data tables, maps, and other data relevant to the issue background and discussions presented in the body of the PDR.

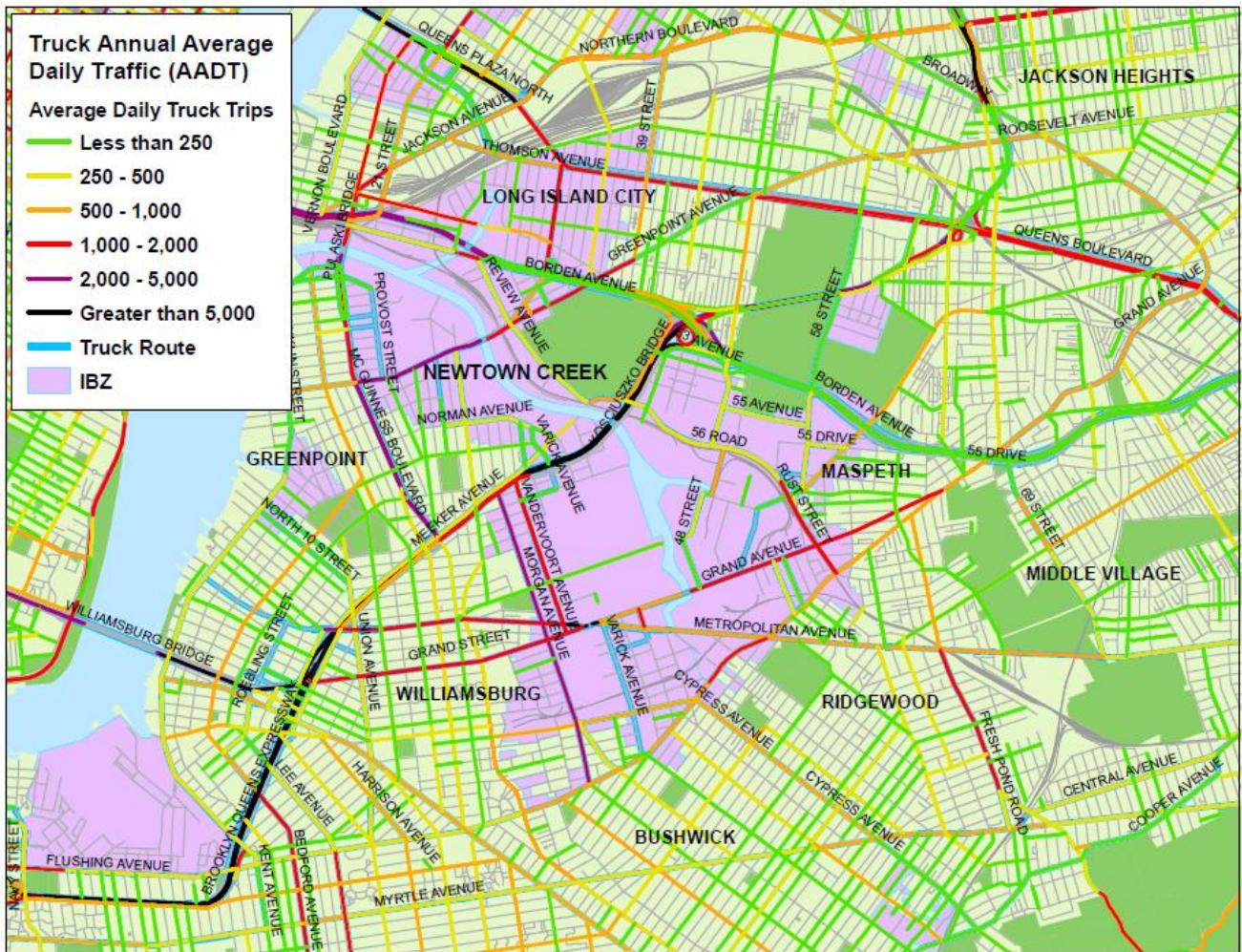


Figure A1. Truck Annual Average Traffic (AADT) around Newtown Creek. Source: [NYS Traffic Data Viewer](#)

		Eastbound (leaving Manhattan)			Westbound (entering Manhattan)		
		Commercial Vans, Pickup Trucks, Police, Fleet Vehicles	Single-Unit Trucks	Multi-Unit Trucks	Commercial Vans, Pickup Trucks, Police, Fleet Vehicles	Single-Unit Trucks	Multi-Unit Trucks
East River Bridges							
Ed Koch Queensboro Bridge	6,082	2,219	678	8,119	2,866	818	
Manhattan Bridge	4,495	1,831	626	5,948	2,827	984	
Williamsburg Bridge	3,999	2,326	104	4,222	2,250	211	
		Eastbound (entering Queens)			Westbound (entering Brooklyn)		
		Commercial Vans, Pickup Trucks, Police, Fleet Vehicles	Single-Unit Trucks	Multi-Unit Trucks	Commercial Vans, Pickup Trucks, Police, Fleet Vehicles	Single-Unit Trucks	Multi-Unit Trucks
Brooklyn-Queens Bridges							
Greenpoint Avenue Bridge	2,054	1,942	522	1,707	1,684	415	
Kosciusko Bridge	8,856	5,676	3,887	7,464	5,836	2,708	
Pulaski Bridge	2,035	1,315	164	1,693	1,178	264	
		Entering Manhattan			Leaving Manhattan		
		Commuter Vans, Commercial Vans, Pickup Trucks, Large SUVs	Single-Unit Trucks	Tractor-Trailers	Commuter Vans, Commercial Vans, Pickup Trucks, Large SUVs	Single-Unit Trucks	Tractor-Trailers
MTA B&T Manhattan Facilities							
Hugh L. Carey Tunnel	187	418	7	162	319	3	
Queens-Midtown Tunnel	796	1,110	6	830	987	2	
		Commercial Vans, Pickup Trucks, Police, Fleet Vehicles	Single-Unit Trucks	Multi-Unit Trucks	Commercial Vans, Pickup Trucks, Police, Fleet Vehicles	Single-Unit Trucks	Multi-Unit Trucks
RFK Memorial Bridge - Manhattan Plaza	2,645	2,189	1,375	2,252	2,688	736	
		Entering Bronx			Entering Queens		
RFK Memorial Bridge - Bronx Plaza	1,918	1,635	1,047	2,377	3,015	866	
		Entering Manhattan			Leaving Manhattan		
		Small Trucks	Large Trucks		Small Trucks	Large Trucks	
PANYNJ Facilities							
George Washington Bridge	5,033	7,990		6,276	10,893		
Holland Tunnel	1,535	19		2,139	2		
Lincoln Tunnel	3,142	673		3,796	912		
		Entering Brooklyn			Entering Staten Island		
		Commercial Vans, Pickup Trucks, Police, Fleet Vehicles	Single-Unit Trucks	Multi-Unit Trucks	Commercial Vans, Pickup Trucks, Police, Fleet Vehicles	Single-Unit Trucks	Multi-Unit Trucks
Select MTA B&T Outer-Borough Bridges							
Verrazano-Narrows Bridge	2,838	3,176	4,196	2,196	2,967	2,313	
		Entering Staten Island			Entering New Jersey		
		Small Trucks	Large Trucks		Small Trucks	Large Trucks	
PANYNJ Staten Island Bridges							
Bayonne Bridge	166	133		139	62		
Goethals Bridge	1,907	2,381		2,375	1,794		

Figure A2. Daily Truck & Van Crossings at Select Bridges and Tunnels in the New York City area. Source: [NYC DOT](#)

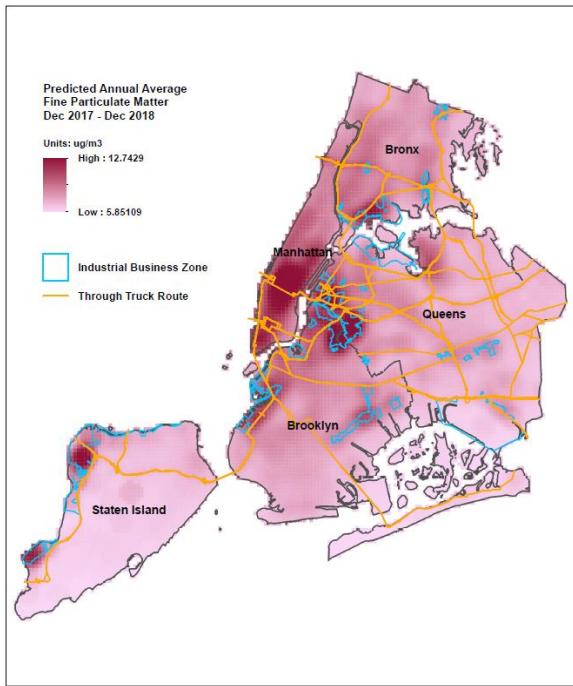


Figure A3. Predicted Annual Average Fine Particulate Matter in New York City (ug/m³). Source: NYCCAS Air Pollution Rasters

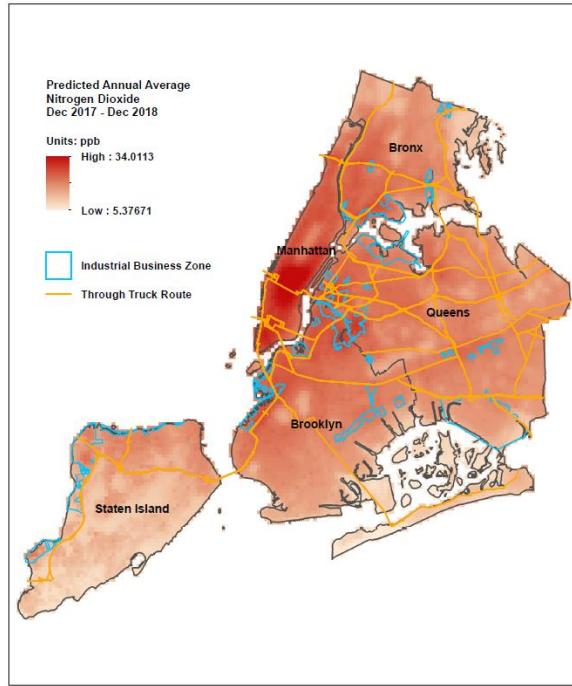


Figure A4. Predicted Annual Average Nitrogen-Dioxide Levels in New York City (ppb). Source: NYCCAS Air Pollution Rasters

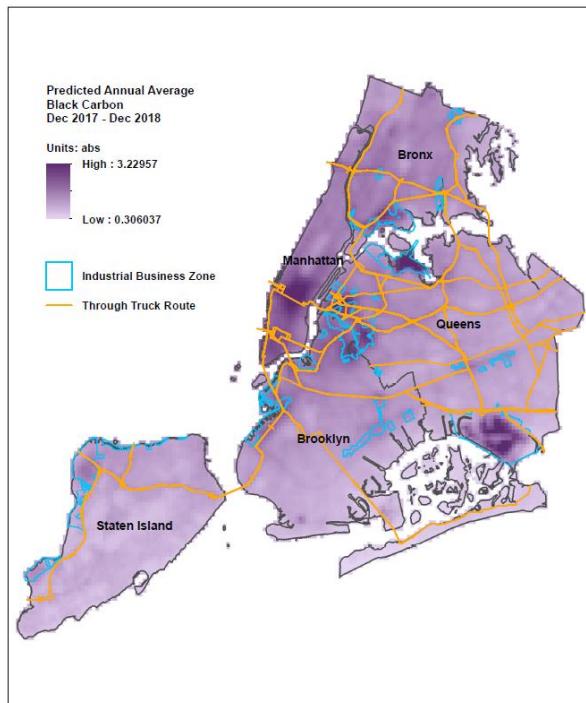
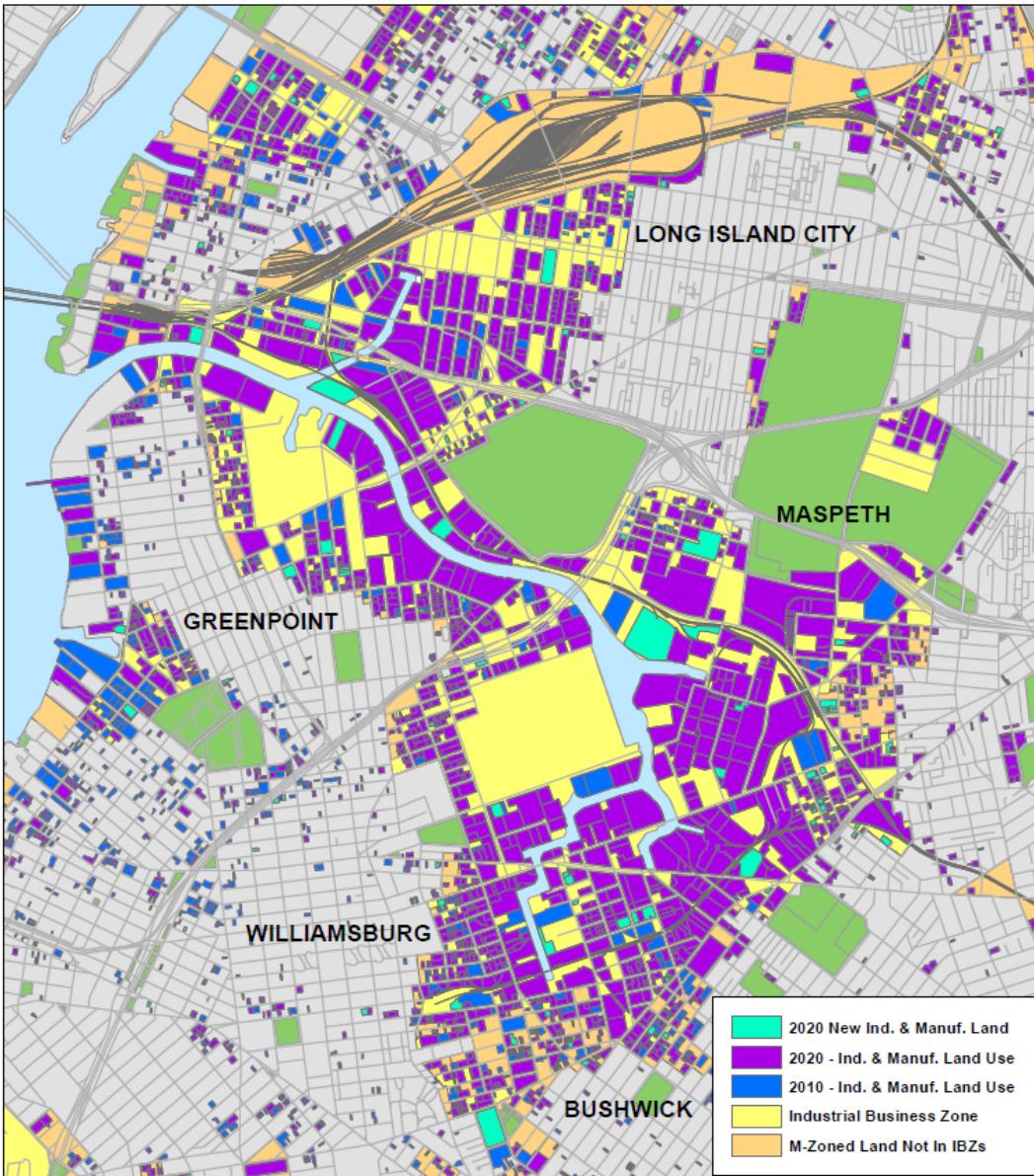


Figure A5. Predicted Annual Average Black Carbon Levels in New York City (abs). Source: NYCCAS Air Pollution Rasters

Source Link: [NYC OpenData](#)



*Figure A6. Changes in Land Use - Industrial and Manufacturing Uses (Land Use Code: 06)
2010 - 2020 in North Brooklyn and Southwest Queens. Source: [NYC PLUTO](#)*

Lot Color	Definition
Teal	Lot currently designated as Ind. & Manuf. Land Use, was not designated as Ind. and Manuf. Land Use in 2010
Blue	Land designated as Ind. & Manuf. Land Use in 2010, not currently designated as Ind. & Manuf. Land Use
Purple	Land designated as Ind. & Manuf. Land Use both in 2010 and 2020

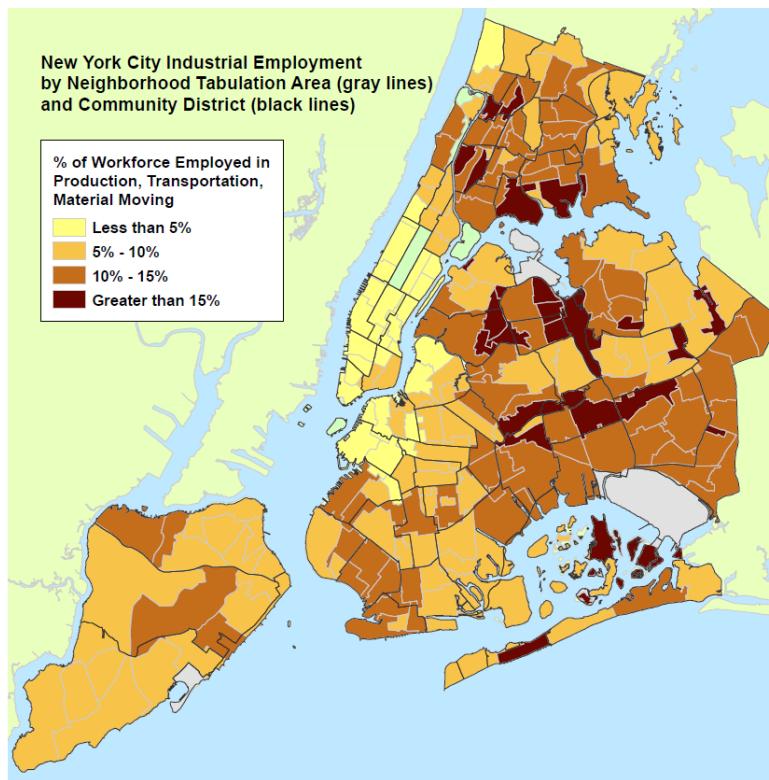


Figure A7. Percentage of NYC Workforce Employed in Production, Transportation, Material Moving by Neighborhood Tabulation Area. Source: [ACS by NTA 2014-2018](#)

Borough	Neighborhood Tabulation Area	Production, Transportation, Material Moving Workforce (No. of Workers)
Queens	Jackson Heights	7,245
Queens	Elmhurst	5,809
Manhattan	Washington Heights South	5,798
Brooklyn	Flatbush	5,691
Queens	South Ozone Park	5,599
Queens	Richmond Hill	5,151
Brooklyn	East New York	5,075
Brooklyn	Bensonhurst West	5,012
Queens	Ridgewood	4,999
Brooklyn	Canarsie	4,618
Queens	Corona	4,423
Queens	North Corona	4,395
Brooklyn	Sunset Park East	4,361
Queens	Jamaica	4,357
Queens	Hunters Point-Sunnyside-West Maspeth	4,265
Brooklyn	Crown Heights North	4,225
Queens	Woodhaven	4,217
Queens	Woodside	4,193
Bronx	East Concourse-Concourse Village	4,078
Bronx	Bedford Park-Fordham North	3,989
Brooklyn	Bensonhurst East	3,840
Brooklyn	Sunset Park West	3,747
Manhattan	Washington Heights North	3,711
Brooklyn	Cypress Hills-City Line	3,678
Brooklyn	Bushwick North	3,630
Queens	Flushing	3,585
Queens	Queens Village	3,580
Bronx	Williamsbridge-Olinville	3,426
Manhattan	Central Harlem North-Polo Grounds	3,423

*Figure A8. Industrial Employment Count (Production, Transportation, Material Moving)
Top 30 New York City Neighborhoods. Source: [ACS by NTA 2014-2018](#)*

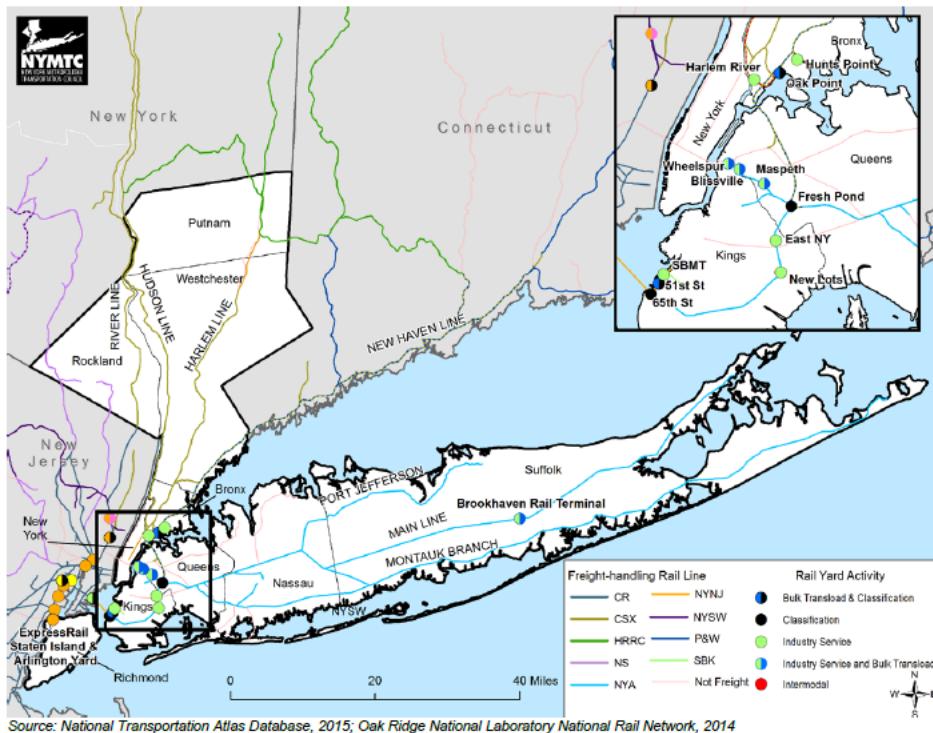


Figure A9. Freight Rail Yards in the New York metropolitan area.

Source: [Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8](#)

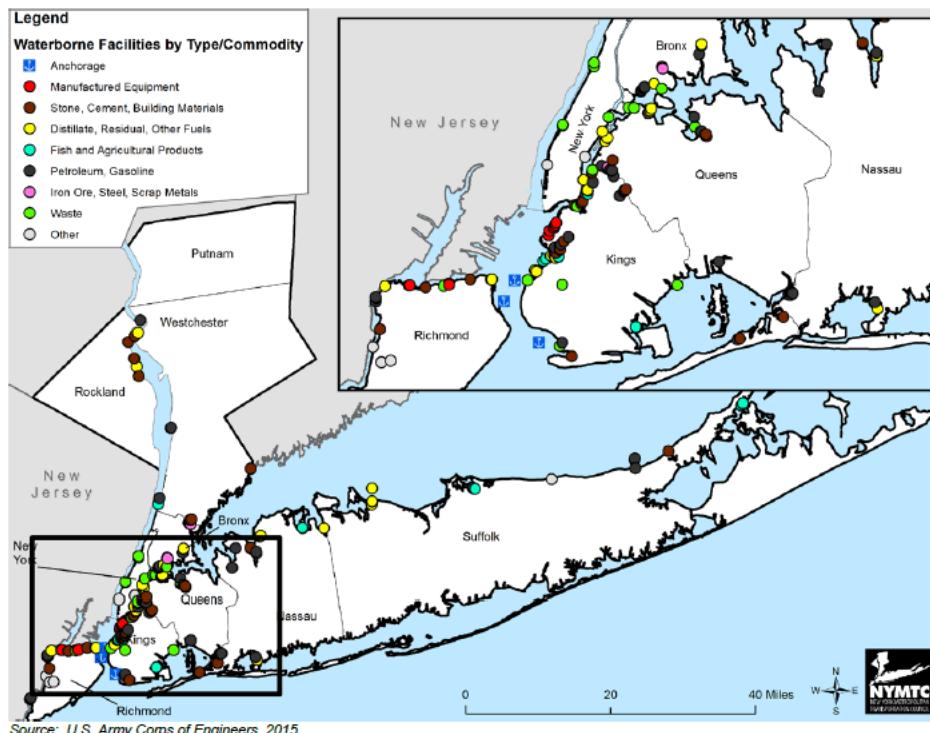


Figure A10. Commercial Barge Facilities in the New York metropolitan area.

Source: [Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8](#)



Figure A11. New York and New Jersey area freight rail lines.

Source: [New York-New Jersey Rail](#)

Appendix B

Appendix B contains descriptions of urban consolidation centers (UCCs), discussed proposed in the body of the PDR.

Urban Consolidation Centers

An urban consolidation center (UCC) is a consolidated logistics facility where multiple delivery firms share logistics space. Within these facilities, firms participate in a consolidation process that results in higher load factors on delivery vehicles, and allows for more efficient bundling of freight by delivery location. These hubs may be developed on the outskirts of a metropolitan area, or within the urban environment. The central aim of a UCC is to improve the load factor on delivery vehicles, in order to reduce the number of trips required to make a given number of deliveries.²⁵³ An urban micro-consolidation center is a type of UCC that facilitates sustainable delivery modes for the final leg of the delivery journey.²⁵⁴ These modes include light electric-powered vans, and cargo bikes. While larger scale UCCs that perform consolidation onto smaller vans and trucks can reasonably locate either inside or on the outskirts of cities, facilities that rely on sustainable and human-powered vehicles for final delivery typically need to be located close to the customer market.²⁵⁵ For larger UCCs, proximity to a major highway with connectivity to an urban center is more important than being physically located within the city.²⁵⁶ Overall, however, the higher land and labor costs associated with siting a UCC within cities are more than offset by the reduction in transportation costs achieved by reducing delivery trip length and time.²⁵⁷

Productive use of UCCs can result in fewer last-mile trips and reduced delivery route duplication. More efficient, multi-leg delivery journeys in turn lead to reductions in carbon emissions and other air pollutants, and less time spent idling at curbs.²⁵⁸ These facilities can offer shorter restocking lead times, and can be deployed as parcel pick-up points. However, the business case for UCCs is uncertain. The idea

²⁵³ Allen, Julian, Michael Browne, Allan Woodburn, and Jacques Leonardi, "A review of urban consolidation centres in the supply chain based on a case study approach," In *Supply Chain Forum: an international journal*, vol. 15 (4) pp. 100-112. Taylor & Francis, 2014

²⁵⁴ Arrieta-Prieto, Mario, Abdelrahman Ismael, Carlos Rivera-Gonzalez, and John Mitchell. "Location of Urban Micro-consolidation Centers to Reduce Social Cost of Last-Mile Deliveries of Cargo: a Heuristic Approach."

²⁵⁵ ibid.

²⁵⁶ Holl, Adelheid, and Ilaria Mariotti. "The geography of logistics firm location: the role of accessibility." *Networks and Spatial Economics* 18, no. 2 (2018): 337-361.

²⁵⁷ Bimschleger, Curt, and Ketul Patel, "[Urban fulfillment centers: helping to deliver on the expectation of same-day delivery.](#)" Deloitte (2019)

²⁵⁸ Allen, Julian, Michael Browne, Allan Woodburn, and Jacques Leonardi, "A review of urban consolidation centres in the supply chain based on a case study approach," In *Supply Chain Forum: an international journal*, vol. 15 (4) pp. 100-112. Taylor & Francis, 2014

of UCCs forming part of a last-mile delivery framework requires acknowledgement of the external costs of urban freight systems.²⁵⁹ There is a high degree of commonality in UCC frameworks in existence today. Most UCC developments require public financial assistance, either in the form of subsidies, or via a public-private partnership model or a full public ownership model.²⁶⁰ Clashes among competing firms regarding management of the UCC, and sharing of space and information, present a significant risk to the overall success of a shared freight consolidation venture.²⁶¹ The sharing of start-up costs and legal responsibility for goods in transit also present a barrier to UCC participation by private firms.²⁶² However, UCCs have been implemented successfully with public assistance in London,²⁶³ Paris,²⁶⁴ the Netherlands,²⁶⁵ and elsewhere in Europe²⁶⁶ and Asia.

²⁵⁹ Björklund, Maria, and Henrik Johansson, “Urban consolidation centre—a literature review, categorisation, and a future research agenda,” *International Journal of Physical Distribution & Logistics Management* (2018)

²⁶⁰ Panero, Marta, and Hyeyon-Shic Shin, and Daniel Polo Lopez [“Urban distribution centers: A means to reducing vehicle miles traveled.”](#) NYU Rudin Center for Transportation Policy and Management (2011)

²⁶¹ Cleophas, Catherine, Caitlin Cottrill, Jan Fabian Ehmke, and Kevin Tierney, “Collaborative urban transportation: Recent advances in theory and practice,” *European Journal of Operational Research* 273 (3) (2019): 801-816

²⁶² Allen, Julian, Michael Browne, Allan Woodburn, and Jacques Leonardi, “A review of urban consolidation centres in the supply chain based on a case study approach,” In *Supply Chain Forum: an international journal*, vol. 15 (4) pp. 100-112. Taylor & Francis, 2014

²⁶³ *ibid.*

²⁶⁴ Conway, Alison, Pierre-Emmanuel Fatisson, Penny Eickemeyer, Jialei Cheng, and Diniece Peters, “Urban micro-consolidation and last mile goods delivery by freight-tricycle in Manhattan: Opportunities and challenges,” In *Transportation Research Board 91st Annual Meeting* (2012)

²⁶⁵ Goederenhub, [Home Page](#)

²⁶⁶ Panero, Marta, and Hyeyon-Shic Shin, and Daniel Polo Lopez [“Urban distribution centers: A means to reducing vehicle miles traveled.”](#) NYU Rudin Center for Transportation Policy and Management (2011)

Appendix C: Bibliography

Allen, Julian, Maja Piecyk, Marzena Piotrowska, Fraser McLeod, Thomas Cherrett, Karen Ghali, Thuba Nguyen et al. "Understanding the impact of e-commerce on last-mile light goods vehicle activity in urban areas: The case of London," *Transportation Research Part D: Transport and Environment* 61 (2018): 325-338

Allen, Julian, Michael Browne, Allan Woodburn, and Jacques Leonardi, "A review of urban consolidation centres in the supply chain based on a case study approach," In *Supply Chain Forum: an international journal*, vol. 15 (4) pp. 100-112. Taylor & Francis, 2014

American Transportation Research Institute, "[Cost of congestion to the trucking industry: 2018 update,](#)" (2018)

Arrieta-Prieto, Mario, Abdelrahman Ismael, Carlos Rivera-Gonzalez, and John Mitchell. "Location of Urban Micro-consolidation Centers to Reduce Social Cost of Last-Mile Deliveries of Cargo: a Heuristic Approach."

Baghestani, Amirhossein, Mohammad Tayarani, Mahdieh Allahviranloo, and H. Oliver Gao, "Evaluating the Traffic and Emissions Impacts of Congestion Pricing in New York City," *Sustainability* 12 (9) (2020): 3655

Barone, Richard, and Emily Roach, "[Why good movement matters: Strategies for moving goods in metropolitan areas,](#)" Regional Plan Association (2016)

Biden for President, "[The Biden plan to secure environmental justice and equitable economic opportunity,](#)" Accessed November 21, 2020

Bimschleger, Curt, and Ketul Patel, "[Urban fulfillment centers: helping to deliver on the expectation of same-day delivery,](#)" Deloitte (2019)

Björklund, Maria, and Henrik Johansson, "Urban consolidation centre—a literature review, categorisation, and a future research agenda," *International Journal of Physical Distribution & Logistics Management* (2018)

Bockmann, Rich, "[Buy a Warehouse. Lease it to Amazon. Triple your money,](#)" *The Real Deal*, May 10, 2019

Bohler Engineering, "[Beginning with the site for last mile distribution](#)"

Bowles, Jonathan, "[The Big Squeeze,](#)" Center for an Urban Future (1999)

CBRE, "[Marketview New York City Industrial Q2 2020,](#)" (2020)

Chapple, Karen, “[Industrial land and jobs study for the San Francisco and Bay Area](#),” University of California Transportation Center (2017)

Chapple, Karen, “The highest and best use? Urban industrial land and job creation,” *Economic Development Quarterly* 28 (4) (2014): 300-313

City of Baltimore, “[Maritime industrial zoning overlay district: summary and evaluation](#),” Published 2010, Accessed November 20, 2020

City of Boston, “[Newmarket industrial-commercial neighborhood district](#),” Published January 22, 2014, Accessed November 20, 2020

City of Minneapolis, “[Minneapolis 2040](#),” Accessed November 20, 2020

City of New York, “[Building Zone Resolution \(1916\)](#),” Accessed November 12, 2020

City of New York, “[Zoning Maps and Resolution \(1961\)](#),” Accessed November 12, 2020

City of New York, Office of the Mayor, “[Protecting and growing New York City’s industrial job base](#),” Published January 2005

City of New York, [Press Release](#), Published August 16, 2018, Accessed October 11, 2020

City of New York, [Press Release](#), Published December 9, 2020, Accessed October 23, 2020

City of Portland, “[Employment and industrial zones](#),” Published August 10, 2020, Accessed November 17, 2020

City of Seattle Department of Planning and Development, “[Industrial lands survey: investigation of comparable cities](#)” (2007)

Cleophas, Catherine, Caitlin Cottrill, Jan Fabian Ehmke, and Kevin Tierney, “Collaborative urban transportation: Recent advances in theory and practice,” *European Journal of Operational Research* 273 (3) (2019): 801-816

Colon, Dave, “[Manhattan panel kills proposed cargo bike corral to save five parking spots](#),” *Streetsblog*, October 22, 2020

Colon, Dave, and Gersh Kuntzman, “[Analysis: New city cargo bike delivery program is absolutely perfect except...,](#)” *Streetsblog*, December 5, 2019

Conway, Alison, and C. Michael Walton, “Policy options for truck user charging,” *Transportation research record* 2115, (1) (2009): 75-83

Conway, Alison, and Camille Kamga, [“Freight tricycle operations in New York City.”](#) City College of the City University of New York (2014)

Conway, Alison, Jialei Cheng, Camille Kamga, and Dan Wan, “Cargo cycles for local delivery in New York City: Performance and impacts,” *Research in transportation business & management* 24 (2017): 90-100

Conway, Alison, Pierre-Emmanuel Fatisson, Penny Eickemeyer, Jialei Cheng, and Diniece Peters, “Urban micro-consolidation and last mile goods delivery by freight-tricycle in Manhattan: Opportunities and challenges,” In *Transportation Research Board 91st Annual Meeting* (2012)

Corkery, Michael, and Sapna Maheshwari, [“As customers move online, so does the holiday shopping season.”](#) *The New York Times*, November 23, 2020

CSX, [“Railroad Equipment”](#)

Davis, Jenna, “NYC’s Industrial Business Zone program: Examining the intersection between economic development and land use policy,’ American Planning Association (2018)

Dempwolf, C. Scott, “An evaluation of recent industrial land use studies: Do theory and history make better practice,” *Unpublished paper* (2010)

Dineen, J.K., [“Offices intruding on SF space zoned for industrial use.”](#) *San Francisco Chronicle*, March 14, 2016

Domonoske, Camila, [“City dwellers don’t like the idea of congestion pricing - but they get over it.”](#) *NPR*, May 7, 2019

European Union Charging, [Low Emission Zones, other Access Regulation Schemes](#)

Evitar, Daphne, [“The Ooze.”](#) *New York Magazine*, Published June 1, 2007

Friedman, Adam, “Transforming the city’s manufacturing landscape,” *From disaster to diversity: What’s next for New York City’s economy* (2009): 21-37

Friedman, Adam, [“What makes the city run: Preserving space for critical economic activities.”](#) Pratt Center for Community Development (2016)

Friedman, Adam, Joan Byron, and Jenifer Becker, [“Making room for housing and jobs.”](#) Pratt Center for Community Development (2015)

Garcia Conde, Ed, [“Coming soon to the Bronx: New York City’s largest last-mile warehouse.”](#) *Welcome2TheBronx*, February 25, 2020

Garcia Conde, Ed, [“Watch how the Whitestone movie theater will be transformed into a modern, futuristic warehouse,”](#) *Welcome2TheBronx*, February 6, 2019

Goederenhub, [Home Page](#)

Greene, Leonard, [“City pumps breaks on controversial parking program.”](#) *New York Daily News*, August 15, 2019

Grodach, Carl, and Chris Gibson, “Advancing manufacturing?: Blinkered visions in U.S. and Australian urban policy,” *Urban Policy and Research* 37 (3) (2019): 279-293

Grodach, Carl, Justin O'Connor, and Chris Gibson, “Manufacturing and cultural production: Towards a progressive policy agenda for the cultural economy,” *City, culture and society* 10 (2017): 17-25

Harvard Environmental and Energy Law Program, [“Regulatory Rollback Tracker.”](#) Accessed November 17, 2020

HDR, Inc., [“Wheelspur Multimodal Facility and Freight Yard.”](#) Accessed November 17, 2020

Holguín-Veras, José, Cara Wang, and Jeffrey Wojtowicz, [“Off-hour delivery trusted vendor program.”](#) Rensselaer Polytechnic Institute (2019)

Holguín-Veras, José, Johanna Amaya, Trilce Encarnacion, Sofia Kyle, and Jeffrey Wojtowicz, [“Impacts of freight parking policies in urban areas: the case of New York City.”](#) Rensselaer Polytechnic Institute (2016)

Holguín-Veras, Jose, Kaan Ozbay, Alain Kornhauser, Anthony Shorris, and Satish Ukkusuri, “Integrative freight demand management in the New York City metropolitan area,” (2010)

Holl, Adelheid, and Ilaria Mariotti. "The geography of logistics firm location: the role of accessibility." *Networks and Spatial Economics* 18, no. 2 (2018): 337-361.

Jaller, Miguel, and Anmol Pahwa, [“Analytical Modeling Framework to Assess the Economic and Environmental Impacts of Residential Deliveries, and Evaluate Sustainable Last-Mile Strategies.”](#) UC Davis, (2020)

Jaller, Miguel, José Holguín-Veras, and Stacey Darville Hodge. “Parking in the city: Challenges for freight traffic.” *Transportation research record* 2379 (1) (2013): 46-56

JLL, [“640 Columbia Street”](#)

Jones, Christopher et al., [“Congestion pricing in NYC: getting it right.”](#) Regional Plan Association (2019)

Jordahl, Haley, "Zoning for industry in a post-industrial era: the legacy and potential of Chicago's Downtown Planned Manufacturing Districts," *Master's Thesis* (2016)

Kamga, Camille, Alison Conway, Nadia Aslam, and Penny Eickemeyer, "[A conference on last mile freight delivery: Use of cleaner mobility vehicles.](#)" University Transportation Research Center (2014)

Kheirbek, Iyad, Jay Haney, Sharon Douglas, Kazuhiko Ito, and Thomas Matte, "The contribution of motor vehicle emissions to ambient fine particulate matter public health impacts in New York City: a health burden assessment," *Environmental Health* 15 (1) (2016): 89

Kheirbek, Iyad, Sarah Johnson, Zev Ross, Grant Pezeshki, Kazuhiko Ito, Holger Eisl, and Thomas Matte, "Spatial variability in levels of benzene, formaldehyde, and total benzene, toluene, ethylbenzene and xylenes in New York City: a land-use regression study," *Environmental Health* 11 (1) (2012): 51

Kilgannon, Corey, "[The Pizza-and-Beer Train: New York City's hidden railroad.](#)" *The New York Times*, April 7, 2019

Kuntzman, Gersh, "[DOT: We are not backing down on neighborhood loading zones.](#)" *Streetsblog*, August 22, 2019

Langan Engineering and Environmental Services, "[Traffic Evaluation](#)"

Lee & Associates, "[Q3 2018 Market Reports,](#)" (2018)

Lemus, Judith D., Joseph Devinny, Achva Stein, Sourojit Dhar, and Fethiye Ozis, "[Stormwater mitigation for architects and developers.](#)" University of Southern California Sea Grant Program (2003)

Lenz, Barbara, and Ernst Riehle, "Bikes for urban freight? Experience in Europe," *Transportation Research Record* 2379 (1) (2013): 39-45

Levinson, Herbert S., and Erica Levine Powers, "[Freight trip generation and land use handbook.](#)" Rensselaer Polytechnic Institute (2012)

Matsuda, Akiko, "[Amazon inks major warehouse deal in East New York.](#)" *The Real Deal*, November 18, 2020

Matte, Thomas D., Zev Ross, Iyad Kheirbek, Holger Eisl, Sarah Johnson, John E. Gorczynski, Daniel Kass, Steven Markowitz, Grant Pezeshki, and Jane E. Clougherty, "Monitoring intraurban spatial patterns of multiple combustion air pollutants in New York City: design and implementation," *Journal of exposure science & environmental epidemiology* 23 (3) (2013): 223-231.

McKinnon, Alan, Michael Browne, Anthony Whiteing, and Maja Piecyk, eds. *Green logistics: Improving the environmental sustainability of logistics*, Kogan Page Publishers, 2015

McLeod, F. N., T. J. Cherrett, Tolga Bektas, Julian Allen, Antonio Martinez-Sykora, Carlos Lamas-Fernandez, Oliver Bates et al., “Quantifying environmental and financial benefits of using porters and cycle couriers for last-mile parcel delivery,” *Transportation Research Part D: Transport and Environment* 82 (2020): 102311

Mohamed, Carlotta, [“New Ozone Park Industrial Center offers affordable rental space for small businesses and entrepreneurs,”](#) *Qns*, January 16, 2020

New York City Council, [“Engines of Opportunity: Reinvigorating New York City’s Manufacturing Zones for the 21st Century,”](#) Published November 2014

New York City Department of City Planning, [“Manufacturing Districts: Overview”](#)

New York City Department of City Planning, [“North Brooklyn Vision Plan,”](#) (2018) Accessed September 30, 2020

New York City Department of City Planning, [“Self-Storage Special Permit IBZ,”](#) (2017)

New York City Department of City Planning, [“Self-Storage Text Amendment”](#) (2017)

New York City Department of Environmental Protection, [“Guidelines for the design and construction of stormwater management systems,”](#) (2012)

New York City Department of Planning, [“Vision 2020 Waterfront Plan: Appendix B”](#) (2010)

New York City Department of Sanitation, [“Commercial Waste Zones - Appendix”](#) Published 2018, Accessed November 3, 2020

New York City Department of Sanitation, [“Commercial Waste Zones”](#) Published 2018, Accessed November 3, 2020

New York City Department of Transportation [New York City Clean Trucks Program](#) (2020)

New York City Department of Transportation, [“Improving the efficiency of truck deliveries in NYC,”](#) (2019)

New York City Department of Transportation, [“Neighborhood Loading Zones”](#)

New York City Department of Transportation, [“New York City Mobility Report.”](#) (2019)

New York City Department of Transportation, [“Smart Truck Management Plan,”](#) (2018)

New York City Economic Development Corporation, [Press Release](#), Published July 16, 2018

New York City Economic Development Corporation, [“Freight NYC.”](#) Accessed September 29, 2020

New York City Economic Development Corporation, “New York Works Industry Spotlight: Creating good jobs in freight”

New York City Economic Development Corporation, [Press Release](#), Published May 8, 2018

New York City Economic Development Corporation, [Press Release](#), Published March 22, 2019

New York City Independent Budget Office, [“How does the city collect parking fines from delivery companies and other businesses?”](#) Published February 5, 2019

New York City Office of the Mayor, [Press Release](#), Published August 16, 2018. Accessed October 5, 2020

New York City, [“Commercial Waste Zones.”](#) Published February 7, 2020. Accessed October 5, 2020

New York Metropolitan Transportation Council, [“NYMTC Regional Freight Plan Update 2015-2040,”](#) Published April 17, 2014, Accessed September 30, 2020

New York Metropolitan Transportation Council, [“Rail freight yard requirements: Land assessment for the east of Hudson area,”](#) (2003) Accessed November 7, 2020

New York Metropolitan Transportation Council, [“Regional Transportation Plan: Plan 2045, Maintaining the vision for a sustainable region - Appendix 8”](#) (2017)

New York State Department of Environmental Conservation, [“Greenpoint Petroleum Remediation Project”](#)

New York State Department of Labor, [“Historical employment and wages 1975-2000.”](#) Accessed November 12, 2020

Newtown Creek Alliance, [“Our Mission”](#)

Newtown Creek Alliance, [“Waste Transfer Stations.”](#) Accessed September 30, 2020

Newtown Creek Alliance, [Newtown Creek Vision Plan](#) Accessed September 29, 2020

Newtown Creek Superfund Community Advisory Group, [“About Newtown Creek”](#)

NYC Zoning Resolution Chapter 4, [44-21](#)

NYS Department of Labor QCEW

Office of the New York State Comptroller, [New York City Employment Trends](#) (2020)

Ovide, Shira, [“Brace for holiday ‘shipageddon’,”](#) *The New York Times*, October 16, 2020

Panero, Marta, and Hyeon-Shic Shin, and Daniel Polo Lopez [“Urban distribution centers: A means to reducing vehicle miles traveled.”](#) NYU Rudin Center for Transportation Policy and Management (2011)

Parrott, Max, [“New Staten Island Amazon facility could exacerbate truck traffic.”](#) *City & State New York*, September 28, 2018

Piecyk, Maja, Alan McKinnon, and Julian Allen, “Evaluating and internalizing the environmental costs of logistics.” *Green Logistics: Improving the environmental sustainability of logistics*, McKinnon, A., S. Cullinane, A. Whiteing, and M. Browne (2010): 68-99

Port Authority New York New Jersey, [Cross Harbor Freight Program](#), Accessed November 17, 2020

Pratt Center for Community Development, [“Non-profit real estate development toolkit: Stable, affordable space for manufacturing,”](#) (2014)

pwc, [“Emerging trends in real estate: United States and Canada 2019,”](#) (2019)

[Quinnipiac University Poll](#), April 2, 2019

Ranieri, Luigi, Salvatore Digesi, Bartolomeo Silvestri, and Michele Roccotelli, “A review of last mile logistics innovations in an externalities cost reduction vision,” *Sustainability* 10 (3) (2018): 782

Regional Plan Association, [“The Triboro.”](#) (2016)

Rhoads, Anna, et al., [“No easy answers as NYC searches for better ways to get freight into a crowded city.”](#) *City Limits*, August 21, 2019

RXR Realty, [“55-15 Grand Ave”](#)

San Francisco Department of Planning, [“Eastern Neighborhood Plans - Zoning”](#)

Schrock, Greg, Charles Heying, Stephen Marotta, Marc Doussard, Max Eisenburger, and Laura Wolf-Powers, “The maker economy in action: Entrepreneurship and supportive ecosystems in Chicago, New York and Portland,” (2016)

Senator Booker, Cory, [“Booker reintroduces sweeping environmental justice bill.”](#) Published July 24, 2019, Accessed November 21, 2020

Sheth, Manali, Polina Butrina, Anne Goodchild, and Edward McCormack, "Measuring delivery route cost trade-offs between electric-assist cargo bicycles and delivery trucks in dense urban areas," *European transport research review* 11 (1) (2019): 11

Smith, Jennifer, "[Grocery delivery goes small with micro-fulfillment centers,](#)" *The Wall Street Journal*, January 27, 2020

Smith, Jennifer, "[Smaller is bigger in new e-commerce warehouses,](#)" *The Wall Street Journal*, November 8, 2020

Smith, Jennifer, "[Smaller is bigger in new e-commerce warehouses,](#)" *The Wall Street Journal*, November 8, 2020

Smith, Jennifer, "[Warehouse, parcel operators add thousands of jobs ahead of holidays,](#)" *The Wall Street Journal*, October 2, 2020

Staff Writers, "[Prologis acquires 18-51 Flushing Avenue,](#)" *Real Estate Daily Beat*, Published January 27, 2020

State of New Jersey Department of Environmental Protection - Office of Environmental Justice, "[Environmental justice law, policy and regulation,](#)" Accessed November 17, 2020

State of New Jersey Department of Environmental Protection - Office of Environmental Justice, "[New Jersey Environmental Justice Law](#)"

State of New Jersey, "[Governor Murphy signs historic environmental justice legislation,](#)" Published September 18, 2020, Accessed November 17, 2020

Texas A&M Transportation Institute, "[A modal comparison of domestic freight transportation effects on the general public: 2001-2014,](#)" (2017)

The Abell Foundation, "[Maritime industrial zoning overlay district study,](#)" (2008) Accessed November 20, 2020

The Brooklyn Hospital Center, "[The need for caring in central and north Brooklyn,](#)" Published January 2013, Accessed September 30, 2020

[The New York City Community Air Survey: Neighborhood Air Quality 2008 - 2018](#), Published 2018, Accessed September 30, 2020

The New York Times (author unattributed), "[New York City's decline in manufacturing gained momentum in 1980,](#)" *The New York Times*, March 22, 1981

Thomas, Lauren, "[Holiday spending will depend on how much the rich splurge and the poor cut back, Deloitte says,](#)" *CNBC*, September 15, 2020

Thompson, Russell G., and Lele Zhang. "Optimising courier routes in central city areas," *Transportation Research Part C: Emerging Technologies* 93 (2018): 1-12

Thuermer, Karen E., "[State of industrial real estate: it's crunch time,](#)" *Logistics Management*, March 1, 2018

Transload facilities are any exchange point where freight can be transferred from one mode to another.

Turnbridge Equities, "[Bronx Logistics Center](#)"

U.S. Bureau of Labor QCEW

U.S. DOT Federal Highway Administration, "[Keeping the global supply chain moving video and transcript](#)"

University of Washington - Supply chain transportation and logistics center, "[Cargo e-bike delivery pilot test in Seattle,](#)" (2020)

UPS, [Press Release](#), October 25, 2018

Verde, Ben, "[Amazon leases Red Hook warehouse as fears of unsustainable truck traffic rise,](#)" *Brooklyn Paper*, November 10, 2020

Viu-Roig, Marta, and Eduard J. Alvarez-Palau, "The Impact of E-Commerce-Related Last-Mile Logistics on Cities: A Systematic Literature Review," *Sustainability* 12 (16) (2020): 6492

West Coast MTO Agreement, [FAQ](#)

West Coast MTO Agreement, [Press Release](#)

WXY Architecture and Urban Design, "[Integrated strategies to address emerging freight and delivery challenges in New York City,](#)" (2017)

Young, Liz, "[Amazon signs another warehouse lease in New York City,](#)" *New York Business Journal*, Published June 24, 2020

Young, Liz, "[Exclusive: Amazon confirms more new leases in New York City - and sources say there's more to come,](#)" *New York Business Journal*, Published October 28, 2020

Ziobro, Paul, "[UPS slashes spending, halts stock buybacks as coronavirus upends business,](#)" *The Wall Street Journal*, April 28, 2020