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Intro 518 Impact Assessment

IMPLICATIONS FOR NEW YORK CITY'S LAST-MILE INDUSTRY, WORKERS, AND CONSUMERS

PREPARED BY

akrf

PREPARED FOR

FIVE BOROUGH JOBS CAMPAIGN

Acknowledgments

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Cover Image: NYCDOT.

Table of Contents

Executive Summary

AKRF, Inc. (AKRF) has been retained by the Five Borough Jobs Campaign to evaluate the economic, operational, employment, transportation, and equity impacts of New York City Council's proposed Introduction 0518 2026 ("Intro 518," or "the legislation").[1] The legislation would establish a new licensing framework for last-mile delivery facilities in New York City, including warehouses, fulfillment centers, and distribution hubs that store, sort, and stage goods for final delivery to consumers. It would impose new employment, training, and compliance requirements, including requiring the direct employment of delivery workers, representing a substantial shift in how last mile logistics operate in the City.

AKRF's analysis uses a stakeholder driven, scenario based, and statistically informed approach to evaluating how last mile delivery operators may respond to the requirements proposed under Intro 518, and what those responses could mean for New York City.

The analysis integrates industry data, stakeholder interviews, and AKRF's economic and transportation modeling expertise to assess potential impacts on employment and businesses, delivery costs and service levels, traffic conditions, and vehicle emissions, with a particular focus on Disadvantaged Communities.[2]

As detailed below, AKRF's analysis finds that Intro 518 has the potential to significantly affect last mile delivery operating costs, facility location decisions, and delivery efficiency citywide, with downstream implications for employment patterns, industrial real estate, e-commerce activity, and neighborhood traffic conditions. Results are presented in aggregate to illustrate a range of potential outcomes and tradeoffs, rather than to predict a single definitive result.

Industry Concerns

AKRF interviews with over a dozen last-mile delivery stakeholders[3] including major carriers, Amazon delivery service partners (DSPs), logistics firms, industry associations, and industrial landlords reveal widespread concern over Intro 518. Stakeholders overwhelmingly caution that the legislation's direct-employment mandate and licensing scheme would destabilize the City's delivery ecosystem, with damaging unintended consequences for workers, small businesses, and consumers.

Key areas of concern cited by stakeholders included:

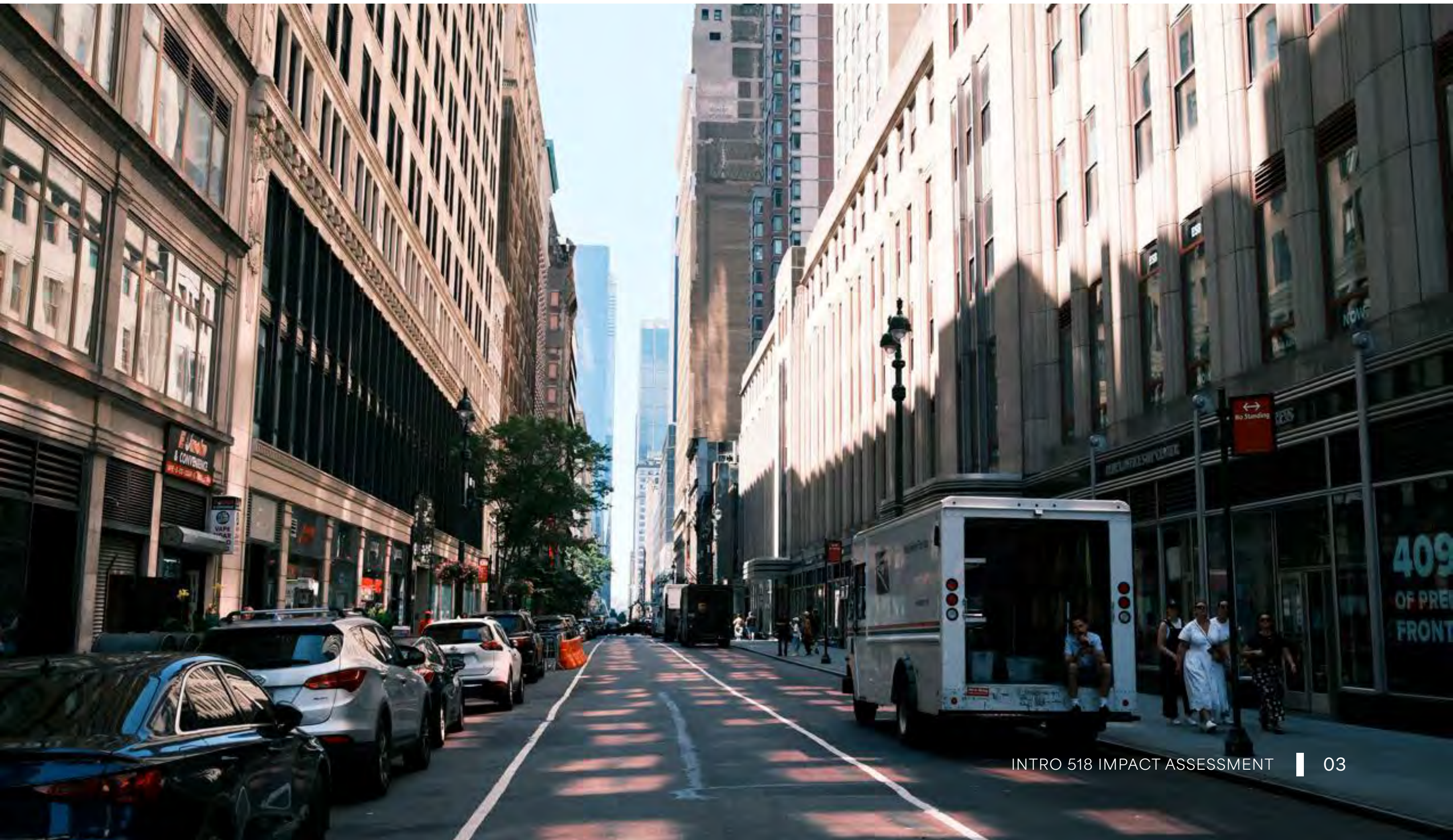
- Loss of Local Jobs & Small Businesses: Intro 518 is seen as an existential threat to hundreds of small delivery contractors and their workers. Operators predict many NYC-based DSP firms would shut down or leave the City, eliminating thousands of jobs held by NYC residents with no guarantee of larger firms absorbing these lost jobs. One industry representative went so far as to call Intro 518 "*the worst bill I've ever seen*" for last-mile companies.
- Service Disruptions & Slower Deliveries: Stakeholders warn of major delivery delays and service cutbacks if companies relocate operations outside the five boroughs. Longer travel time to routes and service areas would reduce network efficiency and eliminate dozens of stops per driver, translating to slower deliveries for NYC customers, especially in the outer boroughs. Same-day and next-day services would likely be curtailed, and product availability may be adjusted.
- Traffic, Emissions & EV Setbacks: Existing operational models have evolved to accommodate NYC's congestion and traffic conditions. Shifting distribution centers outside NYC would flood congested highways with more delivery trucks traveling longer distances, worsening traffic and emissions. The legislation could also undermine green initiatives like cargo-bike micro-hubs and electric vans, which depend on proximity. "*If they move operations to New Jersey, it's not going to be EVs or bikes serving the City,*" one stakeholder noted.
- Workforce Disruption & Equity Impacts: The rapid transition mandated by Intro 518 could leave many drivers and warehouse staff in limbo, with no guarantee they'd be absorbed by larger employers in time, if at all. DSP owners stress that many of their workers live paycheck to paycheck; an abrupt shake-up could mean layoffs, weeks of unemployment, and lost income for vulnerable families. They also fear loss of the career opportunities and close-knit work culture that small firms currently provide.
- Regulatory and Legal Uncertainty: Stakeholders cited unresolved legal risks and implementation ambiguity as a major concern, noting that Intro 518 may conflict with federal laws such as the Federal Aviation Administration Authorization Act (FAAAA), which limits state and local regulation of delivery services. The potential for legal challenges, coupled with unclear licensing, enforcement standards, and penalty thresholds, creates uncertainty around compliance and continued operations. Stakeholders emphasized that even the perception of legal and regulatory risk is already discouraging investment, leasing, and long term planning for last mile facilities in New York City.

Industry Outcomes

New York City's last-mile delivery industry has expanded rapidly over the past decade, driven by e-commerce growth and rising same-day and next-day delivery expectations. Much of this expansion has been propelled by contractor-based delivery models employed by major carriers such as Amazon and FedEx Ground; specifically Amazon's DSP program and FedEx Ground's Independent Service Provider (ISP) network. These arrangements rely on small, locally owned delivery firms operating out of neighborhood-scale facilities to handle the final leg of deliveries. This approach allows operators to scale capacity quickly, maintain dense urban routing, and control costs in a high-volume, low-margin market. By contrast, direct-employment carriers like the United Postal Service (UPS) and the U.S. Postal Service (USPS) represent a structurally different, higher-cost segment of the market and have not accounted for the majority of recent delivery growth.

Intro 518 would most directly and materially affect the contractor-based segment of the industry (exemplified by Amazon's DSP network and FedEx Ground's ISP model) which currently handles a significant share of daily package volume across the five boroughs. This segment underpins today's rapid delivery services but is built on contracted labor and decentralized sites, making it particularly exposed to the legislation's direct-employment mandate and facility licensing requirements. Faced with the need to directly hire drivers and obtain site licenses citywide, affected operators are unlikely to fully restructure their business models within New York City. Instead, industry interviews and scenario analysis indicate firms are more likely to respond by consolidating or closing local delivery stations, reducing service coverage, and/or relocating last-mile operations to locations outside City limits where the legislation would not apply.

Image: AKRF.



These industry responses would alter the structure of the last-mile network in ways central to AKRF's modeled impacts. Facility consolidation and relocation would increase the distance between delivery hubs and customers, resulting in longer routes, reduced delivery density, and lower operational efficiency. While large direct-employment carriers may retain in-City operations and potentially gain some market share, they are unlikely to absorb the full volume, workforce, or service functions displaced from the contractor-based networks. The net effect is projected to be a leaner but less locally-rooted industry, characterized by fewer New York City-based facilities, increased reliance on out-of-City hubs, and diminished capacity to sustain current service levels, employment patterns, and efficiency gains previously achieved through proximity-based urban logistics.

Effects on Jobs and Businesses

Intro 518 directly targets the contractor-based model by requiring delivery workers to be direct employees and subjecting facilities to new licensing requirements. These changes undercut the low-cost, high-density operating model that has enabled the rapid growth of same-day and next-day delivery in the City.

AKRF's analysis indicates that these requirements would place thousands of local delivery jobs and hundreds of small businesses at risk. Carriers that rely on contracted fleets are unlikely to fully convert drivers to direct employment; instead, they would likely consolidate, relocate, and scale back in-City operations. This would result in job losses for drivers, couriers, warehouse staff, and dispatch personnel currently employed by contracted firms. While large direct-employment carriers may expand some operations, they are unlikely to absorb the full volume of displaced work. Across reasonable scenarios, the net effect is a smaller in-City workforce and reduced local delivery capacity.

Modeled outcomes suggest a range of potential employment impacts:

- Low Impact (In-City Adaptation): Operators attempt compliance or partial integration, minimizing displacement. Result: **~3,000-5,000 New York City jobs at risk**, mainly among smaller contractors unable to transition; some losses offset by volume absorbed by larger carriers.
- Moderate Impact (Hybrid/Partial Relocation): A mix of responses, where some facilities relocate or consolidate, while others partially comply via hybrid models. Result: **~6,000-9,000 New York City jobs at risk**, including most contracted drivers and many facility roles. Some losses are offset by modest hiring at remaining in-City operations or alternative employment, but net job contraction is significant.
- High Impact (Widespread Relocation): Most contractor-based operations shut down or move out of NYC. Result: **10,000+ New York City jobs at risk**, reflecting near-total loss of contractor-based delivery and associated warehouse/dispatch staff. Large direct hire operators (UPS, USPS, etc.) remain in NYC but cannot fully replace the displaced jobs.

Impacts would be concentrated in the outer boroughs, where most last-mile facilities are located and where the majority of workers reside; AKRF estimates that 83 percent of last-mile facility workers live in the outer boroughs. In contrast, Manhattan would be less affected because deliveries rely less on warehouse facilities and more on alternative delivery formats like the "walker model."[4]

Overall, even accounting for potential job retention or creation under new models, Intro 518 is expected to result in a substantial net reduction in employment, particularly among drivers and facility workers tied to contractor-based operations. The workers most affected are those the policy is intended to protect. The legislation therefore presents a fundamental tradeoff: while it aims to improve labor standards, it is likely to reduce overall employment, constrain small business participation, and diminish the scale and accessibility of last-mile delivery services in New York City.

The following matrix provides a summary of key job segments, estimated headcounts, their predominant employment model, and the risk level these jobs face under Intro 518's requirements.

Job Segment	Estimated NYC Headcount	Employment Model	Risk under Intro 518
Direct-Employed Delivery Drivers e.g., UPS, USPS, FedEx Express, DHL	~10,000-12,000	In-house W 2 employees of major carriers; mostly union-ized with full benefits	**Low** - Already comply (drivers are direct employees). Jobs are not subject to new requirements, so these positions are secure. Some carriers (UPS, USPS) may see slight volume increases if competitors withdraw, but significant expansion is constrained by their business models.
Direct-Employed Warehouse/Hub Staff	~6,000-8,000	In-house employees of major carriers (often union). Manage sorting, loading, and facility ops at large hubs.	**Low** - Not directly affected as these employers already use direct labor. No job losses expected; these roles continue as long as their operations remain in-City. (Potential for modest uptick if carriers handle more parcels amid competitors' contraction.)
Contracted Delivery Drivers e.g., Amazon DSP drivers, FedEx Ground ISP drivers, regional courier fleets	~7,000-8,000 drivers	Employed by independent local companies under contract to larger platforms. Typically non-union; lower and less consistent wages/ benefits than direct peers.	**High** - Most threatened segment. These jobs must be converted to direct employment or else the facilities cannot be licensed. Likely outcome: widespread elimina-tion or relocation of these positions outside NYC.
Contractor-Model Facility Staff e.g., Amazon delivery station workers, FedEx Ground sort staff	~3,000-5,000 workers	Mix of direct employees at e-commerce firms (Amazon station staff are Amazon employees) and employees of contractors (some 3PLs may use staffing firms). They sort and dispatch packages at facilities whose delivery operations are outsourced.	**High** - Indirectly at risk. If their companies cannot meet the law's terms, many of these facilities would close or move. Amazon's NYC delivery stations are at risk if drivers remain contractors, jeopardizing warehouse jobs unless Amazon shifts deliveries to a direct model or uses non-NYC sites. Similarly, FedEx Ground could consolidate NYC terminals, cutting local sorting jobs, rather than absorb ISP drivers onto FedEx payroll.
App-Based & "Gig" Couriers excluding food e.g., Amazon Flex drivers, "walkers," bike messengers	~10,000+ workers	Independent contractors (gig economy workers). Perform on-demand deliveries via personal vehicles, bikes, or on foot; no fixed "facility" base.	**Low** - Largely unaffected or exempt. Intro 518 covers facilities and their operators' labor practices, so these ad hoc delivery models can continue. Some operators may expand use of foot couriers or mobile pickup points as a workaround.

Who are these at-risk last-mile workers?

Most last-mile delivery and warehouse jobs are entry- to mid-skill positions typically requiring no more than a high school diploma.[5] Consistent with national trends, the workforce is predominantly male (on the order of 80 percent)[6] and disproportionately composed of workers of color.[7] Over half of New York City's transportation and warehousing employees are Black and Hispanic men without college degrees, reflecting the important role last-mile jobs play in providing accessible employment opportunities.[8]

AKRF estimates that 88 percent of the City's last-mile facility workers live in New York City, and approximately 83 percent of workers live in the outer boroughs. Of the five boroughs, Queens County has the largest share of workers residing within the county, accounting for approximately 36 percent of the sampled last-mile facility workforce. The last-mile facility workforce is a diverse group of workers (80 percent minority) who earn a wide range of incomes (average individual incomes between $51,404 and $87,310) living in households of more than three individuals on average. Last-mile facility workers tend to live within and nearby neighborhoods that contain identified last-mile facilities. Nearly half (approximately 49 percent) of the last-mile workforce lives within census tracts designated as Disadvantaged Communities (DACs).

Small Business Viability

Intro 518 poses a significant threat to New York City's small delivery businesses. By effectively outlawing the contractor-based model, it disproportionately burdens minority- and family-owned companies and could eliminate one of the few accessible entrepreneurial ladders in the urban logistics sector. The likely consequence is a dramatic reduction in the number of NYC-based last-mile operators, with just a handful of large corporate players remaining. This consolidation may simplify enforcement, but it would come at the cost of hundreds of shuttered small businesses, thousands of lost local jobs, and a more centralized, less locally rooted delivery industry. For most of the affected small firms, the heavy compliance costs and operational restrictions of Intro 518 make on-site survival in NYC economically unviable.

Economic Ripple Effects

The economic effects of Intro 518 extend beyond delivery companies and workers to a broader network of support businesses and industries that rely on efficient, low-cost logistics. Last-mile delivery operations support economic activity through supplier relationships, service contracts, and worker spending; when these operations contract, relocate, or reduce employment, the impacts ripple across the local economy. Delivery activity generates indirect benefits through purchases of goods and services such as vehicle maintenance, fuel, equipment, technology, and professional services, as well as induced activity from worker spending on housing, food, transportation, and retail. As a result, reductions in last-mile employment and business activity would lead to declines in supply chain demand and overall economic output.

AKRF's analysis indicates these multiplier effects are meaningful: for every 1,000 direct "at risk" jobs, an additional 109 jobs are supported across the broader economy. Job losses would therefore result in reduced labor income, lower business revenues, and diminished tax contributions across New York City.

Beyond these quantifiable effects, changes to delivery cost and service levels would create broader pressures for businesses dependent on time-sensitive shipments. If delivery networks become more expensive or less reliable, local retailers, restaurants, and small enterprises may face higher operating costs, longer delivery times, or reduced service availability. Responses such as raising prices, holding more inventory, or adjusting operations could reduce efficiency and constrain economic activity over time.

Effects on Delivery Costs and Service Levels

Intro 518 would increase delivery costs and reduce service levels primarily by changing how and where the last-mile delivery network operates. Today's system relies on a dense network of in-City facilities and flexible labor models that allow carriers to complete many deliveries within short distances. The proposed requirements would make this model more expensive to sustain and, in many cases, infeasible, leading operators to consolidate facilities, shift operations outside New York City, or redesign delivery networks to reduce compliance costs.

These changes have direct operational consequences. When delivery facilities are located farther from customers, drivers must spend more time traveling to and from service areas, leaving less time for actual deliveries. This reduces the number of packages that can be delivered per route and increases the labor, fleet, and fuel required to serve the same level of demand. At the same time, efforts to offset higher labor and compliance costs such as facility consolidation, reduced staffing, or more reliance on centralized hubs further reduce system flexibility and efficiency. Together, these structural shifts increase the cost of each delivery while making it more difficult to maintain current service performance.

As a result, operators face a fundamental tradeoff: either absorb significantly higher operating costs to maintain current service levels or allow service quality to decline to control costs. In practice, this means that consumers and businesses should expect a combination of higher delivery prices and reduced service reliability, with impacts varying depending on how extensively the network shifts toward out-of-City operations and consolidated models. AKRF quantified the scale of these effects across a range of plausible industry responses.

As shown in **Table 1**, under a full relocation response from operators handling at-risk throughput (Scenario S1), delivery cost per package within the relocated throughput segment would increase approximately 267 percent. Average delivery cost per package citywide would increase approximately 95 percent. In addition to cost increases, New York Households would experience degraded service. Under the same full relocation response from operators handling at-risk throughput, service levels would decrease approximately 10 percent. Under a full relocation scenario that also accounts for constrained capacity at existing out-of-City facilities (Scenario S1b), average service levels decline by approximately 21 percent relative to current conditions. In practical terms, this decline in service levels may manifest as longer delivery windows, reduced availability of same-day and next-day services, and a higher incidence of delayed or failed first-attempt deliveries, particularly during peak periods when network capacity is most constrained. If the cost of relocation was fully passed through to all New York City households, the annual increase in delivery costs for all New York City households would range from $409 per year under the Hybrid Operations/Consolidated Scenario (S2a) to $664 per year under the Full Relocation Scenario (S1).

TABLE 1

Cost and Service Impacts Under Contracted Relocation

Scenario	Mean Cost per Package Percent Increase (All Throughput)[1]	Mean Cost per Package Percent Increase (Relocated Throughput)[1]	Average Decrease Across All Service Metrics - All Throughput (%)[2]	Incremental Cost Pass-Through to NYC Households[3]
S1 - Full Relocation	+95.5%	+267.5%	-10.1%	$664.0
S1a - Out-of-City Absorption	+77.1%	+210.8%	-7.2%	$541.1
S1b - Out-of-City Capacity Constrained	+81.5%	+227.2%	-21.0%	$572.9
S2 - Hybrid Operations	+61.1%	+169.7%	-5.4%	$424.4
S2a - Hybrid Operations Consolidated	+57.9%	+160.7%	-5.3%	$408.9

Notes

1 Cost impacts assume that package throughput is served at existing service levels - the "hold service" scenario.

2 Service impacts assume that package throughput is served at existing cost levels - the "hold cost" scenario.

3 Assumes all incremental cost of relocation and service preservation is passed through evenly across all households in the City.

Sources: AKRF, Inc.

Overall, the analysis indicates that Intro 518 would materially increase the cost of last-mile delivery while reducing service performance, with impacts scaling based on the extent to which operators relocate or consolidate facilities outside New York City. As delivery networks shift farther from end customers, longer travel distances reduce route efficiency and increase labor, fleet, and fuel requirements, driving substantial per-package cost increases. At the same time, these operational constraints limit the number of deliveries that can be completed per route, resulting in slower delivery times, reduced reliability, and diminished capacity during peak periods. Even under more moderate hybrid scenarios, the combined effect is a structurally less efficient delivery system in which higher costs and lower service levels become unavoidable tradeoffs.

Image: AKRF.

Effects on Traffic and Vehicle Emissions

Intro 518 would affect traffic and vehicle emissions by changing where delivery activity originates and how far vehicles must travel to complete deliveries. Today's last-mile system depends on a network of in-City facilities that allow drivers to operate short, dense routes close to customers. If operators respond to the legislation by consolidating or relocating these facilities outside New York City, delivery vehicles would need to travel longer distances to reach service areas, fundamentally changing the geography of the system.

These longer distances have direct and compounding effects on traffic activity. Drivers would spend more time traveling to and from delivery zones, reducing the number of deliveries that can be completed per route and requiring additional vehicles to maintain service levels. This increases total vehicle miles traveled (VMT) across both the regional network and within the City, as more trips are needed and each trip covers greater distance. While some truck trips into the City may be reduced as facilities relocate, these reductions are more than offset by increased van-based delivery travel required to serve customers from farther away.

As a result, the system is expected to generate higher overall traffic volumes and associated emissions, even under scenarios that incorporate partial consolidation or hybrid operating models.

Increased VMT translates directly into higher emissions of greenhouse gases and local air pollutants such as particulate matter and nitrogen oxides, with impacts occurring both citywide and along key delivery corridors. In practical terms, this means that while some neighborhoods near existing facilities may experience localized reductions in truck activity, the broader effect is a net increase in traffic and emissions due to the greater distance and intensity of delivery operations. AKRF quantified the scale of these changes under a range of plausible industry responses.

As shown in **Table 2**, under a full relocation response from operators handling at-risk throughput, total vehicle miles traveled would increase by approximately 36.4 million miles annually, producing about 40,600 tons of additional CO_2e,[9] alongside increases in $PM_{2.5}$ and NO_X emissions. Within New York City alone, this corresponds to roughly 16.8 million additional vehicle miles and approximately 19,000 tons of CO_2e. Scenarios that incorporate partial absorption or hybrid operating models moderate these impacts but do not eliminate them. Scenarios S1a and S1b reduce incremental VMT to roughly 32.7 million miles network-wide, while S2 and S2a further reduce incremental VMT to about 21.9 million, with corresponding lesser increments for in-City travel. However, even under these lower-impact configurations, emissions remain materially elevated relative to existing conditions, with in-City CO_2e increases still ranging from roughly 11,000 to over 19,000 tons depending on the scenario.

TABLE 2

Annual Incremental Traffic and Air Quality Impacts Under Industry Response Scenarios

Metric	S1 (Full Relocation)	S1a (Out-of-City Absorption)/S1b (Out-of-City Capacity Constrained	S2 (Hybrid Operations)/ S2a (Hybrid Operations Consolidated)
Network Wide (In-City and out of City)			
Vehicle Miles Traveled (Miles)	36,403,255	32,700,133	21,931,348
CO_2e Emissions (Tons)	40,575.7	36,460.9	24,459.3
$PM_{2.5}$ Emissions (Tons)	0.42	0.38	0.25
NO_x Emissions (Tons)	26.08	23.43	15.72
Lost Delivery Time (Hours)	-212,998	-193,752	-125,746
Within New York City			
Vehicle Miles Traveled (Miles)	16,759,698	15,249,191	9,916,954
CO_2e Emissions (Tons)	19,067.2	17,353.2	11,304.3
$PM_{2.5}$ Emissions (Tons)	0.20	0.18	0.12
NO_x Emissions (Tons)	12.16	11.07	7.21

Notes

1 Estimates are based on assumed annual package throughput potentially affected by the relocation of last-mile facilities under response scenarios to Intro 518 regulations.

2 Tons = US Short Tons

3 Table results are net of heavy truck trips that are eliminated under facility relocation out of New York City.

Some scenarios are presented together where differing assumptions (e.g., consolidation, capacity constraints, or cost allocation) do not alter underlying routing structure, facility locations, or total displaced package volumes, resulting in identical vehicle miles traveled and therefore identical emissions outcomes in the traffic model.

Sources: AKRF, Inc. utilizing emissions ratios derived from the U.S. Environmental Protection Agency's Motor Vehicle Emission Simulator (EPA MOVES) model, the regulatory tool for estimating emissions from on-road vehicles based on activity data, fleet characteristics, and operating conditions.

Effects On Disadvantaged Communities

Last-mile delivery facilities are associated with concentrated truck traffic, localized air emissions, and curbside activity, and are disproportionately sited in Disadvantaged Communities (DACs), where existing environmental and socioeconomic burdens are already elevated.[10] According to a 2025 New York City Comptroller's report, approximately 68 percent of last-mile facilities in New York City were concentrated in DAC census tracts.[11] The increased demand and volume for local deliveries have led to increased vehicular traffic and air quality issues, both of which are vulnerability factors that are considered when identifying a DAC. AKRF researched, tabulated, and mapped the locations of last-mile facilities located within DACs across New York City.

Of the 58 last-mile facilities that AKRF identified for analysis, 42 facilities (72 percent) are located in DACs, compared to 16 facilities (28 percent) in non-DACs (see **Figure 1**). Clusters of last-mile facilities appear in Queens (mostly in non-DACs); and parts of Brooklyn and Staten Island. Of the facilities that are within DACs, about half are in DACs with comparatively higher burdens and vulnerabilities. For example, Red Hook, Brooklyn contains at least six last-mile facilities in DACs with comparatively higher burdens and vulnerabilities and Sunset Park, Brooklyn contains at least four last-mile facilities in DACs with comparatively lower burdens and vulnerabilities. Gulfport, Staten Island contains at least four last-mile facilities with comparatively higher burdens and vulnerabilities. Last-mile facilities are also scattered along the Hudson River in Manhattan and in the Bronx. DACs with higher burdens and vulnerabilities are not limited to areas with last-mile facilities. Approximately 136 DACs are classified as industrial-heavy (in the 80th percentile or higher for industrial land use), and about half of these (51 percent) also have elevated burdens and vulnerabilities, similar to DACs with last-mile facilities.

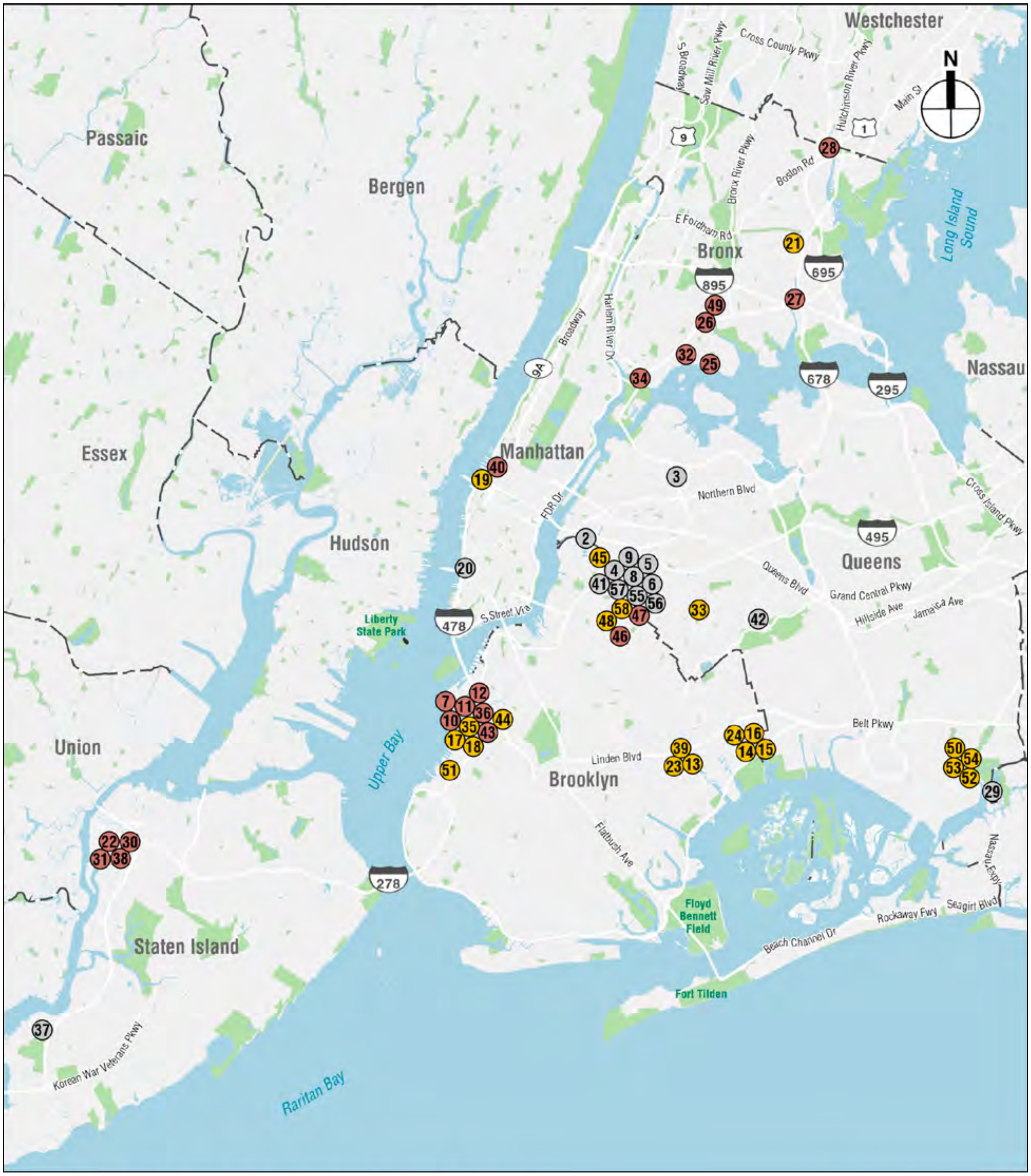
The projected relocation of last mile delivery facilities outside New York City could yield localized transportation and air quality benefits for neighborhoods immediately surrounding existing last-mile facilities, many of which are located within designated DACs. Specifically, the closure of an in City last mile facility would be expected to reduce the number of daily truck trips originating from and returning to that site, resulting in lower VMT, reduced idling, and fewer heavy duty vehicle movements on nearby local streets. For residents living in close proximity to these facilities, this could translate into measurable reductions in localized air pollutant exposure, including diesel related emissions, noise, and curbside congestion. These localized reductions represent a potential environmental benefit for the DACs currently hosting a high concentration of last mile logistics activity, consistent with longstanding concerns about neighborhood level traffic and air quality impacts associated with warehouse clustering.

At the same time, the systemwide transportation effects of relocated last mile operations outside the City are expected to move in the opposite direction. Shifting delivery activity to facilities in New Jersey or other out of City locations would lengthen delivery routes and increase deadhead travel, resulting in higher total VMT across the regional and citywide roadway network. These longer routes would concentrate additional van and truck travel along major arterials, bridge and tunnel approaches, and primary and secondary road networks which pass through other DACs across multiple boroughs.

Figure 2 shows that of the 403 DAC census tracts that intersect with primary and secondary road networks[12] that could experience increases in van and truck traffic with Intro 518, an estimated 389 of those DACs already experience high levels of $PM_{2.5}$, truck traffic, vehicle traffic, benzene, or asthma (in the 80th percentile or above as compared to statewide burden levels). Residing within these

DACs are an estimated 1,734,851 people across 632,745 households. These DACs along primary and secondary road networks could face increased transportation and air quality burdens, resulting in a redistribution (and overall increase) rather than an elimination of air quality impacts.

FIGURE 1
Identified Last-Mile Facilities within Disadvantaged Communities



Last Mile Facilities within Disadvantaged Communities identified as having comparatively higher burdens and vulnerabilities

Last Mile Facilities within Disadvantaged Communities identified as having comparatively lower burdens and vulnerabilities

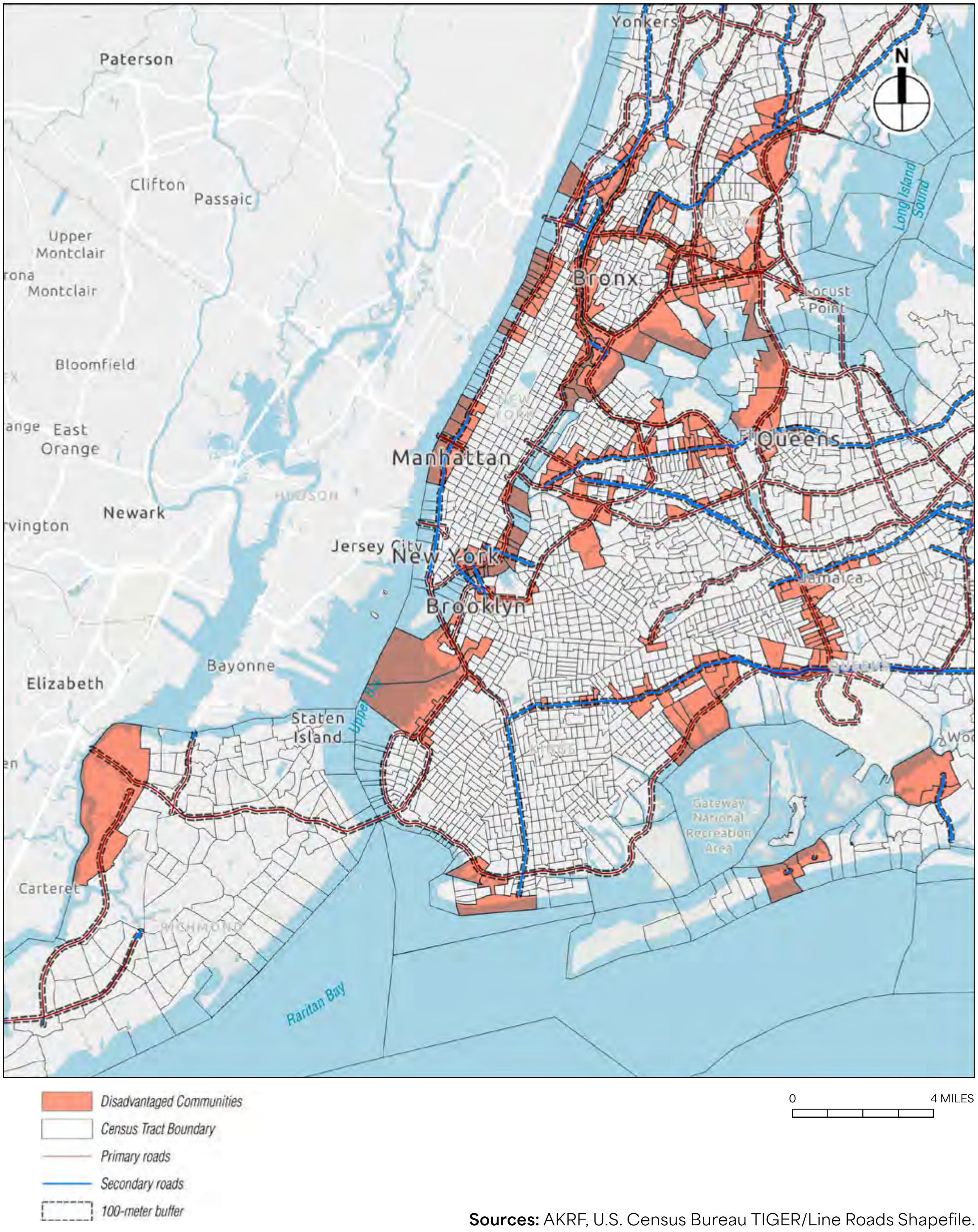
Last Mile Facilities not within a Disadvantaged Community

Notes: Facility numbers correspond to **Table 1-1** in **Appendix 1**

Sources: AKRF, NYS Final DAC Map (2023) Shapefile.

FIGURE 2

Disadvantaged Communities Within or Adjacent to Primary and Secondary Road Networks

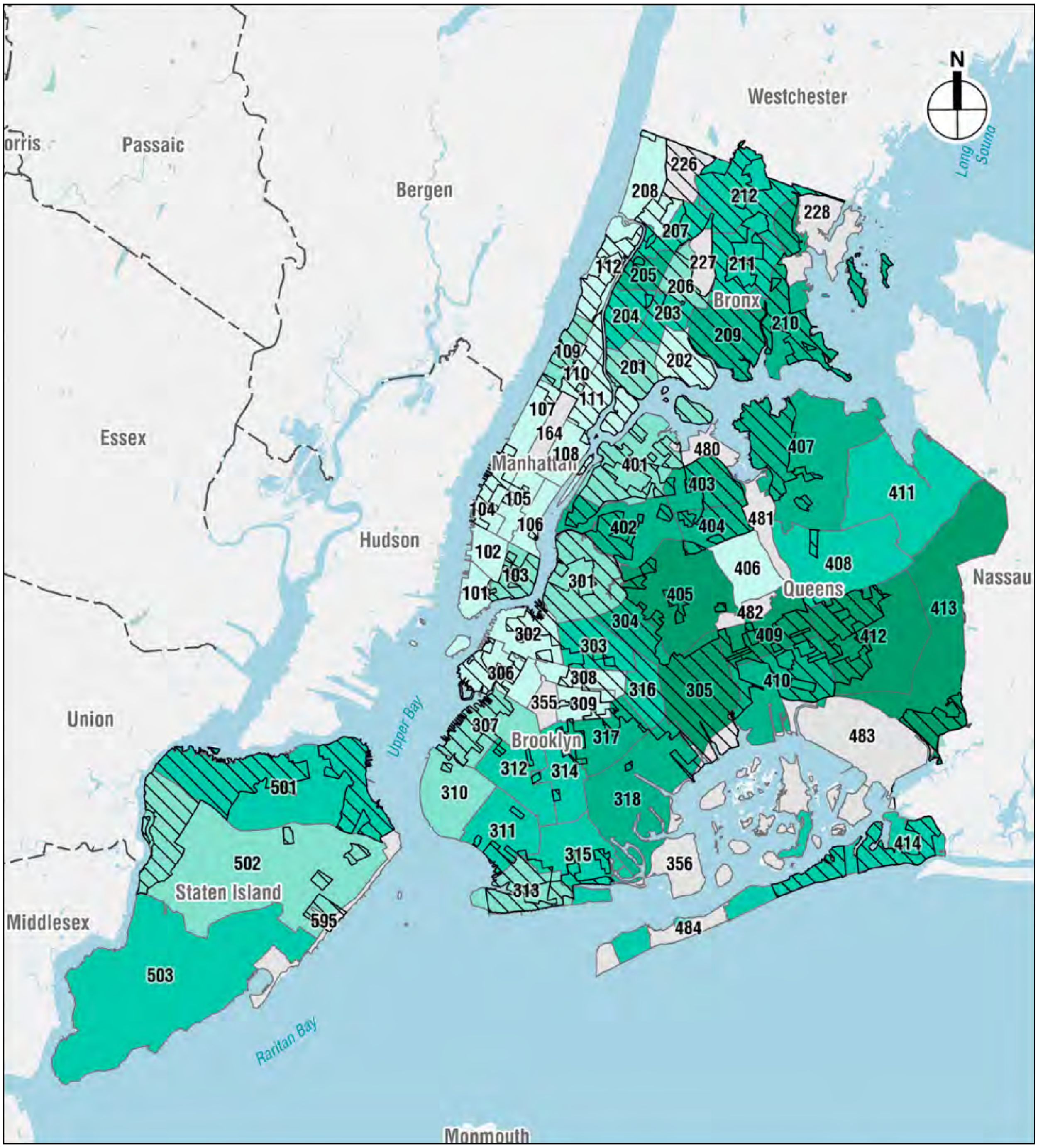


Sources: AKRF, U.S. Census Bureau TIGER/Line Roads Shapefile.

In addition to these transportation and air quality impacts, the relocation of last-mile delivery operations would also have significant employment implications for DACs. Nearly half of the City's last-mile workforce resides within DAC census tracts, with the majority of workers concentrated in the outer boroughs (see **Figure 3**). These workers are disproportionately employed in contractor-based delivery roles that are most at risk under Intro 518. As facilities close, consolidate, or relocate outside New York City, many of these jobs would not transition with them, given the geographic constraints and commuting barriers associated with out-of-City facilities. As a result, DACs that currently host both last-mile facilities and their associated workforce would experience the loss of accessible employment opportunities and potential workforce attrition.

FIGURE 3

Last-Mile Facility Worker Place of Residence by Community District and DACs



Sources: AKRF, Inc., utilizing Replica HQ data.

Responses To Key Questions

To help frame the practical implications of these findings for policymakers, stakeholders, and affected communities, the study evaluates a set of key questions related to costs, service performance, employment, operations, and broader citywide effects under Intro 518.

Consumer costs: How would per package and monthly delivery costs change for households and small businesses?

Households and small businesses can expect higher per-package delivery costs and increased monthly spending on shipments if Intro 518 is enacted. The magnitude of cost increases depends on how carriers respond to the policy: in the most disruptive scenario, average delivery costs could nearly double citywide compared to current levels and rise even more sharply (potentially by two- to three-fold) for deliveries originating from relocated warehouses outside the City. Even in moderate scenarios, significant per-package cost increases (on the order of 40-80 percent) are projected. These higher per-delivery costs would translate directly into greater monthly expenses for frequent e-commerce users. Households and small businesses accustomed to low-cost or free delivery would face substantially higher monthly delivery fees, with particularly pronounced impacts on those relying on frequent shipments.

Service levels: What happens to delivery times, on time performance, geographic coverage, and peak capacity (e.g., holidays, storms)?

Intro 518 is projected to degrade last-mile delivery service performance across NYC but most significantly within the outer boroughs, causing slower deliveries and reduced speed and reliability. Especially under more disruptive scenarios where carriers relocate distribution centers outside City limits, delivery times would lengthen and on-time performance would worsen, as trucks travel longer distances and face capacity shortfalls. Geographic coverage could also be affected, with some harder-to-reach or lower-density areas experiencing longer delivery windows or fewer delivery services. The ability to handle peak demand such as during holidays or severe weather would diminish, potentially causing more delivery delays and missed delivery windows when demand is high or conditions are challenging.

Employment mix and wages: How does Intro 518 affect job counts, classification, wages, benefits, and employment turnover for drivers and warehouse workers?

Intro 518's labor requirements would significantly shrink the overall workforce of last-mile delivery drivers and warehouse workers in NYC while shifting the City-based workforce composition towards fewer but higher-paid jobs. Total job counts could drop substantially, with thousands of contractor-based positions at risk because many smaller delivery firms would likely shut down or relocate rather than convert their entire staff to direct employees. In theory, the remaining jobs (e.g., drivers for large carriers that remain in the City) would provide higher wages and better benefits than today's contractor roles. However, many existing workers could lose their jobs and might not be absorbed by the surviving companies. Workforce turnover could spike in the short term as displaced employees seek new employment, leading to instability long before any potential long-term gains from improved job quality are realized.

Operational viability: Which operators (large, mid market, niche) reduce, relocate, or cease operations? What's the expected contraction in throughput?

Intro 518 is expected to reshape the NYC delivery industry structure, forcing many operators to reduce, relocate, or cease operations inside the City. Large carriers with full-time employee models (like UPS, USPS) would continue operating in NYC, but carriers that rely on contract delivery models (including some major e-commerce networks and most mid-sized and niche couriers) would be heavily impacted. Many of these at-risk operators are projected to relocate distribution centers outside City limits to avoid non-compliance or, if unable to adjust, shut down local operations entirely. As a result, the City's total throughput capacity could contract significantly (potentially on the order of one-third of current daily package volume in extreme scenarios), leading to fewer deliveries handled within the five boroughs and a leaner last-mile network overall.

Citywide spillovers: What are the effects on congestion, emissions, curb management, and small business sales reliant on fast delivery?

The impacts of Intro 518 would extend beyond the delivery sector to broader citywide effects on traffic, environment, and local business activity. Paradoxically, by pushing delivery operations out of the City, the legislation is predicted to exacerbate congestion and increase vehicle miles traveled (VMT) and emissions, since more trucks would have to travel longer distances to complete the same deliveries. Curbside management could become more challenging as more trucks would need curb space in dense areas (with fewer local micro-distribution points supporting cargo bikes or foot deliveries). Small businesses that depend on fast deliveries for inventory or services could face delays and higher costs, potentially reducing their sales or requiring new operating strategies. The intended benefits of reduced local truck activity would be offset by new burdens on City streets and local commerce, with these spillover effects varying across different neighborhoods within NYC.

Equity impacts: How are outer borough neighborhoods affected versus the Manhattan core? How would small businesses and underserved communities be affected?

The effects of Intro 518 are unlikely to be evenly distributed across New York City. Outer-borough communities, including many disadvantaged areas currently hosting last-mile distribution jobs and truck traffic, face both positive and negative impacts. On one hand, relocating distribution facilities out of NYC might reduce some local truck traffic and depot-related nuisances in those neighborhoods. On the other hand, these same communities would see significant job losses, and they might endure increased thru-traffic and pollution as trucks travel longer routes into the City. Meanwhile, the Manhattan core could see relatively less direct disruption, since Manhattan does not require major distribution centers, but Manhattan's e-commerce consumers might actually experience fewer service impacts compared to those in outer boroughs. Small businesses and historically underserved neighborhoods outside Manhattan stand to be hit hardest by rising delivery costs and slower service, potentially worsening existing inequities.

A Introduction and Approach

Over the past decade, the growth of e commerce and on demand delivery has fundamentally reshaped New York City's delivery logistics ecosystem. "Last mile" delivery facilities that dispatch goods for final delivery to consumers have expanded in number, scale, and geographic reach to meet rising demand for fast, low cost delivery.

These last-mile warehouses, sorting centers, and distribution hubs now play a critical role in supporting households, small businesses, and the City's broader economy by enabling efficient and dependable delivery in the City's most densely populated areas.

The rapid expansion of last mile operations in New York City has raised policy questions related to labor practices, worker safety, neighborhood impacts, traffic conditions, and the appropriate regulatory framework for an evolving industry. In response to these concerns, New York City Council introduced legislation (Introduction 518-2026, or "Intro 518") that would require last mile delivery facilities operating in New York City to obtain licenses and, for core delivery and warehouse functions, directly employ workers rather than relying on contracted labor.[13] The proposed legislation has generated substantial interest and debate among policymakers, labor organizations, delivery providers, property owners, small businesses, and community stakeholders. A public hearing on the legislation was held on April 9, 2026.

Policy Debate: Support and Opposition

Supporters of the proposed legislation generally argue that new regulatory requirements are necessary to address perceived shortcomings in the current last mile delivery model. From this perspective, proponents contend that:

- The widespread use of contracted labor separates operational control from legal responsibility, limiting accountability for workplace safety, employment conditions, and street level impacts.
- Direct employment requirements would improve job quality, stability, training, and safety for delivery and warehouse workers.
- Licensing and oversight would establish clearer standards and allow the City to better monitor compliance in a rapidly growing industry.

- Improved labor standards and safety practices could yield broader public benefits, including safer streets and more predictable service outcomes.

Proponents view the legislation as a mechanism to align responsibility with operational control while addressing worker protection and public safety concerns associated with last mile delivery activity.

Opponents of the legislation, including delivery operators and business aligned stakeholders, raise a different set of concerns focused on feasibility, cost, and unintended consequences. Commonly cited arguments include:

- Mandatory conversion from contracted labor to direct employment could significantly increase operating costs, reduce flexibility, and disrupt established logistics models that rely on scalable staffing, particularly during peak demand periods.
- Increased costs may be passed through to consumers and small businesses in the form of higher delivery fees, longer delivery windows, or reduced service availability.
- Operators may respond by relocating facilities or reducing in City operations, potentially leading to job losses, longer delivery routes, increased vehicle miles traveled, and spillover traffic impacts outside New York City.
- Smaller or regional delivery firms may be disproportionately affected relative to larger, vertically integrated operators.
- Workplace safety is already highly regulated and carries high insurance premiums to further self-enforce safety through training and frequent reevaluations.

From this perspective, critics caution that well intentioned labor protections could produce outcomes that undermine affordability, service reliability, and the retention of logistics jobs within the City.

AKRF's study intends to inform this debate by providing an objective, data driven assessment of potential economic, operational, and equity related effects associated with the legislation under realistic compliance scenarios.

AKRF Study Objectives

AKRF was retained by the Five Borough Jobs Campaign to conduct an independent, analytical assessment of the potential implications of Intro 518. The purpose of the study is not to advocate for or against the legislation, but rather to provide policymakers and stakeholders with a clearer understanding of how different compliance and response scenarios affect New York City's economy, delivery services, and communities. The specific objectives of AKRF's analysis are as follows:

- Quantify potential economic impacts, including changes in delivery costs for consumers and small businesses and implications for operators under different response scenarios.
- Evaluate operational and service effects, such as delivery times, reliability, geographic coverage, and the ability to meet peak demand.
- Assess employment and equity considerations, including potential shifts in job location, job mix, and service outcomes across neighborhoods.
- Examine traffic and transportation and air quality effects, including changes in travel time, vehicle miles traveled, and vehicle air emissions associated with facility relocation or operational restructuring.

Responses to Key Questions

AKRF's study works to respond to key questions raised by Intro 518:

1. **Consumer Costs:** How would per package and monthly delivery costs change for households and small businesses?
2. **Service Levels:** What happens to delivery times, on time performance, geographic coverage, and peak capacity (e.g., holidays, storms)?
3. **Employment Mix and Wages:** How does Intro 518 affect job counts, classification, wages, benefits, and employment turnover for drivers and warehouse workers?
4. **Operational Viability:** Which operators (large, mid market, niche) reduce, relocate, or cease operations? What's the expected contraction in throughput?
5. **Citywide Spillovers:** What are the effects on congestion, emissions, curb management, and small business sales reliant on fast delivery?
6. **Equity Impacts:** How are outer borough neighborhoods affected versus the Manhattan core? How would small businesses and underserved communities be affected?

Study Approach

AKRF's approach combines baseline research, stakeholder interviews, scenario development, and quantitative modeling informed by professional judgment and prior logistics, economic, and transportation analyses. The analysis is structured to reflect how last mile delivery operators are likely to respond to Intro 518 in a highly price sensitive market that depends on fast, reliable, and low cost delivery.

The study begins by establishing baseline conditions for last mile delivery in New York City, including facility types and locations, workforce structure, delivery logistics, service levels, and operating costs (detailed in **Section B**). This baseline is informed by public data, prior AKRF analyses, and targeted stakeholder engagement with major national carriers, delivery service partners, and regional operators.

Building on this baseline, AKRF developed a set of industry response scenarios that reflect plausible strategies operators may adopt to manage increased labor and compliance costs under Intro 518 (detailed in **Section D**). These scenarios include facility relocation and hybrid operating strategies shaped by stakeholder input and vetted assumptions before being used for quantified analysis. This ensured that modeled outcomes reflect realistic business behavior rather than theoretical extremes. Because outcomes under the legislation depend on how individual firms respond to changes in labor requirements, compliance obligations, and operating costs, the analysis is designed to capture a range of plausible outcomes rather than a single forecast. For quantified analyses AKRF applies the scenario based modeling approach to evaluate how Intro 518 could influence employment outcomes (in **Section E**), delivery costs and service performance (in **Section F**), and transportation and air quality conditions associated with last mile delivery operations in New York City (in **Section G**).

Once a set of likely operational and market outcomes were established, AKRF evaluated the associated economic implications using IMPLAN (Impact Analysis for Planning). This framework is used to quantify the economic activity generated by last mile delivery facilities, including direct effects such as wages and business output, as well as indirect and induced effects related to supplier activity and household spending. For purposes of scenario analysis, this approach allows AKRF to assess how changes in facility operations such as relocation, consolidation, or closure could influence broader economic activity in New York City, including employment and fiscal contributions.

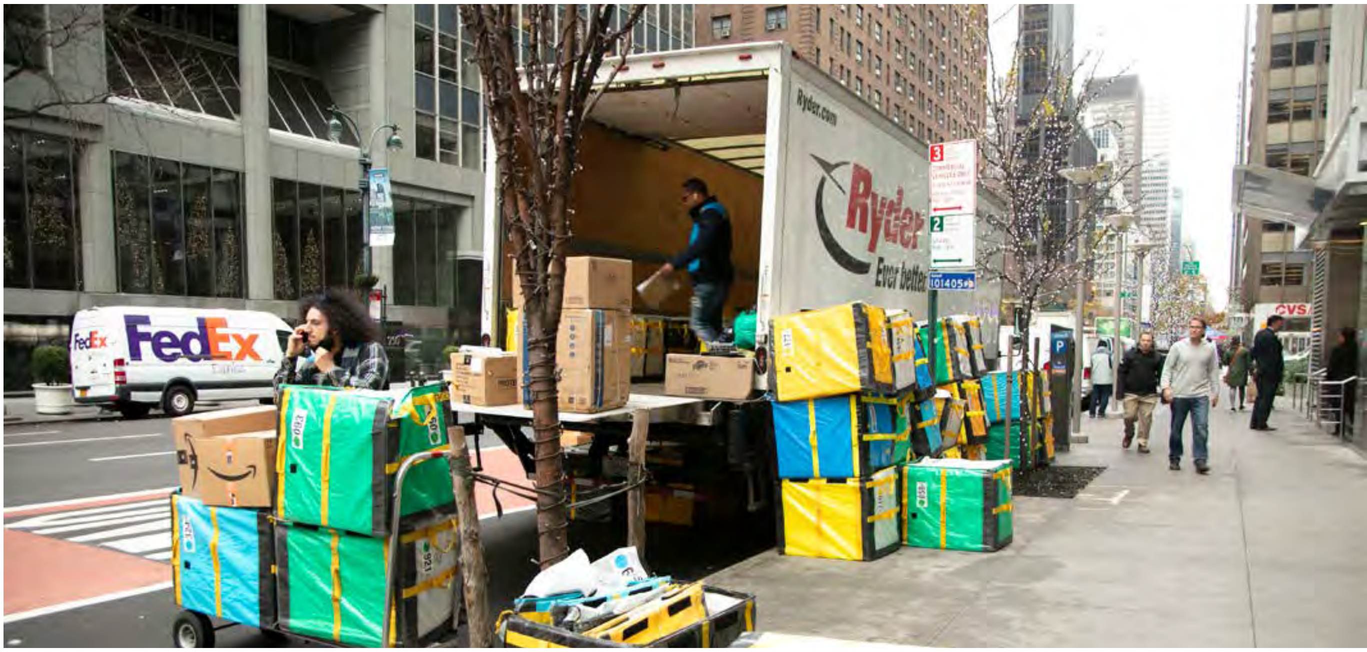


Image: Buck Ennis/Crains New York Business.

Defining and Categorizing "Last Mile Facilities" for Analysis Purposes

Intro 518 defines a "last mile facility" based on functional characteristics, specifically whether a location receives goods as part of a delivery supply chain and stages those goods for delivery to consumers, rather than by size, zoning, or primary business purpose. As written, the definition would encompass a wide range of activities that vary substantially in scale, intensity, operational predictability, and relevance to the legislation's core policy mechanisms.

For purposes of this study, AKRF exercised professional judgment to operationalize Intro 518's definition in a manner that supports meaningful and defensible quantitative analysis, while still acknowledging the broader universe of activities that could plausibly fall within its scope. This required distinguishing between facility types that are sufficiently standardized, prevalent, and data tractable to support citywide modeling, and those for which impacts are more context specific, limited in scale, or too heterogeneous to reliably quantify.

As detailed in **Appendix 2**, AKRF developed a facility typology that categorizes last mile-related uses based on operational function, prevalence in New York City, typical scale, and role within delivery networks. Facility types were evaluated against two criteria: (1) suitability for quantitative analysis, based on consistency of operational characteristics and presence at scale, and (2) relevance to the licensing and employment provisions of Intro 518. Facility types meeting both criteria (such as parcel delivery stations, micro fulfillment centers, grocery delivery fulfillment facilities, and third party logistics cross dock operations) were included in the study's quantified analysis. Other facility types that may meet the legislation's functional definition but exhibit greater variability or uncertainty (including dark stores, micro hubs, reverse logistics centers, and shared logistics spaces), are addressed qualitatively. Several categories were excluded entirely where delivery is incidental to the primary business or where inclusion would not meaningfully inform the policy questions raised by the legislation. AKRF's inventory does not capture the full universe of potentially regulated facilities; the City Council Fiscal Impact Statement for Intro 518 implies a regulated universe of approximately 150 facilities citywide, assumed to include qualifying last-mile warehouses and distribution sites.[14]

This tiered analytical framework is intended to balance completeness with rigor. It does not imply that excluded or qualitatively discussed facilities are unaffected by Intro 518 but rather reflects methodological limits on what can be responsibly quantified at a citywide scale.

Data Sources and Confidentiality

The study draws on a combination of publicly available data, prior research, spatial analysis, and confidential stakeholder interviews conducted as part of AKRF's scope of work. Public data sources include City and State agency publications, prior planning and policy studies, freight and logistics datasets, and geospatial information used to document facility locations, delivery patterns, and traffic conditions.

In addition to publicly available data and prior research, AKRF's analysis is informed by structured interviews with industry participants, including Amazon DSPs and other last-mile delivery operators, national and regional carriers, logistics operators, property owners, and trade association representatives. These interviews were conducted to ground the analysis in real world operating conditions and to test the feasibility of potential response scenarios under Intro 518. AKRF conducted interviews with firms representing a range of operating models and geographic footprints; however, not all targeted participants agreed to participate, reflecting both the sensitivity of the subject matter and ongoing regulatory uncertainty. To supplement interview findings, AKRF also relied on secondary industry research, publicly available filings, and prior studies of last-mile logistics systems. Together, these sources were used to validate assumptions regarding operating costs, labor structures, facility utilization, and likely responses to Intro 518. All stakeholder input is presented in aggregated and anonymized form to protect confidential business information.

To protect commercially sensitive and proprietary information, all interview data are treated as strictly confidential. Information obtained through interviews is aggregated and anonymized in all analyses and reporting. No company specific, facility specific, or contract specific data are disclosed, and illustrative examples are presented only in generalized form. Where precise data could not be disclosed, AKRF relied on ranges, indices, or qualitative descriptors consistent with the study's probabilistic framework and objective of avoiding overstated precision.

B

The Last-Mile Delivery System In New York City

This section describes the structure, evolution, and operating characteristics of New York City's last mile delivery system. It provides baseline context for understanding how last mile delivery functions in a dense urban environment, why facilities and employment models have evolved as they have, and how physical, transportation, and labor constraints shape delivery activity across the five boroughs. This section establishes existing conditions against which Intro 518's potential effects are evaluated in later sections.

What Is Last Mile Delivery?

Last mile delivery refers to the final stage of the supply chain in which goods are transported from a distribution or transfer point to their ultimate destination—homes and businesses. This stage connects large scale logistics systems to individual consumers and enables the speed and convenience that characterize modern e commerce. It is widely recognized as the most operationally complex and cost-intensive segment of the logistics chain due to dispersed destinations, time-sensitive delivery windows, and high stop density.

Because of its extreme density, limited curb access, constrained parking supply, and persistent congestion, New York City has become a proving ground for last mile delivery innovation. Traditional vehicle intensive logistics models reliant on long dwell times and abundant staging space are difficult to deploy at scale. In response, operators have adopted alternative strategies including electric cargo bikes, walking delivery routes, micro distribution hubs, consolidated delivery windows, and short haul, low mileage delivery routes. These approaches are not peripheral in New York City; they are integral to maintaining service reliability, managing costs, and navigating physical constraints unique to dense urban environments.

How the System Operates in New York City

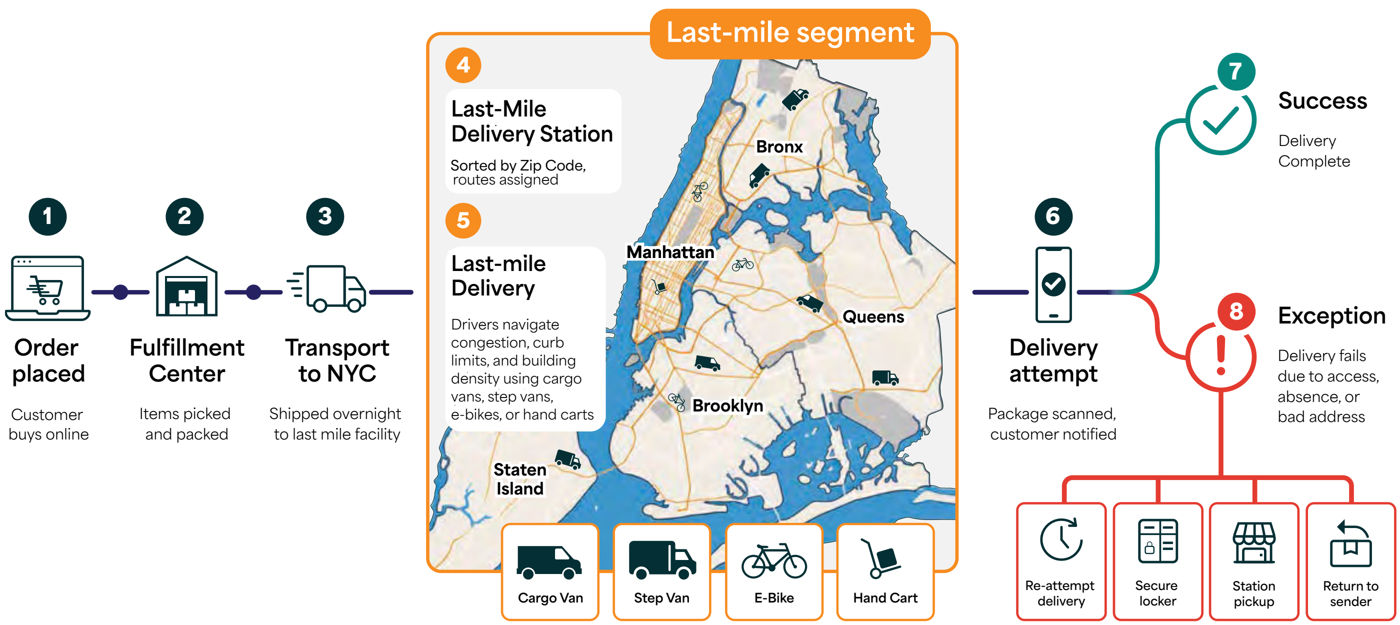
In New York City, last mile delivery is achieved in a variety of ways depending upon the destination and the density of deliveries but typically involves multiple linked operational steps rather than a single direct trip. Goods move first from regional fulfillment centers (often located outside the City) to local delivery stations or staging facilities within the five boroughs. At these facilities, packages are sorted by neighborhood or route and assigned to drivers or couriers for final delivery.

Final delivery is executed using a mix of transportation modes adapted to neighborhood density and street conditions. Cargo vans and step vans remain the backbone of parcel delivery, particularly in the outer boroughs, while electric cargo bikes, hand carts, and on foot couriers are more commonly used in dense areas such as Manhattan and portions of Downtown Brooklyn. In many cases, drivers park vehicles once and complete multiple deliveries on foot, increasing stop density while limiting vehicle movements.

Delivery routes in New York City are typically short in distance but intensive in terms of stops. Under existing conditions, individual routes frequently include more than 100 delivery stops and up to 150 packages per route. Route productivity is highly sensitive to congestion, curb access, and building entry conditions. Even modest increases in travel time at the beginning or end of a route can materially reduce the number of deliveries completed within regulated working hours, affecting both cost and service performance.

FIGURE B-1

Overview of the E Commerce Delivery Process and the Last Mile Segment



This figure provides an illustrative example of the e-commerce delivery process in New York City. Online orders are fulfilled at regional fulfillment centers, transported to local delivery stations, sorted by neighborhood or ZIP code, and assigned to last-mile delivery routes. In Manhattan and other dense areas, deliveries must account for traffic congestion, limited curb space, and vertical residential density, and may be completed using cargo vans, step vans, e-bikes, or hand carts serving apartment buildings, office towers, and mixed-use properties.

Upon delivery, packages are scanned and proof of delivery is recorded. If delivery cannot be completed due to restricted access, recipient absence, incorrect address information, or other operational barriers, the package may be redelivered, placed in a secure locker, returned to the delivery station for pickup, or returned to sender. These exception pathways increase the time, cost, and complexity of last-mile operations in dense urban environments.

Source: AKRF, Inc.

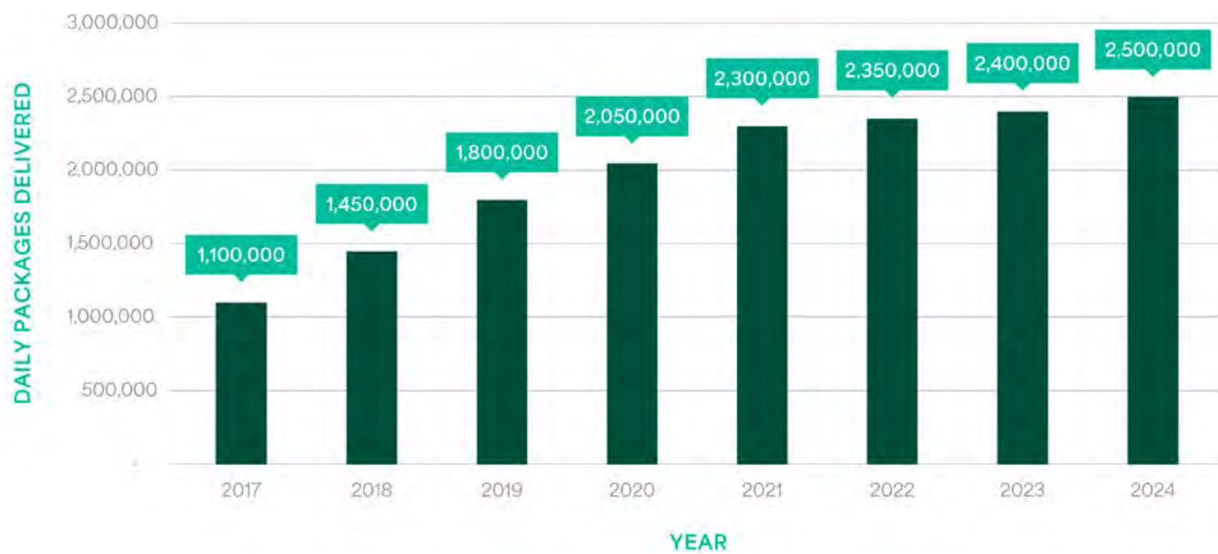
Growth and Scale of NYC Last Mile Delivery Activity

The rapid growth of e commerce has fundamentally reshaped New York City's freight and logistics system. Daily package deliveries are estimated to have increased from approximately 1.1 million in 2017 to roughly 2.5 million by 2024, more than doubling over seven years (see **Figure B-2**). While the COVID 19 pandemic accelerated this trend, much of the growth reflects durable changes in consumer behavior, including increased reliance on online retail, grocery delivery, and other on demand services.

The growth of last mile delivery facilities in New York City reflects not only increased volume, but also a shift in the types of goods being delivered. Residential e commerce orders now account for the majority of freight moving through the City's delivery networks. By 2022, approximately 80 percent of packages were delivered directly to residential addresses, up from roughly 40 percent before the pandemic.[15]

Delivered goods span a wide range of categories, including household items, clothing, electronics, groceries, and other perishable goods. Grocery and prepared food deliveries have experienced rapid growth, with grocery deliveries increasing by more than 130 over the pandemic years.[16] As of 2022, approximately 80 percent of New York City households received deliveries on a weekly basis, with roughly 20 percent receiving four or more deliveries per week.[17] This shift underscores how last mile delivery has become embedded in daily consumer activity across the City.

FIGURE B-2
Daily Package Delivery Counts in New York City (2017-2024)



Notes: Package counts for 2022 and 2023 were unavailable and were therefore normalized by AKRF based on the observed growth between 2021 and 2024.

Sources: AKRF, Inc.; NYC Comptroller's Office Report, Fast Shipping. Slow Justice: Traffic, Worker, and Climate Hazards in Last Mile Delivery. 2025

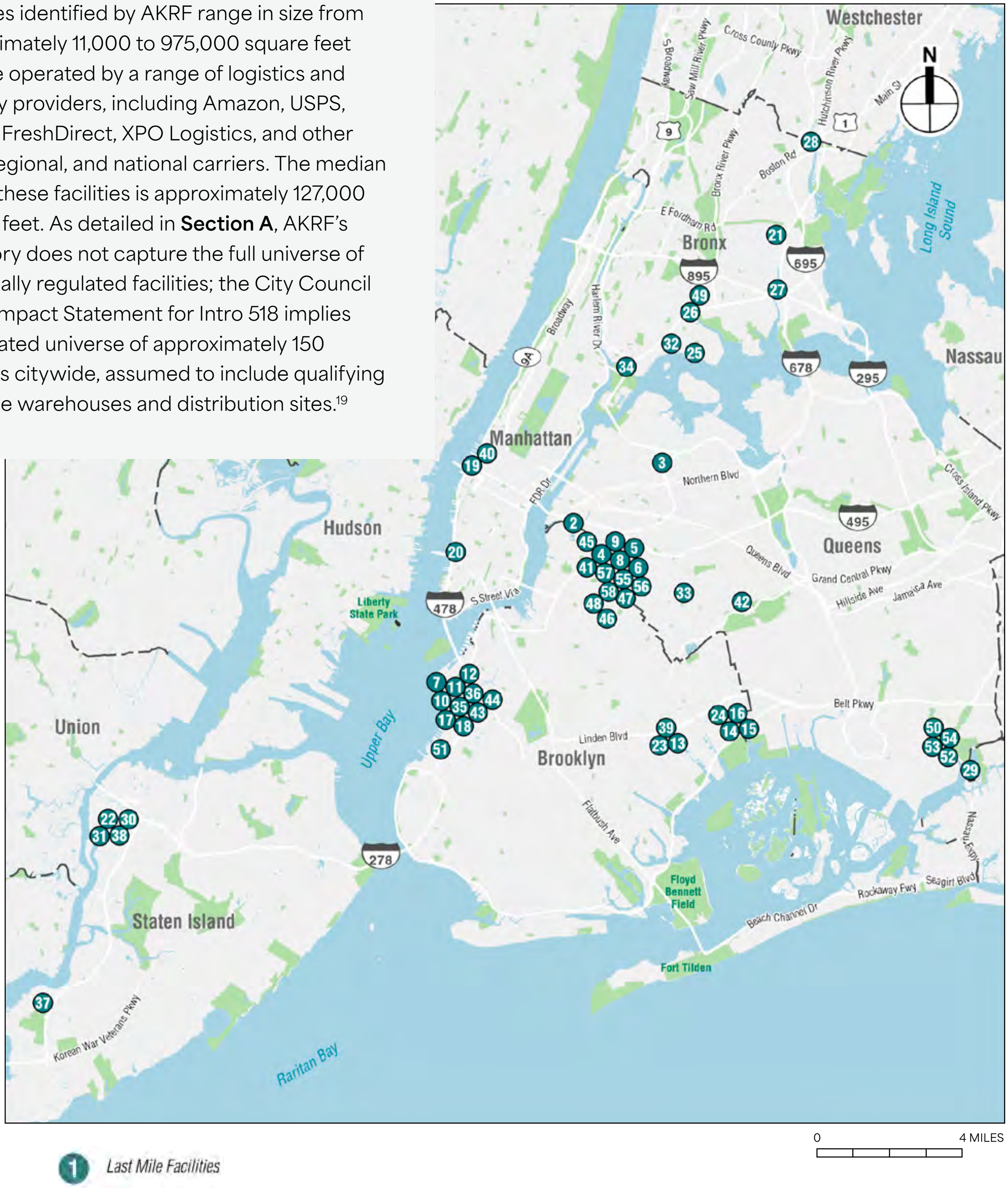
This growth has been accompanied by a parallel expansion in local delivery infrastructure, including delivery stations, fulfillment centers, and logistics hubs distributed across the five boroughs. In the early 2010s, last mile deliveries were predominantly handled by legacy carriers such as UPS, FedEx, and the U.S. Postal Service, operating from a limited number of regional distribution depots. As e commerce activity accelerated—particularly between 2015 and 2018—companies such as Amazon began establishing smaller, localized delivery stations closer to consumers to reduce delivery times and increase operational efficiency. This trend intensified sharply beginning in 2020, when the pandemic drove a more than 30 percent increase in U.S. online retail sales in a single year, prompting rapid expansion of local delivery facilities and solidifying last mile logistics as a permanent component of the City's economic and physical landscape. These facilities now support millions of daily deliveries and represent a core component of the City's commercial landscape.

Figure B-3 identifies 58 last-mile facilities throughout the City, with notable clustering in the more industrial neighborhoods including Maspeth in Queens, Redhook in Brooklyn, and Bloomfield in Staten Island.[18]

FIGURE B-3

Identified Last-Mile Facilities within New York City

Facilities identified by AKRF range in size from approximately 11,000 to 975,000 square feet and are operated by a range of logistics and delivery providers, including Amazon, USPS, FedEx, FreshDirect, XPO Logistics, and other local, regional, and national carriers. The median size of these facilities is approximately 127,000 square feet. As detailed in **Section A**, AKRF's inventory does not capture the full universe of potentially regulated facilities; the City Council Fiscal Impact Statement for Intro 518 implies a regulated universe of approximately 150 facilities citywide, assumed to include qualifying last-mile warehouses and distribution sites.[19]



Notes: Facility numbers correspond to **Appendix 1**, **Table 1-1**

Source: AKRF, Inc.

Why Last Mile Facilities Locate Within New York City

Despite higher real estate and operating costs, last mile delivery facilities have proliferated within New York City because proximity to customers is central to system efficiency. Dense neighborhoods enable high stop density, allowing operators to serve large delivery volumes within compact geographic areas. Shorter routes reduce vehicle miles traveled per package, improve labor productivity, and support rapid delivery guarantees.

Proximity also enables alternative delivery modes. Short routes and dense delivery patterns make cargo bikes, electric vans, and on foot delivery viable at scale–approaches that would be impractical in lower density environments. Stakeholder interviews indicate that many operational efficiencies achieved in New York City depend directly on this proximity and would be significantly diminished under a distribution model centered on out of City facilities with longer routes, greater vehicle dependence, and lower stop density. In this sense, New York City's physical environment has shaped delivery models tailored specifically to high density urban conditions.

Operational Constraints in Dense Urban Environments

Last mile delivery in New York City operates under conditions that are more constrained than in suburban or exurban contexts. Persistent traffic congestion, limited curbside loading space, narrow streets, and high pedestrian activity increase route complexity and reduce average delivery speeds. Building access presents additional challenges. High concentrations of multi unit residential buildings, secure entry systems, and vertical density increase time per stop and require specialized handling practices. Regulatory overlays–including truck route rules, parking restrictions, and delivery time windows–add further layers of operational complexity.

Labor availability and schedule limitations also shape operations. Delivery routes must be completed within regulated working hours, meaning that longer travel distances or increased delays directly reduce delivery capacity unless additional vehicles and labor are deployed. These constraints make the system highly sensitive to changes in facility location, travel distance, and administrative burden. Small shifts in distance or operating friction can cascade through routes, affecting delivery capacity, cost efficiency, and service reliability.

Facility Operations and Delivery Cycles

Last mile delivery facilities in New York City typically operate extended hours, often overnight or early morning, to receive inbound freight, sort packages, and dispatch routes. Delivery drivers and couriers generally depart in the morning and complete deliveries throughout the day, with increasing evening and weekend activity driven by consumer demand and grocery delivery services. These operating cycles allow carriers to maximize vehicle utilization but also contribute to competition for curb space during peak periods.

Vehicles, Curbside Conditions, and Transportation Constraints

Last mile delivery relies heavily on street access and curb availability. Frequent curbside stops–often for short durations–are inherent to door to door delivery. Where legal curb space is unavailable, drivers may double park briefly or park once to complete multiple deliveries on foot. Limited curb access, competing street uses, narrow roadways, and high pedestrian volumes increase delivery time per stop and shape labor needs, vehicle choice, and delivery timing.

Congestion on major highways and arterial streets further affects delivery performance, particularly during peak hours. In response, operators rely on dense routing, off peak deliveries, smaller vehicles, and alternative delivery modes to maintain service reliability.

Amazon Truck in Windsor Terrace. Image: AKRF.

Industry Structure and Employment Models

New York City's last mile delivery system is supported by a diverse set of operators and labor arrangements that reflect different service priorities, cost structures, and approaches to workforce management. Major national parcel carriers such as the United Postal Service (UPS) and the U.S. Postal Service (USPS) operate large, established networks centered on direct employment, collectively bargained wages, and standardized benefits. Other carriers and e commerce platforms rely on hybrid or contractor based delivery models that combine centralized logistics control with subcontracted local delivery operations.

In recent years, contractor based models have expanded significantly, particularly for high volume e commerce deliveries. Under these arrangements, independent delivery companies operate fleets and employ drivers while providing services on behalf of larger platforms. This structure allows delivery networks to scale rapidly, respond to daily and seasonal demand fluctuations, and maintain dense routing within constrained urban environments. The coexistence of direct employment and contracted delivery models reflects fundamental tradeoffs between standardization, flexibility, scalability, and cost control, and forms the baseline structure through which last mile delivery currently operates in New York City.

Employment Models

The City's last mile delivery industry comprises a layered ecosystem of national carriers, federal agencies, e commerce platforms, regional operators, and local couriers, each employing distinct business and labor models. UPS operates a large, unionized workforce under a direct employment model with collectively bargained wages and benefits. The USPS, as an independent federal agency, plays a central role in residential and small parcel delivery and employs unionized federal workers with standardized compensation and benefit structures. FedEx employs multiple models nationwide, with FedEx Express relying primarily on direct employment while FedEx Ground outsources last mile delivery to independent service providers that employ their own drivers.

Amazon operates proprietary delivery stations but contracts daily delivery operations to Delivery Service Partners (DSPs), which are independent small businesses responsible for managing fleets, drivers, and routing. Regional carriers such as LaserShip/OnTrac, Veho, and local courier companies typically serve specialized or time sensitive markets, including retail replenishment, medical deliveries, and same day services, and often rely on a mix of employee and contractor labor. Collectively, these operators handle millions of daily deliveries across the five boroughs and support a large and growing workforce.

Employee Benefits and Labor Economics

EMPLOYEE BENEFITS IN LAST-MILE DELIVERY

In the last-mile delivery sector, employee benefits vary significantly depending on the labor model. Major carriers that directly employ drivers (e.g. UPS, FedEx Express, USPS) generally offer more standardized and comprehensive benefits, while contractor-based models such as Amazon's Delivery Service Providers (DSPs) and FedEx Ground's Independent Service Providers (ISPs) show greater variability in benefits provision. This divergence reflects underlying labor economics: companies with direct employment relationships typically face higher labor costs but provide more robust benefits, whereas outsourcing to contractors can lower costs at the expense of consistency in employee benefits. These differences reflect fundamentally different operating economics, service models, and approaches to workforce management across the last mile delivery sector.

DIRECT EMPLOYMENT CARRIERS (UNIONIZED VS. NON-UNIONIZED)

Unionized carriers like UPS and USPS offer extensive benefits packages, largely due to collective bargaining agreements. UPS drivers represented by the Teamsters union receive industry-leading benefits, including fully employer-paid health insurance for employees and their families (with no premium contribution) and defined-benefit pension plans.[20] USPS, as a quasi-federal employer, also provides its delivery workers with a full suite of federal employee benefits, such as health insurance coverage (with the USPS contributing a significant share of premiums), retirement benefits through the federal pension and Thrift Savings Plan (TSP), and paid leave.[21] Non-union direct employers (e.g. FedEx Express, whose drivers are company employees but generally not unionized) also tend to offer competitive benefits such as health insurance, paid time off, and retirement savings plans, though the scope and generosity may be somewhat less standardized compared to union-negotiated packages.

Image: Amazon.

CONTRACTOR-BASED MODELS

Last-mile networks relying on independent contractors or small delivery firms often feature less consistent benefits. Amazon's DSP program exemplifies this: Amazon contracts with small businesses to deliver packages, and drivers are employees of those contractors, not Amazon itself. Amazon requires DSPs to meet baseline legal obligations (e.g. compliance with minimum wage, overtime, and workers' compensation insurance requirements), but additional benefits like health coverage, paid leave, or retirement plans are not mandated by Amazon and thus vary widely by DSP employer.[22] As a result, benefits may vary significantly by location, tenure, full time status, and the specific benefit structure selected by the owner.

Some DSP firms offer full-time drivers health insurance (Amazon has at times offered financial incentives or recommendations for DSPs to provide it), while others provide minimal or no benefits beyond what's legally required. FedEx Ground employs a similar outsourcing approach: deliveries are handled by independent service provider companies who hire drivers. These drivers' benefits depend on their contracting firm's policies, which may include limited health insurance or 401(k) options, or sometimes only statutory benefits, generally lagging behind the benefits of FedEx's directly-employed Express division drivers.[23]

UNIONIZATION AND BENEFITS DISPARITIES

Collective bargaining emerges as a key factor in benefits disparities. Unionized last-mile drivers (notably the UPS Teamsters) enjoy stronger protections and benefits uniformity across the workforce, whereas non-union drivers in contractor systems lack a collective voice, often resulting in leaner and more uneven benefits. Industry data confirms that union workers overall are far more likely to have employer-provided benefits like retirement plans, paid sick leave, and comprehensive healthcare coverage, compared to non-union workers. This general trend is reflected in the last-mile delivery space: for example, Teamsters-represented UPS full-time drivers have guaranteed pensions and healthcare, while many Amazon DSP drivers and FedEx Ground drivers may not receive comparable benefits.

BASELINE LEGAL REQUIREMENTS

Regardless of model, all employers in the U.S. must adhere to certain baseline benefits and labor standards. These include Social Security & Medicare payroll contributions, unemployment insurance taxes, and workers' compensation coverage for employees (as mandated under state laws). However, beyond such requirements and applicable state/local mandates (like minimum paid sick leave laws), the provision of fringe benefits (health insurance, additional paid leave, retirement contributions, etc.) is largely at employers' discretion in the contractor-based segment. Thus, in contractor models, some firms might offer modest paid time off or a retirement plan (e.g. a 401(k) with limited matching), while others may offer none, contributing to significant variability in the level of benefits that last-mile drivers receive.

UNDERLYING ECONOMIC DIFFERENCES BETWEEN MODELS

Benefit disparities across last mile delivery jobs reflect fundamentally different operating economics rather than isolated employer choices. Legacy carriers such as UPS, USPS, and FedEx Express operate higher cost, service focused networks characterized by centralized facilities, stable demand, and pricing structures (or, in the case of USPS, public funding) that support predictable revenue streams. These operating conditions enable long tenured employment, union representation, and sustained investment in wages and benefits.

By contrast, e commerce and on demand delivery firms operate in a high density, low margin environment marked by volatile daily and seasonal order volumes and strong consumer expectations for very fast delivery. To meet intense peak demand—such as holidays or surge periods—while controlling costs, these firms rely on flexible labor models using subcontracted DSPs, ISPs, or gig drivers that can scale the workforce up or down rapidly and maximize delivery density. This flexibility improves operational responsiveness but leaves thinner margins per package, limiting the resources available to fund comprehensive benefits.

ROLE OF CONTRACTOR MODELS IN LOCAL EMPLOYMENT

The contractor approach has also enabled the emergence of thousands of small, locally owned delivery businesses that hire from surrounding communities and provide entry level delivery jobs without requiring advanced educational credentials. Cost flexibility, rapid scalability, and local entrepreneurship distinguish these firms from large, direct employment networks and explain why comprehensive, UPS style benefits cannot be extended universally across all delivery jobs without fundamentally altering the economics of the industry.

Employment and Land Use Implications

The expansion of last mile delivery has significant implications for employment patterns and industrial land use in New York City. Delivery stations and warehouses have increasingly clustered in areas with strong highway access and industrial zoning, including Maspeth, Red Hook, East New York, and Hunts Point. Many of these neighborhoods were already designated for manufacturing or industrial uses, enabling last mile facilities to develop largely as of right. These employment dynamics are particularly relevant for Disadvantaged Communities (DACs), where a significant share of last-mile workers reside. As detailed in **Section E (Employment Effects)**, a substantial portion of this workforce is concentrated in DAC census tracts, reinforcing the connection between facility location, employment access, and equity outcomes.

By 2024, an estimated 45,400 workers in New York City were employed in sectors related to e commerce delivery, representing an approximately 84 percent increase since 2014. Employment is concentrated in delivery driving, warehouse operations, and related logistics functions and is largely composed of entry to mid skill positions. These jobs typically require a high school diploma or equivalent, short term on the job training, and, for drivers, a valid license rather than post secondary credentials.

Public data indicate that these jobs are predominantly entry to mid skill positions, typically requiring a high school diploma or equivalent, short term on the job training, and a valid driver's license rather than post secondary credentials. The U.S. Bureau of Labor Statistics (BLS) reports that delivery truck drivers and driver/sales workers generally require a high school education, with no prior work experience and limited formal training beyond initial onboarding. Consistent with this, education focused occupational summaries indicate that approximately three quarters of delivery service drivers have a high school diploma, while a substantial minority have no formal educational credential beyond secondary school; very few hold college degrees.[24]

From a demographic standpoint, national data show that delivery driver roles are disproportionately held by men and by workers of color, particularly Black and Hispanic workers. A large scale demographic analysis of U.S. delivery drivers finds that approximately 83 percent of delivery drivers are male, with women representing about 17 percent of the workforce; the most common racial and ethnic groups are White (about 60 percent), followed by Hispanic or Latino (about 19 percent) and Black or African American workers (about 12 percent). While these figures are national, New York City-specific sector analyses indicate similar or greater concentrations of Black and Hispanic workers within transportation and warehousing jobs. The New York State Comptroller reports that more than half of New York City transportation and warehousing workers are Black or Hispanic men without a college degree, and that most workers in the sector earn less than $60,000 annually.[25]

Taken together, these data suggest that last mile delivery provides employment opportunities that are especially important for workers without college degrees and for communities that have historically faced barriers to higher wage employment. At the same time, the demographic and educational profile of the workforce underscores why changes to employment models, work hours, or facility location may have distributional and equity implications, particularly for outer borough neighborhoods where transportation and warehousing jobs are concentrated. While DSP specific demographic data for New York City are not published separately, the available evidence from national delivery driver data and New York City transportation and warehousing sector reports provides a reasonable proxy for understanding the workforce characteristics relevant to this study.

C

Intro 518: Overview, Industry Context, and Regulatory Considerations

This section presents an overview of New York City Council Intro 518, integrating legislative background, industry context, and key policy and regulatory considerations relevant to AKRF's economic, operational, employment, and transportation impact analysis. Detailed legal doctrine, stakeholder perspectives, and technical policy discussions are provided in the supporting appendices.

Legilative Overview and Purpose

Introduction 518-2026 is the operative successor to Introduction 1396-2025 and reflects City Council interest in restructuring regulatory oversight of last mile delivery facilities. Introduction 1396-2025 was introduced by Council Member Tiffany L. Cabán on September 25, 2025 and referred to the Committee on Consumer and Worker Protection. The proposed legislation received extensive Council support, with 41 Members signing on as co sponsors, constituting a supermajority. Supporters characterized the legislation as a necessary restructuring of employer responsibility and business to business relationships within the last mile delivery sector, citing concerns related to the rapid expansion of last mile facilities and perceived impacts on traffic safety, public health, and worker protections. The proposed legislation was not brought to a vote before the end of the Council term and was therefore marked "Filed (End of Session)" on December 31, 2025. Intro 518 was introduced in the current legislative session as a revised successor to Intro 1396 and is likewise sponsored by Council Member Cabán. As of introduction, Intro 518 had 29 Council Members listed as co sponsors, reflecting continued and substantial legislative interest, though at a lower level than the prior session's supermajority support.

The legislation establishes a citywide licensing framework for covered last mile delivery facilities, expands labor and employment requirements, and grants enhanced enforcement authority to the Department of Consumer and Worker Protection (DCWP). The stated policy objectives include improving roadway safety, strengthening worker protections, increasing accountability for delivery operators, and addressing quality of life concerns associated with the rapid growth of last mile logistics.

From an industry perspective, Intro 518 represents a significant shift from traditional land use or vehicle focused regulation toward a facility specific and labor focused regulatory model. Rather than targeting delivery vehicles or zoning classifications, the legislation links operational viability to workforce structure, compliance history, and site specific licensing outcomes. This approach introduces new considerations for how delivery networks may be organized, staffed, and located within New York City.

Definition and Scope of Covered Facilities

Intro 518 defines a covered last mile delivery facility functionally, based on whether a location receives goods as part of a supply chain and dispatches them for delivery to consumers within the City. From the legislation:

> *Last-mile facility. The term "last-mile facility" means a warehouse, storage facility, or other location that receives goods as part of a delivery supply chain, and from which such goods are delivered either to their final destination to consumers in the city, or to locations in the city designated for the transfer of goods to sustainable modes of transport, as defined by the department of transportation, for final delivery to consumers, or both. The term does not include retail businesses where the majority of the premises are used for the purposes of the on-site sale of goods to consumers, or businesses that prepare meals for immediate consumption as their primary business.*
>
> **Source:** The New York City Council - File #: Int 0518-2026

The definition is not conditioned on facility size, employment count, delivery volume, or zoning designation. While certain uses are explicitly excluded, such as retail establishments primarily used for on site consumer sales and food service businesses focused on immediate consumption, the functional approach may encompass a wide range of uses beyond large e commerce delivery stations.

As discussed in greater detail in **Appendix 2**, this breadth creates uncertainty regarding applicability for mixed use facilities, micro fulfillment centers, shared logistics spaces, and businesses for which delivery is ancillary rather than core. From a market perspective, uncertainty regarding whether a facility is covered may influence leasing decisions, capital investment, operational design, and compliance planning.

Licensing Framework and Operational Consequences

Intro 518 establishes a location specific licensing regime administered by DCWP. Licenses would be issued for fixed terms and subject to renewal, suspension, or revocation based on current operations as well as historical compliance with labor, safety, environmental, and consumer protection laws. Importantly, licensing determinations are tied to individual facilities rather than companywide performance.

This structure introduces a new form of operational risk for multi facility operators. Compliance issues at a single site could jeopardize the continued operation of that facility regardless of broader corporate standing. As a result, operators may treat facilities more independently when making decisions related to staffing, investment, leasing, and long term viability. Over time, this dynamic has the potential to influence where facilities are sited, which neighborhoods receive continued investment, and how resilient delivery networks are to enforcement actions or administrative delays.

Facility Siting and Consolidation Implications

Because Intro 518 ties licensure to individual facilities rather than to operators on a company wide basis, the legislation introduces a form of site specific operational risk that may influence where delivery facilities are located and how networks are structured. Compliance issues at a single location could jeopardize the continued operation of that facility regardless of an operator's broader compliance record, which may lead multi facility operators to manage locations more independently when making decisions about staffing, leasing, and capital investment. Over time, this dynamic could incentivize the consolidation of activity into fewer facilities with lower perceived regulatory risk or discourage reinvestment in locations where license renewal or ongoing operation is viewed as uncertain. Such responses may affect which neighborhoods continue to host last mile facilities and receive associated employment and investment.

Employment Structure and Labor Model Requirements

A central provision of Intro 518 is the requirement that core delivery and warehouse functions be performed by workers directly employed by the facility operator. The legislation substantially limits the use of subcontracted delivery companies, staffing agencies, or third party logistics providers for these roles. Existing subcontracting arrangements may continue only during a defined transition period, capped at 24 months or the expiration of existing contracts, whichever occurs first.

If subcontracted workers are displaced as a result of the transition, operators are required to offer those workers direct employment first, while preserving existing rights and benefits. As examined in AKRF's industry assessment, contractor based delivery models are widely used to manage demand volatility, maintain route density, and control costs in dense urban environments. Restricting these models may prompt operators to consolidate workforces, redesign shifts, limit service during peak periods, or alter the geographic distribution of delivery activity, including relocating certain functions outside the City.

Image: AKRF.

Training, Compliance, and Financial Requirements

Intro 518 would impose additional operational requirements, including mandatory annual training for delivery workers through certified nonprofit providers, expanded recordkeeping and identification obligations, and enhanced worker termination and anti retaliation protections. During any transition period in which subcontracted workers are used, operators would be subject to heightened documentation and oversight.

Intro 518 also includes a bonding requirement for facilities that continue to rely on non employee delivery workers during an allowed transition period, requiring the posting of a bond for each such worker. These measures increase fixed compliance costs and ongoing administrative burdens, particularly for operators with high delivery volumes, thin margins, and limited ability to absorb additional overhead.

Policy Alignment and Potential Tradeoffs

New York City has invested in a range of initiatives aimed at improving freight efficiency, safety, and sustainability, including cargo bike programs, neighborhood loading zones, micro distribution hubs, and commercial fleet electrification. Many last mile operators have adapted their delivery models to align with these initiatives, deploying cargo bikes, short haul electric vehicles, and hyper local facilities to reduce congestion and emissions. Stakeholders have cautioned that if Intro 518 inadvertently incentivizes the relocation or consolidation of delivery facilities outside City boundaries, these gains could be undermined. Longer delivery routes may increase truck miles traveled, reduce the feasibility of electric vehicles and cargo bikes, and place additional pressure on roadway infrastructure.

Urban Delivery Innovation Context

New York City's high density, limited curb space, and congestion challenges have driven last-mile delivery operators to adopt a range of innovative practices, including cargo bike fleets, neighborhood-scale micro-distribution hubs, walking routes, and short-haul electric vehicle delivery models. These approaches are increasingly integral to delivery operations in dense neighborhoods and have emerged in response to both market forces and City policy initiatives.

Alignment with City Programs

City programs such as expanded loading zones, the Microhub Pilot Program, the Commercial Cargo Bike Program, and initiatives to support commercial fleet electrification are designed to reduce double parking, improve safety, and lower emissions. Many operators have invested in infrastructure, workforce training, and fleet transitions aligned with these initiatives, particularly where dense, in-City facilities enable short delivery routes and high stop density.

Risk of Policy Misalignment

Stakeholders noted that if regulatory or labor requirements increase uncertainty or operating costs to the point that facilities are consolidated or relocated outside City boundaries, these delivery innovations could be undermined. Longer delivery distances may reduce the feasibility of cargo bikes and electric vehicles, increase truck miles traveled, and exacerbate congestion on both highways and local streets. These dynamics could create tensions between the objectives of Intro 518 and broader City goals related to climate action, Vision Zero, and freight efficiency.

Legal and Implementation Context

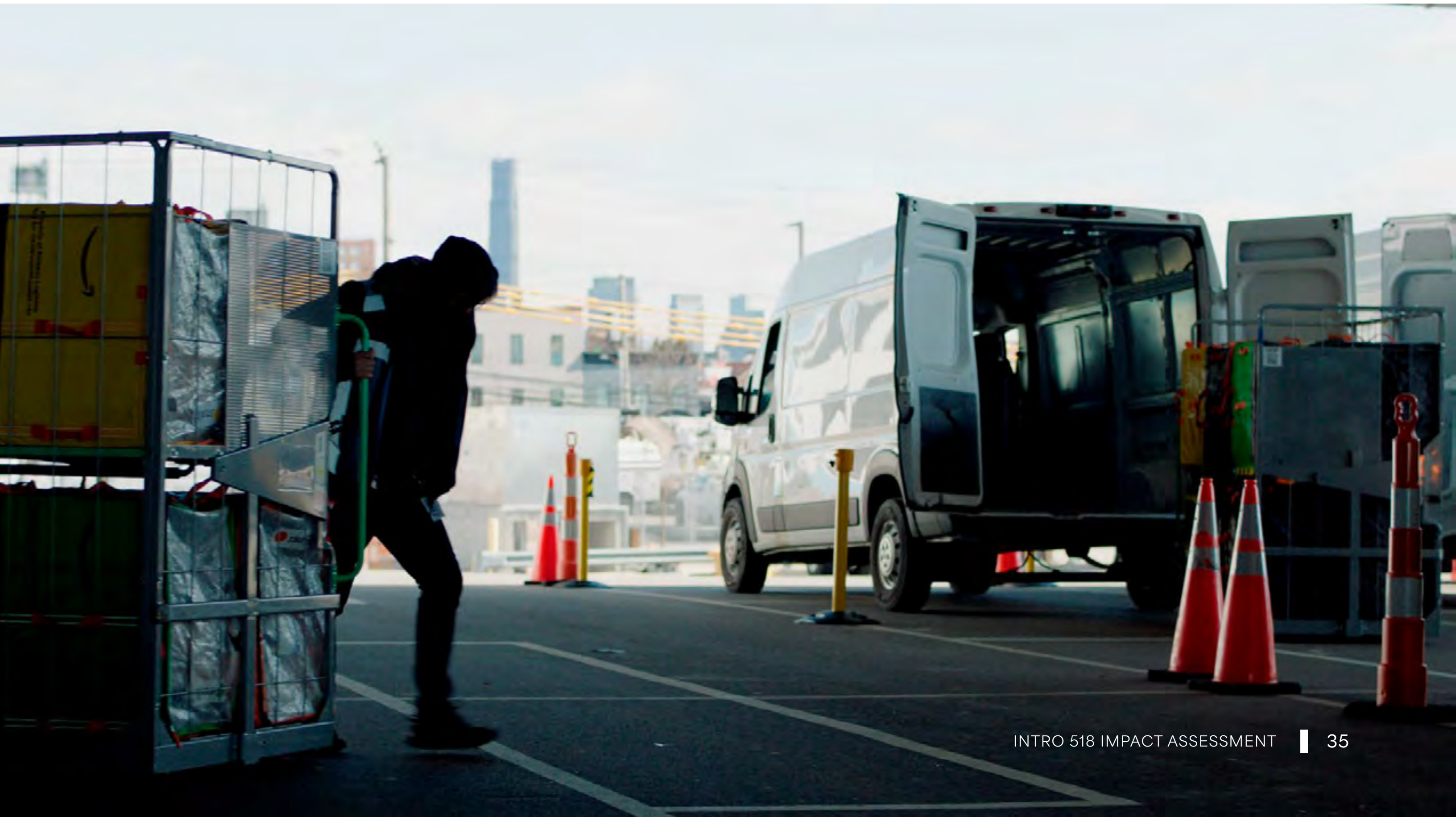
Intro 518 grants DCWP broad enforcement authority and provides workers with a private right of action. The legislation would take effect following a defined implementation period, with certain provisions phased in over time. While the legislation does not mandate specific employee benefit structures, its labor and operational requirements may interact with federal transportation, labor, and commerce laws.

As discussed in detail in **Appendix 3**, legal uncertainty surrounding federal preemption, labor law interaction, and constitutional considerations may influence how regulated entities respond to the legislation even prior to judicial review. From an economic and market analysis standpoint, this uncertainty itself is a relevant factor shaping investment decisions, compliance strategies, and facility siting behavior.

Relationship to AKRF's Scenario-Based Analysis

Together, the provisions of Intro 518 introduce new regulatory, operational, and economic considerations that may affect employment levels, job location, service reliability, delivery costs, and neighborhood impacts. Because the legislation does not prescribe how operators must restructure their networks in practice, AKRF's analysis relies on market grounded scenarios informed by stakeholder engagement, observed industry behavior, and comparable regulatory environments.

Image: Five Boroughs Job Campaign.



D Industry Response Scenarios

Stakeholder Perspectives

AKRF's interviews with a broad cross section of last mile delivery stakeholders–including national carriers, Amazon Delivery Service Partners (DSPs), regional logistics firms, industry associations, and industrial property owners–revealed widespread concern regarding the potential operational, employment, and market effects of Intro 518. While interviewees acknowledged the City's stated goals related to worker protections, safety, and accountability, stakeholders consistently characterized the legislation's direct employment mandate and facility based licensing framework as misaligned with how last mile delivery currently functions in New York City. Across interviews, stakeholders emphasized that these requirements could destabilize existing delivery networks and produce unintended consequences for workers, small businesses, consumers, and neighborhood scale infrastructure.

Image: FedEx.

A central theme raised by stakeholders was the risk of significant workforce disruption, particularly for employees of small, locally owned DSPs that operate on thin margins and rely on subcontracted delivery models. Interviewees expressed skepticism that displaced contractors would be seamlessly absorbed into direct employment roles with large carriers or e commerce platforms, noting that such conversions are not part of those firms' operating models in other markets. Instead, many stakeholders anticipated layoffs, prolonged employment gaps, or job relocation outside City limits, with disproportionate impacts on working class communities in the outer boroughs where last mile employment is concentrated. Stakeholders also emphasized the potential loss of entry level employment opportunities, advancement pathways, and small business entrepreneurship enabled by the current DSP model, raising concerns that consolidation toward a small number of large operators could reduce workforce mobility and local economic participation.

From an operational standpoint, stakeholders described Intro 518's requirements as difficult to implement within the constraints of New York City's delivery environment. Interviewees highlighted the importance of decentralized, neighborhood scale facilities in maintaining service reliability amid congestion, curb constraints, and limited delivery windows. Many anticipated that, if compliance proves infeasible at in City sites, operators would respond by consolidating or relocating distribution functions to locations outside City boundaries. Stakeholders consistently emphasized, however, that an "outside in" delivery model would degrade service levels, increase deadhead travel time, reduce delivery density, and undermine same day or next day delivery capabilities, particularly in outer borough neighborhoods.

Stakeholders further warned that such operational shifts could have broader transportation, environmental, and sustainability implications. Interviewees stressed that recent investments in cargo bikes, micro distribution hubs, electric vehicles, and local charging infrastructure depend on proximity between facilities and delivery areas. Relocating hubs outside the City, they argued, would likely increase vehicle miles traveled, intensify pressure on regional highway corridors, reduce the feasibility of electric and micromobility delivery modes, and potentially reverse gains achieved through City freight and climate initiatives. Several stakeholders noted that regulatory uncertainty alone has already begun to affect investment behavior, with operators and property owners delaying expansion, modernization, or leasing decisions while evaluating contingency plans outside New York City.

Taken together, stakeholder feedback underscores a shared expectation that Intro 518 would prompt a range of adaptive responses rather than uniform compliance. These responses could include workforce restructuring, service reductions, facility consolidation, relocation outside City limits, partial market exit, or hybrid operating strategies. The diversity of views expressed, and the emphasis on uncertainty and feasibility rather than a single predicted outcome, informed AKRF's selection of industry response scenarios. The scenarios evaluated in the following sections are therefore designed to reflect plausible behavioral responses grounded in observed industry practice and stakeholder experience, rather than assuming full, immediate, or frictionless implementation of the legislation's requirements.

Industry Response Scenarios

Stakeholder interviews indicate that regulatory uncertainty alone has already begun to affect market behavior. Property owners and operators reported that industrial users are pausing investment, delaying modernization projects, and developing contingency plans outside New York City in response to proposed legislation. Interviewees noted that relocation sentiment is most pronounced among package delivery operators and DSP reliant users, which operate on thin margins and are particularly sensitive to labor model changes and administrative burden.

Northern New Jersey was consistently identified as the most feasible alternative location due to existing and available industrial inventory and infrastructure, with Long Island and Westchester offering more limited and cost constrained options. Existing facilities located outside the City are generally clustered in areas with strong access to regional transportation infrastructure. Notable concentrations of these facilities were identified in Kearny, NJ; Teterboro, NJ; Cranbury, NJ; Avenel, NJ; Bethpage, NY; Shirley, NY; and Carle Place, NY. These sites vary in scale, ranging from approximately 100,000 to 600,000 square feet, and are operated by a range of different logistics providers.

Where sufficient capacity exists, these existing facilities can take on additional volume by increasing utilization of available space, labor, and infrastructure. Under a relocation response scenario absorption allows displaced demand to be redirected into the current suburban footprint, limiting the need to replicate infrastructure and moderating increases in additional operating costs and required vehicle travel time/mileage. In these cases, the suburban network effectively "stretches" to accommodate incremental demand without fundamentally changing its spatial footprint. However, when displaced volume exceeds what existing facilities can reasonably handle, the system shifts towards building additional capacity. Here, additional facilities must be developed in suburban locations to serve overflow demand. AKRF evaluated both absorption and new-build scenarios to assess how varying levels of utilization of existing out-of-City facilities versus incremental suburban capacity expansion impact outcomes for consumers.

Overall, stakeholders emphasized that relocation is generally not cost effective and would be pursued only if in-City operations become infeasible. In this context, relocation was described as a last resort response rather than an efficiency enhancing strategy.

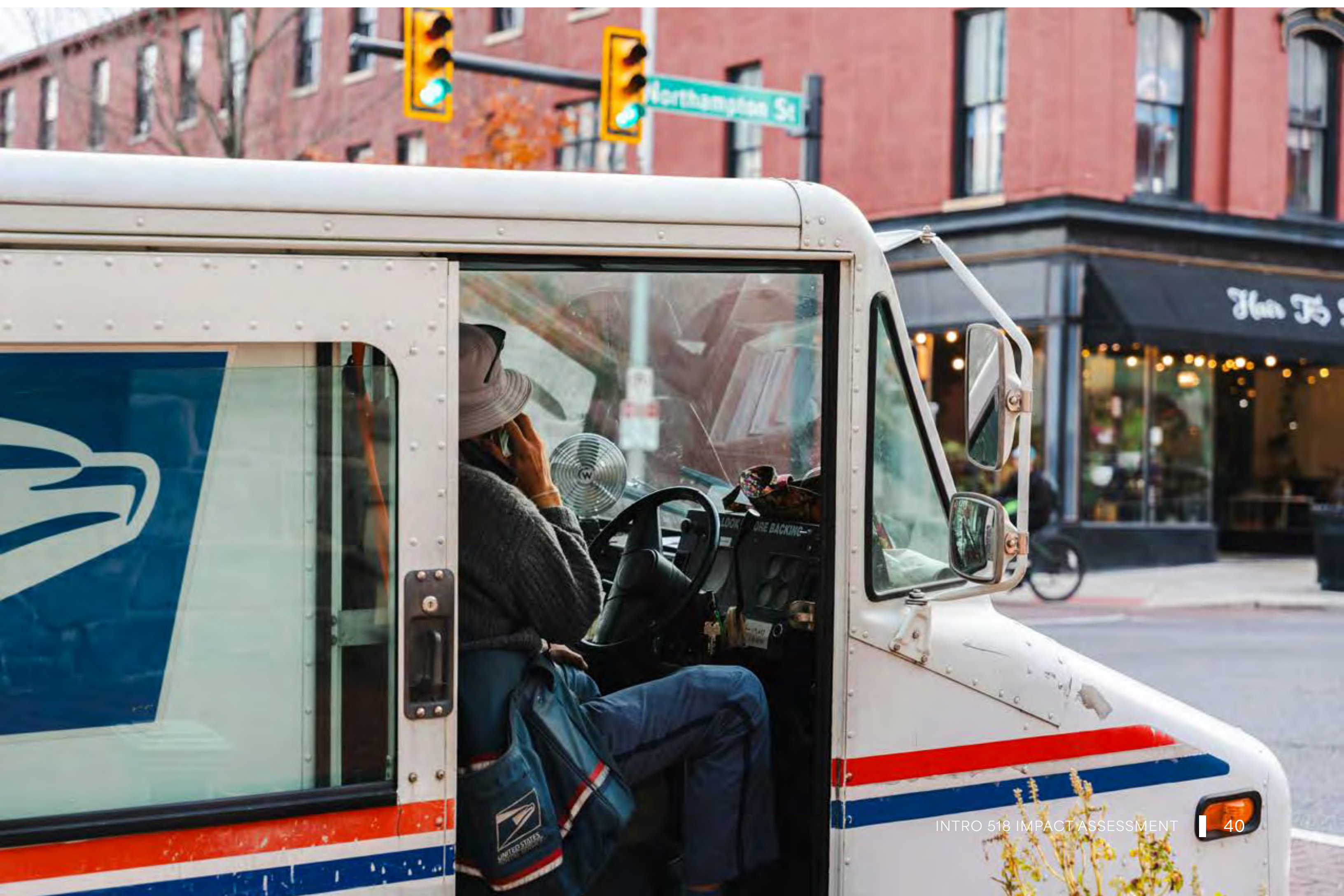
While the indirect effects of Intro 518 could extend throughout the broader logistics and goods movement ecosystem, the most immediate impacts would likely fall on delivery firms operating under subcontracted models, particularly Amazon DSPs and FedEx Ground Independent Service Providers (ISPs), which rely on third-party labor arrangements targeted by the legislation. Accordingly, these firms would be expected to adjust operations through a combination of workforce adjustments, routing and network changes, and other structural modifications to maintain delivery capacity under increased regulatory and cost pressures.

The following industry response scenarios illustrate the range of potential operational outcomes:

- Relocation of Operations Outside New York City: Many DSPs and ISPs would likely be unable to comply with the direct-employment requirements established under Intro 518. In response, operators may close or relocate facilities to nearby jurisdictions in New Jersey, Long Island, or the lower Hudson Valley while continuing to serve New York City routes from outside City limits. This scenario would shift warehouse, dispatch, and courier origination activity away from NYC and could result in the loss of thousands of jobs currently accessible to City residents.
- Facility Consolidation, Automation, and Labor Substitution: Larger logistics operators may respond by consolidating activity from multiple smaller urban facilities into fewer, larger regional distribution hubs located inside and outside the City in order to improve operational efficiency and reduce compliance exposure. As part of this transition, firms may also accelerate investment in automation technologies across sorting, loading, routing, and warehouse operations to offset higher labor costs and operational complexity. Together, these changes would likely reduce demand for local facility-based employment, including warehouse workers, sorters, dispatchers, and other delivery support personnel.
- Compliance Without Structural Change (Unlikely): Some larger or better-capitalized firms may attempt to transition portions of their workforce to direct employment structures in order to maintain operations within New York City. However, doing so would require substantial administrative restructuring, including expanded payroll systems, insurance coverage, human resources capacity, compliance oversight, and employee benefits administration. These requirements may create significant financial and operational barriers, particularly for smaller contractors and locally owned operators.

Overall, the likely industry response to Intro 518 would be a structural reconfiguration of the last-mile delivery network rather than a marginal adjustment. Faced with the legislation's direct-hire mandate and facility licensing requirements, many contractor-based operators would likely relocate last-mile operations outside the City, consolidating activity into fewer regional hubs in nearby jurisdictions such as New Jersey, Long Island, or Westchester County to avoid increased compliance and labor costs. This shift would be accompanied by the closure or downsizing of smaller urban depots and a resulting loss of facility-based employment for warehouse, sorting, dispatch, and administrative roles currently located within New York City. At the same time, remaining operations would likely become more centralized and spatially distant from end consumers, increasing route lengths and "deadhead" travel time as drivers begin and end shifts outside the City. These inefficiencies would reduce stop density per route and constrain overall delivery throughput, with knock-on effects for same-day and next-day service reliability.

In parallel, operators would likely pursue further consolidation and technological substitution, reducing the number of active facilities while increasing reliance on automation in sorting, routing, and warehouse functions to offset higher labor costs and operational complexity. To maintain service coverage within dense urban areas, firms may also expand alternative last-mile strategies such as foot and bicycle couriers, curbside or mobile micro-distribution points, and parcel lockers, particularly in Manhattan and other high-density neighborhoods. However, these approaches are inherently capacity-limited and are unlikely to fully replicate the throughput of traditional depot-based networks. The resulting system would likely be more centralized and capital-intensive, with reduced reliance on local contractor networks and a more limited physical logistics footprint within New York City itself.



E

Intro 518 Effects on Local Jobs and Businesses

Intro 518's direct-employment mandate and other licensing requirements create new cost and compliance pressures on last-mile delivery operators. These policy changes can affect local jobs and businesses through multiple channels, including:

1. Labor model mandates that effectively prohibit contracting deliveries and thereby force changes to employment models;
2. Licensing risk and administrative burdens that could deter operators from maintaining or investing in New York City facilities;
3. Higher operating and compliance costs (e.g. for direct payroll, bonding, training, and reporting) that erode profit margins; and
4. Operational restructurings (such as facility consolidation, relocation outside city limits, or service model reconfiguration) undertaken as companies seek to avoid these new requirements.

In combination, these pressures are expected to drive major adjustments in how last-mile logistics firms do business in the City, with consequent risks to local employment and small businesses. This section examines these potential impacts in detail. It provides scenario-based estimates of the types and numbers of jobs at risk under different industry responses; an assessment of the equity and geographic distribution of impacts (including workforce demographics and the implications for Disadvantaged Communities); analysis of the risks to small-business contractors; and discussion of spillover effects on other local businesses.

Conceptual Approach

AKRF's assessment of the potential effects of Intro 518 on local jobs and businesses is grounded in a scenario-based, market-responsive analytical framework that reflects how last-mile delivery operators are likely to respond to the legislation in practice. As described in the Study Approach, the analysis does not assume uniform compliance or a single outcome; rather, it evaluates a range of plausible industry responses and their implications for employment, small businesses, and the broader local economy.

The conceptual framework begins with the understanding that New York City's last-mile delivery system is a heterogeneous, multi-layered ecosystem comprising direct-employment carriers, contractor-based delivery networks, including Amazon Delivery Service Partners (DSPs) and FedEx Ground Independent Service Providers (ISPs), and a wide range of smaller courier and logistics firms. These segments differ materially in their labor structures, cost models, scalability, and capacity to absorb regulatory changes.

Intro 518 directly targets the contractor-based segment by requiring the use of direct employment for core delivery and warehouse functions. As a result, the analysis conceptualizes impacts as flowing through four primary adjustment mechanisms. These include labor model restructuring, in which firms may attempt to convert contractor-based roles to direct employment or reduce workforce size where conversion is not feasible; facility-level decisions, such as consolidation, downsizing, or relocation of last-mile operations outside New York City; and business viability outcomes, particularly for small, locally owned delivery firms operating under subcontracting models that may face disproportionate challenges in adapting to the new requirements. Finally, firms are expected to undertake broader operational reconfiguration, including changes in route structures, service coverage, and delivery density, as they seek to maintain system performance under new cost and regulatory constraints.

These adjustment mechanisms are not independent; rather, they interact within a highly cost-sensitive and operationally constrained delivery system, where proximity to customers, flexible labor, and dense routing are critical to maintaining efficiency and service levels. To capture these dynamics, AKRF evaluates employment and business impacts across a set of three conceptual industry response scenarios, representing a spectrum of likely outcomes:

- In-City Adaptation (Low Impact): Partial compliance and restructuring, with some firms transitioning to direct employment or modifying operations while maintaining a presence in New York City
- Hybrid / Partial Relocation (Moderate Impact): A mixed response in which some operators relocate or consolidate facilities while others remain and adapt, resulting in partial displacement of jobs and businesses
- Widespread Relocation (High Impact): Broad withdrawal of contractor-based operations from New York City, with relocation to out-of-City facilities and substantial loss of local employment and small business activity

These scenarios are not predictions, but structured representations of how firms may respond under varying levels of cost pressure and regulatory feasibility. Within this framework, the analysis focuses on three key outcomes: (1) employment effects, including the scale and distribution of jobs at risk; (2) small business viability, particularly for contractor-based firms; and (3) broader economic spillovers affecting related industries and local economies. The analysis highlights a central tradeoff: improving labor conditions within a subset of jobs may reduce the overall number of jobs and the scale of local business participation in the sector.

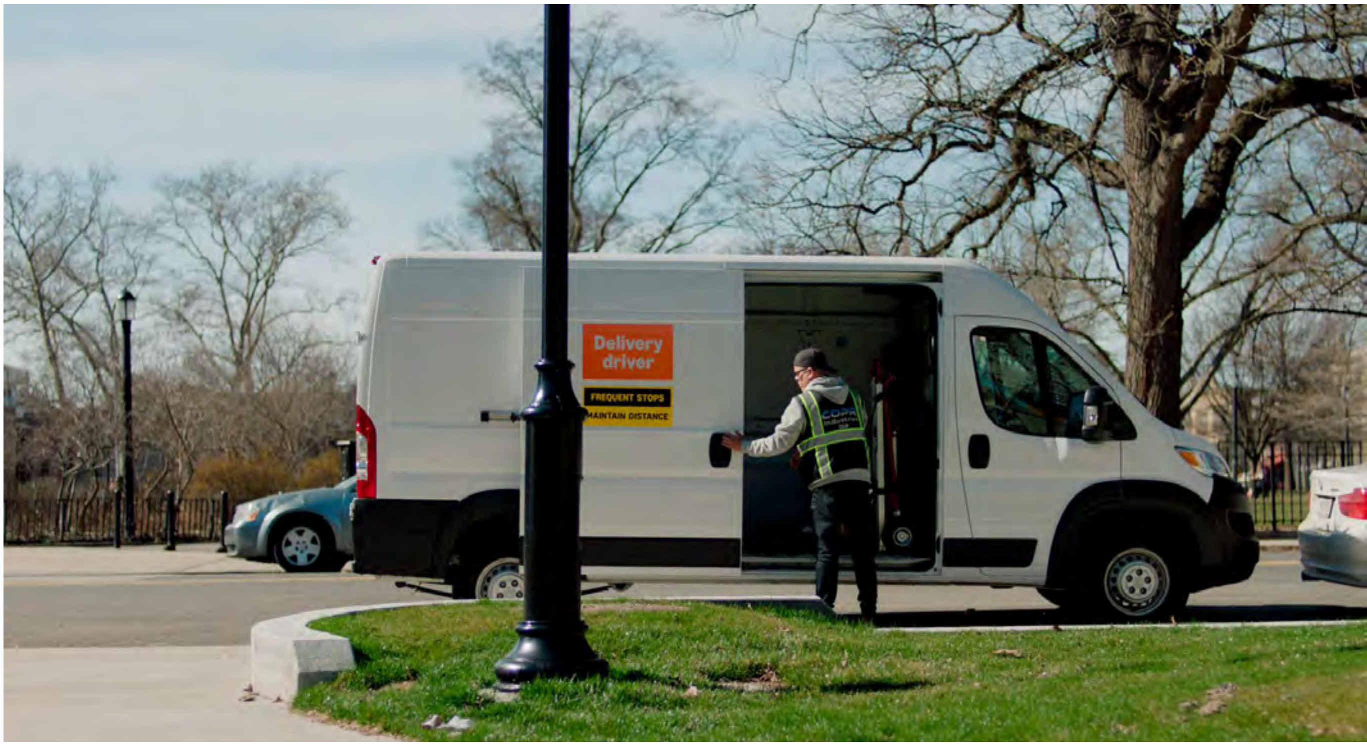


Image: Five Boroughs Job Campaign.

Methodology

The methodology for evaluating the effects of Intro 518 on local jobs and businesses builds on the study's broader scenario framework and integrates industry data, stakeholder input, and economic modeling to assess both direct and indirect impacts. The analysis begins by establishing baseline conditions for New York City's last-mile delivery sector, which serve as the reference point for all subsequent impact estimates. This baseline includes a characterization of industry structure across major operator types–such as direct-employment carriers, contractor-based fleets, and independent couriers–as well as a detailed understanding of employment models. It also incorporates estimates of workforce scale and distribution by job type, including drivers, warehouse staff, dispatch, and support roles, along with a spatial mapping of last-mile facilities using AKRF's inventory and borough-wide cluster analysis. These baseline conditions are derived from a combination of public data, prior studies, spatial analysis, and stakeholder interviews.

Building on this foundation, scenario assumptions were developed through structured engagement with industry stakeholders, including national carriers, delivery service providers (DSPs), independent service providers (ISPs), logistics firms, and property owners. These interviews inform key inputs such as the feasibility of transitioning to direct employment models, the likelihood of facility relocation or consolidation, expected workforce adjustments under varying compliance conditions, and constraints on absorbing displaced workers into existing networks. The findings are synthesized to construct behaviorally realistic response scenarios that reflect actual operating constraints and decision-making processes, rather than purely theoretical outcomes.

For each scenario, impacts to jobs and businesses are estimated by applying scenario-specific assumptions to the baseline industry structure. This includes allocating job risk across different labor models and job types, with particular attention to the vulnerability of contractor-based drivers relative to direct-employment roles. Job impacts are also linked to facility-level outcomes (such as closures, relocations, or consolidation of last-mile operations) allowing for a more spatially grounded assessment of employment change. In addition, the analysis evaluates potential effects on small, contractor-based delivery businesses, considering factors such as firm size, ownership characteristics, reliance on subcontracting, and capacity to absorb compliance costs or transition to new operating models. Together, these components provide a structured understanding of who is affected, how impacts occur, and under what conditions.

To capture broader economic effects, the methodology applies IMPLAN to translate direct employment changes into indirect and induced impacts. This includes supply chain effects across supporting industries (such as vehicle maintenance, fuel supply, and logistics services), as well as changes in household spending associated with shifts in employment and income. The analysis also estimates implications for economic output and tax revenues. Given uncertainty in total employment levels, results are presented using standardized per-1,000 job multipliers are proportionately allocated across at-risk sectors including as freight trucking, couriers, and warehousing, consistent with the study's probabilistic framework.

The methodology further incorporates spatial and demographic analysis to evaluate how impacts are distributed across New York City. Worker residence patterns are analyzed using modeled employment data (e.g., Replica HQ) to identify where affected workers live, while Disadvantaged Communities (DACs), as defined by New York State, are used to assess equity implications. The geographic distribution of facilities and employment is also examined to identify borough- and neighborhood-level concentrations of impact, with particular attention to outer-borough communities where last-mile employment is most prevalent. This allows the analysis to move beyond aggregate job counts and assess who is most affected and where.

Finally, consistent with the overall study approach, results are presented as ranges across scenarios rather than single-point estimates, with key assumptions such as labor conversion rates, relocation likelihoods, and workforce absorption capacity adjusted by scenario. The analysis focuses on near-term market responses (within approximately one to three years), rather than long-term equilibrium conditions. All stakeholder input is aggregated and anonymized, and where precise data are unavailable, the methodology relies on bounded ranges and scenario logic to avoid overstating precision.

Image: AKRF.

Employment Effects

Last-Mile Industry Employment Models

New York City's last-mile delivery industry includes a range of operators with distinct business and labor models. Among national parcel carriers, UPS operates a large, unionized workforce with direct employment and collectively bargained wages and benefits. In contrast, FedEx Ground relies on a contractor-based model, outsourcing delivery operations to independent service providers who employ their own drivers. The U.S. Postal Service (USPS), a federal agency, plays a significant role in last-mile delivery, particularly for residential and small-parcel deliveries, and employs unionized federal workers with standardized benefits. E-commerce platforms (most notably Amazon) operate proprietary delivery stations and contract with Delivery Service Partners (DSPs), which are independent small businesses responsible for managing fleets, drivers, and routes. Regional carriers such as LaserShip/OnTrac and Veho, along with local courier companies, typically serve niche markets like retail, medical, and same-day delivery, often using a mix of employee and contractor labor. Together, these entities form a complex ecosystem that handles millions of daily deliveries across the five boroughs and supports thousands of businesses and workers citywide.

Employee Benefits

Last-mile delivery workers' benefits vary depending on the employer's labor model. Direct-employment carriers like UPS, FedEx Express, and USPS provide more comprehensive and uniform benefits that typically include full health insurance coverage (often for families), substantial paid leave, and retirement plans (pensions or 401k) to their drivers. In contrast, outsourced contractor models such as Amazon's DSPs, FedEx Ground's Independent Service Providers (ISPs), and many regional courier firms tend to offer more limited or inconsistent benefits packages. For example, a unionized UPS driver typically receives a higher hourly wage and more comprehensive benefits–including fully-paid family health insurance, paid leave, and a pension–compared to many DSP or ISP-employed drivers, whose benefits vary depending on the policies of their individual employers.

Benefit disparities reflect fundamentally different operating models. Carriers like UPS, USPS, and FedEx Express run higher-cost, service-focused networks: they handle large volumes through centralized hubs, promise moderately slower delivery speeds (e.g. 1-2 day standard service instead of same-day), and have the pricing power (or public funding in USPS's case) to support a stable, long-tenured workforce. This structure lets them invest more in employee compensation, often under union agreements, and achieve efficiency with experienced drivers, making comprehensive benefits feasible.

By contrast, e-commerce and on-demand delivery companies (Amazon and many couriers) operate in a high-density, low-margin market where customers expect very fast delivery and order volumes fluctuate heavily by day and season. To meet intense peak demand (e.g. holidays, surge hours) at low cost, these firms rely on flexible labor models using subcontracted DSPs/ISPs or gig drivers that can scale the workforce up or down quickly and maximize delivery density. This flexibility, however, comes with thinner margins per package, leaving less budget for each worker's benefits.

The contractor approach has also enabled the rise of thousands of small, local delivery businesses that hire from the community and provide entry-level driver jobs without requiring advanced education. Cost flexibility, rapid scalability, and local entrepreneurship - make the contractor model fundamentally different from the big direct-employed networks, explaining why full UPS-style benefits cannot simply be extended to every delivery job without changing the economics of the industry.

Jobs at Risk

While unionized, directly employed delivery workers (e.g., at UPS, USPS, and FedEx Express) earn higher wages and receive more comprehensive benefits, these outcomes reflect a fundamentally different, higher-cost operating model, not a structure that can be universally applied across New York City's last-mile delivery sector. Direct-employment systems are sustained by consolidated networks, slower delivery guarantees, and long-tenured workforce. In contrast, most of NYC's last-mile operations function in a high-density, on-demand, low-margin environment that requires flexible labor, rapid scaling, and high stop density. Mandating a shift to direct employment would likely lead operators to reduce headcount, consolidate or relocate facilities, limit service coverage, and increase costs for consumers and small businesses. The core tradeoff is not simply between low- and high-wage jobs, but between maintaining broad job accessibility and risking a contraction in total employment and service availability.

The following matrix provides a summary of key job segments, estimated headcounts, their predominant employment model, and the risk level these jobs face under Intro 518's requirements.

Job Segment	Estimated NYC Headcount	Employment Model	Risk under Intro 518
Direct-Employed Delivery Drivers e.g., UPS, USPS, FedEx Express, DHL	~10,000-12,000	In-house W 2 employees of major carriers; mostly unionized with full benefits	**Low** - Already comply (drivers are direct employees). Jobs are not subject to new requirements, so these positions are secure. Some carriers (UPS, USPS) may see slight volume increases if competitors withdraw, but significant expansion is constrained by their business models.
Direct-Employed Warehouse/Hub Staff	~6,000-8,000	In-house employees of major carriers (often union). Manage sorting, loading, and facility ops at large hubs.	**Low** - Not directly affected as these employers already use direct labor. No job losses expected; these roles continue as long as their operations remain in-City. (Potential for modest uptick if carriers handle more parcels amid competitors' contraction.)
Contracted Delivery Drivers e.g., Amazon DSP drivers, FedEx Ground ISP drivers, regional courier fleets	~7,000-8,000 drivers	Employed by independent local companies under contract to larger platforms. Typically non-union; lower and less consistent wages/ benefits than direct peers.	**High** - Most threatened segment. These jobs must be converted to direct employment or else the facilities cannot be licensed. Likely outcome: widespread elimination or relocation of these positions outside NYC.
Contractor-Model Facility Staff e.g., Amazon delivery station workers, FedEx Ground sort staff	~3,000-5,000 workers	Mix of direct employees at e-commerce firms (Amazon station staff are Amazon employees) and employees of contractors (some 3PLs may use staffing firms). They sort and dispatch packages at facilities whose delivery operations are outsourced.	**High** - Indirectly at risk. If their companies cannot meet the law's terms, many of these facilities would close or move. Amazon's NYC delivery stations are at risk if drivers remain contractors, jeopardizing warehouse jobs unless Amazon shifts deliveries to a direct model or uses non-NYC sites. Similarly, FedEx Ground could consolidate NYC terminals, cutting local sorting jobs, rather than absorb ISP drivers onto FedEx payroll.
App-Based & "Gig" Couriers excluding food e.g., Amazon Flex drivers, "walkers," bike messengers	~10,000+ workers	Independent contractors (gig economy workers). Perform on-demand deliveries via personal vehicles, bikes, or on foot; no fixed "facility" base.	**Low** - Largely unaffected or exempt. Intro 518 covers facilities and their operators' labor practices, so these ad hoc delivery models can continue. Some operators may expand use of foot couriers or mobile pickup points as a workaround.

While the indirect effects of Intro 518 could ripple across the broader logistics ecosystem, the most immediate and direct risks fall on workers employed by subcontracted delivery firms—particularly Amazon's DSPs and FedEx Ground's ISPs. These companies operate under a contractor model that is directly targeted by Intro 518's restrictions on third-party employment for core delivery services. The following predicted industry response scenarios illustrate the range of potential outcomes:

- Low Impact Scenario (In-City Adaptation): Operators attempt compliance or partial integration, minimizing displacement. Result: ~3,000-5,000 local jobs at risk, mainly among smaller contractors unable to convert to direct employment. Larger carriers absorb some volume, mitigating losses.
- Moderate Impact Scenario (Hybrid/Partial Relocation): A mix of responses - some facilities relocate or consolidate, while others partially comply via hybrid models. Result: ~6,000-9,000 jobs at risk, including most subcontracted delivery driver positions and many facility roles. Some losses offset by modest hiring at remaining in-City operations or alternative employment, but net job contraction is significant.
- High Impact Scenario (Widespread Relocation): Most contractor-based operations shut down or move out of NYC. Result: on the order of 10,000+ jobs at risk, reflecting the near-total loss of subcontracted drivers and associated warehouse/dispatch staff. Large direct-hire operators (UPS, USPS, etc.) remain in NYC but cannot fully replace the evacuated jobs.

Low Impact Scenario (In-City Adaptation) Est. 3,000 - 5,000 Local Jobs at Risk

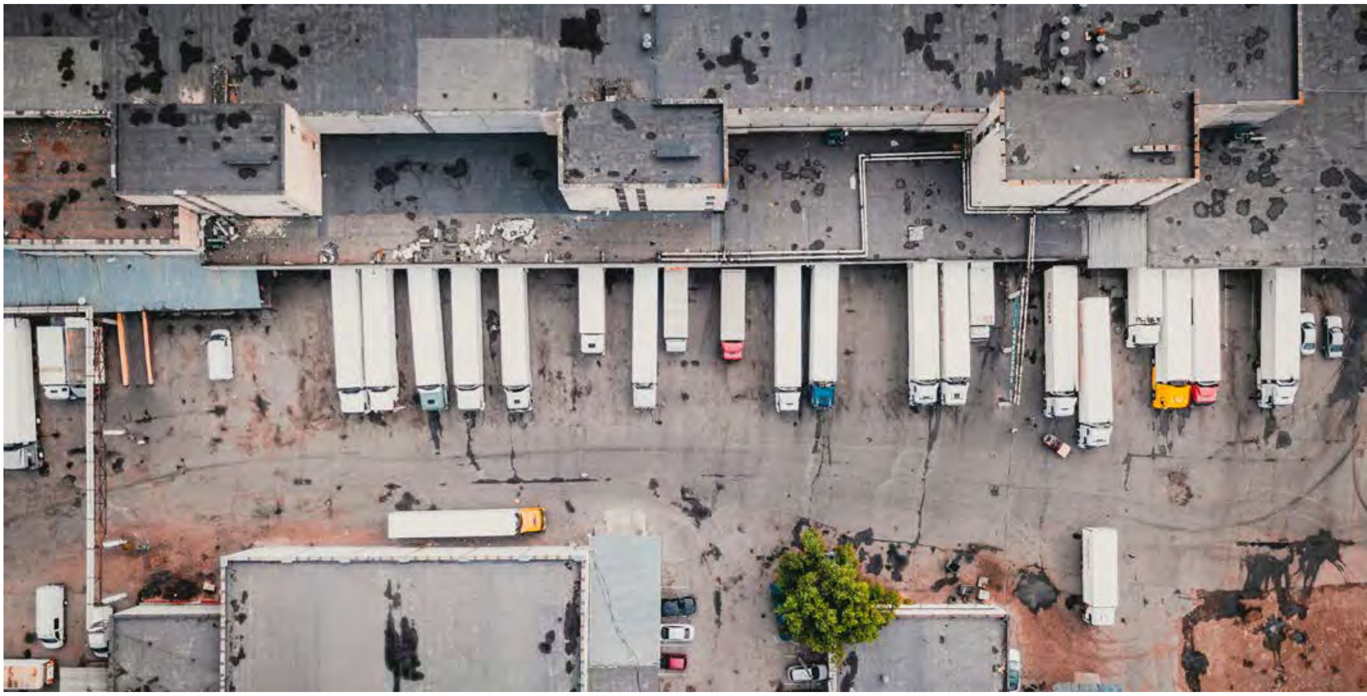
Under a limited-impact scenario, a subset of last-mile operators (primarily larger firms or better-capitalized regional providers) can partially adapt to the requirements of Intro 518 through a combination of operational restructuring and selective compliance. In this case, some contractor-based delivery networks transition a portion of their workforce to direct-employment models, particularly in higher-volume facilities where economies of scale can help absorb increased labor and administrative costs. Employment losses still occur but are moderated by partial retention of in-City operations and the ability of certain firms to internalize delivery functions. Job risk remains concentrated among smaller contractor-based firms, such as DSPs and ISPs, that lack the capital and administrative capacity to convert to direct employment, resulting in disproportionate impacts on contractor driver positions relative to facility-based roles.

Within this scenario, operators may also explore limited expansion of alternative delivery models, such as walker-based last-mile distribution staged from compliant facilities or micro-hubs as a supplemental adaptation strategy. However, interview findings and operational constraints suggest that the scalability of the walker model is inherently limited, both in terms of geographic coverage and payload capacity. While walker delivery may offset a portion of van-based driver demand in dense, high-volume areas of Manhattan and parts of the inner boroughs, it is not a viable substitute across the broader service area, particularly in lower-density neighborhoods or locations requiring longer delivery routes. As such, any expansion of the walker model is assumed to be incremental and localized, reducing—but not eliminating—job displacement among driver roles.

Facility-level impacts in this scenario include selective consolidation and limited closures, with most large-format distribution centers remaining operational. Remaining operators are assumed to maintain a portion of existing employment through a combination of labor conversion, operational adjustments, and targeted use of alternative delivery formats. However, even under this more adaptive outcome, the analysis assumes that not all displaced workers can be absorbed into restructured operations, reflecting both capacity constraints and the mismatch between displaced contractor drivers and available direct-employment or alternative delivery roles.

Moderate Impact Scenario (Hybrid/Partial Relocation) Est. 6,000 - 9,000 Local Jobs at Risk

In the moderate-impact scenario, industry response is characterized by a combination of contraction within New York City and strategic reconfiguration of the last-mile network, including consolidation of facilities and a shift toward higher-efficiency operations. A significant number of contractor-based firms—including DSPs, ISPs, and smaller logistics providers—are unable to meet the requirements of Intro 518 and exit the City market, while larger operators respond by consolidating multiple smaller facilities into fewer, higher-capacity hubs, often located outside New York City. This consolidation reduces the overall number of in-City facilities and concentrates remaining operations in a smaller set of compliant sites. As part of this restructuring, operators increasingly adopt automation technologies and process efficiencies—such as advanced sorting systems, route optimization, and reduced staffing ratios—which further reduce demand for facility-based labor, including sorters, dispatchers, and warehouse staff.



Employment impacts in this scenario are therefore driven by both spatial relocation and structural changes in how work is performed. Job losses extend beyond contractor driver roles to include a broader range of facility-based positions, as consolidation and automation reduce total labor needs even where operations are maintained. While some larger carriers expand direct-employment models within the City, these expansions are not sufficient to offset losses associated with the closure or downsizing of contractor-driven facilities, particularly given the higher cost structure of direct employment. In parallel, a growing share of last-mile activity shifts to out-of-City hubs, where firms can operate under existing labor models at lower cost and larger scale. Consistent with stakeholder input, this scenario reflects the practical limitations of scaling direct-employment models across a dispersed urban network, and emphasizes that job impacts arise not only from firm exit, but from systemic changes in facility footprint and labor intensity within the industry.

High Impact Scenario (Extensive Relocation and Structural Exit) Est. 10,000+ Local Jobs at Risk

Under a high-impact or worst-case scenario, Intro 518 triggers a fundamental restructuring of the last-mile delivery industry in New York City, with widespread relocation of operations and large-scale exit of contractor-based firms from the City. In this outcome, most DSPs, ISPs, and similar subcontracting entities are unable to operate under the new regulatory framework and cease in-City operations entirely. Large carriers maintain a limited presence within New York City but rely increasingly on facilities located in New Jersey and other surrounding regions to serve the metropolitan market. As a result, the majority of contractor-based driver jobs are eliminated within the City, and associated small businesses (including family-owned delivery firms) are effectively displaced. Facility closures are widespread, particularly among smaller and mid-sized last-mile hubs, leading to substantial losses in warehouse, dispatch, and support roles in addition to driver positions. While some employment is recreated outside the City, the analysis assumes that these jobs are less accessible to current New York City residents, resulting in a net loss of City-based employment. This scenario also incorporates the potential for accelerated efficiency measures, such as automation or route consolidation, which further reduce overall labor demand. This outcome reflects conditions in which relocation and structural exit are the dominant industry responses, and where adaptation within the City is limited to a small number of large, vertically integrated operators.

Shared Drivers of Workforce Risk

Across all scenarios, job risk is shaped by several consistent structural dynamics. First, contractor-based drivers represent the most exposed segment of the workforce, given the direct targeting of subcontracting models by Intro 518. Second, facility-level decisions (particularly closures, consolidation, and relocation) serve as the primary mechanism through which employment impacts materialize, linking job outcomes directly to spatial changes in the network. Third, the capacity of remaining operators to absorb displaced workers is constrained by both economic and operational factors, including higher per-employee costs and limits on facility throughput. Finally, as detailed below, many of the at-risk jobs are held by New York City residents, particularly in outer-borough and disadvantaged communities, meaning that even partial relocation of employment outside the City can result in disproportionate local impacts and limited pathways for re-employment.

Who Are These Last-Mile Workers? Workforce Geography and Equity

To understand how these impacts translate to real-world effects, it is critical to examine who comprises the last-mile workforce and where these workers live. Last-mile delivery jobs and facilities are not evenly spread across the City. Both the workforce and the infrastructure have a heavy presence in outer-borough, industrial neighborhoods. Most last-mile delivery and warehouse jobs are entry- to mid-skill positions typically requiring no more than a high school diploma. Consistent with national trends, the workforce is predominantly male (on the order of 80 percent) and disproportionately composed of workers of color. Over half of New York City's transportation and warehousing employees are Black and Hispanic men without college degrees, reflecting the important role last-mile jobs play in providing accessible employment opportunities.

AKRF used Replica HQ to estimate the place of residence and the demographics of workers at last-mile facilities identified throughout the City.[26] The data are derived from modeled, activity-based employment estimates and were extracted using H3 hexagonal grid cells at resolution 8. At this resolution, each hex cell represents an approximate area of approximately 0.7 km² (about 0.27 square miles). Because H3 cells do not align precisely with parcel boundaries or individual sites, the resulting worker counts are best understood as approximate indicators of workforce presence within and around each facility location rather than exact employment totals for individual facilities.

As summarized in **Table E-1**, the Replica HQ dataset identifies 19,342 workers within the geographic filters containing last-mile facilities and working in relevant industries.[27] These workers have an estimated average individual income of $60,947 with a relatively high average household size at nearly four persons per household. These households have an estimated average household income of $132,384, suggesting that last-mile jobs are the single source of income for many lower-income families and a critical second income for middle-income families.

TABLE E-1

Key Metrics for Last-Mile Delivery Worker Population

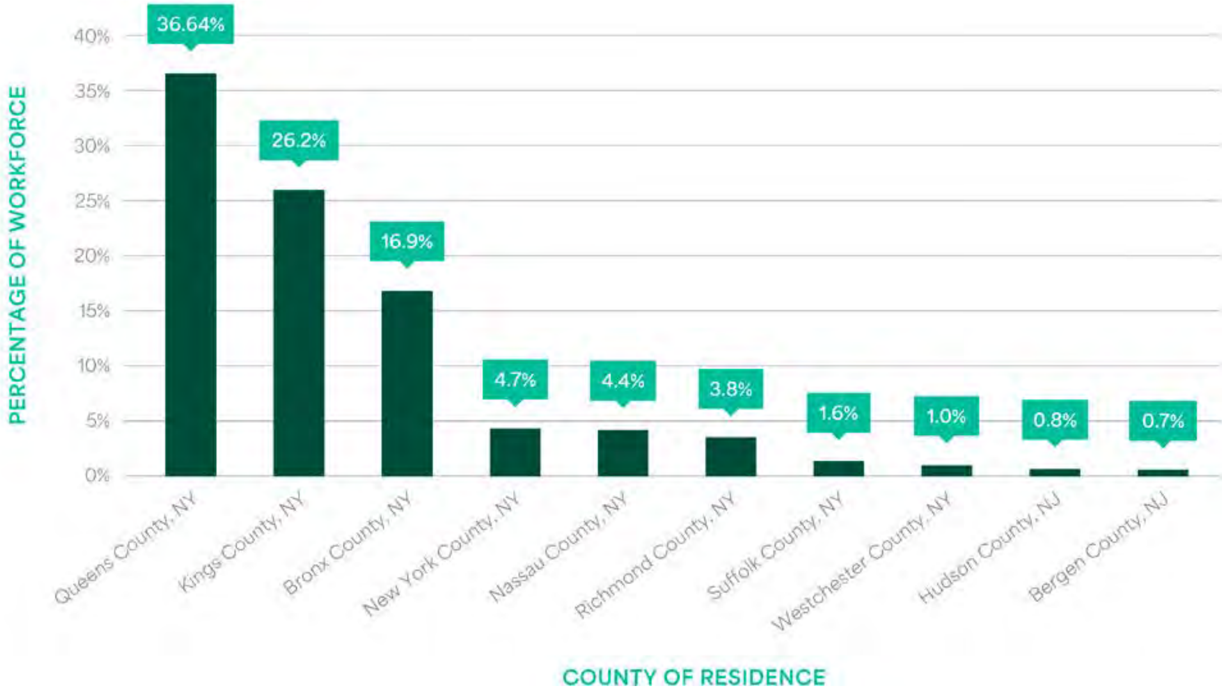
Metric	Value
Total Workers (sample count)	19,342
Average Household Size (persons/hh)	3.7
Average Household Income ($/year)	$132,384
Average Individual Income ($/year)	$60,947

Sources: Replica HQ; AKRF.

As shown in **Figure E-1**, approximately 88 percent of workers at identified last-mile facilities live in New York City, and approximately 83 percent of workers live in the outer boroughs. Of the five boroughs, Queens County has the largest share of workers residing within the county, accounting for approximately 36 percent of the sampled last-mile facility workforce.

FIGURE E-1

Top Ten Places of Residence (County) for Workers at Identified Last-Mile Facilities



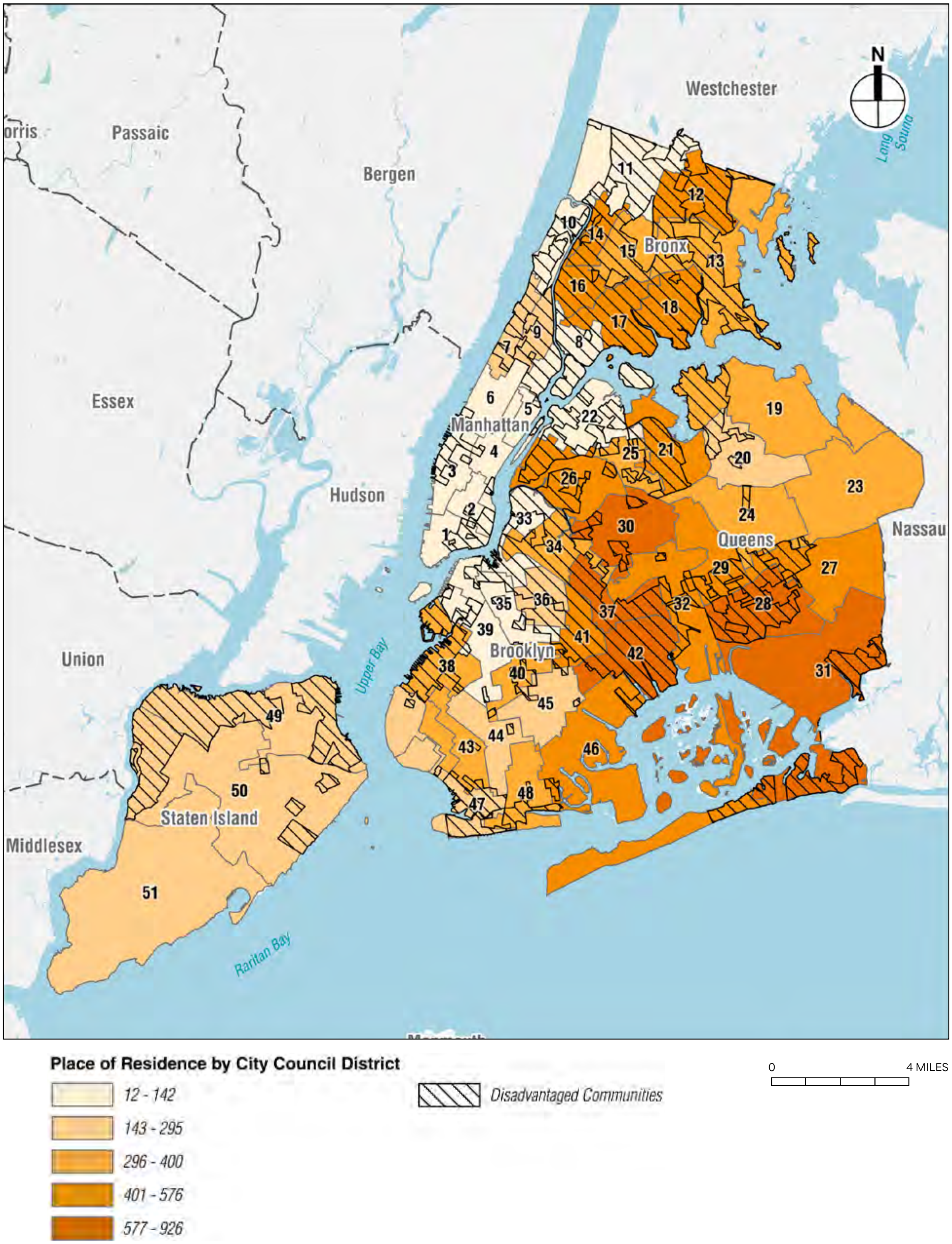
Sources: Replica HQ; AKRF.

Figure E-2 shows the distribution of last-mile facility workers by City Council district, with darker shading indicating higher concentrations. Districts overlapping with Disadvantaged Communities (DACs) are also highlighted to illustrate potential equity impacts.

Last-mile facility workers tend to live within and nearby neighborhoods that contain identified last-mile facilities. As shown in **Figure E-2**, the highest concentrations of the last-mile facility workforce can be found in City Council Districts 28, 30, 31 37, and 42. The district with the highest number of last-mile facility workers is City Council District 28. Nearly half (approximately 49 percent) of the last-mile workforce lives within census tracts designated as Disadvantaged Communities (DACs).

FIGURE E-2

Last-Mile Workforce Place of Residence by City Council District and DACs



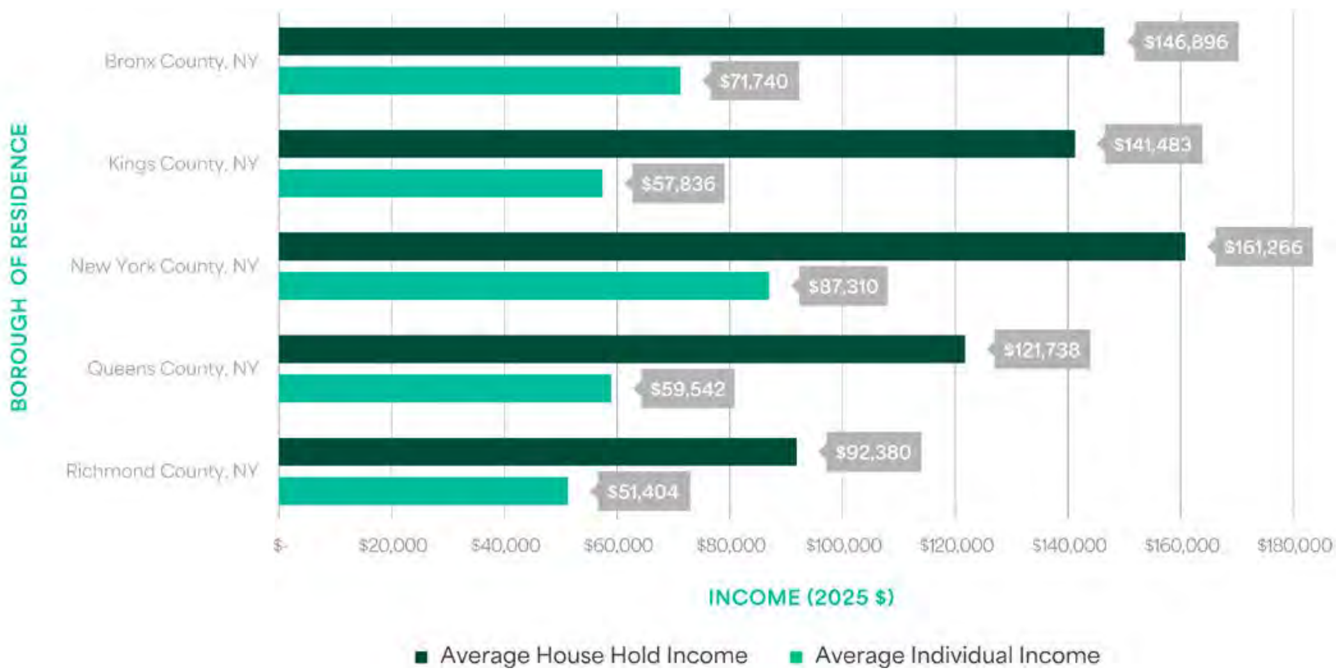
Sources: Replica HQ; AKRF.

Individual and Household Income

Last-mile facility workers who live within New York City have a range of individual and household incomes (see **Figure E-3**). The average individual incomes of these workers range from $51,404 (workers residing in the Bronx) to $87,310 (workers residing in Manhattan). The average household incomes of last-mile facility workers living in the City range from $92,380 (workers residing in the Bronx) to $161,266 (workers residing in Manhattan). Workers living in Staten Island and Manhattan report higher average individual incomes than the average for the last-mile facility workforce overall (see **Table E-1**). Workers in these boroughs and Queens report higher average household incomes than the workforce overall. Workers residing in Brooklyn and the Bronx report lower average incomes than the overall workforce. Workers living in Queens report lower than average individual incomes but higher than average household incomes.

FIGURE E-3

Average Incomes of Last-Mile Facility Workers Living in NYC, by Borough



Sources: Replica HQ; AKRF.

As shown in **Table E-2**, last-mile facility workers residing in Queens report the highest average household size among workers residing in New York City (4.0 persons per household, higher than the average for the overall workforce). Workers residing in Manhattan report the lowest average household size among workers living in the City (2.6 persons per household, lower than the average for the overall workforce).

TABLE E-2
Average Household Sizes of Last-Mile Facility Workers Residing in NYC

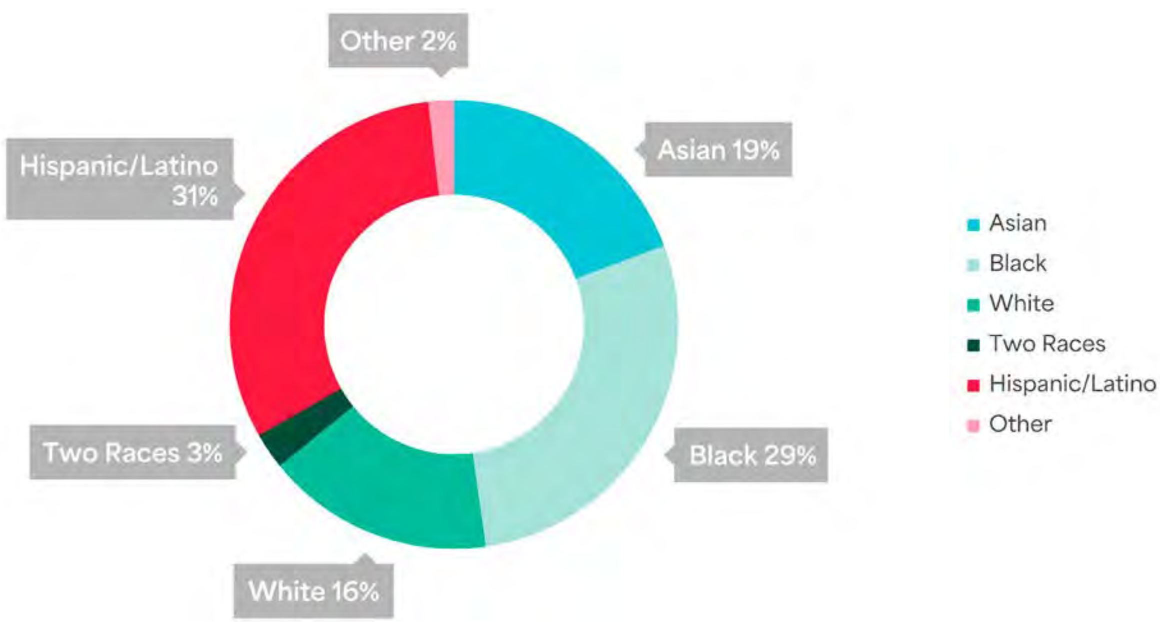
County of Residence	Average HH Size
Bronx County, NY	3.7
Kings County, NY	3.7
New York County, NY	2.6
Queens County, NY	4.0
Richmond County, NY	3.6

Sources: AKRF, Inc. using Replica HQ data.

Race and Ethnicity

Approximately 80 percent of the last-mile facility workforce is of minority race/ethnicity with roughly 16 percent identifying as White (see **Figure E-4**). Approximately five percent of the workforce identifies as Other or multiple races/ethnicities.

FIGURE E-4
Race/Ethnicity of Last-Mile Facility Workers

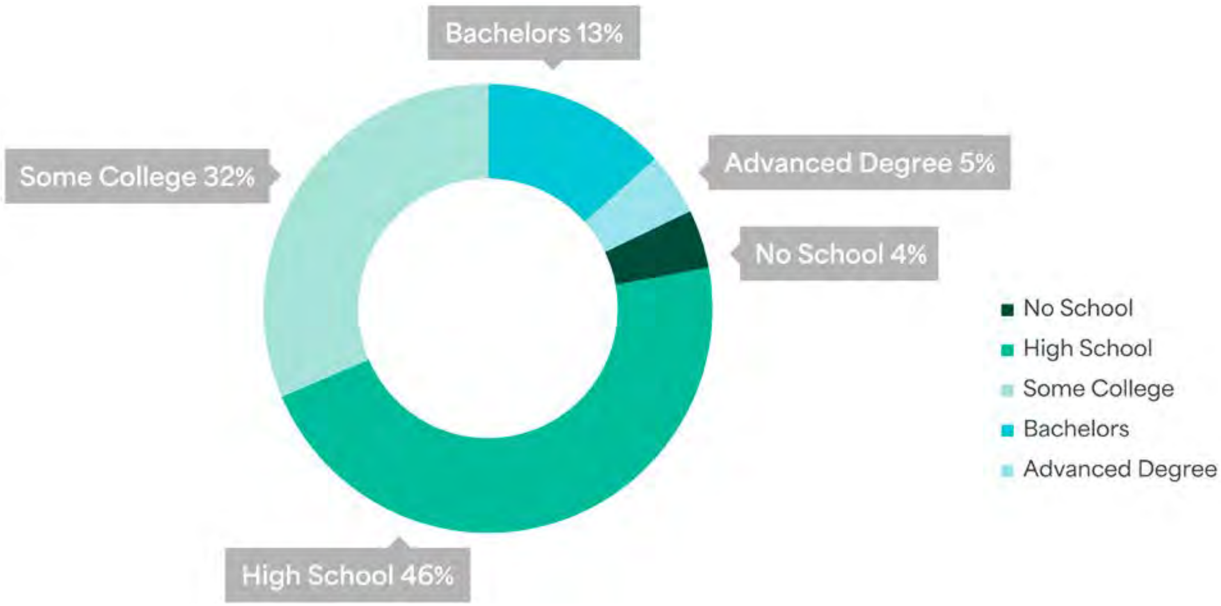


Sources: AKRF, Inc. using Replica HQ data.

Educational Attainment

As shown in **Figure E-5**, roughly 46 percent of the workforce have completed high school as their highest level of educational attainment. A further 32 percent report completing some college with only 13 percent of the workforce having completed a bachelor's degree. Approximately five percent of the workforce has completed an advanced degree.

FIGURE E-5
Highest Educational Attainment of Last-Mile Facility Workers

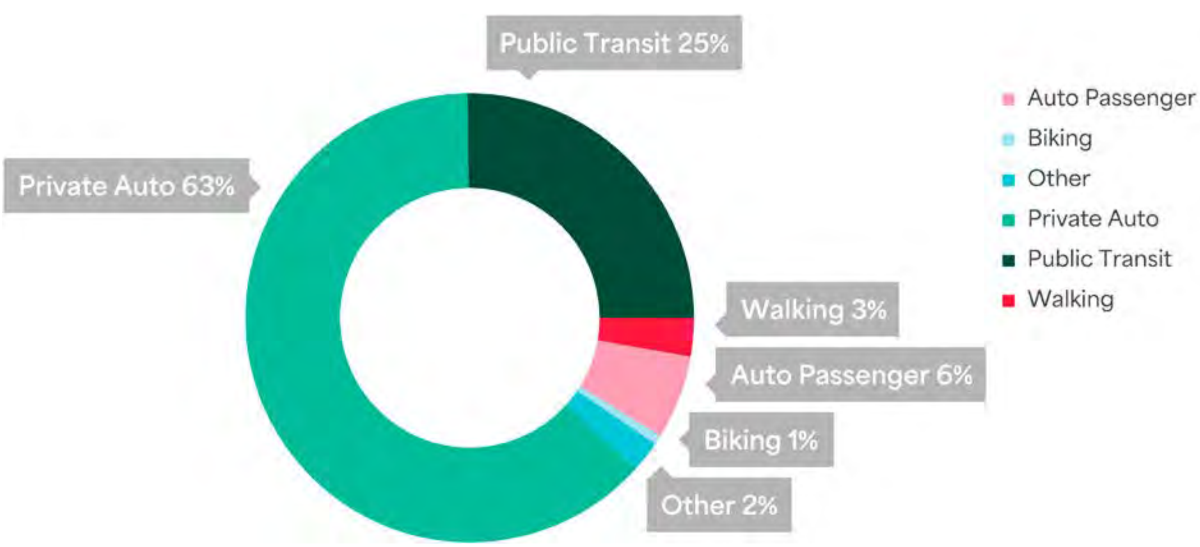


Sources: AKRF, Inc. using Replica HQ data.

Commute to Work

Although the majority (88 percent) of last-mile facility workers live within New York City, the minority of those workers (roughly 25 percent) utilizes public transportation to get to their work location. Approximately 63 percent of this workforce gets to work using private auto vehicles (see **Figure E-6**). Many last-mile facility workers rely on private vehicles for commuting because these facilities are often located in outer-borough industrial areas with limited access to direct public transit options, making driving a more practical and time-efficient choice.

FIGURE E-6
Mode of Transit to Work for Last-Mile Facility Workers



Sources: AKRF, Inc. using Replica HQ data.

Overall, the last-mile facility workforce is a diverse group of workers that mostly live within the five boroughs of New York City. These workers earn a wide range of incomes living in households of more than three individuals on average. These workers generally have less than a bachelor's degree and typically travel to work using private auto vehicles. This workforce encompasses a range of job types that support last-mile delivery activities including warehouse and operations staff, logistical and support roles, and delivery drivers who are responsible for ensuring the final delivery of goods.

Workers At Out-Of-City Facilities

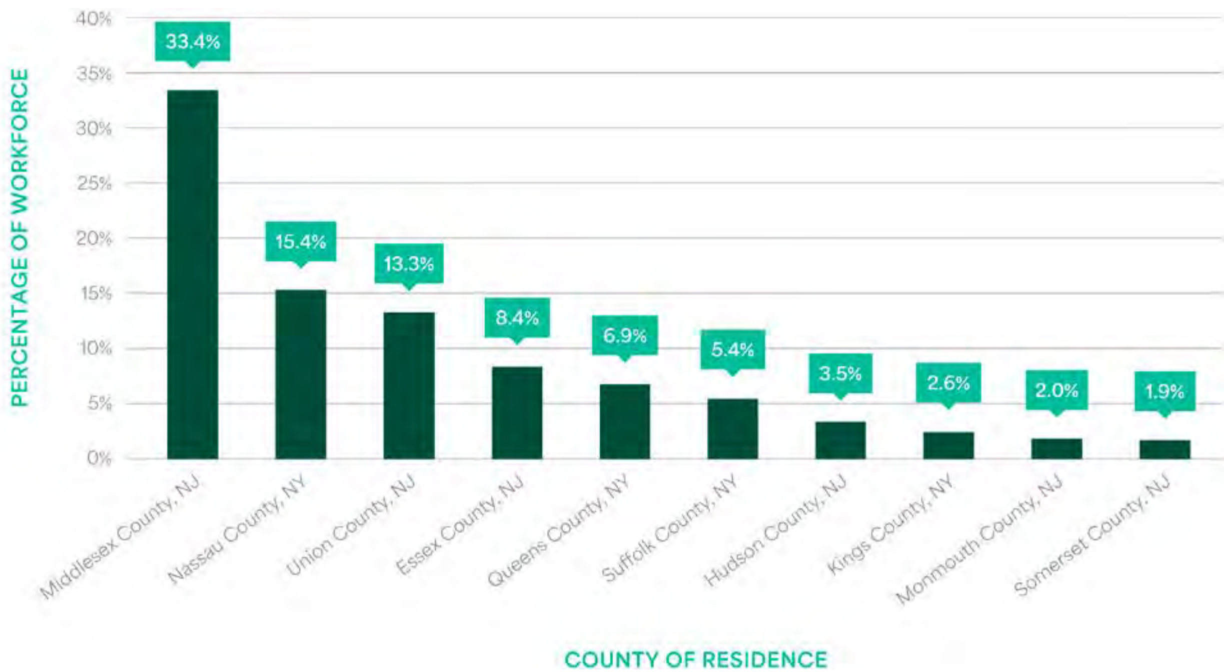
Although New York City residents and businesses are served by an extensive network of last-mile delivery facilities within the City, the substantial volume of packages moving to and within the City necessitates the presence of proximate sorting and distribution centers located outside New York City boundaries. These facilities often function as "middle-mile" nodes within the regional logistics network and, under potential relocation scenarios, could assume last-mile roles. While existing facilities are not expected to fully absorb rerouted package volumes, their locations illustrate established logistics clusters that represent plausible and strategic areas for the development of new facilities under the potential effects of Intro 518.

As shown in **Figure E-7** below, workers at these existing facilities outside of New York City generally live in and nearby counties where these facilities are concentrated. Approximately one-third of the workforce at identified facilities lives within Middlesex County, New Jersey. Only approximately 10 percent of workers at these facilities are New York City residents. This reflects stakeholders' observations that residents are unlikely to pursue these jobs if relocated, as commuting the required distances from their homes would be logistically impractical.

Stakeholder interviews indicate that last-mile delivery operations based within New York City rely heavily on a local workforce. Operators reported that most drivers reside within the five boroughs and often rely on public transportation or short commutes to access facilities. Relocating operations outside the City (particularly to Northern New Jersey or farther portions of Long Island) would materially constrain access to this labor pool due to longer commute times, toll costs, and limited transit connectivity. As a result, relocation is expected to lead to workforce attrition and job loss rather than seamless re-employment at new locations.

FIGURE E-7

Top Ten Places of Residence (County) for Workers at Out-of-City Last-Mile Facilities



Sources: AKRF, Inc. using Replica HQ data.

A key takeaway from the analysis is that the relocation of last-mile delivery operations does not translate into a simple geographic shift of jobs for existing New York City workers. Stakeholder interviews and workforce data indicate that last-mile delivery employment is highly localized, with most workers living near the facilities where they are employed. Relocation to out-of-City locations introduces significant commuting barriers, including increased travel time, costs, and limited transit access. As a result, many displaced workers would not transition to employment at relocated facilities, leading to a net loss of accessible jobs for New York City residents rather than a redistribution of employment opportunities.

Small Business Viability

Intro 518's direct-employment mandate and facility licensing requirements would pose challenges for local last-mile delivery contractors and related support businesses. The contractor-based model has allowed hundreds of small New York City companies to participate in e-commerce delivery, including Amazon's Delivery Service Partners (DSPs), FedEx Ground's Independent Service Providers (ISPs), and various regional courier and third-party logistics firms. These operators are typically independently owned businesses that work out of leased last-mile facilities in the five boroughs, employing anywhere from a few dozen up to low-hundreds of workers (primarily drivers, plus dispatchers and support staff). Many are minority-, immigrant-, veteran-, or family-owned enterprises founded in the past decade to meet surging parcel demand. These small firms serve as vital extensions of larger carriers and e-commerce platforms, offering local market expertise, flexible scaling (especially during peak seasons), entry-level employment opportunities (often for working-class and immigrant communities), and competitive last-mile services across the City. Collectively, their fleets handle a major share of NYC's 2–3 million daily deliveries, performing the door-to-door "last leg" that brings packages from warehouses to homes and businesses.

Scale and Role of Small Delivery Firms at Risk

Barring the direct-hire carriers (UPS, USPS), almost all major last-mile networks serving NYC rely heavily on locally contracted small businesses to cover delivery routes. Amazon currently works with over 40 NYC-based DSP companies, which together employ on the order of 5,000 delivery workers (drivers and support staff) to serve Amazon's eleven local delivery stations. FedEx Ground similarly contracts out all its neighborhood deliveries to independent ISPs; this accounts for roughly dozens of small contractor entities across the metro area, with perhaps 1,000 or more drivers serving the five boroughs. In addition, numerous niche couriers and specialized 3PLs operate in NYC, ranging from bike/foot messenger services to same-day medical or retail delivery firms. Some of these smaller outfits employ just 5–15 staff and rely on agile, low-capital operations. In total, industry interviews and available data suggest that the number of subcontracted last-mile delivery businesses active in NYC likely exceeds 100. These small firms are disproportionately concentrated in the outer boroughs (especially the Bronx, Queens, and Brooklyn, where most last-mile facilities and workforce reside) and are often deeply rooted in their local communities.

Why the Contractor Model Enabled Local Entrepreneurship

The contractor-based model has created accessible pathways to business ownership for New Yorkers who might otherwise face steep barriers to entering the logistics industry. Under programs like Amazon's DSP and FedEx's ISP, individuals can launch a delivery company with modest upfront investment (leasing a small fleet of vans, fulfilling basic insurance and safety requirements) and secure a guaranteed volume of delivery routes through partnerships with a larger platform. This model's built-in client demand and operational support (routing technology, training, etc.) have allowed many local, minority-owned, and family-run businesses to form and grow. These small companies hire locally (owners often recruit drivers and staff from their own neighborhoods) and they have more flexibility in scheduling and work culture compared to large corporate employers. Local route knowledge and community ties make these operators effective in serving New York's diverse neighborhoods, and their ability to scale up quickly during peak periods (thanks to independent staffing) has been key to maintaining affordable, rapid delivery in NYC's high-demand environment.

Challenges for Small Businesses Under Intro 518

Intro 518's direct-hire mandate directly threatens the viability of this contractor ecosystem. Small delivery companies would be forced to switch all drivers and warehouse workers to their own payroll (with full employee benefits), instead of engaging them as subcontractors or independent hires. This requirement erases the core cost and flexibility advantages that allow these small firms to compete. Most such firms operate on thin margins, so absorbing higher labor costs (wages, overtime, benefits) or purchasing entire fleets outright is financially infeasible. Many have limited human resources or compliance infrastructure; transitioning to a fully direct-employment model would require them to manage payroll systems, benefits administration, and labor law compliance at a scale far beyond their current capacity. Additionally, Intro 518's licensing framework (requiring a license for each facility site, with risk of suspension for non-compliance) introduces new administrative costs and uncertainty. A small operator running a single delivery station would have to secure and maintain a license and could face business-ending penalties if any compliance failure occurs at that location.

Other specific burdens compound the threat. Insurance and bonding requirements (to guarantee license compliance) would raise overhead costs, especially for small firms with less bargaining power. Limits on subcontracted vehicles and third-party fleet services would block small companies from augmenting capacity via rentals or subcontracting during surges, undercutting their core flexibility. For very small couriers or bike/foot delivery companies, the legislation's broad facility definition (no minimum size threshold) means they too might have to obtain licenses and comply with direct hiring, even if they operate micro-hubs with just a handful of people. In short, facing these mandates, the vast majority of local delivery contractors would struggle to remain solvent.

Image: Five Boroughs Job Campaign.

Likely Outcomes for Small Businesses

Given these challenges, most at-risk small delivery businesses would likely cease operating within New York City or be absorbed by larger entities. The primary response for many will be to exit the NYC market, either through permanent closure or by relocating operations just outside the City (e.g., to New Jersey or Long Island) and continuing to serve NYC customers from beyond the legislation's reach. Some mid-sized contractors might pursue consolidation or mergers to achieve the scale needed for direct employment (for instance, combining multiple DSPs into one larger company), but merger opportunities are limited and would still displace existing owners. The lightest-impact response scenario—full conversion to a direct-hire model—appears unattainable for the majority of small firms given the cost and administrative hurdles. Thus, nearly all DSP and ISP firms would either be forced out of business or driven to operate from outside City limits. A few micro-logistics providers (bicycle couriers, on-foot delivery services) might attempt to exploit potential carve-outs (for example, if non-motorized operations were exempted), but this is a narrow niche and not a viable path for larger parcel volumes or motorized fleets.

Economic Ripple Effects of Last-Mile Employment

This section evaluates the broader economic implications of changes to last-mile delivery employment, including indirect and induced effects that extend beyond the sector itself.

Implications for Support Businesses

The contraction or relocation of last-mile delivery operations would have ripple effects across a network of supporting businesses. Firms that provide vehicle maintenance, fuel, fleet leasing, staffing, and logistics support are closely tied to contractor-based delivery networks and would likely experience reduced demand if these operations scale back or exit New York City. Beyond these direct linkages, last-mile delivery activity supports broader economic output through supply chain purchases and household spending. Employment in warehousing, delivery, and dispatch functions generates indirect impacts through vendor relationships and induced impacts as workers spend wages locally.

Together, these effects illustrate that the economic role of the last-mile sector extends beyond delivery itself, supporting a wider ecosystem of businesses and economic activity throughout the City. This analysis captures economic impacts occurring within New York City; additional indirect and induced activity supported by last-mile logistics operations may occur outside the City and is not reflected in the reported results.

Economic impacts are typically measured across three categories of effects that together capture how industry activity circulates throughout the broader economy. In the context of last-mile delivery these are:

- Direct Effects: Economic activity generated by the last-mile logistics sector itself, including employment, wages, and business operations associated with warehouse facilities, parcel sorting centers, dispatch operations, and delivery services.
- Indirect Effects: Economic activity generated through supply chain relationships as last-mile operators purchase goods and services from other businesses, such as fuel suppliers, vehicle maintenance companies, technology providers, equipment vendors, utilities, and professional service firms.
- Induced Effects: Economic activity generated when workers employed directly or indirectly by the sector spend their earnings within the broader economy on goods and services such as housing, food, healthcare, transportation, entertainment, and retail purchases.

Last-mile delivery operations support a broad range of occupations and business activities spanning transportation, warehousing, distribution, and local delivery services. Employment associated with the sector includes delivery drivers, warehouse and sorting personnel, dispatchers, logistics coordinators, fleet maintenance workers, and administrative and managerial staff, as well as workers involved in localized courier and messenger services. Because these activities are distributed across multiple segments of the logistics and freight economy, this analysis considers several NAICS sectors weighted to capture the operational contributions of the at-risk worker population and normalized over a 1,000-worker segment for modeling purposes.[28]

As shown in **Table E-3**, for every 1,000 direct jobs in last-mile delivery that are at risk, an additional 109 jobs are supported through supply chain linkages and household spending effects across the broader economy–and therefore are also at risk. These include indirect jobs in industries that provide goods and services to the last-mile sector (such as vehicle maintenance, fuel distribution, logistics support, and technology services), as well as induced jobs supported by the consumer spending of last-mile workers within their local neighborhoods.

As a result, the economic exposure associated with job losses in the last-mile sector extends beyond the directly affected workforce. Every 1,000 at-risk direct jobs corresponds not only to the loss of those positions, but also to a broader reduction in economic activity that supports an additional 109 jobs across the regional economy. In total, 1,000 direct jobs support approximately $37.6 million in labor income and $82.8 million in economic output–meaning that reductions in last-mile employment represent a combined loss of both direct earnings and the downstream economic activity those earnings sustain.

This relationship highlights that the value at risk under Intro 518 is not limited to the workers directly employed in delivery and warehouse operations, but also includes the broader network of businesses and local economies that depend on the sector's spending and supply chain activity. As direct employment contracts, these indirect and induced effects compound the total economic impact, resulting in a multiplier effect in which reductions in jobs, income, and output extend well beyond the last-mile delivery system itself.

TABLE E-3
Estimated Economic Effects per 1,000 Direct Jobs

Impact Type	Employment	Labor Income	Value Added[2]	Economic Output[3]
Direct	1,000	$27,807,121	$45,286,719	$58,864,433
Indirect	55	$4,621,415	$7,230,239	$10,638,957
Induced	54	$5,146,574	$9,413,743	$13,315,840
Total	**1,109**	**$37,575,110**	**$61,930,701**	**$82,819,230**

Notes:

1 All dollar values presented in 2026 dollars.

2 Value added is the contribution to gross regional product after subtracting intermediate inputs (labor income, taxes, and profits).

3 Economic output is the total value of goods and services produced by workers most at risk of job loss and does not reflect output for 1,000 workers across the entire industry.

Sources: AKRF, Inc. using the 2023 IMPLAN model, including Sector 399 (Truck Transportation), Sector 403 (Couriers and Messengers), and Sector 404 (Warehousing and Storage) to represent the primary economic activities associated with last-mile delivery

As shown in **Table E-4**, for every 1,000 direct at-risk jobs within last-mile delivery, approximately $11.7 million in total tax revenue is generated from the economic activity associated with these jobs and is therefore at risk under displacement scenarios. This includes approximately $2.3 million in tax revenue accruing to New York City and associated sub-county jurisdictions (such as municipalities, school districts, and special districts), with additional revenues flowing to state and federal governments.

This total reflects both the direct fiscal contributions of last-mile delivery operations, such as payroll-related taxes and business activity, as well as the broader indirect and induced tax effects supported by the sector. Indirect tax revenues are generated through supply chain activity as firms purchase goods and services from other businesses, while induced tax revenues arise from the household spending of workers whose employment is supported by the sector. As shown in **Table E-4**, of the total $11.7 million in tax revenue supported per 1,000 direct jobs, approximately $8.2 million is associated with direct activity, with an additional $1.5 million and $2.0 million generated through indirect and induced effects, respectively.

As a result, the fiscal exposure associated with job losses in the last-mile sector extends beyond the immediate loss of direct tax contributions. Reductions in employment would also weaken downstream economic activity and household spending, leading to compounded declines in tax revenues across multiple levels of government. This highlights that the fiscal impacts of Intro 518 are not limited to the delivery sector itself, but include a broader erosion of public revenues supported by the industry's supply chains and workforce spending activity.

TABLE E-4
Estimated Tax Revenue per 1,000 Direct Jobs

Impact Type	New York City[2]	New York State	Federal	Total Tax Revenue
Direct	$1,398,541	$1,228,709	$5,531,856	$8,159,106
Indirect	$321,329	$228,799	$937,669	$1,487,797
Induced	$590,321	$347,809	$1,104,644	$2,042,775
Total	**$2,310,191**	**$1,805,317**	**$7,574,170**	**$11,689,677**

Notes:
1 All dollar values presented in 2026 dollars.
2 Local tax revenues generated that accrue to government entities below the county level, including municipalities, school districts, fire districts, and other special-purpose taxing jurisdictions.

County-level tax results are not shown because IMPLAN's "county taxes" category assumes independent county taxing jurisdictions. In New York City, the five boroughs function as counties in name only, with most taxation administered at the City level and allocated across state and sub-county entities. As a result, IMPLAN does not generate a meaningful standalone county tax output for this geography, with such effects captured in broader tax categories.

Sources: AKRF, Inc. using the 2023 IMPLAN model, including Sector 399 (Truck Transportation), Sector 403 (Couriers and Messengers), and Sector 404 (Warehousing and Storage) to represent the primary economic activitie associated with last-mile delivery.

In addition to these quantifiable effects, changes to delivery cost and service levels would create broader pressures for businesses that rely on regular, time-sensitive shipments. If delivery networks become more expensive or less reliable, local retailers, restaurants, and other small enterprises could face higher operating costs, longer delivery times, and reduced service availability. In response, businesses may increase prices, adjust operations, or modify inventory strategies–such as ordering larger, less frequent shipments–to manage costs, often at the expense of efficiency.

These dynamics extend beyond the delivery sector itself. As logistics costs rise and service reliability declines, small businesses that depend on timely, affordable deliveries may experience tighter margins or pass increased costs on to customers, contributing to higher consumer prices over time, as detailed in **Section F**.

Overall, the economic ripple effects of Intro 518 reflect both the direct contraction of the last-mile sector and the downstream impacts on supply chains, household spending, and business operations. While the magnitude of these effects varies across scenarios, the analysis indicates that changes to delivery cost and network efficiency would reverberate across the broader economy, affecting not only logistics operators but also the businesses and communities that depend on them.

F

Intro 518 Effects on Consumer Costs and Service Levels

Conceptual Approach

AKRF's analysis is structured as a network-based assessment of last-mile delivery operations, focusing on how regulatory constraints introduced by Intro 518 may influence facility siting decisions, throughput allocation, and service coverage across the regional logistics system.

Rather than producing a single-point forecast, the analysis employs a scenario-based framework to evaluate a range of plausible operator responses. This approach emphasizes primary cost drivers such as transportation distance, routing efficiency, labor inputs, and capacity constraints within both existing and relocated facilities, alongside key service outcomes. It also reflects fundamental physical and operational constraints inherent to last-mile logistics, particularly the role of distance as a binding factor in network performance. Within this framework, trade-offs between cost containment and service preservation can be evaluated systematically under varying degrees of relocation and consolidation.

Methodology

AKRF's quantitative cost and service impact analysis uses a scenario based modeling framework designed to reflect uncertainty in firm behavior and market responses. Rather than relying on single point assumptions or deterministic forecasts, the analysis simulates a range of plausible outcomes based on how operators may respond to new labor, cost, and compliance requirements.

A central feature of the analysis is the distinction between "at-risk" delivery volume, representing approximately 36 percent of daily throughput that may change operationally under the legislation, and the remaining 64 percent that is expected to continue operating under existing conditions. The analysis then tests how this at-risk share may be reconfigured across different network strategies, including full relocation, partial suburban absorption, capacity-constrained outcomes, and hybrid models that retain some in-City operations. Across all scenarios, outcomes are expressed as blended system-level metrics, reflecting the combined performance of unchanged and reconfigured portions of the network.

The analysis is structured around three core components: (1) establishment of baseline conditions for last mile delivery operations in New York City; (2) identification of key policy driven uncertainties and behavioral response mechanisms; and (3) simulation of outcomes under alternative response scenarios using a Monte Carlo framework.[29]

(1) Baseline Conditions and Data Inputs

Baseline conditions represent the "no action" environment against which the impacts of Intro 518 are evaluated. These conditions describe existing last mile delivery operations in New York City, including facility counts and typologies, delivery volumes, labor structure, delivery times, operating costs, and employment characteristics. Baseline inputs draw on a combination of public data sources, industry research, stakeholder interviews, and AKRF's professional judgment informed by prior logistics and transportation studies.

All baseline assumptions are treated as fixed inputs within the model. Changes in outcomes under Intro 518 are modeled as deviations from these baseline conditions, ensuring that reported impacts reflect policy driven effects rather than background market trends.

(2) Identification of Uncertain Inputs

The proposed legislation introduces uncertainty across multiple dimensions of last mile delivery operations, including labor costs, compliance expenses, pricing strategies, operational restructuring, and facility siting decisions. AKRF identified a set of key uncertain variables[30] that are expected to influence market responses to Intro 518, including:

- Incremental labor costs associated with conversion to direct employment
- Changes in overhead and administrative costs
- Cost pass through rates to consumers
- Demand sensitivity to price and service changes
- Probability of facility consolidation, relocation, or closure
- Additional travel distance and delivery time associated with operational shifts

Each uncertain variable is defined by a plausible range of values informed by available data, stakeholder input, and industry precedent. Where evidence suggests a central tendency, distributions reflect that information; where uncertainty is high or behavior is difficult to predict, broader distributions are used to avoid overstating precision.

(3) Monte Carlo Simulation Framework

To evaluate how uncertainty in these inputs translates into potential outcomes, AKRF employed a Monte Carlo simulation framework implemented in a structured Excel model. The simulation repeatedly samples from the defined probability distributions for uncertain inputs and calculates resulting outcomes for each iteration using internally consistent mathematical relationships.

To capture uncertainty in key operational inputs and reflect real-world variability, the model runs 10,000 iterations in which parameters such as route distance, delivery time, labor costs, and facility utilization vary within defined ranges. This produces a distribution of outcomes for cost per package and service metrics, rather than a single estimate.

Only exogenous uncertainties such as cost escalation, pass through rates, or relocation distances are randomized. Endogenous outcomes, including delivery time, per package cost, service reliability, and facility counts are calculated through explicit functional relationships that link them to the sampled inputs. This structure ensures that related outcomes move together in a realistic manner (for example, longer delivery distances producing longer delivery times and higher costs), rather than being treated as independent random events.

Costs are constructed from the bottom up across major categories, including labor, fleet, and facility operations, and are normalized to a citywide per-package basis. Service performance is derived from a calibrated sensitivity framework that links operational conditions, such as route length and delivery density, to outcomes including on-time delivery and same-day service.

Thousands of simulation runs are conducted for each scenario, generating distributions of outcomes rather than single estimates. Results are summarized using measures such as averages, percentiles, and probabilities of exceeding defined thresholds, allowing the analysis to characterize both expected outcomes and tail risk conditions.

Image: NYCDOT.

Scenario Based Modeling of Operator Responses

Industry stakeholders indicate that, in response to Intro 518's proposed direct-hire mandate and facility licensing requirements, some last-mile delivery operators would likely relocate portions of their operations to nearby areas outside New York City, including New Jersey, Long Island, and Westchester County, in order to avoid increased labor costs, licensing obligations, bonding and reporting requirements. As the current last-mile model depends on flexible contractor-based labor networks and a distributed system of neighborhood-scale facilities to maximize delivery density and minimize travel time, companies may determine that consolidating operations into fewer larger regional hubs outside the City is a more economically viable strategy (or one that more closely aligns with their operational model), despite the resulting increase in route lengths, deadhead travel, and reduced delivery efficiency. Because firms are unlikely to respond uniformly to Intro 518, AKRF evaluated impacts under multiple response scenarios that reflect plausible industry behavior. These scenarios include:

- S1 - Full Relocation: All at-risk throughput is moved outside New York City and served from newly built suburban facilities, representing the highest-disruption and highest-cost case with maximum increases in delivery distance, fleet requirements, VMT, and emissions.
- S1a - Relocation with Out-of-City Consolidation: A portion of displaced volume is absorbed into existing suburban facilities, reducing the need for new capacity and moderating cost, service, and transportation impacts relative to S1.
- S1b - Relocation with Capacity Constraints: Suburban facilities are assumed to have limited absorption capacity, resulting in a mix of relocated throughput and unmet or degraded service, producing divergence between cost pressures and service outcomes.
- S2 - Hybrid Operations: Carriers retain a meaningful in-City footprint while selectively relocating higher-traffic facilities, creating a mixed network that moderates cost increases, service degradation, and VMT/emissions growth relative to full relocation.
- S2a - Hybrid Operations with In-City Consolidation: Remaining in-City operations are consolidated into fewer, higher-utilization facilities, improving efficiency and lowering fixed costs while increasing routing density and creating trade-offs in service performance and localized delivery intensity.

At one end of the spectrum, full relocation scenarios (S1-S1b) assume that at-risk throughput is shifted outside the City and served from suburban facilities, either newly built or partially absorbed into existing capacity. These configurations increase average delivery distances, expand fleet requirements, and raise both operating costs and total VMT, with corresponding increases in emissions and cost. Because facilities are farther from end customers, a greater share of each route is consumed by non-productive travel time, reducing delivery efficiency and amplifying the required transportation intensity.

At the other end, hybrid models (S2-S2a) assume that carriers retain meaningful in-City operations while selectively relocating portions of their network. This preserves proximity for a share of deliveries, moderating cost escalation, service degradation, and emissions growth. However, even under these configurations, longer average routing distances for relocated flows continue to drive increases in traffic activity and air quality impacts. Consolidation in S2a improves cost efficiency but increases in-City delivery density. Across all scenarios, transportation and environmental outcomes are directly driven by how facility geography changes relative to demand. Scenarios with greater reliance on relocation generate the largest increases in VMT and emissions, while hybrid and consolidated approaches partially offset, but do not eliminate, these effects. In all cases, increased spatial separation between facilities and end customers emerges as the primary driver of higher costs, greater traffic volumes, and elevated air quality impacts.

The model also evaluates two bounding conditions. In "Hold Service" cases, it estimates the level of additional cost required to maintain current service standards despite operational disruption. In "Hold Cost" cases, it holds costs at current levels and measures the resulting decline in service. Together, these bounds illustrate the tradeoff between higher delivery costs and reduced service quality under different scenarios

Interpretation of Results

The Monte Carlo results provide a probabilistic assessment of potential impacts rather than a single predicted outcome. This allows the analysis to address questions such as the likelihood of meaningful cost increases, service degradation, facility displacement, or employment shifts, rather than assuming that any one outcome will occur uniformly across the market.

By explicitly modeling uncertainty and firm heterogeneity, the methodology supports defensible conclusions about the magnitude, distribution, and likelihood of impacts associated with Intro 518. This probabilistic framing aligns with policy analysis best practices and supports informed consideration of potential tradeoffs without overstating certainty. Please see **Appendix 4** for more detail on AKRF's quantified impact analysis methodology and Monte Carlo Simulation.

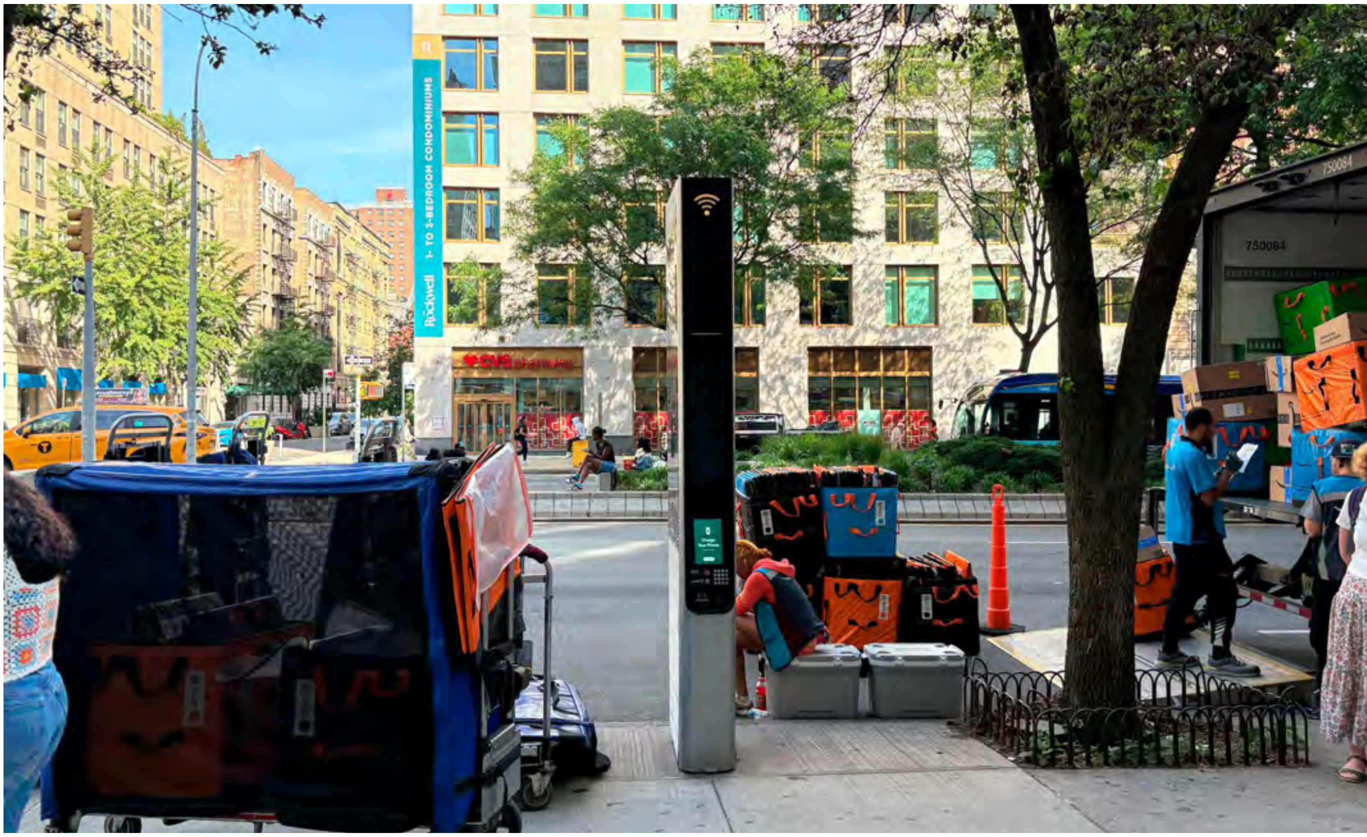


Image: AKRF.

Cost and Service Scenarios

The analysis examines how "at-risk" last-mile delivery throughput may be reconfigured under a range of defined scenarios that bracket plausible industry adaptations. These scenarios vary in the extent of facility relocation, consolidation, and service coverage adjustments. At one end of the spectrum, full relocation scenarios assume that affected throughput is shifted out of the City, either entirely to new facilities, representing the highest-cost outcome, or partially absorbed into existing out-of-City operations with some efficiency gains. Variants of this approach also consider constrained capacity, where a portion of demand is unmet or experiences degraded service. At the other end, hybrid operating models assume that carriers retain an in-City footprint while selectively relocating higher-traffic facilities, balancing cost pressures with service continuity. Additional hybrid scenarios incorporate in-City consolidation strategies, reflecting efforts to streamline operations while maintaining partial service coverage, with potential trade-offs in delivery performance and increased labor costs associated with in-City operations.

The conceptual response scenarios (see **Section F** above) are translated into measurable changes in logistics network structure, throughput distribution, and cost formation. Broad shifts, such as relocating operations across geographies, consolidating activity into fewer facilities, retaining a portion of in-City functions, and limited absorption, are represented as adjustments in where volume is processed and how facility capacity is used. These changes are then linked to impacts on labor needs, delivery distances, and operating intensity, allowing qualitative responses to be expressed as consistent, comparable parameters

Relocation (S1)

This scenario represents a full relocation response in which all “at-risk” last-mile throughput is shifted outside the City to newly developed suburban facilities. No existing out-of-City capacity is assumed to be available for absorption, requiring operators to replicate the displaced network entirely in new locations (although the cost of additional facility construction is not accounted for in cost estimates). As a result, the cost structure reflects full operational cost conditions, including longer line-haul distances, expanded delivery radii, and the need to scale labor and fleet resources to maintain coverage. Because all relocated throughput is served from outside the City, this scenario establishes the upper bound for cost impacts.

Relocation With Out of City Consolidation (S1a)

This scenario assumes that a portion of “at-risk” throughput can be absorbed into existing suburban facilities, reducing the need for entirely new capacity. The cost model is structured as a three-tier system within each iteration: (1) remaining in-City operations that remain unchanged, (2) suburban facilities that absorb additional volume at reduced operating cost, and (3) newly developed suburban facilities that operate at full cost, consistent with S1. Total system costs and service outcomes are calculated by blending these tiers based on their respective throughput shares. This configuration captures partial efficiency gains from consolidation, while still reflecting the higher costs associated with incremental relocation and expanded delivery distances.

Relocation With Out of City Consolidation and Limited Capacity (S1b)

This scenario builds on S1a by introducing a binding capacity constraint in the suburban market. Existing facilities are assumed to absorb volume up to their operational limits, after which additional displaced throughput cannot be fully accommodated. The model retains the same three-tier cost structure as S1a but incorporates an uncovered portion of demand that is either backlogged or experiences degraded service. This results in a divergence between cost and service outcomes, where system costs continue to increase due to relocation and partial new capacity, while service performance deteriorates due to unmet demand. This scenario reflects a constrained-market condition.

Hybrid Operations (S2)

This scenario assumes a mixed operating model in which carriers retain a portion of their in-City footprint while relocating higher-traffic or non-compliant facilities outside the City. The resulting network is composed of three tiers: (1) non-at-risk existing operations that continue unchanged (approximately 64 percent of baseline throughput), (2) relocated suburban facilities handling displaced volume, and (3) retained in-City facilities subject to Intro 518 requirements. This structure simulates decisions operators to balance cost pressures with service continuity by maintaining proximity to end customers for a portion of deliveries. Compared to full relocation scenarios, S2 results in lower cost escalation and more stable service performance, though at the expense of higher labor costs associated with in-City operations.

Hybrid Operations and in City Consolidation

This scenario refines the hybrid model by incorporating consolidation within the in-City tier. Rather than maintaining the full set of remaining in-City facilities, operators reduce the number of in-City sites and concentrate throughput into fewer, higher-intensity locations. The network effectively operates as a two-tier system consisting of (1) relocated suburban facilities and (2) a consolidated set of in-City facilities subject to Intro 518. This configuration reduces overall overhead and improves facility-level efficiency but introduces trade-offs in routing and service. Longer in-City delivery routes and increased stop density may reduce the need for incremental fleet expansion but can also place pressure on delivery times and reliability. The result is a more cost-efficient configuration than S2, with potential marginal declines in service performance depending on routing constraints and local demand patterns.

Image: AKRF.

Findings

The relocation of last-mile delivery operations in response to the requirements of Intro 518 would materially affect both cost structures and service performance. Shifting “at-risk” throughput outside the City introduces higher fixed and variable costs associated with longer distances and increased reliance on regional distribution networks. These changes increase per-package delivery costs, particularly where new facilities must be introduced or where existing out-of-City facilities operate at or near capacity. At the same time, greater distances between distribution nodes and final delivery destinations introduce operational inefficiencies, including longer delivery routes, increased vehicle miles traveled, and tighter scheduling constraints. From a service perspective, these factors may translate into extended delivery windows, reduced same-day or next-day coverage in certain areas, and a higher likelihood of backlogs during peak periods. While some cost pressures may be mitigated through consolidation or network optimization, such efficiencies often come with trade-offs, including reduced service flexibility and diminished geographic coverage.

Image: Reuters.

AKRF's modeling indicates that increased distance between distribution facilities and service areas introduces a structural constraint that cannot be fully mitigated through additional investment. While operators can deploy more vehicles, expand the labor pool, or optimize routing algorithms to improve throughput, these measures exhibit diminishing returns once travel distances exceed certain thresholds. Fundamentally, last-mile delivery remains time- and distance-dependent: each additional mile traveled imposes a fixed time cost that cannot be eliminated, only absorbed at greater operational expense. As a result, beyond a certain point, efforts to preserve service levels, such as maintaining same-day or next-day delivery, require disproportionately higher inputs of labor and capital, driving up per-package costs to try and offset delays. Although AKRF models the preservation of service as a function of cost, in the real world the diminishing returns would likely prohibit additional investment beyond a certain threshold. This means that under a relocation scenario, diminished service is more likely than not (see **Appendix 4**, detailed technical methodology for more information on impact probabilities and likelihoods). Proximity to the end consumer is a critical determinant of both cost efficiency and service reliability, and relocation strategies that significantly increase delivery distances inherently erode system performance despite operational adjustments.

Impacts On Cost

The cost analysis evaluates how Intro 518 may alter the underlying economics of last-mile delivery in New York City by reshaping where and how delivery activity occurs. The assessment focuses on system-level cost per package, capturing changes in transportation distance, routing efficiency, labor inputs, and facility utilization as operators adjust their networks in response to the legislation. Because a majority of delivery volume is expected to continue operating under existing conditions, overall cost impacts are driven by how the "at-risk" share of throughput is reconfigured across scenarios, including relocation, consolidation, and hybrid operating models.

As shown in **Table F-1**, under a relocation response in which current service levels are preserved, the cost per package associated with relocated throughput is projected to increase by approximately 160 to 267 percent relative to existing levels. Diffused into system wide package throughput, this cost increase is projected to be between 58 and 95 percent. Throughout iterations the cost per package settled around $9.67 for relocated package throughput under S1 (diffused to $5.18 system-wide) to $6.90 for relocated package throughput under S2a (diffused to $4.18 system-wide). These costs are not necessarily consumer-facing costs (although they could be) but rather the cost associated with delivery of the typical package.[31]

TABLE F-1

Cost Impacts Under Contracted Relocation (Service Held Constant)

Scenario	Incremental Annual Cost to Preserve Service Levels ($ millions)	Mean Cost per Package (All Throughput)	Mean Cost per Package (Relocated Throughput)	Mean Cost per Package Percent Increase (All Throughput)	Mean Cost per Package Percent Increase (Relocated Throughput)
S1 - Full Relocation	$2,200	$5.2	$9.7	+95.5%	+267.5%
S1a - Out-of-City Absorption	$1,793	$4.7	$8.2	+77.1%	+210.8%
S1b - Out-of-City Capacity Constrained	$1,8982	$4.8	$8.7	+81.5%	+227.2%
S2 - Hybrid Operations	$1,406	$4.3	$7.1	+61.1%	+169.7%
S2a - Hybrid Operations Consolidated	$1,355	$4.2	$6.9	+57.9%	+160.7%

Notes: The capacity constrain assumption does not allow spending to fully offset service degradation.

Source: AKRF, Inc.

Delivery operators may choose to pass through cost increases to consumers, absorb them within their margins, or offset them through operational efficiencies, pricing adjustments across services, or other revenue strategies. **Table F-2** shows the household cost impacts under a relocation response in which current service levels are preserved. If the cost of relocation was fully passed through to all New York City households, the annual increase in delivery costs for all New York City households would range from $409 in S2a to $664 in S1. If the cost of relocation was fully passed through only to households whose package throughput was relocated, the annual increase in delivery costs for those households would range from $1,114 in S2a to $1,838 in S1.

TABLE F-2
Household Cost Impacts Under Contracted Relocation (Service Held Constant)

Scenario	Incremental Annual Cost to Preserve Service Levels[1]	Incremental Cost Pass-Through to NYC Households[2]	Incremental Cost Pass-Through to Relocated Package Households[4]
S1 – Full Relocation	$2,199.9	$664.0	$1,838.6
S1a – Out-of-City Absorption	$1,792.8	$541.1	$1,461.3
S1b – Out-of-City Capacity Constrained	$1,898.23	$572.9	$1,575.3
S2 – Hybrid Operations	$1,406.2	$424.4	$1,176.2
S2a – Hybrid Operations Consolidated	$1,354.9	$408.9	$1,114.0

Notes:

1 Dollar values in millions.

2 Assumes all incremental cost of relocation and service preservation is passed through evenly across all households in the City.

3 The capacity constraint assumption does not allow spending to fully offset service degradation.

4 Assumes all incremental relocation and service preservation costs are borne solely by households associated with throughput relocated to facilities outside New York City. This estimate may overstate household-level impacts, as available data do not disaggregate package volumes between household and business deliveries.

Sources: AKRF, Inc.

The cost impacts of Intro 518 are driven by how delivery networks adapt to increased spatial separation between facilities and the customers they serve. Response scenarios that rely more heavily on relocation generate higher system-wide costs, while those that retain or optimize in-City operations moderate, but do not eliminate, cost increases. Even when diffused across the full delivery system, the added costs required to preserve existing service levels are substantial, reflecting the fundamental importance of proximity in last-mile logistics. While the extent to which these costs are ultimately borne by consumers will depend on operator pricing strategies and market dynamics, maintaining current service performance under relocation scenarios entails a meaningful increase in the underlying cost of delivery.

Impacts on Service

The service impact analysis evaluates how Intro 518 may affect the reliability, speed, and overall quality of last-mile delivery as operators adjust their networks in response to changing operational conditions. Unlike cost, which can be calculated directly from defined inputs, service performance is influenced by the interaction of several factors, including route length, time pressure on drivers, delivery density, and the level of operational investment. These dynamics cannot be modeled at the level of individual delivery attempts in a citywide analysis. Instead, the model uses a calibrated sensitivity approach that translates changes in operating conditions into system-wide service outcomes, anchored to defined baseline performance in New York City.

Under this framework, existing service levels serve as a reference point, and changes in key drivers such as miles per route, hours per route, packages per route, and cost per package are used to estimate how service metrics respond. In general, longer routes, longer delivery times, and higher package volumes place downward pressure on service performance, while increased spending can partially offset these effects by improving reliability. The analysis focuses on four core metrics, including on-time delivery, same-day delivery, next-day delivery, and first-attempt success. These metrics respond differently to operational stress, with time-sensitive services such as same-day delivery being the most affected.

Stakeholder interviews reinforce these modeled outcomes. Operators noted that even modest increases in travel time (e.g., on the order of 20 to 30 minutes between a facility and initial delivery zones) can eliminate dozens of delivery stops per route, materially reducing throughput. Under such conditions, firms must either expand fleet and labor resources or accept declines in service performance due to fixed working-hour constraints. These operational adjustments were consistently described as cascading through delivery systems, affecting reliability, peak-period capacity, and the feasibility of same-day and next-day service.

As shown in **Table F-3**, under a relocation response in which current cost levels are preserved, the average decrease across all four service metrics would be between 5.3 percent in S2a and 21.0 percent in S1b. This loss in service may manifest as increased delivery delays, reduced delivery success rates, and diminished availability or reliability of same-day and next-day delivery services. The large decrease in service performance in S1b is driven primarily by the loss of same-day day service which decrease by over 1/3.

It is anticipated that under the modeled decreases in service coverage, the number of annual late deliveries in New York City would range from 94.4 million in S2a to 132.0 million packages in S1b. For the average New York City household this would mean between 4.8 and 16.1 additional late deliveries per year if service reduction impacts are distributed evenly across all households.

TABLE F-3

Service Impacts Under Contracted Relocation (Costs Held Constant)

Scenario	Average Decrease Across All Service Metrics (%)[1]	Annual Late Deliveries	Per-Household Incremental Annual Late Deliveries	Incremental Failed First-Attempt Deliveries
S1 - Full Relocation	-10.1%	109,004,740	9.2	19,096,724
S1a - Out-of-City Absorption	-7.2%	99,919,514	6.4	13,458,283
S1b - Out-of-City Capacity Constrained	-21.0%	132,041,562	16.1	47,235,511
S2 - Hybrid Operations	-5.4%	94,899,273	4.9	10,245,051
S2a - Hybrid Operations Consolidated	-5.3%	94,466,129	4.8	10,001,502

Notes:

1 Isolated for relocated throughput only. Service level declines would be smaller when averaged across the full delivery network.

Source: AKRF, Inc.

Overall, modeling indicates that service impacts under Intro 518 are driven less by changes in cost levels and more by the underlying spatial and operational reconfiguration of the delivery network. Across all scenarios, reductions in service quality are a consistent outcome of increased distance between facilities and end customers, with the magnitude of impact varying based on the degree of relocation, absorption capacity, and in-City operational retention. Scenarios with greater reliance on full relocation and limited absorption capacity produce the most pronounced declines in performance, while hybrid and consolidated models partially mitigate these effects but do not fully eliminate them. Importantly, even relatively modest percentage changes in service metrics translate into large absolute effects when applied across citywide delivery volumes, underscoring the scale at which small degradations in reliability accumulate in a high-throughput urban logistics system.

G Intro 518 Effects On Traffic And Vehicle Emissions

Conceptual Approach

The conceptual framework is grounded in the idea that last-mile delivery performance is fundamentally constrained by geography, particularly the distance between distribution facilities and end customers. When facilities are relocated outside the City, the additional travel time required for vehicles to reach delivery zones reduces the time available for in-area deliveries, lowering per-van productivity and requiring more vehicles to maintain the same throughput. This creates a cascading effect in which longer commute distances increase fleet size, which in turn increases total vehicle miles traveled and associated emissions.

The model treats these relationships as structural rather than behavioral, emphasizing that operational efficiency in last-mile logistics is tightly bound to spatial configuration. By holding demand constant and varying only facility location and network structure across scenarios, the analysis isolates how changes in geography alone drive differences in transportation activity and environmental outcomes.

Methodology

Estimated impacts on incremental vehicle miles traveled (VMT) and associated air quality emissions that would result from the relocation of last-mile delivery facilities outside of New York City are based on an assumed level of "at-risk" package throughput. The study evaluated transportation effects across 10 geographic service areas spanning all five boroughs: Manhattan (North and South), the Bronx (North and South), Queens (East and West), Brooklyn (East and West), and Staten Island (East and West).[32] For each service area, delivery van VMT and travel times were calculated under two conditions: an existing condition, in which the delivery facility is located within or near the service area, and a relocated condition, in which the facility is assumed to have moved to a location outside the City. Each service area is represented by a facility under both conditions, with operational flows modeled at a 25,000-package-per-facility per-day scale. Route-level travel data, including mileage to, from, and within each service area, and corresponding travel times, is modeled for each day of the week using geocoded routing analysis derived from origin-destination pairs, then averaged to produce representative daily metrics. The difference between the relocated and existing scenarios yields the incremental VMT and travel time attributable to facility displacement. The model also accounts for changes in delivery productivity resulting from longer travel distances, which increase the number of required delivery vehicles and amplify total VMT under relocation scenarios.

Emissions are calculated by applying EPA MOVES-based emission factors to the modeled VMT. These emission factors vary depending on both vehicle type–delivery vans versus heavy-duty 18-wheeler trucks–and road type, including local streets, arterial roads, and highways. The analysis tracks three key pollutants: carbon dioxide equivalent (CO_2e),[33] fine particulate matter ($PM_{2.5}$),[34] and nitrogen oxides (NO_X).[35] Results are reported in two ways: total emissions across the full modeled network and a subset of emissions occurring within New York City boundaries. In-City emissions isolate only the portion of vehicle activity that occurs inside New York City, allowing the analysis to distinguish local air quality impacts from broader regional travel. The model also explicitly accounts for inbound and outbound trips by 18-wheeler supply trucks that serve each facility. These trips are modeled as round trips between regional distribution hubs and New York City facilities, with emissions calculated separately and allocated to each service area based on its operational footprint.

To scale results from individual facilities to a citywide estimate, the model applies borough-level multipliers. These multipliers are derived from the distribution of “at-risk” package volume across the City and allocated to service areas in proportion to household counts. This ensures that higher-demand areas contribute proportionally more to total emissions and VMT estimates. The resulting outputs represent the aggregated incremental increase in vehicle activity and emissions that would occur if displaced facilities were relocated outside New York City under the modeled scenarios.

For a more detailed explanation of AKRF’s methodology please see **Appendix 5**.

Findings

The relocation of last-mile delivery operations in response to Intro 518 would also have significant implications for VMT and associated air quality impacts within New York City. Shifting “at-risk” throughput outside the City increases the physical distance that delivery vehicles must travel between regional distribution facilities and final delivery destinations, resulting in higher total mileage per package delivered. These longer commute distances not only increase overall fleet activity but also change the composition of travel within the City, as a greater share of vehicle miles is shifted to inbound and outbound trips on arterial roadways and across regional corridors. In combination, these effects lead to higher emissions of greenhouse gases and localized air pollutants, particularly from the additional van and heavy-duty truck activity required to maintain delivery throughput.

AKRF’s modeling indicates that these impacts are structurally driven by changes in spatial configuration and cannot be fully offset through operational efficiencies alone. While carriers may optimize routing, adjust fleet composition, or improve load factors, total VMT remain fundamentally tied to the distance between facilities and service areas. Each additional mile traveled introduces incremental emissions that scale with activity levels, particularly for internal combustion engine fleets that dominate current delivery operations. As a result, increases in facility-to-customer distance translate directly into higher emissions burdens, with limited ability for technological or operational adjustments to fully compensate. Relocation strategies that materially extend delivery radii are expected to increase both citywide and in-City emissions, highlighting the role of proximity as a primary determinant of air quality outcomes in last-mile logistics systems.

As shown in **Table G-1**, the relocation of last-mile delivery operations drives substantial increases in VMT and associated emissions across all scenarios, with total network-wide VMT ranging from approximately 23.0 million miles (S2/S2a) to 38.2 million miles in the full relocation scenario (S1). Within New York City, this translates to an additional 11.0 million to 18.6 million miles of travel annually, reflecting the increased distance between facilities and delivery areas. These increases in travel directly translate into higher incremental emissions, with network-wide CO_2e increasing by approximately 26,749.0 to 44,491.6 tons, $PM_{2.5}$ from 0.28 to 0.46 tons, and NO_X from 17.20 to 28.61 tons per year. In-City emissions follow a similar range, with CO_2e increasing from 13,594.0 to 22,983.1 tons, $PM_{2.5}$ from 0.14 to 0.24 tons, and NO_X from 8.69 to 14.70 tons per year. Operational impacts scale accordingly, with lost delivery time ranging from approximately 125,746 to 212,998 hours annually and incremental daily van requirements increasing from 234 to 393 vehicles. For context, based on the 25,000-package per-day facility scaled up to represent relocated or at-risk throughput, the addition of incremental daily van requirements of 234 to 393 vehicles would result in total fleets of between 2,309 and 3,962 vans per day.

TABLE G-1

Annual Incremental Routing and Air Quality Impacts from Facility Relocation

Metric	S1	S1a/S1b	S2/S2a
Network Wide (In-City and out of City)			
VMT (Miles)	38,239,384	34,354,129	23,004,947
CO_2e Emissions (Tons)	44,491.6	39,988.4	26,749.0
$PM_{2.5}$ Emissions (Tons)	0.46	0.42	0.28
NO_X Emissions (Tons)	28.61	25.72	17.20
Lost Delivery Time (Hours)	-212,998	-193,752	-125,746
Incremental Daily Delivery Vans Required[2]	393	356	234
Total Daily Delivery Vans Required[2]	3,962	3,510	2,309
Within New York City			
VMT (Miles)	18,595,827	16,903,188	10,990,553
CO_2e Emissions (Tons)	22,983.1	20,880.7	13,594.0
$PM_{2.5}$ Emissions (Tons)	0.24	0.22	0.14
NO_X Emissions (Tons)	14.70	13.35	8.69

Notes:

1 Estimates are based on assumed annual package throughput potentially affected by the relocation of last-mile facilities under response scenarios to Intro 518 regulations.

2 Incremental and Total Daily Delivery van counts estimate vans serving only the relocated or at-risk throughput and not all network or New York City deliveries.

Source: AKRF, Inc.

Some scenarios are presented together as they result in identical impacts. In particular, scenarios such as S1a versus S1b or S2 versus S2a apply different assumptions about consolidation, capacity constraints, or cost allocation, but they do not change the underlying routing structure, facility locations, or total displaced package volumes that drive VMT. Because the traffic model is driven primarily by VMT, fleet composition, and road-type distribution, any scenario that generates the same displaced throughput, and the same routing distances will necessarily produce the same emissions outcomes. Differences in cost or service assumptions do not affect physical travel behavior in the traffic model unless they explicitly alter route lengths, vehicle counts, or trip patterns. As a result, where scenarios vary only in financial or operational allocation mechanisms but not in transportation activity, their air quality results remain identical.

Table G-2 presents the annual incremental air quality impacts associated with facility relocation, accounting for the reduction in inbound heavy truck trips. Relocating last-mile delivery facilities outside New York City reduces the number of inbound heavy truck trips that would otherwise enter the City to supply these facilities. Under existing conditions, large trailer trucks transport packages from regional distribution hubs to in-City last-mile facilities, generating a consistent stream of heavy truck traffic on City streets. When these facilities are moved outside the City, those inbound deliveries are rerouted to suburban locations, eliminating the need for many of these trucks to travel into New York City. As a result, a portion of heavy truck vehicle miles traveled and associated emissions is removed from the City's roadway network. While this reduction partially offsets the increases in van activity associated with longer delivery routes, the net effect across scenarios remains an overall increase in total VMT and emissions due to the substantially higher volume of last-mile delivery activity required to serve the same demand from more distant locations.

TABLE G-2

Annual Air Quality Impacts from Facility Relocation (Net of Heavy Truck Trips)

Metric	S1	S1a/S1b	S2/S2a
Network Wide (In-City and out of City)			
VMT (Miles)	36,403,255	32,700,133	21,931,348
CO2e Emissions (Tons)	40,575.7	36,460.9	24,459.3
PM2.5 Emissions (Tons)	0.42	0.38	0.25
NOx Emissions (Tons)	26.08	23.43	15.72
Within New York City			
VMT (Miles)	16,759,698	15,249,191	9,916,954
CO2e Emissions (Tons)	19,067.2	17,353.2	11,304.3
PM2.5 Emissions (Tons)	0.20	0.18	0.12
NOx Emissions (Tons)	12.16	11.07	7.21

Notes:

1 Estimates are based on assumed annual package throughput potentially affected by the relocation of last-mile facilities under response scenarios to Intro 518 regulations.

2 Tons = US Short Tons

Source: AKRF, Inc.

As shown in **Table G-2**, even after accounting for the reduction in inbound heavy truck trips, facility relocation leads to net increases in VMT and emissions at both the regional and City level. Under S1, network-wide VMT increases by approximately 36.4 million miles annually, generating an additional 40,575 tons of CO_2e, 0.42 tons of $PM_{2.5}$, and 26.08 tons of NO_X. Within New York City alone, this includes roughly 16.8 million additional miles of travel and 19,067.2 tons of CO_2e emissions. Scenarios S1a and S1b reduce these impacts modestly, with network-wide VMT at approximately 32.7 million miles and in-City VMT at 15.2 million miles, while S2 and S2a further reduce impacts to 21.9 million miles network-wide and 9.9 million miles within the City. Despite these reductions, emissions remain substantial across all scenarios, with in-City CO_2e increases ranging from approximately 11,304 tons in S2/S2a to over 19,000 tons in S1.

As detailed above, AKRF's modeling indicates that while reductions in inbound heavy truck activity provide a measurable offset, they are not sufficient to counterbalance the broader system impacts associated with the relocation of last-mile facilities. The increase in delivery distances introduces a persistent expansion in van-based activity that drives net growth in VMT and emissions across all scenarios. Even under lower-impact cases such as S2 and S2a, where displaced throughput is more limited, the system continues to generate millions of additional miles of travel and materially higher emissions relative to baseline conditions. The spatial separation between distribution facilities and end consumers is a primary driver of transportation intensity and environmental impact.

Several consistent patterns emerge across all scenarios. In-City emissions account for roughly half of total incremental emissions, indicating that a substantial share of the additional vehicle activity occurs within New York City rather than being confined to regional travel. The reduction in inbound heavy-duty truck trips provides a partial offset, lowering gross CO2e emissions by approximately 8 to 9 percent across scenarios, though this is insufficient to counterbalance the broader increase in van-based delivery activity. In addition, all scenarios show a decline in in-area delivery time, reflecting the core operational mechanism driving these impacts: as facilities move farther from service areas, a greater portion of each route is consumed by commuting rather than deliveries. This reduction in productive delivery time lowers per-van throughput and necessitates a larger fleet to maintain service levels, causing increases in VMT and emissions.

Image: AKRF.

H

Equity and Neighborhood Effects

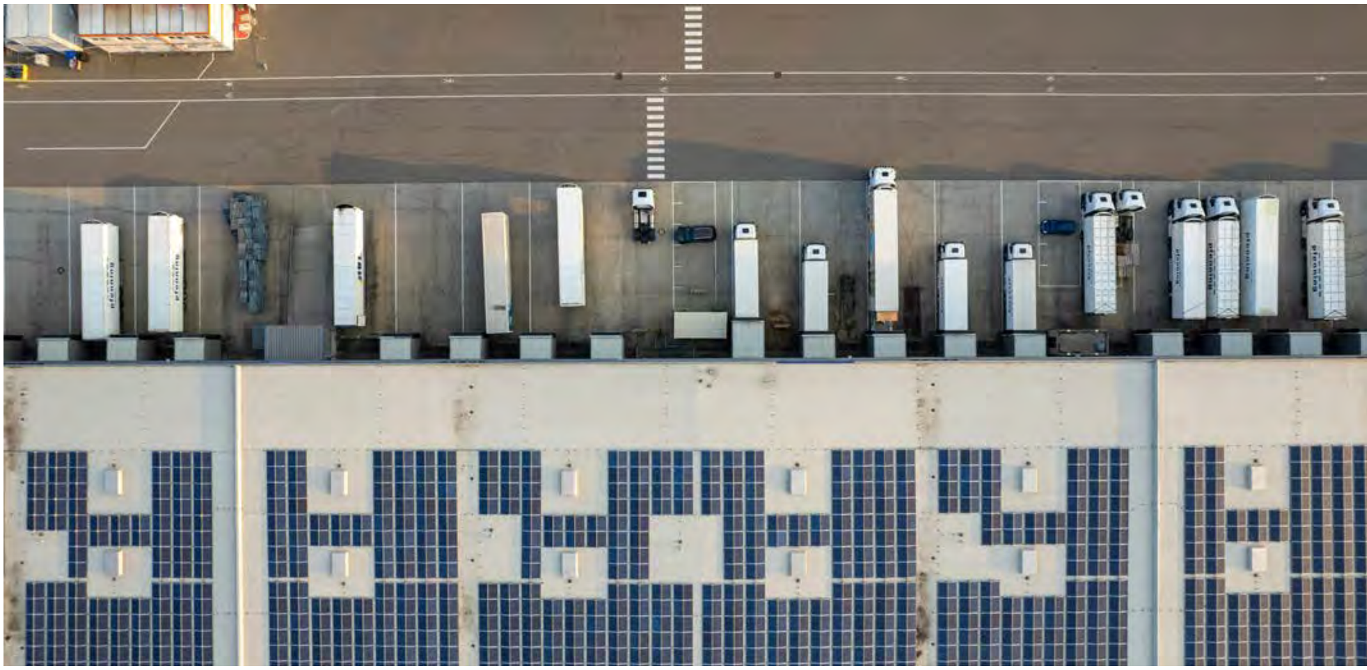
The impacts of Intro 518 are expected to vary across neighborhoods based on the spatial distribution of last-mile facilities, transportation networks, and the workforce that supports these operations. Because delivery infrastructure and employment are concentrated in industrial areas and outer-borough communities, many of which are also designated as Disadvantaged Communities (DACs), the effects of relocation and restructuring are not evenly distributed. This section evaluates how changes in facility location, employment, and delivery activity may shift economic and environmental burdens across neighborhoods. It highlights how impacts may be redistributed across communities rather than eliminated.

Conceptual Approach

This analysis evaluated whether last-mile delivery facilities are disproportionately concentrated within disadvantaged communities (DACs), whether census tracts containing such facilities exhibit elevated environmental burdens and vulnerabilities relative to other industrial areas, and how Intro 518 could affect the distribution of logistics activity, truck traffic, emissions, and employment. The analysis focused on burdens commonly associated with freight and industrial activity, including diesel truck traffic, air quality, industrial land use, and related socioeconomic and health vulnerability indicators, while recognizing that many last-mile facilities are located within long-established industrial areas that already experience elevated environmental burdens.

Methodology

AKRF conducted a review of relevant literature and a spatial analysis of identified last-mile facilities throughout New York City using publicly available datasets and the New York State Final Disadvantaged Communities shapefile.[36] Additional information regarding the regulatory background and criteria for identifying DACs are detailed in **6**. Census tracts containing last-mile facilities were evaluated using relevant DAC criteria, including diesel truck traffic, PM2.5, benzene exposure, asthma prevalence, industrial land use, and demographic and income indicators. AKRF then developed average and weighted-average percentile rankings for these tracts using the total last-mile facility square footage in each tract and compared them to industrial-heavy DACs and industrial-heavy census tracts citywide and statewide to distinguish burdens potentially associated with last-mile facilities from broader industrial-area conditions. The analysis also qualitatively considered how Intro 518 could influence facility relocation, operational consolidation, truck travel patterns, and employment distribution.



Impacts on Outer Boroughs

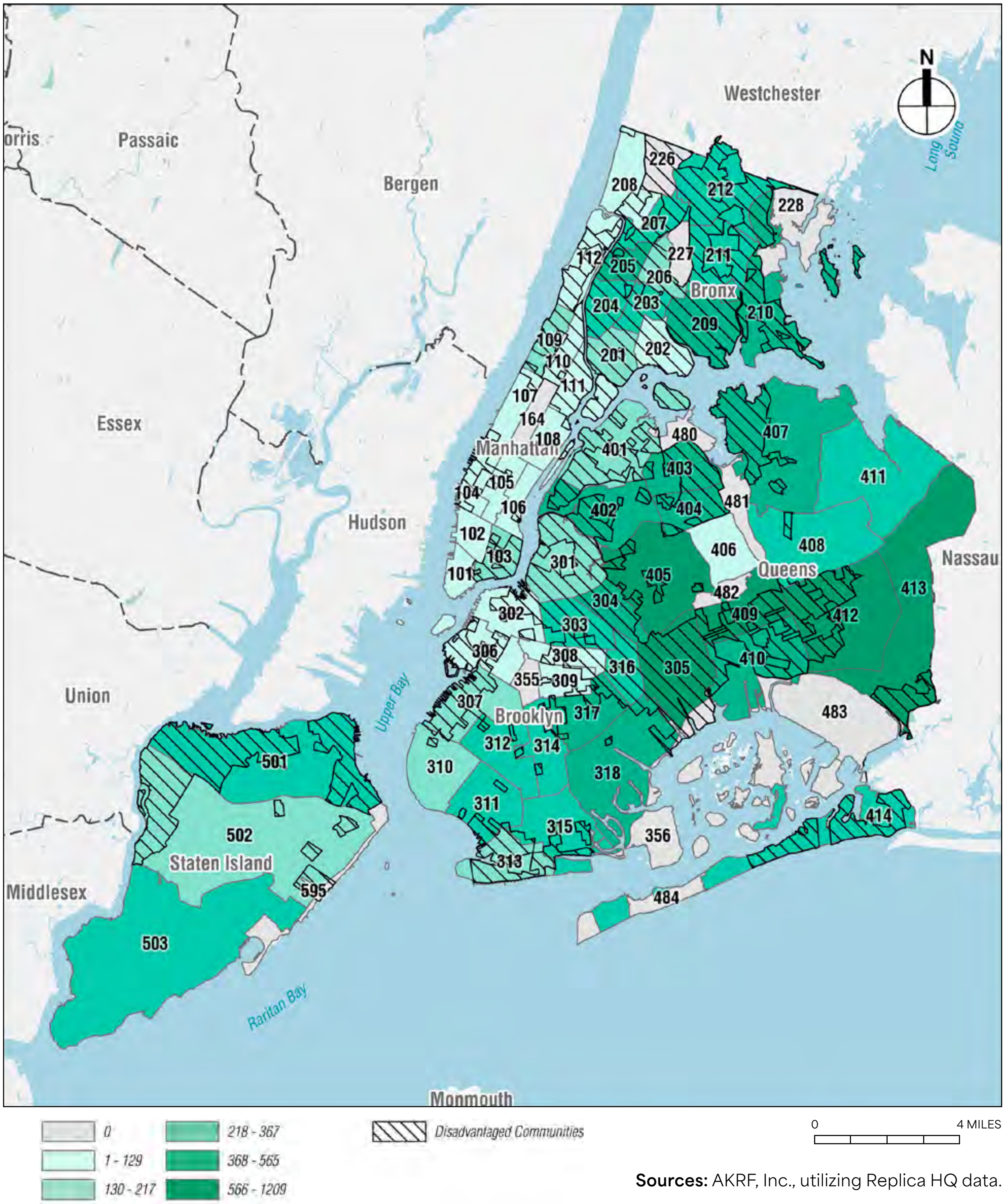
Because last-mile facilities, contractor-based delivery networks, and the workforce supporting them are concentrated primarily in outer-borough industrial and logistics corridors, the most direct employment, service, and small-business impacts of relocation scenarios would be concentrated in Queens, Brooklyn, the Bronx, and Staten Island. These boroughs rely heavily on van delivery systems and neighborhood-scale logistics facilities that enable high stop density, short route cycles, and efficient intra-borough routing. Under scenarios involving facility consolidation or relocation outside the City, these areas would be more exposed to longer "line-haul" distances from origin points, reduced facility proximity, and declining route efficiency, all of which translate into fewer local jobs, longer delivery windows, and increases in per-delivery costs for households and businesses.

Manhattan, by contrast, operates under a structurally different last-mile service model that is less dependent on embedded warehouse infrastructure within the borough. Deliveries in Manhattan are already largely supported through consolidated upstream facilities located outside the island, with final distribution occurring via high-density delivery methods such as walker-based courier systems, bicycle logistics, and other small-footprint urban delivery strategies. This model is designed around constrained street access, limited parking availability, and high delivery density, and therefore does not rely to the same extent on traditional van routing within the borough itself. As a result, Manhattan's baseline logistics structure is already "relocated" in functional terms, with in-City warehousing playing a reduced role relative to outer-borough operations. Accordingly, while Manhattan would not be fully insulated from broader systemwide effects, such as potential changes in pricing structures or carrier network optimization, it is expected to experience relatively limited direct disruption to its underlying delivery structure and service. The more pronounced impacts would be concentrated in the outer boroughs, where last-mile employment is more heavily tied to physical facility locations within those communities and where households and businesses are more dependent on nearby facilities to maintain current levels of service speed, reliability, and cost efficiency.

As shown in **Figure H-1**, last-mile facility workers tend to live within and nearby neighborhoods that contain identified last-mile facilities (i.e. outer borough communities). Furthermore, nearly half (approximately 49 percent) of the last-mile workforce lives within census tracts designated as Disadvantaged Communities (DACs).

FIGURE H-1

Last-Mile Facility Worker Place of Residence by Community District and DACs



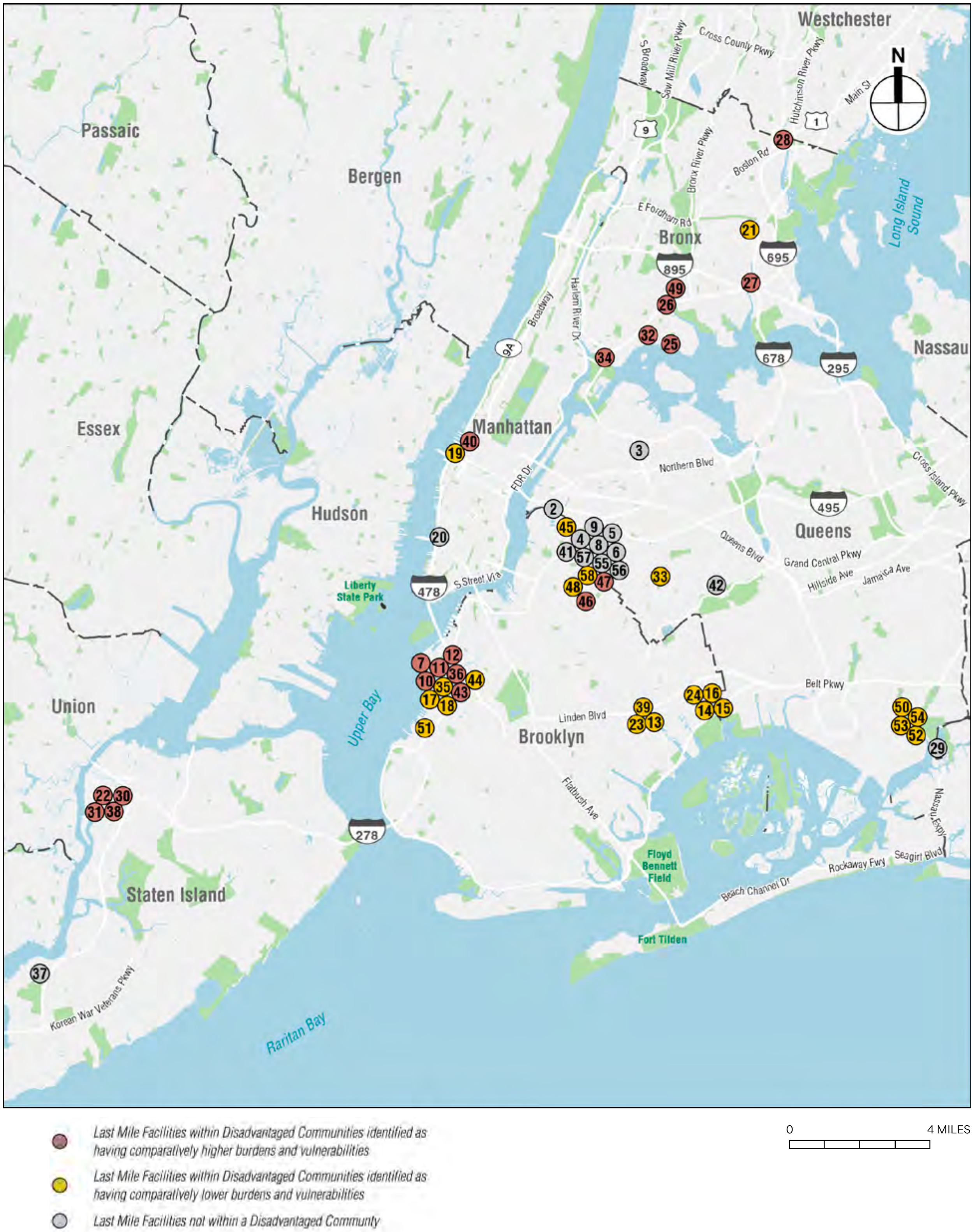
Sources: AKRF, Inc., utilizing Replica HQ data.

Dacs and Distribution of Air Quality Impacts

The spatial distribution of last-mile logistics facilities shows a strong overlap with New York State's designated DACs, which are defined by the Climate Justice Working Group using combined indicators of environmental burden and socioeconomic vulnerability. Consistent with this framework and DEC Environmental Justice Siting Law Guidance, DACs are areas where existing pollution burdens and population sensitivities increase the likelihood that additional emissions sources may result in disproportionate impacts. Based on AKRF's literature review, the 2025 Comptroller's report found that approximately 68 percent of last-mile facilities are concentrated in New York City's environmental justice communities (i.e., disadvantaged communities). An existing conditions analysis indicates that approximately 72 percent of identified last-mile facilities are located within DACs, with nearly half of those situated in DACs that rank comparatively higher in burdens and vulnerabilities (see **Figure H-2**). These facilities are concentrated in industrial and freight-intensive neighborhoods such as Red Hook, East New York, Sunset Park, Maspeth, Hunts Point, and portions of Staten Island, Brooklyn, Queens, and the Bronx, which are already characterized by elevated truck activity and industrial land use.

Image: Richard B. Levine/Levine Roberts via ZUMA Press.

FIGURE H-2
Identified Last-Mile Facilities within Disadvantaged Communities



Notes: Facility numbers correspond to **Appendix 1**, **Table 1-1**.

Sources: AKRF, NYS Final DAC Map (2023) Shapefile.

Across these locations, many of the environmental and demographic characteristics associated with last-mile facilities are not unique, but rather reflect broader conditions present in the City's most industrial-heavy DACs and census tracts. These include elevated vehicular traffic, benzene exposure, PM2.5 concentrations, asthma prevalence, intensive industrial land use, and higher proportions of minority and low-income populations. AKRF compiled the NYS Disadvantaged Community Criteria rankings for the relevant DACs and then developed average and weighted average rankings for the relevant DACs based on the total square footage of last-mile facilities in each DAC (see **Appendix 6**). Within this broader pattern, diesel truck traffic emerges as the most consistently distinguishing feature associated with last-mile facilities, driven by heavy-duty freight movements, warehouse-related deliveries, freight corridor routing, and congestion from high-frequency delivery operations. These activities contribute directly to localized emissions of PM2.5 and NOx, as well as secondary impacts such as noise, traffic delays, and cumulative exposure burdens in adjacent neighborhoods.

However, comparative analysis shows that while diesel truck activity is elevated in last-mile facility DACs, other key environmental indicators generally do not tend to exceed levels observed in industrial-heavy DACs and census tracts (see **Table 6-1** in **Appendix 6**). In particular, asthma prevalence in last-mile DACs does not exceed the 80^{th} percentile citywide or statewide, indicating that although exposures are present, they are not unusually high relative to other industrial areas. Similarly, citywide PM2.5 levels in last-mile DACs (65^{th} percentile) are below the threshold for extreme burden classification, but higher than other industrial areas (55^{th} percentile). The statewide weighted average percentile of PM2.5 within last-mile facility DACs (84^{th} percentile) is above the threshold for extreme burden classification, though, and above the average industrial-heavy DACs level for New York State (80^{th} percentile).

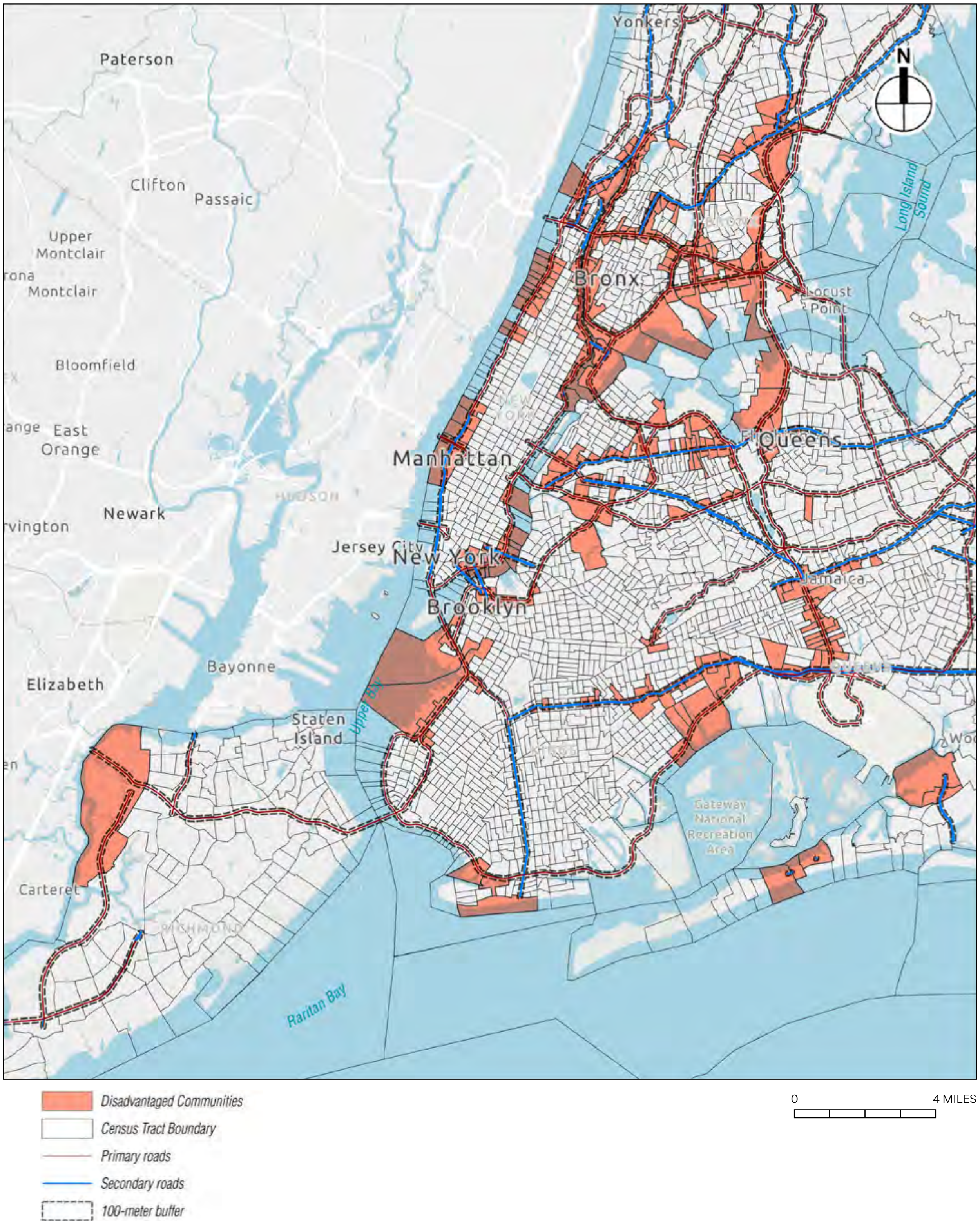
Of all the industrial-heavy DACs, approximately half are considered to have higher burdens and vulnerabilities (51 percent). The weighted average industrial land use burden falls within the 89^{th} percentile for New York City, indicating that last-mile DACs are correlated with industrial-heavy areas. This suggests that last-mile facilities primarily intensify existing conditions in industrial-heavy areas rather than introduce distinct or uniquely elevated environmental burdens. See **Appendix 6** for further information on comparative environmental burden scores.

At the same time, last-mile facilities contribute to localized concentrations of economic activity, including employment opportunities and property tax generation, alongside their environmental footprint. Overall, the evidence indicates that these facilities are not the sole or dominant source of environmental burden in DACs, but rather one component of broader industrial and freight-related land use systems.

Prior research observing health and community impacts of PM2.5 and tailpipe emissions related to roadways has established a primary effect area of 100 meters from the roadway. This primary effect area represents the portion of the DAC where the most immediate and concentrated impacts are expected to occur, although the broader consequences and secondary impacts of rerouted traffic would extend throughout the surrounding community. Under a facility relocation scenario, the distribution of these impacts would shift rather than disappear. The removal of facilities from DACs currently hosting last-mile operations would likely reduce localized truck trips, idling, and curbside congestion in those specific neighborhoods, producing measurable air quality and noise benefits at the immediate site level. However, as delivery operations relocate to facilities outside New York City, the resulting increase in vehicle miles traveled (VMT) would redistribute diesel truck activity across regional corridors and major arterials that also traverse DACs throughout the City. Given that PM2.5 and tailpipe emission impacts are most acute within approximately 100 meters of roadways, DACs located along bridge and tunnel approaches, freight corridors, and major delivery routes would be particularly exposed to these shifted burdens (see **Figure H-3**).

FIGURE H-3

Disadvantaged Communities Within or Adjacent to Primary and Secondary Road Networks



Sources: AKRF, U.S. Census Bureau TIGER/Line Roads Shapefile.

The net effect on DACs under facility relocation is therefore characterized not by an overall reduction in impacts, but by a redistribution of exposure across the regional freight and transportation network. Under this scenario, DACs located adjacent to existing last-mile facilities would likely experience localized reductions in heavy-duty truck activity, idling, curbside congestion, and associated diesel-related emissions as warehouse operations are relocated, consolidated, or shifted outside the City. These near-site improvements could translate into measurable decreases in localized exposure to traffic-related pollutants such as $PM_{2.5}$, NO_X, and diesel particulate matter, as well as secondary benefits related to noise, and neighborhood-level congestion in communities that currently host a high concentration of logistics infrastructure. However, these localized benefits are counterbalanced by systemwide increases in vehicle miles traveled and the geographic dispersion of delivery activity, as longer haul distances from regional hubs shift truck and van traffic onto major arterials, bridge and tunnel approaches, and secondary freight corridors that traverse multiple boroughs. Because traffic-related pollutant exposure is highly concentrated within close proximity to roadways, particularly within approximately 100 meters, DACs situated along these primary and secondary routes are more likely to experience incremental increases in exposure to diesel emissions and related air quality burdens. As a result, while some DACs near existing warehouse clusters may see improvements in localized environmental conditions, other DACs located along regional delivery pathways may experience offsetting increases in traffic intensity and associated emissions, producing a spatially uneven outcome in which environmental burdens are redistributed rather than uniformly reduced, with impacts shifting between neighborhood-level warehouse-adjacent areas and corridor-adjacent communities depending on proximity to freight nodes versus transportation networks.

Image: FedEx.

Stakeholder interviews indicate that electric vehicle (EV) deployment in last-mile delivery is strongly dependent on in-City or near-City distribution facilities, where dense routing patterns, short trip lengths, and predictable mileage cycles make electrified operations feasible. Under these conditions, operators are able to rely on frequent return-to-depot charging and lower-capacity charging infrastructure embedded within urban facilities, supporting meaningful operation of EV fleets in last-mile delivery. However, stakeholders consistently emphasize that relocation of operations outside the City would significantly undermine this viability, as longer delivery routes, increased vehicle miles traveled, and extended time on the road would exceed the practical range and feasibility of most delivery EVs, forcing a shift back toward gasoline- and diesel-powered vehicles with higher fuel consumption, maintenance costs, and tailpipe emissions. New York City and its existing logistics operating procedures are therefore viewed as a critical proving ground for low-emission logistics innovation, where dense urban conditions enable EV adoption that is difficult to replicate in more dispersed regional networks. While the relocation of existing last-mile facilities may reduce localized emissions in adjacent communities, it would likely undermine or halt EV deployment and increase reliance on internal combustion vehicles across the broader delivery system, resulting in higher overall emissions and vehicle miles traveled. Rather than reducing total emissions, this shift would redistribute those higher emissions more widely across the regional network, dispersing traffic-related pollution across a larger set of communities and roadway corridors.

Effects on Safety

The most comprehensive Citywide analysis of traffic safety impacts associated with last mile delivery facilities in New York City examines facilities that opened between 2017 and 2022, a period marked by rapid, pandemic era expansion.[37] While not isolating delivery vehicles to confirm a positive correlation, that analysis found that a substantial majority of new facilities were associated with increases in injury-causing crashes and truck-involved crashes within a half-mile radius following opening, particularly in neighborhoods with multiple facilities clustered together. These findings reflect conditions during a period of exceptional growth, when delivery volumes surged and facilities were activated quickly, often outpacing local oversight and traffic management. It is also unsurprising, since the numbers of crashes at intersections or along street segments primarily increase or decrease linearly according to the vehicular volume of traffic. An increase in crashes would therefore be expected to occur within the area near any type of development that increases traffic.

To date, no comparable Citywide analysis has isolated whether crash rates near existing facilities have declined or stabilized in the years following that initial surge. Operators interviewed by AKRF report that delivery practices, routing discipline, vehicle technology, and driver training have evolved since the pandemic peak (see **Recent Advances in Safety Systems** inset); they do not view Intro 518 as offering safety improvement measures equaling or exceeding their current practices.

Intro 518's potential to increase Citywide VMT through the relocation of last-mile operations outside New York City raises a different and potentially more persistent set of safety risks. Relocation would lengthen delivery routes and increase daytime van trips, when pedestrian activity, school travel, and curbside interactions are most prevalent. Unlike in-City facilities, which often concentrate inbound freight movements during overnight or early-morning hours and rely on shorter local routes, relocated facilities would generate longer approach trips and sustained circulation throughout the day. This would expand exposure across a broader set of neighborhoods, including additional disadvantaged communities located along major routes.

From a street-safety and equity perspective, this represents a shift from localized, increasingly managed delivery activity toward more diffuse, longer-distance vehicle travel during peak pedestrian hours. While relocation could reduce truck activity immediately surrounding some existing facilities, the resulting increase in VMT and daytime delivery traffic would broaden the geographic footprint of risk, potentially increasing conflicts in neighborhoods that do not currently host last-mile facilities but already experience elevated traffic burdens. This redistribution of exposure underscores why increases in VMT, regardless of origin, are directly relevant to pedestrian safety and equity outcomes.

The period of rapid expansion in last-mile delivery activity during the late 2010s and early 2020s coincided with a learning curve in facility operations, routing, and driver management. Since that time, major delivery operators have implemented substantial changes to improve safety performance, including the introduction of real-time driver monitoring, advanced vehicle safety systems, and more structured routing and training protocols.

These measures reflect a broader shift toward more standardized, technology-enabled safety management across the industry, with early evidence indicating reductions in unsafe driving behaviors and crash rates even as delivery volumes have remained elevated. The technologies and practices described below illustrate how last-mile operations are continuing to evolve beyond the conditions observed during the initial surge period.

Recent Advances in Last-Mile Delivery Safety Systems

Amazon has heavily invested in technology to monitor and boost delivery driver safety, including in New York City. Since 2020, Amazon's contracted Delivery Service Partner (DSP) vans have been equipped with advanced AI-powered, dual-facing camera systems (the Netradyne Driveri platform) that monitor the road and driver. These in-cab cameras use computer vision to detect unsafe behaviors (distraction, seatbelt use, tailgating, rolling stops, etc.) and provide real-time voice alerts to coach drivers mid-route.[38] Paired with smartphone telematics apps that log harsh braking, speeding, and phone use, Amazon creates daily safety "scores" for each driver, adding accountability and targeted coaching for safer habits.[39] The impact has been notable: an initial 2020 camera pilot reduced accident rates by 48 percent (with significant drops in seatbelt and distraction violations),[40] and Amazon reports that its "serious" crash rate in NYC fell by 35.7 percent from 2024 to 2025 after wide deployment of these systems[41] (figures are self-reported, but align with broader industry findings). In Manhattan and other dense areas, Amazon has also introduced electric cargo bikes (speed-capped at 12 mph) to slow down last-mile travel, reducing collision risks while easing traffic and emissions.[42] Additionally, AI-driven route optimization improves safety by adjusting for local conditions (e.g. weather or complex intersections) and highlighting precise destinations to minimize unsafe maneuvers.[43]

Amazon's new Rivian electric delivery vans (EDVs), now deployed in NYC and nationwide, further enhance driver safety with built-in advanced driver-assistance systems (ADAS). These custom vans feature 360° exterior camera coverage, sensor-based collision warnings, and automatic emergency braking to help avoid crashes.[44] They also integrate navigation and driver support software directly into the dashboard, which reduces distraction and encourages safe driving speeds.[45] Amazon says it has spent billions on safety innovations since 2019 (including VR driver training and simulator programs) and that its overall logistics safety performance has improved markedly in recent years.[46] The company credits its technology and intensive training for a declining rate of driver-related incidents (even as online order volumes surged) and emphasizes that these tools help both protect communities and coach drivers toward safer habits.[47][48]

Image: Amazon.

Peer carriers are adopting analogous safety tech, especially FedEx Ground. FedEx Ground, which similarly uses contracted delivery operators, has mandated a host of in-vehicle safety systems in recent years. As of 2021, FedEx requires five-point backup radar sensors and side- and rear-view camera displays on contractor vans to eliminate blind spots and prevent reversing collisions. [49] By late 2023, FedEx expanded its contractor requirements to include forward-collision avoidance with automatic braking, lane-departure warning alarms, and speed governors on new delivery vehicles.[50] The company has also deployed video telematics (dual-facing dashcams) to monitor driving behavior, using the data for driver coaching and intervention; a next-generation AI system to detect distracted driving and issue real-time in-cab alerts is reportedly in the works.[51] FedEx has not publicly released detailed safety outcome metrics, but in 2023 executives stated that these technologies have "helped bring down accidents as a percentage of miles driven."[52] By contrast, UPS, which directly employs its drivers and emphasizes rigorous training and telematics, has historically maintained a better safety record per mile than FedEx's contractor model, highlighting how both technology and operational practices can influence safety.[53] Overall, across the last-mile delivery industry, there is a clear trend toward leveraging AI-assisted cameras, on-board sensors, and digital driver-monitoring to improve safety performance. Major carriers and regulators alike are watching these systems' real-world results closely, as companies report fewer accidents and violations where such technologies are in place.[54]

Responses To Key Questions

This presents a series of six questions and answers that distill the study's findings for policymakers, stakeholders, and affected communities. These responses provide clear, evidence-based insights into topics such as delivery costs, service performance, employment and wages, operational viability, broader citywide impacts, and equity considerations under the proposed regulations.

1. Consumer Costs: How would per package and monthly delivery costs change for households and small businesses?

Intro 518 stands to make e-commerce deliveries noticeably more expensive for NYC residents and small businesses. Under the legislation's provisions, many carriers would incur higher operating costs due to required shifts in their operating models. Those increased costs are expected to be passed on to customers, raising both the cost per package and customers' monthly spending on deliveries. The report's analysis indicates that under a scenario of full relocation of currently "at-risk" last-mile operations outside City limits (a worst-case response to the policy), the average cost per package could increase by over 90 percent citywide. For deliveries involving relocated warehouses, the per-package cost increase could exceed 250 percent, meaning more than triple the current costs for those shipments. Even under scenarios where some carriers adopt hybrid measures (partial relocation and partial compliance with new labor rules), per-package costs are expected to rise significantly in the range of 50-60 percent on average, depending on how extensively carriers adjust operations.

In practical terms, these percentages indicate that a typical household's monthly spending on deliveries might roughly double, or even triple in extreme cases, if the same number of packages are ordered as before. For example, if a household currently spends $50 per month on e-commerce shipping and service fees, that cost could increase to around $100 in a scenario where carriers relocate many operations outside NYC due to the higher costs per package (subject to the exact scenario). Households that currently enjoy low-cost or subscription-based deliveries might see free shipping thresholds increase or disappear, and delivery fees rise significantly, effectively ending the era of extremely low-cost deliveries. Small businesses such as local retailers or restaurants that rely on frequent deliveries for inventory and supplies would similarly grapple with rising delivery expenses. If their monthly inbound delivery costs double, these businesses might have to either pass on costs to customers or invest more in inventory, affecting their cash flow. Smaller vendors using e-commerce platforms, who depend on affordable shipping to reach customers, might face a competitive squeeze as their shipping expenses rise, potentially eroding profit margins or forcing price increases.

Overall, Intro 518's mandates would make last-mile delivery more expensive for every stakeholder in the supply chain. The range of projected per-package cost increases spans from moderate (tens of percent) to extreme (doubling or tripling) depending on how completely carriers relocate operations rather than comply. These higher per-package costs will substantially raise the monthly costs for users of delivery services–especially impacting households and small businesses that rely on timely, affordable shipments for daily needs and operations.

2. Service Levels: What happens to delivery times, on time performance, geographic coverage, and peak capacity (e.g., holidays, storms)?

The proposed changes in delivery operations under Intro 518 would likely slow down last-mile deliveries in New York City and reduce the reliability and coverage of service, especially during peak times like holidays or storms. Requiring in-City distribution center labor to be direct employees could prompt many carriers to relocate facilities outside the five boroughs. This would lengthen the distance between warehouses and customers, reducing the number of deliveries each route can complete in a given time frame. In a moderate scenario where some carriers partially adapt but still relocate a portion of operations, average deliveries per route might fall moderately (for example, due to added drive times into the City), causing a measurable slowdown in typical delivery times and reduction in on-time performance. In an extreme scenario where facilities wholly relocate ("full relocation") and face capacity constraints, the modeling suggests service metrics could degrade by up to 20 percent or more on average compared to current performance.

Although the areas of service in which these degradations occur would ultimately be determined by the carrier, several specific service dimensions are likely to be affected:

- Delivery Times: Doorstep deliveries would take longer on average because vehicles must cover more miles daily to reach customers from distant warehouses. Drivers might have to drop 20-30 percent fewer packages per route per day if starting outside the City, implying longer overall delivery durations. Customers in outer boroughs could face particularly extended delivery windows relative to current conditions, as those areas would be furthest from the relocated distribution points.
- On-Time Performance: With longer routes and increased congestion, carriers would find it harder to meet promised delivery timeframes. The share of deliveries arriving within standard service

windows could drop - a projected 10 percent decline citywide under moderate conditions, and potentially up to 21 percent decline under worst-case constraints. In practical terms, more packages might arrive late or be rescheduled, especially during peak demand periods.

- Geographic Coverage: Lower-density areas may see reduced delivery frequency or slower service. While carriers would strive to serve all addresses, the legislation's pressures may force them to triage deliveries, prioritizing denser areas where routes are more efficient. This could mean fewer same-day or next-day options for outer neighborhoods.
- Peak Capacity: During surges (holidays, large sales events, or severe weather) networks would be strained, since fewer City-based facilities limit the handling capacity. Carriers have indicated that if a major storm or holiday rush coincides with relocated operations, there is increased risk of significant delays as distant facilities and longer routes limit the flexibility to add extra last-minute deliveries or adjust routes quickly. The relocation of operations may also hinder use of micro-hubs and cargo bikes (which currently help manage peak and last-minute deliveries in Manhattan), further reducing City delivery capacity during high-demand periods

Overall, the expected outcome is a general decline in delivery service levels in NYC if Intro 518 is implemented. All else equal, shipments would tend to take longer and face more delays. Rapid-delivery options such as same-day or 2-hour deliveries would likely be scaled back, and coverage might become inconsistent in the hardest-to-serve areas. These impacts become more severe in scenarios where more operations leave the City, placing stress on long-distance truck routes and creating an inflexible network that struggles during peak demand times or disruptive events.

Image: AKRF.

3. Employment Mix and Wages: How does Intro 518 affect job counts, classification, wages, benefits, and employment turnover for drivers and warehouse workers?

The proposed legislation would impose sweeping changes to the employment structure in the last-mile delivery sector. Thousands of current driver and warehouse jobs are projected to be eliminated or moved outside the City if carriers respond by relocating operations or ceasing those segments in NYC (rather than converting to direct employment en masse). Employment impacts vary by scenario: estimates range from roughly 3,000-5,000 jobs at risk under a low-impact scenario (if some carriers pragmatically adapt to the mandate) to over 10,000 jobs at risk in a high-impact scenario (if most at-risk operators relocate or shut in the City). The majority of these at-risk positions are currently held by contractor-driver and warehouse workers who are not employed directly by large parcel carriers.

In terms of job classifications and labor mix, Intro 518 would discourage the use of independent contractor models for facility-based last-mile deliveries in the City, effectively eliminating the contracted delivery drivers employed by third-party delivery service providers (DSPs) or subcontractors. If implemented, the industry would likely pivot toward a smaller number of directly-employed drivers (e.g., with major unionized carriers such as USPS and UPS) and potentially more reliance on independent "gig" couriers who operate outside distribution facilities (e.g., app-based drivers and foot couriers, who are not covered by the legislation and thus unaffected). The net result would be a shift in employment mix toward a more formal, higher-wage workforce but with significantly fewer total jobs. Given the relatively short compliance timeframe envisioned by the legislation (drivers must become employees by 2028), many of the numerous small and mid-sized delivery companies reliant on contracting may find it financially untenable to convert all their workers to full-time employees, so rather than transitioning all workers to direct employment, these firms are expected to relocate or close their NYC operations. Large national carriers with direct-employment models (UPS, USPS, some FedEx units) would remain in operation, possibly expanding slightly, but they are not expected to fully absorb the displaced jobs given different operation scales and business models.

For the workforce that does remain in the City, wages and benefits would likely improve, as these remaining jobs would primarily be with companies that pay higher hourly rates and offer full-time benefits (e.g., unionized delivery drivers). However, the total wage bill within the City's last-mile sector might decrease because far fewer workers would be employed; thus, fewer individuals would receive those higher wages. In terms of employment turnover, the abrupt shift could cause a short-term spike in workforce dislocation. The immediate result of the law's implementation could be a wave of layoffs among contractor-based drivers and warehouse staff, especially in outer-borough facilities where these jobs are concentrated. Many of these workers might face extended unemployment or have to seek work outside NYC (possibly following relocated companies) because there is no guarantee that larger carriers will quickly hire the displaced workforce. Over time, if those who find employment with the major carriers enjoy higher pay and more stable employment terms, turnover in those particular positions may actually decline (since higher wages and benefits tend to improve retention). However, the initial shock and widespread displacement caused by the policy would likely mean significant near-term churn and economic hardship for many workers previously employed by the smaller firms, particularly those in disadvantaged communities where such jobs are a key source of income.

4. Operational Viability: Which operators (large, mid market, niche) reduce, relocate, or cease operations? What's the expected contraction in throughput?

The viability of various delivery operators in NYC would diverge sharply under Intro 518. The proposed requirement for in-City distribution centers to use only direct employees and for larger carriers to ensure drivers maintain employee status would disproportionately affect carriers that rely on third-party contract labor models. Different tiers of operators are likely to pursue distinct responses:

- Large, unionized carriers (e.g. UPS, USPS) – These firms already employ drivers and warehouse staff directly and would likely continue operating in NYC with minimal direct disruption from the law. They might even see a moderate increase in volume (absorbing some demand from exiting competitors), but their capacity to expand is limited by their existing infrastructure and business strategy. They likely cannot fully replace the capacity lost if other networks withdraw since their delivery models and networks are different (e.g., UPS has fixed routes and limited flexibility to rapidly expand capacity).
- Large e-commerce networks using contractors (e.g. Amazon's DSP network) – These operators are most heavily impacted, as their current last-mile operations in NYC depend heavily on small contractor companies and subcontracted drivers. Full compliance (converting all contract drivers to employees and maintaining wages/benefits accordingly) would sharply raise their labor and operating costs. For example, internal cost modeling suggests Amazon's per-package costs could rise by 50-100 percent if forced to directly employ drivers at prevailing wages. Rather than absorb these costs, it is anticipated that such companies would move a significant share of their

distribution activities to facilities just outside NYC, such as New Jersey or upstate, and adjust their logistics so that deliveries from those external hubs cover the City. Approximately 36 percent of current daily parcel volume is considered "at-risk throughput" tied to these contractor-based operations. In the most extreme scenario, essentially that entire segment (one-third of City deliveries) would be relocated out of NYC in the wake of the legislation. Some companies may cease certain services or reduce volume if relocating proves too costly or logistically challenging, further decreasing in-City throughput.

- Mid-market and niche local couriers (small parcel delivery firms) – Many smaller local operators are anticipated to struggle to meet the law's labor requirements, as they often have slim profit margins and limited resources to transition their entire driver pool to full employee status. A number of these small courier companies may shut down their NYC operations entirely or relocate to nearby areas where they can run more cost-effectively. This includes numerous minority- or family-owned delivery firms currently serving neighborhoods across the City. In effect, NYC's last-mile industry could consolidate, leaving a few large players and drastically fewer smaller companies.

As these varied responses unfold, the overall last-mile system capacity in the City is forecast to shrink. In the scenarios modeled, the throughput reduction roughly corresponds to the share of operations that relocate. If about one-third of daily deliveries (the "at-risk" portion) are moved out of NYC, local last-mile throughput effectively drops by 30 to 35 percent. Even with partial mitigation (e.g., if some mid-sized companies manage a hybrid approach or large carriers partially backfill the gap) a non-negligible contraction of deliveries is expected, with the moderate scenario also showing a significant reduction. This contraction means that fewer packages can be processed and delivered within the City in the same timeframe, making the network leaner and potentially leaving demand for deliveries partially unmet. In the worst case, almost all volume from impacted operators leaves, representing a major throughput contraction that could result in certain delivery services being curtailed in NYC, at least until alternative distribution systems are developed. The ultimate severity depends on how many operators exit versus adapt, but it is more likely than not that Intro 518 would drive a substantial reduction in in-City last-mile operational capacity and throughput as many incumbent players either relocate or downsize significantly.

5. Citywide Spillovers: What are the effects on congestion, emissions, curb management, and small business sales reliant on fast delivery?

The ripple effects of Intro 518 would likely manifest across New York City in ways that go beyond the last-mile companies themselves. Some major anticipated spillovers include:

- Congestion and Traffic: Moving distribution centers out of the City is expected to add significant truck traffic onto regional roads and City streets, as vehicles must travel further distances to deliver goods back into the five boroughs. Instead of eliminating truck trips, total vehicle-miles traveled (VMT) by delivery trucks could increase substantially, possibly by tens of millions of additional miles per year. These longer trips would be concentrated on highways and primary corridors leading into NYC, potentially aggravating congestion there, and could also contribute to increased local traffic congestion in neighborhoods as trucks still must circulate to deliver to final addresses. For example, delivery vehicles that previously operated from local hubs now would be coming from outside the City, likely spending more time on heavily trafficked approaches such as bridges and arterial roads. While some reduction in local truck movements near closed facilities is possible, the net effect is more overall truck traffic regionwide; thus, any localized improvement may be offset by worsening congestion on the routes into the City and on City streets where the deliveries still occur.

- Emissions and Air Quality: With longer trips and potentially more delivery vehicles needed (to cover the same volume from distant locations), greenhouse gas emissions and air pollution from trucks would rise. Air quality modeling shows a net increase in CO2 emissions and other pollutants in all scenarios. For instance, if roughly one-third of deliveries are relocated, the City could see tens of thousands of additional tons of CO2 emitted annually due to extended routes, undermining local climate goals. The displacement of emissions may also shift poorer air quality to certain areas–in particular, to outer borough corridors and neighboring regions where trucks from external warehouses would travel frequently, potentially increasing pollution in those communities.
- Curb Management: The relocation of local distribution centers could disrupt existing curbside delivery patterns and intensify strains on curb space in busy areas. Currently, many companies have local facilities or micro-hubs (especially in Manhattan) that allow shipments to be broken into smaller loads (e.g., for cargo bikes or foot couriers), reducing the number of large trucks on crowded streets. If these facilities are moved out of NYC or shuttered to avoid the regulation, carriers would rely more heavily on trucks to carry packages directly into neighborhoods. This could lead to more trucks needing curb access for deliveries, potentially worsening curbside congestion and double-parking issues in some areas. Conversely, neighborhoods currently hosting large distribution centers might see some localized relief from heavy truck parking and loading if those facilities close, though on balance, the City's curb management challenges would likely worsen overall with the shift to more truck-based deliveries from outside. Also, promising initiatives like cargo bike delivery programs (which rely on local micro-hubs) could be curtailed, thereby reducing sustainable last-mile options in Manhattan and burdening curbs with more conventional vehicles.
- Small Business Sales and Operations: Many small businesses rely on fast, dependable deliveries for their inventory or to fulfill customer orders. If deliveries slow down or become costlier under Intro 518, these businesses may struggle to adapt. For example, a small retailer or restaurant may depend on daily shipments of supplies (e.g., ingredients, merchandise); delays and increased fees here could force them to hold more inventory on-hand as a buffer, tying up capital and storage space. In cases where same-day or next-day delivery from suppliers becomes less reliable, some retailers might face stockouts or missed sales opportunities, impacting their revenue. In general, the reduced delivery speed and increased costs act like a friction on commerce, which particularly affects small, local businesses that have fewer resources to absorb these changes. This could potentially result in lost sales or higher prices for consumers if businesses are compelled to pass on the added shipping costs to their customers.

In summary, while one objective of Intro 518 is to reduce negative externalities like congestion and pollution, the analysis suggests the actual outcome may be more complex. Longer truck routes could increase regional congestion and emissions, and the removal of local distribution nodes may challenge City curb management. Additionally, small businesses reliant on quick delivery services could face operational and financial stresses. The magnitude of these spillover effects will depend on how many operators relocate and how carriers adapt their networks, with more disruptive outcomes likely under scenarios of widespread relocation and limited mitigation measures by the industry.

Image: Five Boroughs Job Campaign.

6. Equity Impacts: How are outer borough neighborhoods affected versus the Manhattan core? How would small businesses and underserved communities be affected?

The impacts of Intro 518 will not be uniform across NYC's boroughs or demographic groups. The proposed legislation would disproportionately affect outer-borough neighborhoods and disadvantaged communities, both in terms of economic opportunity and environmental quality. The analysis identifies several key points regarding equity:

- Job Losses in Outer Boroughs and Disadvantaged Areas: The concentration of last-mile delivery facilities and contractors in certain outer-borough areas means these communities face a higher risk of job displacements. Many of the "at-risk" delivery companies and their workers are located in the Bronx, Queens, Brooklyn, and Staten Island, often in or near communities with higher poverty and minority populations. If these facilities close or relocate outside the City, thousands of local jobs could vanish, disproportionately impacting workers and families in those neighborhoods who rely on these jobs for their livelihoods. These job losses could exacerbate economic inequality, as Manhattan and wealthier areas, which rely on fewer of these in-City facilities, would experience far fewer direct employment impacts. Even if some drivers or warehouse workers find new jobs with big carriers, those jobs might be in different locations or require longer commutes, which can be burdensome for workers in outer boroughs.
- Shifts in Environmental Burdens: Intro 518's relocation-driven approach risks shifting environmental impacts rather than eliminating them. For instance, while moving truck depots out of a community might provide localized relief from constant truck activity, noise, and emissions at that site, the displaced trucks must still travel through many of the same communities en route to make

deliveries. Disadvantaged communities (DACs) in the Bronx and Northern Manhattan are likely to see increased traffic and emissions if operations are relocated to North Jersey or upstate. This is because trucks would have to travel longer distances along major corridors (such as the Cross Bronx Expressway or other routes through these areas) to reach customers. In short, the environmental and congestion burdens might be redistributed towards where many lower-income residents live, potentially aggravating existing environmental justice concerns.

- Service Disparities (Outer Boroughs vs. Manhattan): In terms of service, outer-borough residents and businesses are likely to experience bigger declines in delivery speed and reliability compared to Manhattan. The current delivery model for Manhattan already provides service from out of the City, meaning that Manhattan's current operations would be less affected under Intro 518. In addition, with a concentration of remaining direct-delivery services (e.g., USPS/UPS) often prioritizing Manhattan's dense commercial core, outer neighborhoods might get slower, less frequent deliveries under a leaner network. If some carriers limit their coverage or reduce same-day/next-day options outside Manhattan, the gap in service quality between Manhattan and the outer boroughs could widen. Conversely, the Manhattan core might benefit from carriers concentrating resources there (for example, maintaining some cargo bike operations or dedicating trucks to Manhattan loops) but such arrangements may not extend to less dense boroughs. This is another way in which the legislation's burdens may weigh more heavily on the periphery of the City.

- Impacts on Small Businesses & Underserved Communities: Small businesses in outer boroughs and low-income neighborhoods could face compounding challenges. Many such businesses rely on quick, affordable deliveries to stock goods or send products to customers; slower service and higher shipping costs will be especially challenging for those with thin margins. An independent shop in Queens or the Bronx, for example, might find it harder to compete with Manhattan-based retailers if inventory deliveries to outer boroughs slow down more. Similarly, consumers in such communities (particularly those without easy access to brick-and-mortar stores) might have to pay more or wait longer for online orders, which is a regressive burden impacting those less able to afford alternatives. In summary, Intro 518 could inadvertently deepen existing inequalities by hitting hardest those communities that can least afford increased costs or reduced services, even as it aims to relieve them from certain quality-of-life issues like local truck congestion.

About AKRF

NEW YORK ROOTS, DECADES OF LEADERSHIP

AKRF, Inc. is a New York City-based environmental, planning, and engineering consulting firm founded in 1981, originally as a boutique environmental impact consultancy in Manhattan. Over four decades it has grown into a multidisciplinary industry leader, with its headquarters in Manhattan and more than 400 professionals across offices in New York, New Jersey, Pennsylvania, Maryland, Connecticut, and Virginia. Today AKRF is recognized for combining broad technical expertise with deep local knowledge of New York's unique urban challenges, delivering integrated services in environmental, infrastructure, and development projects citywide and beyond.

SHAPING ENVIRONMENTAL REVIEW & REDEVELOPMENT

AKRF has long been at the forefront of New York's environmental review process, helping to define best practices and inform public policy. The firm has prepared over 1,000 environmental impact reviews under NEPA, SEQRA, and CEQR, including some of the region's most high-profile projects such as the revitalization of Times Square, the post-9/11 redevelopment of the World Trade Center site, and the new Governor Mario M. Cuomo Bridge (Tappan Zee). AKRF also played an important role in developing New York City's original City Environmental Quality Review (CEQR) Technical Manual and its major updates, later serving as a key contributor to City initiatives like the Green Fast Track permitting program and the Get Stuff Built Advisory Board. These decades of leadership reflect AKRF's enduring commitment to advancing innovative, effective environmental planning and impact analysis in its home city.

ECONOMIC, REAL ESTATE, TRANSPORTATION & AIR QUALITY EXPERTISE

In addition to its planning and environmental services, AKRF offers robust economic, real estate, transportation, and air quality practices. The firm's Economic and Real Estate Advisory Services group provides expertise in urban economics, real estate market and policy analysis, fiscal and economic impact modeling, land use strategy, and regulatory impact analysis, helping public- and private-sector clients make informed decisions and demonstrate the benefits of projects and policies. Similarly, AKRF's traffic, transportation, and air quality teams include licensed traffic engineers and transportation planners who leverage state-of-the-art modeling and analysis tools to address transportation planning, multimodal traffic operations, freight and curbside management, vehicle-miles-traveled (VMT) reduction strategies, emissions modeling, and air quality analysis. This multidisciplinary approach allows AKRF to optimize mobility solutions, mitigate environmental impacts, and integrate climate-related considerations into complex urban projects, ensuring that development and infrastructure initiatives are both economically and environmentally sustainable.

NEW YORK CITY FOCUS, COMMUNITY COMMITMENT

Rooted in New York City for over 40 years, AKRF takes pride in its home-town origins and remains deeply committed to the City's communities and future. The firm has partnered with City agencies, private developers, and local stakeholders on transformative projects in all five boroughs, from waterfront revitalizations and transit-oriented redevelopments to critical infrastructure and neighborhood plans, always with an emphasis on civic-minded planning, community engagement, and equity. With a place-based perspective and strong public-sector relationships, AKRF approaches each project with an abiding commitment to New York City's environmental health, economic vitality, and sustainable future, reflecting the firm's dedication to the city it calls home.

AKRF prepared the bridging documents and provided REI and design-build oversight for the redesign of Hudson Street. Image: AKRF.

Endnotes

1 Intro 518 was introduced by Council Member Tiffany L. Cabán on February 12, 2026, and referred to the City Council's Committee on Consumer and Worker Protection. A public hearing on the legislation was held on April 9, 2026.

2 Disadvantaged Communities are New York State census tracts identified by the New York State Climate Justice Working Group as bearing disproportionate burdens of environmental pollution, negative public health effects, climate change impacts, and socioeconomic stressors, based on a combination of environmental, health, climate vulnerability, and demographic indicators.

3 AKRF interviews are anonymized to allow participants to speak openly about business operations and Intro 518. AKRF has requested and conducted interviews with a broad range of industry representatives but as of May 2026 has not heard back from representatives of major direct-employment carriers.

4 The "walker model" refers to an urban last-mile delivery approach in which packages are transported by truck to a staging location and then handed off to delivery workers ("walkers") who complete deliveries on foot within a defined geographic area. This model is commonly used by e-commerce operators such as Amazon in high-density areas of Manhattan, where congestion, limited curb space, and parking constraints make traditional van-based delivery inefficient.

5 U.S. Bureau of Labor Statistics (BLS), Occupational Outlook Handbook. The BLS reports that delivery truck drivers and driver/sales workers "typically need a high school diploma or equivalent" for entry-level positions (Occupational Outlook Handbook - Delivery Truck Drivers and Driver/Sales Workers, updated 2024) and often no prior experience. Similarly, for warehouse laborer roles, the BLS notes "no formal educational credential" is usually required (Occupational Outlook Handbook - Hand Laborers and Material Movers, 2024).

6 U.S. Bureau of Labor Statistics, Current Population Survey (CPS), 2025 Annual Averages. National labor force data show that the delivery and trucking occupations are overwhelmingly male. In 2025, only about 7.7 percent of "driver/sales workers and truck drivers" were women (BLS CPS, Employed people by detailed occupation, 2025). Even focusing on the local delivery segment, only ~28–30 percent of U.S. "couriers and messengers" workers are female, meaning roughly 70 percent are male.

7 U.S. Bureau of Labor Statistics, Current Population Survey, 2025. Federal data indicate that Black and Hispanic workers are overrepresented in last-mile delivery roles relative to their share of the overall labor force. In 2025, about 20 percent of U.S. driver/sales and truck driver positions were held by Black workers and 26 percent by Hispanic workers, compared to 12.7 percent and 20 percent of the total workforce, respectively. The New York State Comptroller reports that in New York City's transportation and warehousing sector, "more than one-half of sector workers are Black or African American and/or Hispanic or Latino" (Office of the NYS Comptroller, The Transportation and Warehousing Sector in New York City, June 2022).

8 Office of the New York State Comptroller, June 2022. An official analysis of New York City's transportation and warehousing sector (which includes local delivery and warehouse jobs) found that a majority of the City's 170,000+ workers in this sector are Black or Hispanic men without a four-year college degree. (NYS Comptroller, The Transportation and Warehousing Sector in NYC, 2022).

9 CO_2e (carbon dioxide equivalent) is a standardized metric that expresses the total climate impact of multiple greenhouse gases as the amount of carbon dioxide that would produce the same level of warming.

10 The criteria for identifying a census tract as a DAC include multiple indicators that represent the environmental burdens or climate change risks within a community, or population characteristics and health vulnerabilities that can contribute to more severe adverse effects of climate change. Census tracts with higher scores relative to other census tracts statewide or to their region (i.e., New York City) were identified as DACs. Approximately 35 percent of New York State census tracts were identified as DACs.

11 https://comptroller.nyc.gov/reports/fast-shipping-slow-justice-traffic-worker-and-climate-hazards-in-last-mile-delivery/.

12 As defined by the U.S. Department of Commerce, U.S. Census Bureau, Geography Division: primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways. Secondary roads are main arteries, usually in the U.S. Highway, State Highway, and/or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They usually have both a local name and a route number.

13 Intro 518 builds upon a prior legislative effort, Intro 1396-2025, which proposed similar regulatory changes to last-mile delivery operations but was not advanced to adoption. The current bill reflects a continuation and refinement of earlier policy discussions regarding labor standards, facility regulation, and delivery system impacts in New York City. Intro 518 language can be found through the following New York City Council weblink: https://intro.nyc/0518-2026

14 The City Council Fiscal Impact Statement for Intro 518 estimates that the proposed licensing of last-mile facilities would generate approximately $75,000 in annual revenue, beginning in FY27 and continuing into FY28, based on a $500 per-facility annual licensing fee, with no additional revenues from fines or penalties. The City Council estimate is presented on an annual recurring basis; however, the statement provides no further underlying data to substantiate how the number of covered facilities or compliance assumptions were derived. The Fiscal Impact Statement for Int. No. 518 is publicly available through the NYC Council's Legistar legislative tracking system: https://legistar.council.nyc.gov/

15 https://www.nyc.gov/html/dot/downloads/pdf/microhubs-pilot-mn-cb8-sept2024.pdf

16 https://www.manhattanbp.nyc.gov/wp-content/uploads/2023/03/MBPO-Report-Tackling-the-E-Commerce-Delivery-Crisis.pdf

17 https://www.nyc.gov/html/dot/downloads/pdf/microhubs-pilot-mn-cb8-sept2024.pdf

18 The identified facilities were compiled from multiple publicly available sources and are intended to represent a realistic set of known last-mile delivery locations, not an exhaustive list of all such facilities present in New York City. **Appendix 1** provides additional detail on AKRF's inventory and illustrates last-mile facilities by borough.

19 The City Council Fiscal Impact Statement for Intro 518 estimates that the proposed licensing of last-mile facilities would generate approximately $75,000 in annual revenue, beginning in FY27 and continuing into FY28, based on a $500 per-facility annual licensing fee, with no additional revenues from fines or penalties. The City Council estimate is presented on an annual recurring basis; however, the statement provides no further underlying data to substantiate how the number of covered facilities or compliance assumptions were derived. The Fiscal Impact Statement for Int. No. 518 is publicly available through the NYC Council's Legistar legislative tracking system: https://legistar.council.nyc.gov/

20 https://about.ups.com/us/en/newsroom/negotiations/negotiations-basics/working-at-ups.html

21 https://www.cnbc.com/2023/08/09/ups-drivers-to-average-170000-in-pay-benefits-at-end-of-5-year-deal.html

22 https://newrepublic.com/article/174638/labor-ups-teamsters-fedex-next

23 https://legalclarity.org/do-amazon-drivers-get-benefits-by-driver-type/

24 U.S. Bureau of Labor Statistics. Delivery truck drivers and driver/sales workers. Occupational Outlook Handbook. Retrieved from https://www.bls.gov/ooh/transportation-and-material-moving/delivery-truck-drivers-and-driver-sales-workers.htm.

25 Office of the New York State Comptroller). The transportation and warehousing sector in New York City. Retrieved from https://www.osc.ny.gov/reports/osdc/transportation-and-warehousing-sector-new-york-city

26 Replica HQ is a 'big data' platform that uses anonymized, modeled data derived from mobile device activity, transportation networks, and demographic sources to estimate travel behavior and employment patterns. Replica HQ provides trip and population datasets for selected geographies; the trip dataset models daily travel behavior for a synthetic population, including trip purpose, mode, time, length, and generalized origins

and destinations, while the population dataset adds demographic characteristics (age, household size, income, employment) spatially allocated to standardized geographic units, supporting analysis of relative mobility and population patterns.

27 NAICs codes relevant to last-mile delivery include, but are not limited to, 484110 “general trucking,” 484220 “specialized freight,” 492110 “couriers,” 492210 “local delivery,” and 493110 “general storage.”

28 NAICS (North American Industry Classification System) codes are standardized numerical classifications used by federal statistical agencies to categorize businesses and establishments based on their primary economic activity. NAICS code considered for analysis include NAICS 484110 (General Freight Trucking, Local), representing local freight and parcel transportation; NAICS 484220 (Specialized Freight Trucking, Local), representing specialized local hauling and freight services; NAICS 492110 (Couriers and Express Delivery Services), representing integrated parcel and express delivery networks; NAICS 482210 (Local Messengers and Local Delivery), representing localized courier and messenger operations such as walker and bicycle delivery services; and NAICS 493110 (General Warehousing and Storage), representing warehouse, fulfillment, and distribution facility operations that support last-mile logistics activity. IMPLAN uses its own sectoring scheme rather than NAICS directly; accordingly, this analysis maps NAICS codes to IMPLAN sectors to align with the model’s internal structure. Specifically, NAICS 484110 and 484220 are represented by IMPLAN Sector 399 (Truck Transportation), NAICS 492110 and 492210 by Sector 403 (Couriers and Messengers), and NAICS 493110 by Sector 404 (Warehousing and Storage).

29 A Monte Carlo framework is a stochastic modeling structure that uses repeated random sampling from defined input distributions to evaluate a range of possible outcomes and quantify uncertainty within the modeled system. For more information on AKRF’s application of the Monte Carlo framework see **Section K**.

30 Uncertain variables are inputs whose potential changes span a wide range of plausible values that cannot be reliably specified using deterministic assumptions.

31 Delivery operators utilize internal pricing structures to determine the final cost per package to consumers, often incorporating multiple revenue streams that are blended to produce the final price.

32 Service areas were developed for modeling purposes and are not intended to reflect actual service areas for delivery.

33 CO_2e (carbon dioxide equivalent) is a standardized metric that expresses the total climate impact of multiple greenhouse gases as the amount of carbon dioxide that would produce the same level of warming.

34 $PM_{2.5}$ (fine particulate matter) are airborne particles 2.5 micrometers or smaller, commonly produced by vehicle emissions, that can penetrate deep into the lungs and bloodstream, posing significant risks to respiratory and cardiovascular health.

35 NO_X (nitrogen oxides) are a group of reactive gases, primarily nitrogen dioxide (NO_2) and nitric oxide (NO), formed during high-temperature fuel combustion in vehicles, which can irritate the respiratory system and contribute to the formation of smog and other harmful air pollutants.

36 Available: https://climate.ny.gov/resources/disadvantaged-communities-criteria

37 New York City Comptroller Brad Lander, Fast Shipping. Slow Justice: Traffic, Worker, and Climate Hazards in Last Mile Delivery. November 2025.

38 https://traderleaks.com/stock-markets/amazon-drivers-describe-the-paranoia-of-working-under-the-watchful-eyes-of-new-truck-cameras-that-monitor-them-constantly-and-fire-off-rage-inducing-alerts-if-they-make-a-wrong-move-amzn/

39 https://www.cnbc.com/2021/02/12/amazon-mentor-app-tracks-and-disciplines-delivery-drivers.html

40 https://traderleaks.com/stock-markets/amazon-drivers-describe-the-paranoia-of-working-under-the-watchful-eyes-of-new-truck-cameras-that-monitor-them-constantly-and-fire-off-rage-inducing-alerts-if-they-make-a-wrong-move-amzn/

41 https://www.aboutamazon.com/news/policy-news-views/amazon-testimony-delivery-protection-act-new-york-city

42 *Ibid*

43 https://www.aboutamazon.eu/news/sustainability/how-amazon-supports-safety-decarbonisation-and-speed-in-last-mile-delivery-in-europe

44 https://www.aboutamazon.com/news/transportation/everything-you-need-to-know-about-amazons-electric-delivery-vans-from-rivian

45 *Ibid*

46 https://www.aboutamazon.com/news/policy-news-views/amazon-testimony-delivery-protection-act-new-york-city

47 *Ibid*

48 https://www.aboutamazon.eu/news/sustainability/how-amazon-supports-safety-decarbonisation-and-speed-in-last-mile-delivery-in-europe

49 https://www.thedashcamstore.com/fedex-ground-safety-technology-requirements-for-contractors/

50 *Ibid*

51 https://www.carriermanagement.com/news/2023/08/17/251885.htm

52 *Ibid*

53 *Ibid*

54 *Ibid*

Appendix 1

Inventory of Last-Mile Facilities in New York City

This appendix provides additional information on the last-mile facilities located within New York City as identified by AKRF for purposes of analysis, including visual representation of locations by borough. As shown in **Table 1-1**, AKRF identified 58 facilities ranging in size from approximately 11,000 sf to 975,000 sf and a median size of 127,000 sf. These facilities are present in every borough of the city and include a variety of major operators such as Amazon, UPS, FedEx, USPS, and third-party providers like OnTrac. Overall, the borough-level distribution of last-mile facilities is highly concentrated in Brooklyn and Queens (approximately 66 percent or two-thirds of last-mile facilities are located in these two boroughs), where industrial land use is found in large pocketed areas, including one of the largest contiguous industrial land use areas in the city.[1] Beyond their physical location, these last-mile facilities also support a range of employment and business functions, from warehouse operations and logistics coordination to driving and vehicle servicing.

TABLE 1-1

Identified Last-Mile Facilities within New York City

Map ID	Address	Borough	Block	Lot	Gross Floor Area (SF)	Tenant Information	Notes
1	48-00 Grand Ave, Maspeth, NY 11378	QN	2611	111	56,725	Potential Distribution Site	Constructed and owned by Prologis - used by Fedex
2	23-30 Borden Ave, Long Island City, NY 11101	QN	68	38	777,258	Innovo	
3	26-15 Boody St, Flushing, NY 11377	QN	1016	75	92,344	Amazon Distribution Center	Amazon signed lease running through 2029 - final delivery station for Queens e-commerce network
4	4606 57th Ave, Queens, NY 11378	QN	2529	40	362,474	Fedex ground facility	Included in NYC Comptroller Report
5	58-95 Maurice Ave, Flushing, NY 11378	QN	2662	18	127,587	FEDEx Shipping Center	Sale offering shows FedEx as tenant - likely to be last-mile facility
6	55-15 Grand Ave,Flushing, NY 11378	QN	2610	336	857,715	Amazon Maspeth Warehouse	Amazon signed lease in 2020
7	280 Richards St., Brooklyn NY 11231	BK	612	150	150,977	Thor-Amazon	Amazon Lease
8	49-15 Maspeth Avenue, Maspeth, NY 11378	QN	2575	245	35,658	XPO Logistics (Trucking Company)	Recent Cyclomedia shows FW Webb company but logistics use is still possible - property records indicate use/ownership by XPO
9	50-02 55th Ave, Flushing, NY 11378	QN	2573	25	457,750	UPS Distribution Center	Waze shows a UPS Distribution center here. Cyclomedia shows UPS trucks parked in parking lot.
10	640 Columbia St., Brooklyn NY 11231	BK	612	99	478,268	Amazon Distribution Center	Leased to Amazon under long term lease

Map ID	Address	Borough	Block	Lot	Gross Floor Area (SF)	Tenant Information	Notes
11	55 Bay St, Brooklyn NY 11231	BK	591	1	95,787	DH Property Holdings - Amazon Use	Amazon "Fresh" Warehouse
12	36 Seabring St, Brooklyn NY 11231	BK	508	25	11,082	NY GOexpress	Public information shows us by GOExpress, USPS collection, and messenger services
13	570 E 108 St, Brooklyn NY 11236	BK	8156	1	177,386	FedEx Ground/ FedEx Ship Center	Included in NYC Comptroller Report
14	12595 Flatlands Avenue, Brooklyn n NY 11208	BK	4561	1	211,098	Amazon Center	Part of Brooklyn Logistics Center - Amazon advertising jobs at location - two buildings at location are being used
15	830 Fountain Avenue, Brooklyn NY 11208	BK	4452	425	279,162	FedEx Ground	Included in NYC Comptroller Report
16	1050 Forbell Street, Brooklyn NY 11208	BK	Multiple	Multiple	411,860	USPS Carrier Annex	Block 4550 Lots 1, Block 4551 Lot 1, Block 4552 Lot 1, Block 4553 Lot 1
17	34 35th Street, Brooklyn, NY 11232	BK	691	1	Unknown	Amazon Fulfillment Center PNY2 (PIP3)	Multipurpose space, some of which is used by Amazon logistics
18	51 20th Street, Brooklyn NY 11232	BK	635	113	218,566	SIP Holdings	Identified in BJH Study
19	563 W 41st St, New York NY 10036	MN	1070	1	68,085	FedEx Shipping Center	Potentially a retail location but its larger size may indicate logistics use
20	315 W Houston St, New York NY 10014	MN	596	92	479,500	UPS Distribution Center	Extensive truck use at this location, likely logistics use
21	1502 Bassett Avenue, Bronx NY 10462	BX	4226	5	366,375	Amazon Distribution Center	Amazon Delivery Station DYY5
22	546 Gulf Avenue, Staten Island NY 10314	SI	1760	35	904,400	Amazon Distribution Center	Amazon Distribution Facility JFK8/ DYY6
23	10401 Foster Avenue	BK	8134	301	274,340	UPS	UPS location, potentially not a full distribution hub
24	2300 Linden Boulevard	BK	4362	1 and 2	119,648	Amazon Flex Location (DBK6)	Appears in Comptroller Report
25	1300 Viele Avenue, Bronx NY 10474	BX	2777	230	120,775	Amazon Distribution Center (DNJ3)	
26	1055 Bronx River Ave, Bronx NY 10472	BX	3708	7501	193,731	Amazon Distribution Center (DYO2)	
27	2505 Bruckner Blvd, Bronx NY 10465	BX	5293	1	735,520	Inovo Property Group/Amazon Distribution Center SNY2 VNY2	
28	4301 Boston Road, Bronx NY 10466	BX	5655	326	72,248	UPS Distribution Center	Site owned by UPS on ZoLa
29	253-51 Rockaway Blvd, Woodmere NY 11598	QN	13895	85	235,234	Amazon (JFK Logistics Center LLC)	Amazon leases this location for logistics (DYY3)
30	526 Gulf Ave. Richmond Staten Island New York USA 10314- 7120	SI	1760	45	975,000	Amazon Last-mile Delivery station for small packages	Amazon DYX2 and LDJ5
31	566 Gulf Ave. Staten Island New York USA 10314-7120	SI	1760	25	450,000	Amazon Last-mile Delivery station for small packages	Amazon DYY6

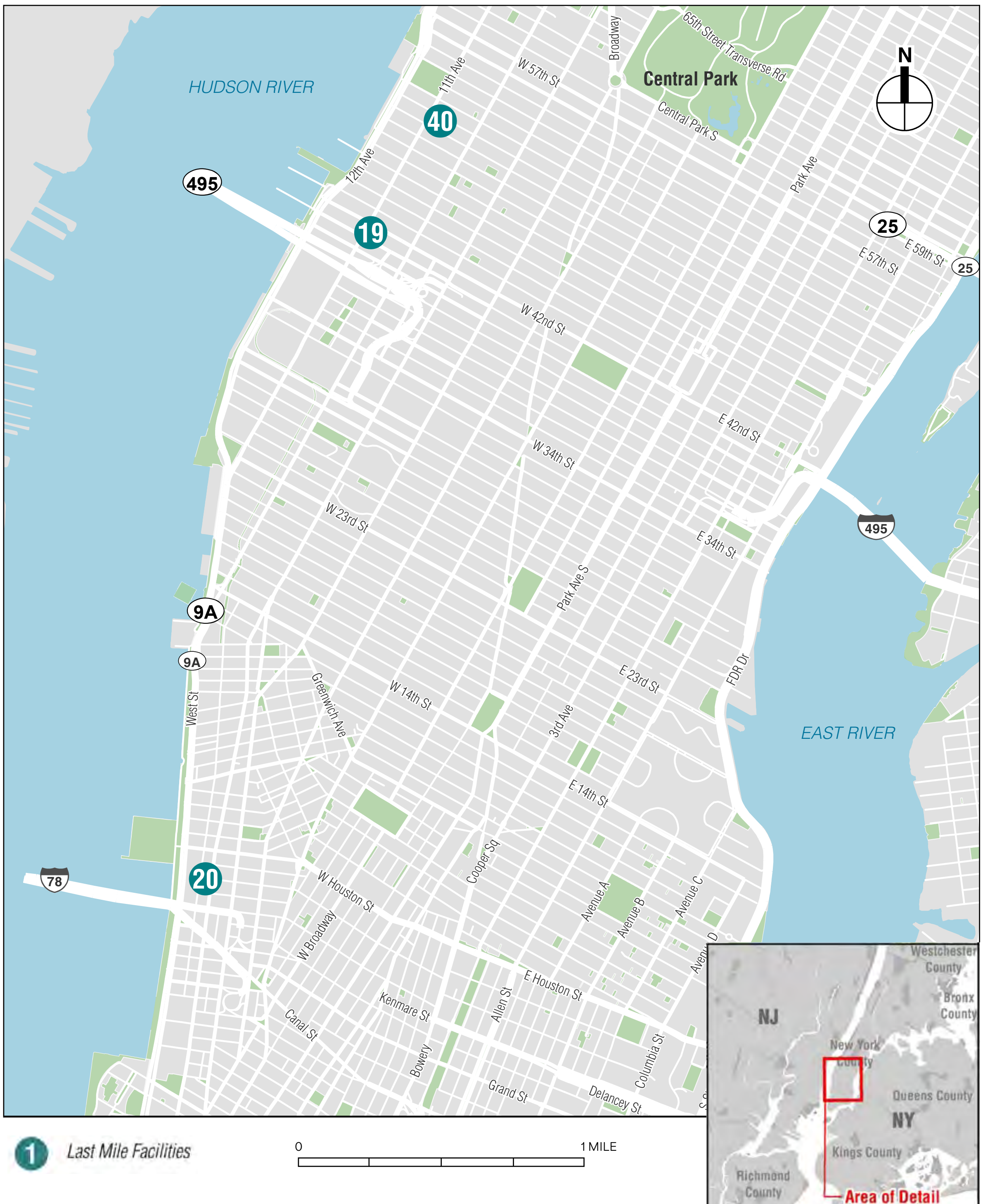
Map ID	Address	Borough	Block	Lot	Gross Floor Area (SF)	Tenant Information	Notes
32	511 Barry Street Hunts Point The Bronx, New York USA 10474-6601	BX	2606	41	108,986	Amazon Last-mile Delivery station for small packages	Cyclomedia shows Amazon delivery hub / Amazon DYN9
33	66-26 Metropolitan Avenue Middle Village Queens New York USA 11379	QN	3605	1	300,000	Amazon Last-mile Delivery station for small packages	Amazon lease for some sf at this location
34	2 Saint Anns Ave	BX	2543	1	566,233	FreshDirect	
35	50 20th St	BK	635	13	194,300	FedEx	
36	683 Court St	BK	624	1	254,330	Unkown	Looks potentially in use but no public tenant information
37	2807 Arthur Kill Rd	SI	7167	95	136,346	Unkown	Looks operational - no public tenant info
38	586 Gulf Ave	SI	1760	1	975,000	IKEA	Most recent tenant info is IKEA
39	800 Bank Street/10615 Foster Ave	BK	8138	250	77,000	UPS	NYC Comptroller Report
40	706 11th Ave	MN	1079	3	65,625	Amazon - Ebike and local delivery	NYC Comptroller Report
41	57-47 47th Street	QN	2602	58	70,776	OnTrac/LaserShip	NYC Comptroller Report
42	88-36 77 Ave	QN	3857	179	71,000	CDL Last-mile Solutions	NYC Comptroller Report
43	722-750 Court	BK	621	136	37,000	RXR - TBD	DOT Truck Study
44	73 20th Street	BK	635	11	36,779	Bridge Industrial	DOT Truck Study
45	448 Kingsland Avenue	BK	2612	20	31,684		
46	450 Johnson Avenue	BK	2992	17	32,500		
47	512 Johnson Avenue	BK	2993	18	23,900		
48	280 Johnson Avenue	BK	3073	35	31,450		
49	1125 Close Avenue	BX	3735	12	66,800		
50	230-19 Rockaway Boulevard	QN	13791	20	97,721		
51	150 52nd Street	BK	804	7501	119,937		
52	230-59 Rockaway Boulevard	QN	13791	22	178,870		
53	230-39 Rockaway Boulevard	QN	13791	21	107,762		
54	230-79 Rockaway Boulevard	QN	13791	23	141,782		
55	18-51 Flushing Avenue	QN	3393	62	29,207		
56	57-54 Page Place	QN	2603	130	56,966		
57	57-00 47 Street	QN	2601	6	19,760		
58	46-81 Metropolitan Avenue	QN	2611	71	15,100		

Source: AKRF, Inc.

Manhattan Facilities

As shown in **Figure 1-1**, there are three identified facilities in Manhattan ranging in size from approximately 54,000 sf to 480,000 sf. These facilities are situated in Midtown West and Hudson Square. The largest facility, located at 315 West Houston Street (Manhattan Block 596, Lot 92) is operated by UPS.

FIGURE 1-1
Identified Last-Mile Facilities in Manhattan

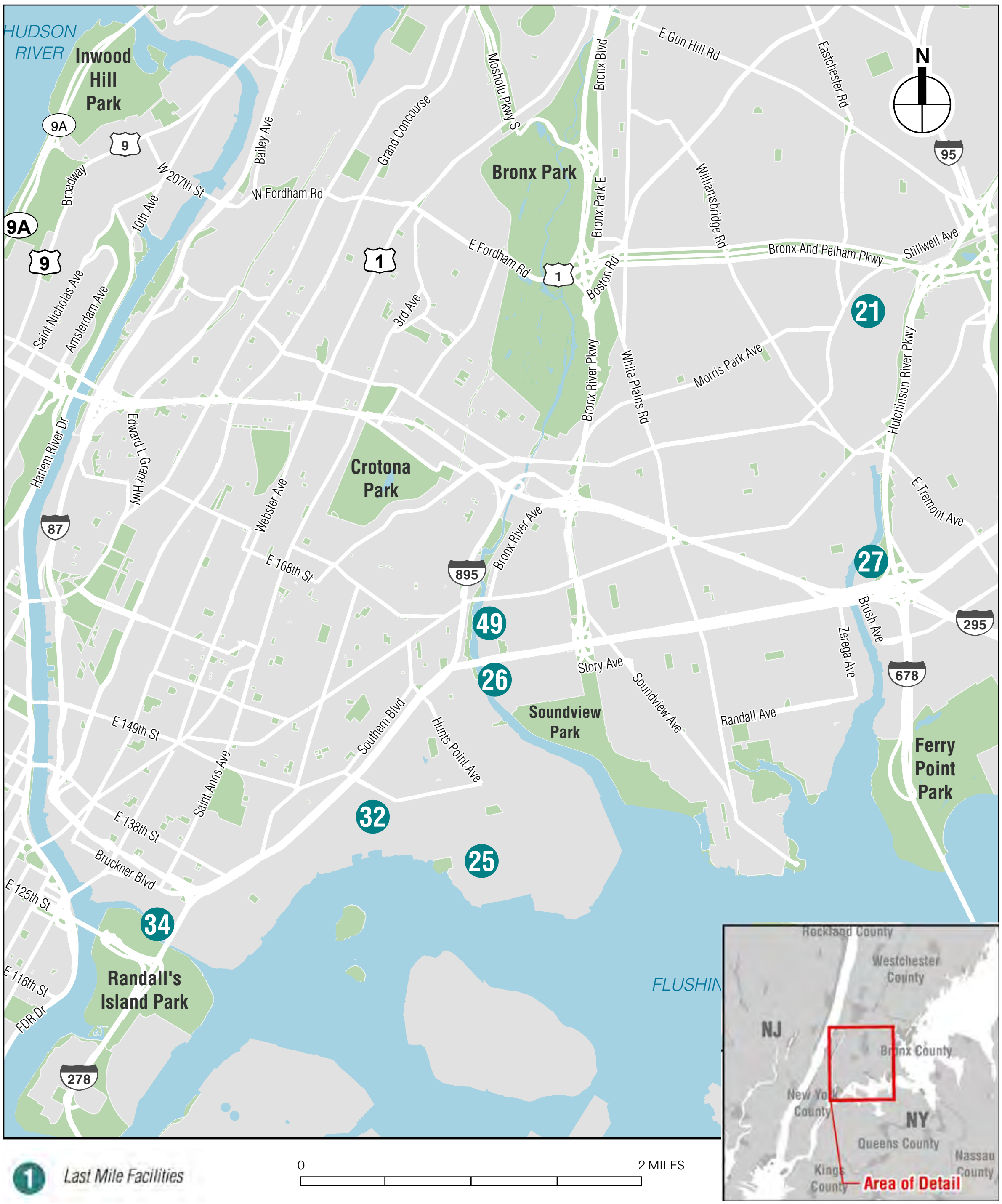


Source: AKRF, Inc.

Bronx Facilities

As shown in **Figure 1-2,** there are eight identified facilities within the Bronx ranging in size from approximately 72,000 sf to 735,000 sf. These facilities are primarily concentrated in Hunts Point and Mott Haven, with additional locations in Longwood, Castle Hill, and Morris Park. The facilities have a median size of approximately 120,000 square feet and include operators such as Amazon, UPS, and FreshDirect. The largest facility, located at 2505 Bruckner Boulevard (Bronx Block 5293, Lot 1), functions as an Amazon distribution hub.

FIGURE 1-2
Identified Last-Mile Facilities in The Bronx



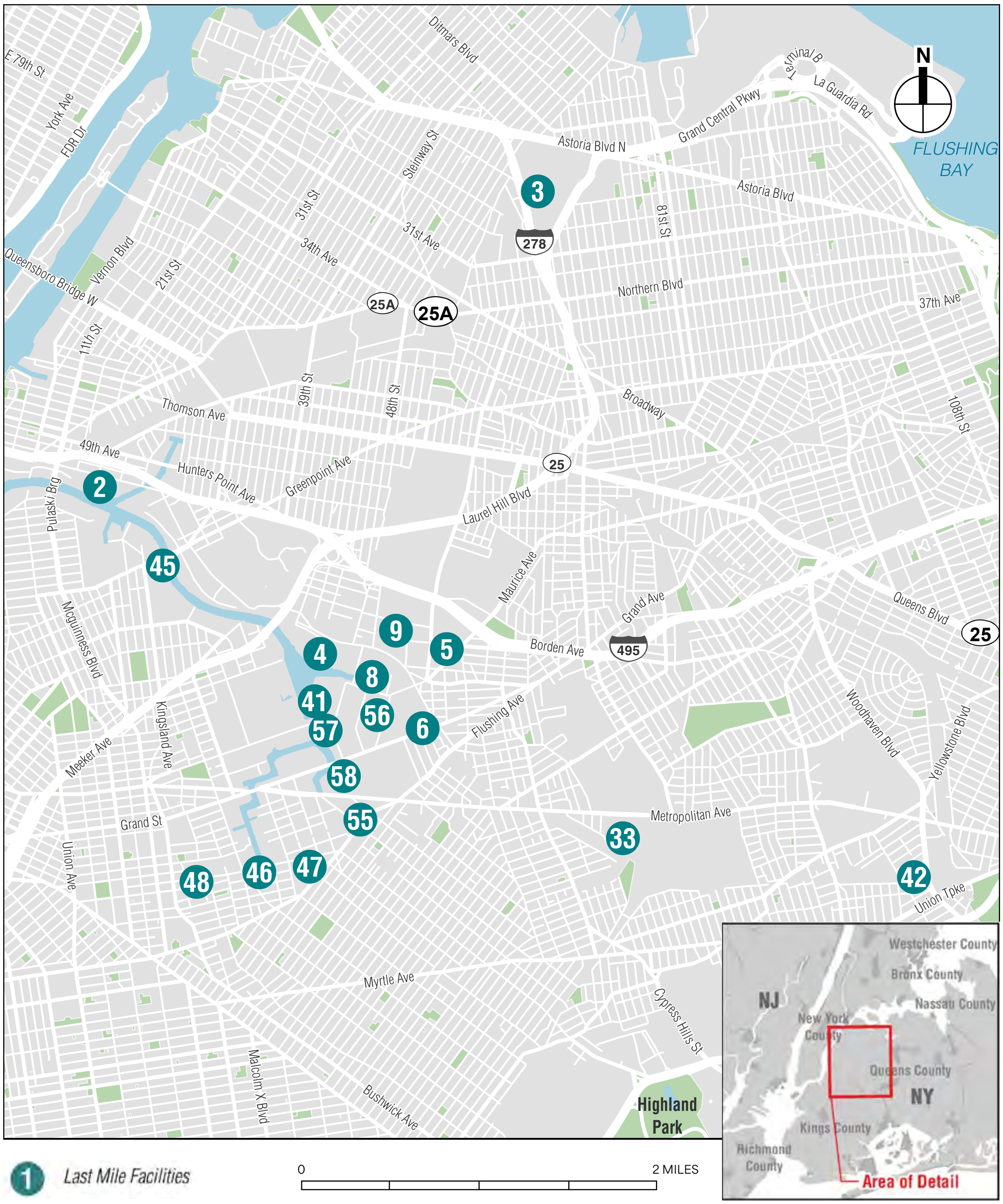
Source: AKRF, Inc.

Queens Facilities

As shown in **Figure 1-3**, there are 20 facilities identified within Queens ranging in size from approximately 15,000 sf to 857,000 sf. These facilities are concentrated in Maspeth with further locations in Hunters Point, Ridgewood, Woodside, and Glendale. The median size of last-mile facilities located in Queens is approximately 127,000 sf and includes major operators such as Amazon and FedEx. The largest facility, located at 55-15 Grand Avenue (Queens Block 2610, Lot 336) is the Amazon Maspeth Warehouse.

FIGURE 1-3

Identified Last-Mile Facilities in Queens

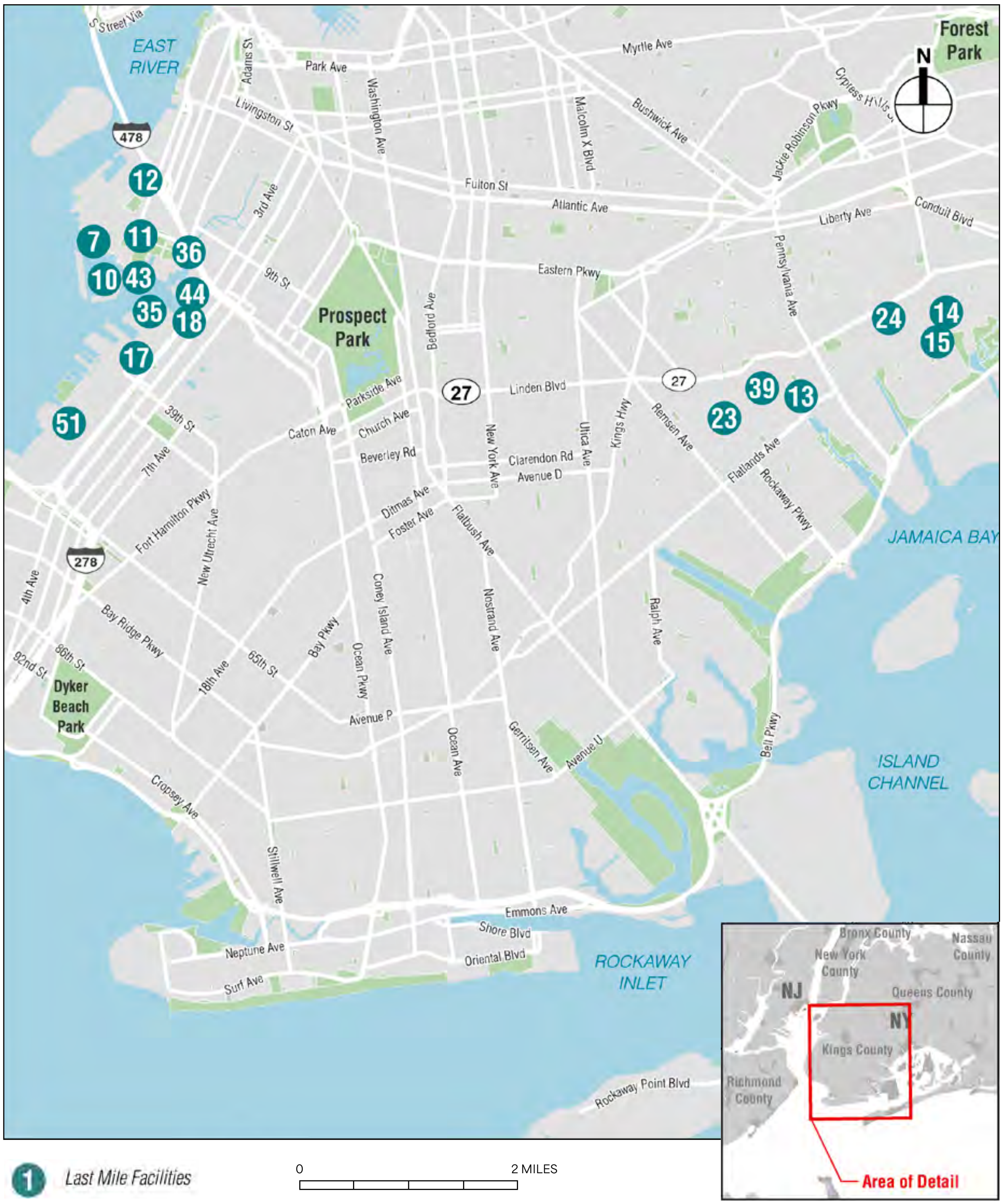


Source: AKRF, Inc.

Brooklyn Facilities

As shown in **Figure 1-4**, there are 22 facilities identified within Brooklyn ranging in size from approximately 11,000 sf to 478,000 sf. These facilities are concentrated in Redhook along the waterfront and near JFK. The median size of these facilities is 143,000 sf and includes major operators such as Amazon, FedEx, USPS, and UPS. The largest facility, located at 640 Columbia Street (Brooklyn Block 612, Lot 99) is an Amazon distribution site.

FIGURE 1-4
Identified Last-Mile Facilities in Brooklyn



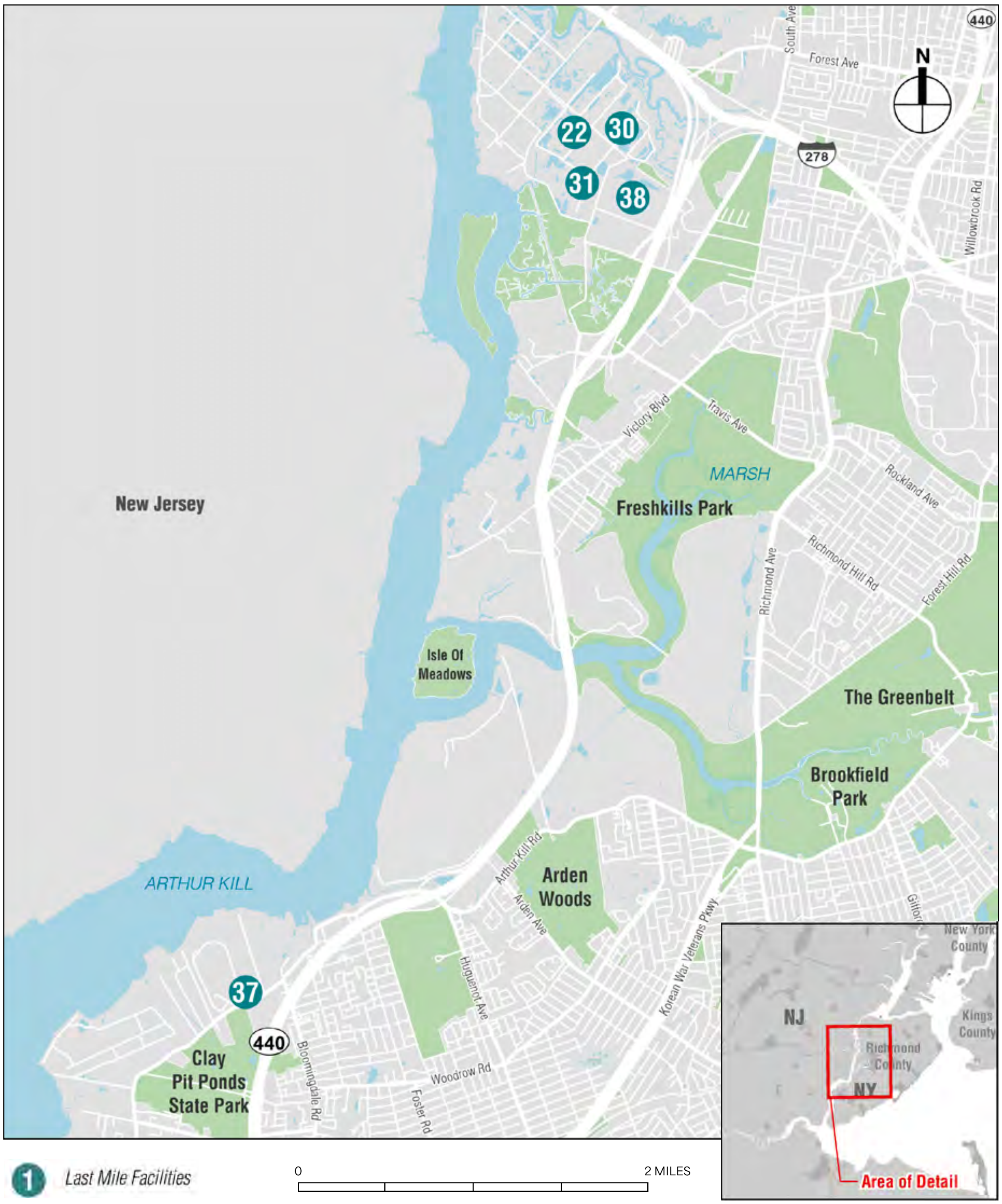
Source: AKRF, Inc.

Staten Island Facilities

As shown in **Figure 1-5**, there are five facilities identified within Staten Island ranging in size from 136,000 sf to 975,000 sf (the largest of all citywide facilities). The median size of last-mile facilities in Staten Island is 245,000 sf and includes major operators such as Amazon and IKEA. These facilities are concentrated in Bloomfield with a single location in the Charleston neighborhood. The largest facility located at 526 Gulf Avenue (Staten Island Block 1760, Lot 45) is an Amazon distribution facility.

FIGURE 1-5

Identified Last-Mile Facilities in Staten Island



Source: AKRF, Inc.

Appendix 2

Defining and Catagorizing "Last Mile Facilities" For Analysis Purposes

This appendix provides additional detail regarding the scope, applicability, and analytical treatment of last mile delivery facilities under Intro 518. It supplements the consolidated overview presented in the main body of the report by clarifying how facilities are defined under the bill, the range of facility types that may fall within that definition, and the methodological approach used to evaluate their potential impacts, as summarized in the typology matrix included in this appendix.

FUNCTIONAL DEFINITION OF COVERED FACILITIES

Intro 518 defines a covered last mile facility based on functional characteristics rather than zoning, size, or primary business classification. Specifically, a facility is considered covered if it receives goods as part of a delivery supply chain and dispatches or stages those goods for delivery to consumers within New York City, either directly or through transfer to more sustainable modes of transportation. This functional approach differs from traditional land-use and industrial classification frameworks by focusing on delivery-related activity rather than facility typology, and as a result, it captures a broader and more diverse set of uses that may not otherwise be categorized as logistics or industrial facilities.

RANGE OF POTENTIALLY COVERED FACILITY TYPES

Based on AKRF's review of the bill language and stakeholder discussions, this functional definition could encompass a wide range of facility types beyond large e commerce distribution centers. These include, depending on operational characteristics, parcel delivery stations and courier depots, grocery and pharmacy micro fulfillment centers, grocery delivery fulfillment facilities, third party logistics cross dock operations, shared or multi tenant warehouse spaces, back of house staging areas within retail or wholesale establishments, construction or trade supply depots with outbound delivery functions, beverage and food wholesale distributors, and medical or laboratory supply distribution points. In many cases, delivery activity may be ancillary to a facility's primary business use, but still sufficient to trigger coverage under the bill.

APPLICABILITY AND COMPLIANCE CONSIDERATIONS

Stakeholders emphasized that for mixed-use facilities or businesses with hybrid operating models, applicability may not be immediately clear and may require case-specific interpretation by regulators. The absence of minimum thresholds for employment, delivery volume, or physical size increases the potential for uncertainty regarding whether a given facility is subject to the bill's requirements. From an industry and real estate perspective, this ambiguity has implications for leasing decisions, facility design, investment timing, and compliance planning, particularly for property owners, landlords, and operators who may not view themselves as part of the delivery sector but could nonetheless be subject to the bill's provisions.

For purposes of this study, AKRF was therefore required to exercise professional judgment in operationalizing the bill's broad functional definition in a manner that supports meaningful and defensible quantitative analysis while still acknowledging the broader universe of activities that could plausibly fall within its scope. This required distinguishing between facility types that are sufficiently standardized, prevalent, and data-tractable to support citywide quantitative modeling, and those for which impacts are more context-specific, limited in scale, or too heterogeneous to reliably quantify.

ANALYTICAL TYPOLOGY AND SCREENING FRAMEWORK

AKRF developed a facility typology that categorizes last-mile-related activities based on operational function, prevalence in New York City, typical scale, and role within delivery networks. Using this typology, facility categories were evaluated against two key analytical criteria:

1. Suitability for Quantitative Analysis – whether a facility type exhibits relatively consistent operational characteristics (e.g., throughput, employment intensity, vehicle activity, and delivery patterns) and occurs at sufficient scale across the city to support generalized modeling of economic, operational, employment, and traffic impacts; and

2. Relevance to the Policy Mechanisms of Intro 518 – whether the facility type is likely to be materially affected by the bill's licensing and employment provisions in a manner that could produce measurable citywide impacts.

The results of this framework are summarized in the accompanying typology matrix.

CATEGORIZATION FOR ANALYSIS

Based on this framework, AKRF identified a subset of last mile facility types that are both central to delivery networks and sufficiently consistent in form and function to support quantitative assessment. These include parcel delivery stations, micro fulfillment centers, grocery delivery fulfillment facilities, and third party logistics cross dock operations. These facilities represent the primary nodes through which high-volume consumer deliveries are processed and dispatched and are therefore most directly relevant to evaluating potential impacts on costs, service levels, employment, and traffic conditions under Intro 518.

Other facility types, while potentially meeting the bill's functional definition, were determined to be more appropriate for qualitative treatment only. These include smaller-scale, hybrid, or emerging facility types such as dark stores, micro hubs, reverse logistics centers, and shared logistics spaces whose operational characteristics, scale, and future prevalence are highly variable or context-dependent. For these uses, the analysis describes potential mechanisms of impact and directional considerations but does not attempt to model aggregate citywide effects due to uncertainty and the risk of overstating precision.

Finally, several categories of activities were excluded from both quantitative and qualitative impact analysis despite their potential to involve some form of delivery activity. These include traditional retail stores with incidental delivery functions, dark kitchens, business-to-business warehouses, manufacturing facilities, courier dispatch locations without goods handling, self-storage facilities, and home-based sellers. These uses were excluded because delivery is not their primary function, their inclusion would not meaningfully inform the policy questions raised by Intro 518, or their impacts are better understood as part of broader retail, industrial, or residential land use patterns rather than as last mile logistics facilities.

IMPLICATIONS FOR INTERPRETATION

This tiered analytical approach is intended to balance completeness with analytical rigor. By distinguishing between facility types included in quantitative analysis, those addressed qualitatively, and those excluded, the study avoids overstating precision where data and operational consistency do not support it, while still recognizing the breadth of activities that could fall within the bill's functional definition. Importantly, this framework does not imply that excluded or qualitatively discussed facilities are unaffected by Intro 518; rather, it reflects methodological limits on what can be responsibly quantified at a citywide scale.

TABLE 2-1
Facility Typology Matrix

#	Facility Category	Description	Prevalence in NYC	Include in Study?	Quantitative / Qualitative
1	Parcel Delivery Stations	High-volume last-mile nodes where parcels arrive from regional sort centers, are sorted, and dispatched to consumers. Includes conveyor systems, loading docks, and large delivery van fleets.	Very common across all boroughs	Yes	Quantitative
2	Micro-Fulfillment Centers (MFCs)	Small, often automated warehouses embedded in dense urban areas to enable rapid e-commerce delivery. Store inventory and fulfill orders within hours.	Growing rapidly, especially in Manhattan, Brooklyn, and Queens	Yes	Quantitative
3	Dark Stores / Dark Retail	Retail-like spaces closed to the public and used exclusively for online order fulfillment. Resemble convenience stores internally but serve only delivery.	Moderately common; expanded significantly during the pandemic	Yes	Quantitative
4	E-Commerce Fulfillment Warehouses	Larger facilities storing inventory and fulfilling online orders. May include robotics, pallet storage, and large-scale pick/pack operations.	Common in outer-borough industrial zones (Brooklyn, Queens, Bronx)	Yes	Quantitative
5	Grocery Delivery Fulfillment Centers	Facilities storing perishable goods and dispatching grocery orders. Often include refrigeration, insulated packaging, and rapid-turnover operations.	Very common (FreshDirect, Amazon Fresh, app-based services)	Yes	Quantitative
6	3PL Cross-Docks (B2C)	Third-party logistics facilities that receive goods and immediately redistribute them to consumers. Typically low storage dwell time.	Moderately common but often invisible in industrial areas	Yes	Quantitative
7	Micro-Hubs (Goods-Handling Only)	Small facilities where goods are transferred from vans/trucks to cargo bikes or other sustainable modes. Often located curbside or in small lots.	Emerging but growing (DOT pilots in Manhattan and Brooklyn)	Yes	Qualitative
8	Reverse Logistics Centers (Consumer-Outbound)	Facilities processing returns and sometimes shipping refurbished goods back to consumers.	Limited; most reverse logistics occurs in NJ, some in outer boroughs	Yes	Qualitative
9	Dark Kitchens / Ghost Kitchens	Delivery-only food preparation sites with no dine-in service. Often house multiple virtual brands.	Very common; hundreds operate citywide	No	Not Included
10	Co-Warehousing / Shared Logistics Spaces	Shared warehouse spaces where small businesses rent units for storage, fulfillment, or light production.	Growing (Saltbox, ReadySpaces in Brooklyn and Queens)	Yes	Qualitative
11	Wholesale Club Back-of-House Fulfillment	Areas within wholesale clubs used for online order fulfillment.	Limited; NYC has relatively few wholesale clubs	No	Not Included
12	Storage Units Used for Package Staging	Self-storage or small warehouse units used by delivery platforms or small sellers to stage goods for dispatch.	Occasional; used informally by delivery apps and small sellers	Yes	Qualitative
13	Vendor Consolidation Points	Facilities aggregating goods from multiple small vendors for consumer delivery.	Moderately common in niche sectors (fashion, specialty goods)	Yes	Qualitative
14	Retail Stores With Delivery Components	Traditional retail stores that also ship online orders.	Very common citywide	No	Not Included
15	Pure B2B Warehouses	Warehouses serving only business clients, with no consumer-bound deliveries.	Common in industrial zones	No	Not Included
16	Manufacturing / Assembly Sites	Facilities producing goods rather than receiving them as part of a delivery supply chain.	Moderately common in light-industrial areas	No	Not Included

#	Address	Borough	Block	Lot	Gross Floor Area (SF)
17	Courier Dispatch Centers (No Goods Storage)	Facilities where couriers gather or are dispatched, but no goods are stored.	Common for bike messenger services and app-based delivery platforms	No	Not Included
18	Self-Storage Facilities	Facilities where individuals or businesses rent units to store goods.	Very common citywide	No	Not Included
19	Home-Based Resellers (Small-Scale)	Individuals selling goods online from their homes at low volume.	Extremely common	No	Not Included
20	Home-Based Resellers (Commercial-Scale)	Homes used as de facto warehouses with pallet deliveries and daily pickups. Noted separately as a zoning/code issue.	Rare but present	No	Not Included

Appendix 3

Legal Context and Economic Relevance of Intro 528 Analysis Purposes

This appendix provides contextual legal background relevant to AKRF's economic, operational, and service impact analysis of Intro 518. The discussion below does not offer legal conclusions or assess the ultimate validity of the legislation. Rather, it explains why legal uncertainty itself may influence how regulated entities respond to the bill, including decisions related to investment, staffing, facility siting, service coverage, and cost pass through. These behavioral responses are directly relevant to the scenario based analysis undertaken by AKRF.

WHY LEGAL CONTEXT MATTERS FOR ECONOMIC ANALYSIS

Regulatory frameworks that introduce unresolved legal questions can affect business behavior even before any litigation is initiated or resolved. In the context of last mile delivery and logistics, perceived legal risk may:

- Increase the risk premium associated with operating or expanding facilities in New York City;
- Influence whether firms pursue full compliance, partial exit, restructuring, or relocation strategies;
- Accelerate decisions to shift capital investment or service functions to adjacent jurisdictions;
- Affect the timing and scale of hiring, training, and facility upgrades; and
- Increase the likelihood that compliance and risk management costs are passed through to consumers and small businesses.

Accordingly, regulated entities often evaluate not only the direct requirements of legislation, but also the surrounding legal landscape when making operational and investment decisions. The frameworks summarized below are commonly raised by stakeholders when assessing local regulation affecting logistics and labor models.

FEDERAL TRANSPORTATION PREEMPTION

A recurring issue in policy discussions is the potential application of federal law governing motor carriers and interstate commerce. Federal statutes limit the ability of state and local governments to regulate matters that directly affect the prices, routes, or services of motor carriers, while preserving traditional local authority over safety and generally applicable labor standards. Courts evaluate these questions on a fact specific basis, with outcomes often turning on how a law is implemented in practice rather than how it is framed. This creates uncertainty that may influence compliance planning and investment decisions for multistate delivery operators.

ADDITIONAL LEGAL FRAMEWORKS COMMONLY RAISED BY STAKEHOLDERS

In addition to federal transportation preemption, stakeholders sometimes cite the following doctrines when evaluating the scope and implementation of local regulation:

- **Federal Labor Law Preemption (NLRA):** Federal labor law may limit state or local regulation of conduct that is protected, prohibited, or intentionally left unregulated under the National Labor Relations Act. Where legislation is perceived to affect hiring practices, termination protections, or bargaining leverage, such arguments may be raised in litigation or compliance strategy.
- **Dormant Commerce Clause:** Constitutional principles restrict state and local laws that discriminate against or unduly burden interstate commerce. Even facially neutral regulations may be evaluated based on whether burdens on integrated, multistate logistics networks are excessive relative to local benefits.
- **Due Process and Vagueness Considerations:** Regulated parties are entitled to fair notice of their obligations and protection against arbitrary enforcement. Broad or functional definitions–such as those determining which facilities or services are covered–may be scrutinized if boundaries are perceived as unclear, contributing to enforcement and compliance uncertainty.
- **ERISA Preemption (Limited Context):** While Intro 518 does not directly mandate specific employee benefits, multistate operators sometimes raise concerns where local requirements are alleged to interfere with uniform administration of benefit plans across jurisdictions.
- **Takings and Exactions (Contextual):** In limited circumstances, regulated entities may argue that licensing conditions or operational requirements effectively deprive property of economically viable use. Although such claims face a high legal threshold, the potential for fact intensive litigation may factor into investment and location decisions.

These legal considerations help explain why operators may pursue a range of response scenarios–including restructuring, reduced service coverage, hybrid compliance strategies, or relocation outside New York City–even in the absence of definitive judicial outcomes. In this way, legal uncertainty functions as an input to economic behavior, rather than a substitute for economic analysis. This reinforces the relevance of AKRF's market grounded, scenario based approach, which evaluates how regulated entities are likely to respond under conditions of heightened regulatory and legal risk.

In addition to secondary effects on the last-mile and logistics industries, as described above, the Intro 518 legislation as introduced in 2025 potentially overreaches the administrative powers of the municipal government. The Federal Aviation Administration Authorization Act of 1994 (FAAAA), specifically 49 U.S.C. § 14501(c), contains an express preemption clause prohibiting states and local governments from enacting or enforcing laws "related to a price, route, or service of any motor carrier with respect to the transportation of property." Courts have interpreted this provision broadly, invalidating state and local measures that have a significant connection with or effect on motor carriers' rates, routes, or services, while preserving traditional exercises of power, such as safety regulations and generally applicable labor standards, that affect carriers only indirectly.

Several court decisions have shaped the scope of the FAAAA preemption and its impact on state and local regulation of transportation and logistics.[2] In Rowe v. New Hampshire Motor Transport Association (2008), the Supreme Court held that a Maine law requiring age verification for tobacco deliveries was preempted because it related to the services offered by motor carriers, establishing that even indirect state regulations affecting delivery services can fall under FAAAA preemption.[3]

Similarly, American Trucking Associations v. City of Los Angeles (2013) reinforced this principle, invalidating local port trucking regulations that imposed operational requirements, such as off street parking plans and mandatory placards, because they effectively regulated carriers' services.[4] These cases underscore that state and local authorities cannot impose rules that directly or substantially affect the prices, routes, or services of motor carriers engaged in interstate commerce. Lower courts have further explored the boundaries of FAAAA preemption in cases involving employment and liability. For example, in Massachusetts Delivery Association v. Coakley/Healey (2015), the First Circuit considered whether a state law limiting independent contractor status could be preempted, noting that laws with significant operational impact on carriers may fall within FAAAA's scope.[5] Conversely, in Dan's City Used Cars v. Pelkey (2013), the Supreme Court found that certain state laws regulating tow and auction operations did not preempt federal authority because they did not meaningfully regulate transportation services.[6] Emerging circuit court cases have created a split over whether negligence claims against brokers or carriers are preempted, particularly when framed as safety or liability protections. Collectively, these decisions have established that the FAAAA broadly shields motor carriers from state and local regulations that affect delivery services although exceptions exist where laws are tangential to operations or fall under safety exceptions, creating ongoing legal uncertainty in the regulation of logistics and delivery operations.

In the context of Intro 518-2025, the FAAAA could be implicated where the City's direct employment mandate for core delivery services, prohibition on subcontracting, bonding requirements, and route-related recordkeeping materially alter how motor carriers structure last-mile delivery operations. To the extent these provisions are viewed as regulating the business model and service configuration of logistics operators, particularly by restricting the use of independent contractors or third-party logistics providers, they could be challenged as preempted under the FAAAA. Conversely, the law may fall within the statute's safety exception and traditional local authority over workplace standards and business licensing, especially given its emphasis on road safety, worker protections, and consumer protection.

Appendix 4

Detailed Methodology - Cost and Service

MONTE CARLO METHODS

A traditional cost-and-service analysis would pick a point estimate for each input ("miles per route is 25, drivers earn $28/hr, the facility is 275,000 square feet") and compute a single cost per package from those inputs. That approach hides the most important thing the model needs to communicate: the result is uncertain, and the size of that uncertainty matters as much as the central value. A 10 percent chance of a $5/pkg outcome looks very different from a 1-in-1000 chance of the same outcome, and a deterministic model cannot tell those apart.

Monte Carlo simulation is used to explicitly account for uncertainty by representing each input as a probability distribution rather than a single deterministic value. For each parameter, a plausible range is defined. For example, miles per route may vary between 15 and 35. A value is randomly drawn from each distribution, the cost and service calculations are executed, and the process is repeated 10,000 times. The result is a distribution of outcomes, such as cost per package and service performance metrics, rather than a single point estimate. This enables direct evaluation of summary statistics, including the mean, median, and selected percentiles such as the 5^{th} and 95^{th}, as well as the overall shape of the distribution.

The selection of 10,000 iterations reflects a balance between statistical stability and computational efficiency. At lower iteration counts, for example below approximately 5,000, the tails of the distribution exhibit variability across runs, which reduces the reliability of percentile-based metrics. At higher iteration counts, for example above approximately 50,000, incremental gains in precision are minimal because the distribution has effectively converged. A fixed random seed of 42 is applied across all scenarios to ensure that comparisons reflect differences in modeled conditions rather than stochastic variation. This approach ensures that each scenario is evaluated against an identical set of underlying draws, isolating the effects of policy and operational assumptions.

Within each iteration, the model follows a consistent sequence. Operational parameters are sampled from their respective distributions, and per-facility daily costs are constructed from the bottom up across defined cost categories. These costs are scaled by facility counts and normalized by total daily package volume to derive cost per package. Service performance metrics are then calculated from the same set of operational inputs using a calibrated sensitivity framework. For scenarios comprising multiple operational tiers, cost and service outputs are aggregated using throughput-weighted averages.

DETAILED COST CALCULATION STEP

Almost every input parameter in the model is specified by a min and a max value on its Assumptions sheet. For example, miles per route could be between 15 and 35; driver hourly pay could be between

$24 and $32. We do not specify a probability distribution explicitly; instead, the model converts the (min, max) range into a truncated normal distribution using the following convention:

median = (min + max) / 2

standard deviation = (max - min) / 4

The /4 convention places the min and max approximately ±2 standard deviations from the median, which means roughly 95 percent of draws fall inside the user-specified range. The remaining 5 percent fall outside the range and are clamped to the bounds; values drawn outside the range are set to min or max rather than redrawn. Clamping rather than rejection sampling matters for two reasons: it keeps the computation fast (no looping until a valid draw is obtained), and it avoids the tail-truncation bias that would arise from systematically discarding certain values. The cost of this approach is a small mass concentration at the bounds, which is acceptable because it does not affect the central tendency or the bulk of the distribution. The intuition is that the (min, max) range defines the plausible operating envelope, with the central estimate being more likely than the extremes. A truncated normal with std = range/4 expresses that belief without requiring the user to specify standard deviations directly.

Some parameters cannot be drawn independently because they are physically related to each other. The clearest example is route geometry. Three operational variables (miles per route, hours per route, and packages per route) move together. A 35-mile route generally takes longer to drive than a 15-mile route, and a route carrying 150 packages generally takes longer than one carrying 80. Drawing these three variables independently from their truncated normals would routinely generate impossible combinations such as a 35-mile route completed in 6 hours with only 80 packages on board, or a 15-mile route taking 10 hours to deliver 150 packages. Either combination is operationally absurd, and including them in the simulation would smear out the cost and service distributions in ways that do not correspond to anything a real operator could produce.

The remedy is to draw the three variables under a fixed correlation structure. We use the following correlations, calibrated against industry data and relevant route-engineering literature:

P(miles, hours) = 0.85 (longer routes take more time)

P(miles, packages) = 0.45 (longer routes carry more packages, but only modestly, depends on density)

P(hours, packages) = 0.70 (more time on the road means more deliveries)

These three numbers form a 3×3 correlation matrix **Σ**. The standard mathematical tool for drawing correlated random variables from a target correlation matrix is the Cholesky decomposition. For any positive-definite matrix **Σ**, there is a unique lower-triangular matrix L such that $L \times L^T = \Sigma$. The columns of L provide the steps for combining three independent random draws into three correlated draws with exactly the correlation structure of **Σ**. The procedure is:

Step 1. Build **Σ** (the 3×3 correlation matrix).

Step 2. Compute its Cholesky decomposition L. (This is a one-time calculation.)

Step 3. Draw three independent standard-normal random numbers $Z = (z_1, z_2, z_3)$.

Step 4. Compute Z* = L × Z. The result is three correlated standard-normal numbers.

Step 5. Map each Z*i back to its real-world units: value = clamp(min, max, median + std × Z*i).

An example may be useful. Suppose we draw Z = (-0.83, +0.92, -0.20). Treated independently, this would describe a route with below-average miles, above-average hours, and slightly below-average packages, which is operationally implausible. After multiplying by L, the result is Z* = (-0.83, -0.22, +0.05). The above-average independent hours draw has been pulled back toward average because miles is below average and the two are 85 percent correlated. The package draw has shifted from -0.20 to +0.05 because both hours and packages move with miles. After scaling, the resulting route has somewhat fewer miles, fewer hours, and roughly average packages, which is operationally coherent.

Once correlated, cost of operations per facility per day is build out across eight categories. Each category uses inputs that come from either the truncated normal draws or the correlated Cholesky draws. The categories are:

- **Labor:** the largest line item, typically 45–55 percent of facility cost. Computed as drivers × pay × (1 + benefits burden) × hours/route + warehouse workers × WH pay × (1 + benefits burden) × 8 + admin × salary / 260. The benefits burden (around 30-35 percent) captures payroll taxes, employer-side health insurance contributions, paid time off, and similar costs that are layered on top of base wages. The driver labor cost scales directly with hours per route, which is the correlated draw, so longer routes drive higher labor cost both directly (more hours) and indirectly (longer routes correlate with more miles and more packages, which all push hours up).
- **Fleet:** computed as routes × (EV-share × EV $/mi + (1 – EV-share) × gas $/mi + maintenance $/mi) × miles/route + routes × insurance/yr / 365. Each route corresponds to one truck so insurance and depreciation scale with route count. Fuel and maintenance scale with mileage. The EV adoption share blends two unit costs (EVs are cheaper per mile for fuel and maintenance but require capital investment captured elsewhere).
- **Facility:** computed as square footage × lease $/sqft/yr / 365 + monthly utilities / 30.4 + annual equipment / 365. Three sub-components, each converted to a common per-day basis. Lease is the dominant piece (typically 70-85 percent of facility cost) and is the line item most affected by relocation, since suburban industrial space costs less per square foot than NYC industrial space but typically requires more total square footage.
- **Tolls:** computed as routes × (percent bridge × bridge toll + percent congestion-zone × congestion toll + parking & violations per route). Every route into Manhattan or across a tolled crossing pays these costs regardless of where the originating warehouse is located. This is one of the costs that does not go away when a facility relocates, a truck running from a New Jersey warehouse to a Manhattan delivery zone also pays tolls and congestion charges as a truck running to the same service area from a Bronx warehouse.
- **Technology:** annual platform cost (TMS, route planning software, customer-facing systems) divided by 365 days. This cost is roughly constant per facility regardless of size, so large facilities carry proportionally lower technology cost per package.
- **Failed delivery:** computed as failed-delivery rate × packages × $15 redelivery cost. The $15 figure reflects the industry estimate for the cost of a redelivery attempt (driver time, fuel, and customer service handling). Failed delivery rate is itself sensitive to operational stress, longer routes and tighter time windows produce more failures.

- **G&A overhead:** computed as the sum of the previous six categories × G&A percent, where G&A is roughly 5 percent. This captures corporate functions allocated to each facility (HR, finance, regional management).
- **Peak season adjustment:** when the peak indicator fires for an iteration (it does so in approximately 14 percent of iterations, reflecting the share of the year that is peak season), we multiply labor, fleet, and facility costs by their peak multipliers (typically 1.25-1.30) and add a flat van-rental adder. This captures the November-December surge plus smaller mid-year peaks. Including it as a stochastic indicator rather than a permanent multiplier means each iteration is internally consistent (either it is peak or it is not), and the simulation reflects the annual blend.

These eight components sum to total cost per facility per day. We aggregate to market level by multiplying by facility count: total daily NYC cost = facility cost × facility count. Cost per package is then total daily NYC cost divided by citywide daily package volume.

Using citywide volume rather than per-facility throughput means cost per package is a policy-relevant metric ("what does it cost the system to deliver a package in NYC") rather than an operator-level unit cost. This convention matters for cross-scenario comparison: when relocation scenarios add facilities or reroute volume, the denominator remains fixed at the actual NYC delivery volume, so cost-per-package increases reflect the real cost burden imposed on the citywide market.

DETAILED SERVICE CALCULATION STEP

Service quality is the harder modeling problem. Cost is largely mechanical: given the inputs, the formulas produce a number. Service quality emerges from the interaction of route stress, time pressure, package density, and operational investment, none of which can be simulated at the level of individual delivery attempts within a citywide cost-and-pricing model. The model takes a different approach: a calibrated linear sensitivity model that derives service rates from the operational parameters.

The structure has four pieces: base rates, reference baselines, a sensitivity coefficient matrix, and a clamping rule.

Base rates are the service rates observed in NYC under existing operating conditions:

On-Time delivery rate = 90.5%

Same-Day delivery rate = 80.0%

Next-Day delivery rate = 93.0%

First-Attempt delivery rate = 90.5%

Reference baselines are the operating conditions under which those base rates are achieved:

Reference miles per route = 20 (existing) / 25 (relocated scenarios)

Reference hours per route = 10

Reference packages per route = 115

Reference cost per package = $2.65

The sensitivity coefficient matrix has four rows (one per service metric) and four columns (one per operational driver). Each entry is the percentage-point change in that service rate per unit deviation from the reference baseline. These coefficients are drawn from stakeholder interviews and a review of relevant industry literature:

	miles	hours	packages	cost
On-Time	-0.40	-1.20	-0.10	+0.60
Same-Day	-0.80	-2.50	-0.15	+1.00
Next-Day	-0.20	-0.50	-0.05	+0.30
First-Attempt	-0.25	-0.40	-0.12	+0.35

The signs encode the underlying operational dynamics. Longer routes, longer hours, and more packages all degrade service (negative coefficients). Higher cost, interpreted here as additional spending on drivers, fleet, and reliability per package, improves service (positive coefficients). The hours coefficients are the largest in absolute value because driver fatigue and end-of-route compression are first-order drivers of late deliveries: each additional hour of route length compresses the late-day delivery window where the bulk of failures occur. Same-Day is the most sensitive metric because it operates under the tightest time constraint; Next-Day is the least sensitive because the time buffer is large.

The formula for any single iteration is:

rate = base + Σ (coefficient × deviation) / 100

rate = clamp(0%, 100%, rate)

Deviations are signed (actual minus baseline). The /100 converts the percentage-point coefficients to decimal rates. Clamping prevents impossible values when extreme parameter combinations push the raw output above 100 percent or below 0 percent.

Two refinements warrant explicit mention. First, the hours coefficients themselves are stochastic. Each iteration draws a fresh hours coefficient ±30 percent around the base value to reflect calibration uncertainty. The direction and approximate magnitude of the hours effect are well established, but the literature shows enough variance that treating the coefficient as known to two decimal places would understate uncertainty. Second, for the Hold Service runs, the cost coefficients are multiplied by 2.5×. This represents the interventional pricing mechanism: it represents the assumption that operators must spend disproportionately to preserve service in a relocated environment. The 2.5× factor reflects that recovering service from a degraded baseline takes more spending than the original cost-coefficient suggests for marginal improvement around the existing operating point. Without this targeted multiplier, the back-solve would produce cost-per-package values so high they would be operationally unreachable.

TIERED THROUGHPUT

When a scenario has more than one tier (existing 64 percent + relocated 36 percent, or 64 percent + absorbed + new-build, etc.), tier-level cost-per-package values and service rates are weighted by their throughput shares to produce blended outputs:

Blended cost per package = Σ (tier share × tier cost per package)

Blended service rate = Σ (tier share × tier service rate)

An important convention applies to the 64 percent non-at-risk tier in every scenario. By definition, that portion of the system operates under existing conditions regardless of policy, so its cost per package must equal the existing baseline.

BACK-SOLVING HOLD SERVICE

Hold Service answers the following: what would cost per package have to be to keep each of the four service rates at its existing baseline despite the operational disruption from relocation?

The math is a back-solve. Starting from the service equation:

$$rate\_baseline = base + (miles\_coef \times \Delta miles + hours\_coef \times \Delta hours + pkg\_coef \times \Delta pkg + cost\_coef \times \Delta cost) / 100$$

Setting baseline minus base equal to zero (the condition that the rate must equal its baseline) yields:

$$0 = miles\_coef \times \Delta miles + hours\_coef \times \Delta hours + pkg\_coef \times \Delta pkg + cost\_coef\_2.5x \times \Delta cost$$

Solving for the cost deviation:

$$\Delta cost\_required = -(miles\_coef \times \Delta miles + hours\_coef \times \Delta hours + pkg\_coef \times \Delta pkg) / cost\_coef\_2.5x$$

$$cost\_per\_package\_required = REF\_COST + \Delta cost\_required$$

This calculation is performed independently for each of the four service metrics: On-Time, Same-Day, Next-Day, and First-Attempt. Because the coefficients differ across metrics, the required cost per package also differs across metrics. We then take the maximum across the four. This reflects the binding-constraint logic: preserving all four service rates means satisfying whichever one is hardest to satisfy. If preserving on-time would cost $4.50/pkg and preserving same-day would cost $5.20/pkg, the Hold Service result is reported as $5.20/pkg, since spending only enough to preserve on-time would still leave same-day below baseline.

The result is then floored at the operating cost (the actual cost-buildup result for that iteration) so that Hold Service can never undercut the cost of physically running the operation. If the back-solve produces $1.80 but the operation costs $2.40 to run, the model reports $2.40.

Two scenario-specific refinements. First, S1 Hold Service deploys 393 additional routes with inverse-proportional miles scaling. The intuition is operational: route densification (running more, shorter routes) is one of the principal levers operators use to preserve service, and the model captures this by reducing average miles per route as routes are added. The 393 figure is calibrated to fully replace at-risk throughput at existing route productivity. Second, S1a and S1b Hold Service apply per-tier efficiency scaling. The absorbed/served tier shares existing infrastructure, so its required cost per package is not the uniform back-solve value, it is scaled down by the Primary-block efficiency ratio (mean ≈ 0.65). Without this adjustment, S1a/S1b Hold Service would overstate the cost of the absorbed tier, since the absorbed tier inherits some of the existing tier's efficiency by sharing facilities and route infrastructure.

HOLD COST

Hold Cost is the policy counterpart to Hold Service. The question it answers is the following: if cost per package is fixed at the existing baseline (no service-preservation spending), how far do service rates fall under the operational disruption?

The mathematics runs the service equation in its forward direction. We fix cost per package at baseline (so Δcost = 0) and the operational deviations (Δmiles, Δhours, Δpkg) flow through the sensitivity matrix to produce the resulting service rates. Effective additional routes = 0 (no densification spending). The result is a service-degradation distribution, a picture of what NYC actually receives if operators do not spend their way out of the disruption.

Hold Service and Hold Cost mark the two ends of a continuum. In practice, operators will land somewhere between them, spending some incremental amount, accepting some service degradation. The model is not predicting either end; it is bracketing the policy tradeoff.

DETAILED SCENARIO WALKTHROUGH

Existing (the baseline)

Single-tier, no relocation, existing operating conditions throughout. This is the reference baseline against which every other scenario is measured. 10,000 iterations through the standard cost buildup and service derivation with existing-condition parameters.

Headline statistics: mean cost per package = $2.65, median = $2.53, standard deviation = $0.87, 5th percentile = $1.45, 95th percentile = $4.21. Mean on-time = 90.9 percent. Every delta in the Summary Comparison sheet is measured against these numbers. The fact that the mean is slightly higher than the median indicates a moderately right-skewed distribution: most days the system operates near the median, but a small share of high-cost days (peak season, high-mileage draws) pulls the mean upward. This pattern is consistent with real world expectations.

S1, Full Relocation (the no-adaptation upper bound)

Every at-risk facility leaves NYC. The 36 percent relocated tier runs at full new-facility cost: new lease, new equipment, full staffing, no shared infrastructure. Routes lengthen substantially because the warehouses are now in suburban New Jersey, Westchester, or Long Island while the delivery zones remain inside the five boroughs. The 64 percent non-at-risk tier continues at existing conditions. 393 additional routes are deployed system-wide in the Hold Service variant. That number represents the route count needed to fully replace at-risk throughput at existing route productivity.

What it represents: S1 is the worst-case operator response: every affected operator chooses to leave, no operator absorbs throughput into existing suburban capacity, no operator consolidates, no operator finds efficiency. It serves as the upper bound of disruption.

Outcomes: blended cost per package = $2.67 (only +0.8 percent vs existing, because the 64 percent unaffected portion dominates the blend), but blended on-time falls to 87.4 percent (-3.5pp). The relocated tier alone runs at on-time 81.1 percent and same-day 61.4 percent, a substantial degradation that is masked at the system level by the unaffected majority. Hold Service pushes blended cost per package to $5.18 (+95.7 percent, translating to roughly $2.20B in annual incremental cost). Hold Cost keeps blended cost per package at $2.67 but produces approximately 30M additional late deliveries per year, or about 9.2 per NYC household per year.

Likelihood profile: across the 10,000 iterations, blended cost per package exceeds the existing baseline in roughly 46 percent of draws (about 34 percent by more than 10 percent) and blended on-time rate falls below the existing baseline in roughly 87 percent of draws (about 32 percent by more than 5 percentage points). The cost figure looks deceptively modest because the 64 percent non-at-risk pool anchors the blend at $2.65; the relocated tier alone exceeds baseline cost in essentially every iteration. Service degradation is the more reliably present effect at the citywide level.

S1a, Full Relocation with Suburban Absorption (some adaptation)

Some operators already have suburban facilities and absorb relocated volume into existing operations rather than building new sites. The 36 percent relocated pool splits stochastically into two sub-tiers: an absorbed tier (40-60 percent of relocated volume, drawn each iteration) at marginal cost, and a new-build tier (the remainder) at full cost identical to S1's relocated tier. Marginal cost multipliers reduce the absorbed tier's facility overhead to 10-20 percent of full cost (the building already exists, the lease is paid, the equipment is in place, the marginal cost is only utilities and incremental wear). Labor falls to 85-95 percent (slight efficiency gain from existing supervision but mostly still need full driver staffing). Fleet is at 75-85 percent (some spare truck capacity exists). Tolls remain at 100 percent (every route into NYC pays the same toll regardless of operator status). Additional routes drop (vs S1's 393) because absorbed facilities already have route infrastructure that can flex.

What it represents: S1a is the partial-adaptation scenario. It is more realistic than S1 because at least some operators can in fact absorb relocated NYC volume into existing operations. The absorption rate (40-60 percent) is specified as a range rather than a point estimate because the actual share depends on operator-specific facility capacity, which is not directly observable.

Outcomes: blended cost per package = $2.61, very close to the existing baseline of $2.65. The 64 percent non-at-risk pool anchors the blend; within the at-risk portion, the absorbed sub-tier (using existing suburban facilities at marginal cost) partially offsets the higher new-build sub-tier cost. Hold Service = $4.69, meaningfully below S1's $5.18 because the absorbed tier needs less service-preservation premium thanks to its operational efficiency advantage (recovery rates on the four service metrics reduce the gap that needs closing). Hold Cost = $2.65 with service falling between S1's blended and the existing baseline. The gap S1 - S1a (= $0.49/pkg in Hold Service, or roughly $0.41B per year) quantifies the value of suburban consolidation: this is what the market saves in service-preservation cost when 40-60 percent of relocated volume can be absorbed at marginal cost.

Likelihood profile: across the 10,000 iterations, blended cost per package exceeds the existing baseline in roughly 43 percent of draws (about 31 percent by more than 10 percent), and blended on-time rate falls below the existing baseline in roughly 79 percent of draws (about 20 percent by more than 5 percentage points).

S1b, Suburban Absorption with Capacity Constraint (the stress test)

The suburban market may not have enough total capacity to absorb all displaced volume. S1b builds on S1a by adding a coverage rate (60-80 percent, drawn stochastically) that determines what share of the 36 percent gets served at all by the absorbed-plus-new-build pipeline. The remainder is the backlogged-degraded tier, volume that cannot find a home and operates with explicit service floors: on-time 40-60 percent, same-day 0-5 percent, next-day 30-50 percent, first-attempt 40-60 percent. Effective additional routes = reduced × coverage rate (so backlogged volume gets no incremental routing investment).

What it represents: S1b functions as the capacity stress test. It asks: what happens if the suburban market simply cannot absorb everything? The 60-80 percent coverage range is calibrated against the approximate capacity of existing suburban distribution infrastructure; it would take new construction to push coverage closer to 100 percent, and that construction takes years. So S1b is the realistic medium-term scenario for the case where a substantial share of operators try to relocate but the market does not have capacity ready.

Outcomes: blended cost per package = $2.66, slightly above S1a because the backlogged tier carries full operational cost without the offsetting efficiency of the absorbed tier. Blended on-time rate falls to 84.8 percent, the worst of any scenario, because the backlogged tier's service is floored at degraded rates (40–60 percent on-time, 0–5 percent same-day, etc.) by capacity constraints. Hold Service = $4.81, between S1a ($4.69) and S1 ($5.18) because operators still incur the service-preservation premium across all relocated volume but capacity constraints prevent recovery on the backlogged portion. Hold Cost = $2.65 with the worst service distribution of any scenario. The gap S1a → S1b (+$0.12/pkg in Hold Service, +$0.11B per year) quantifies the cost of insufficient capacity. The cost gap is small because all relocated volume still pays the premium; the service degradation is large because the backlogged tier is genuinely failing.

Likelihood profile: blended cost per package exceeds the existing baseline in roughly 45 percent of draws (about 33 percent by more than 10 percent) and blended on-time rate falls below the existing baseline in roughly 98 percent of draws (about 65 percent by more than 5 percentage points). Service degradation is essentially certain under S1b, and a meaningful drop is more likely than not.

S2, Hybrid Operations / Partial Relocation (the realistic middle)

Instead of all at-risk facilities relocating, only the highest-traffic ones move out (top 25-35 percent by volume, drawn stochastically each iteration). The remaining at-risk facilities stay in NYC and absorb Intro 518 compliance costs, wage uplift of 8-18 percent to meet new wage floors, W-2 benefits override of 35-55 percent to convert independent contractors to employees, plus training and licensing costs. The two sub-tiers (relocated and retained) carry different operational parameters. Additional routes for Hold Service = 393 × relocated throughput share (≈45-55 percent), so meaningfully fewer than S1 because most volume stays in-city.

What it represents: S2 represents the most realistic operator-response scenario. Real operators do not all make the same choice; the largest operators with the most financial exposure have the strongest incentive to relocate (they encounter the policy threshold most directly), while smaller operators may find the compliance burden less costly than relocation. The threshold-driven selection is a more accurate model of operator behavior than S1's flat 36 percent relocation, and the relocated share varies stochastically across iterations because the threshold itself is a draw.

Outcomes: blended cost per package = $2.80, Hold Service = $4.27, Hold Cost = $2.65. Primary blended is higher than S1a/S1b because the retained sub-tier carries Intro 518 compliance costs (wage uplift, W-2 benefits override, training, licensing) that elevate its operating cost above the existing baseline. Hold Service in S2 falls to $4.27 (roughly $0.91/pkg below S1's $5.18) because only the relocated sub-tier (about 22 percent of total volume) requires the service-preservation premium. The retained sub-tier stays in-city with no longer-route stress, so its Hold Service cost equals its Primary cost (compliance only, no premium). The gap S1 - S2 (= $0.91/pkg in Hold Service, or roughly $0.79B per year) quantifies the value of maintaining an in-city presence.

Likelihood profile: blended cost per package exceeds the existing baseline in roughly 51 percent of draws (about 40 percent by more than 10 percent), higher than the relocation-only scenarios because the retained tier's compliance costs raise the blended primary above baseline across most iterations. Blended on-time rate falls below the existing baseline in roughly 70 percent of draws (about 17 percent by more than 5 percentage points), the lowest service-degradation likelihood of the relocation scenarios because most volume stays in-city.

S2a, Hybrid + In-City Consolidation (the optimized lower bound)

Same hybrid structure as S2, but the retained in-city tier consolidates further. Capacity ceilings (15-25K packages per consolidated facility per day) cap how much consolidation can absorb. The relocated tier inherits S2's parameters via cross-reference, so the only difference between S2 and S2a is the treatment of the in-city retained tier.

What it represents: S2a represents the best-case operator response, in which operators that remain in-city run leaner operations. Fewer facilities, each operating at higher density, capture the management efficiency that comes from not paying for duplicate functions across many small sites. This is the rationalization scenario operators would naturally pursue under sustained compliance cost pressure, under W-2 wage obligations, operators have a strong incentive to ensure each facility runs at full utilization rather than maintaining slack capacity across many sites.

Outcomes: blended cost per package = $2.72, Hold Service = $4.18, Hold Cost = $2.65. S2a's consolidation efficiency multipliers (labor 0.80-0.92, fleet 0.85-0.95, overhead 0.55-0.75, etc.) reduce the retained sub-tier's cost relative to S2, pulling blended primary down by about $0.08/pkg. Hold Service falls $0.09/pkg below S2. The gap S2 - S2a (= $0.09/pkg in Hold Service, or roughly $0.05B per year) quantifies the value of in-city consolidation. S2a represents the lower bound of disruption: the floor of what the policy costs the system under full strategic optimization by operators.

Likelihood profile: blended cost per package exceeds the existing baseline in roughly 47 percent of draws (about 36 percent by more than 10 percent) and blended on-time rate falls below the existing baseline in roughly 70 percent of draws (about 18 percent by more than 5 percentage points). The likelihood profile is similar to S2 with consolidation pulling cost-up odds slightly lower.

MODEL LIMITATIONS

The model is designed to evaluate system-level outcomes rather than simulate individual delivery operations. It does not replicate package-level routing or stop-by-stop delivery attempts; instead, service performance is derived from a calibrated sensitivity model. As a result, the analysis captures aggregate service rates but cannot identify specific failure modes, such as which neighborhoods experience greater delays or which package types are disproportionately affected. Similarly, the model does not dynamically account for carrier substitution. In scenarios where capacity constraints emerge, such as S1b, unmet demand is reflected as degraded service rather than being reallocated to alternative carriers like USPS. In practice, some portion of this volume would likely be absorbed by other providers, shifting both cost and service outcomes in ways not represented here.

The analysis does not incorporate demand response. Potential behavioral adjustments, such as reduced ordering due to slower service or shifts to alternative fulfillment channels, are not modeled. This assumption likely understates the broader economic effects of service degradation, particularly where delivery reliability influences consumer or business activity. In addition, operator decision-making in hybrid scenarios is simplified. Facility relocation in S2 and S2a is determined using a stochastic threshold rather than facility-specific compliance costs. A more detailed framework would account for variation in facility characteristics, lease structures, and operator strategies; however, such data are not available, or are infeasible to model, necessitating the use of a threshold-based approach.

Several modeling parameters are calibrated using available last-mile delivery literature, but they retain inherent uncertainty. Sensitivity coefficients governing service outcomes are partially treated stochastically, with select variables allowed to vary within defined ranges, while others are held at central estimates. A more comprehensive treatment would extend stochastic variation across all key coefficients using empirically grounded distributions. In addition, certain calibration choices, such as the multiplier applied in "Hold Service" scenarios to reflect the cost of maintaining service levels under stress, are based on informed judgment rather than direct empirical measurement. While these assumptions are grounded in operational logic, they introduce uncertainty that should be considered when interpreting results.

Finally, the model reflects a short-run perspective, simulating system performance on a day-to-day basis without capturing longer-term market adjustments. Over time, factors such as new facility development, capacity expansion in suburban markets, operator entry and exit, and technological improvements would likely moderate some of the more extreme outcomes observed in relocation scenarios. As such, the results are best interpreted as indicative of near-term disruption over a one- to three-year horizon rather than steady-state conditions. Despite these limitations, the comparative findings remain robust, as all scenarios are evaluated within a consistent modeling framework. Differences in outcomes are therefore attributable to the modeled policy responses rather than to variations in methodology.

DETAILED FINDINGS - LIKELIHOOD OF IMPACTS

This section contains likelihood and percentile tables that summarize the distributional outputs of the Monte Carlo analysis by reporting the frequency with which outcomes occur across 10,000 simulated iterations. Rather than presenting single-point estimates, these tables show how often cost and service metrics fall above or below relevant benchmarks, providing a clearer sense of risk and variability in system performance. This includes the probability of cost increases exceeding specified thresholds, as well as the likelihood of service degradation relative to existing conditions.

This section presents findings on the Primary Block (or "blended") simulation which allows both cost and service to adjust freely in response to changes in operating conditions, producing a fully endogenous outcome in which each iteration reflects how the system would likely perform under the modeled scenario. In this framework, cost is calculated directly from operational inputs while service outcomes are derived from the calibrated sensitivity model, with no constraints imposed on either variable. In contrast, the Hold Service and Hold Cost simulations impose controlled constraints to isolate different sides of the tradeoff. Hold Service fixes service levels at baseline and back-solves for the level of cost required to maintain them under changed conditions, effectively estimating the cost of preserving performance. Hold Cost does the opposite by holding cost constant and allowing service to vary freely, capturing the resulting decline in performance when no additional spending is introduced. Together, these approaches define a bounded range of outcomes, with the Primary Block representing expected system behavior and the Hold scenarios illustrating the limits of cost-driven service preservation and cost-constrained service degradation.

TABLE 4-1

At-Risk Blended Service Degradation Likelihood for Primary Block and Hold Cost Simulations

Threshold	S1	S1a	S1b	S2	S2a
Primary (Blended) Block					
On-time < 90%	79.5%	69.3%	96.3%	60.5%	60.0%
On-time < 85%	22.1%	12.4%	53.5%	11.4%	11.1%
On-time < 80%	0.6%	0.1%	5.0%	0.0%	0.0%
Same-day < 70%	24.7%	15.3%	58.5%	12.5%	11.9%
Hold Cost					
On-time < 90%	79.7%	70.0%	96.6%	61.4%	60.6%
On-time < 85%	22.1%	12.8%	54.0%	11.9%	11.4%
On-time < 80%	0.6%	0.1%	5.1%	0.0%	0.0%
Same-day < 70%	24.7%	15.7%	59.2%	13.0%	12.0%

Notes: Table shows the probability that the citywide-blended service rate falls below a given threshold across 10,000 iterations. Primary block = organic outcome; Hold Cost = cost held at baseline, service degrades. On-time and same-day rates are the two most policy-relevant service metrics.

Sources: AKRF, Inc.

TABLE 4-2

At-Risk On-Time Service Degradation Likelihood for Primary Block and Hold Cost Simulations

Threshold	S1	S1a	S1b	S2	S2a
Primary (Blended) Block					
< 85%	81.2%	58.0%	100.0%	39.1%	39.7%
< 80%	39.8%	12.1%	96.7%	2.6%	2.6%
< 75%	7.8%	0.0%	63.0%	0.0%	0.0%
< 70%	0.0%	0.0%	11.6%	0.0%	0.0%
Hold Cost					
< 85%	80.8%	59.7%	100.0%	42.0%	41.1%
< 80%	40.4%	13.5%	96.9%	3.3%	3.0%
< 75%	8.3%	0.1%	64.0%	0.0%	0.0%
< 70%	0.0%	0.0%	12.5%	0.0%	0.0%

Notes: Table shows the probability that the at-risk tier on-time delivery rate falls below a given threshold across 10,000 iterations. At-risk = the 36 percent of NYC throughput directly affected by each scenario. S1 uses the relocated-portion on-time rate; S1a/S1b/S2/S2a use their respective blended at-risk on-time columns.

Sources: AKRF, Inc.

TABLE 4-3

At-Risk Same-Day Service Degredation Likelihood for Primary Block and Hold Cost Simulations

Threshold	S1	S1a	S1b	S2	S2a
Primary (Blended) Block					
< 70%	85.5%	66.6%	100.0%	44.0%	44.5%
< 60%	42.7%	16.7%	98.3%	2.8%	2.7%
< 50%	7.7%	0.2%	67.7%	0.0%	0.0%
< 40%	0.0%	0.0%	9.3%	0.0%	0.0%
Hold Cost					
< 70%	85.3%	68.0%	100.0%	46.6%	45.7%
< 60%	43.2%	18.4%	98.3%	3.4%	3.1%
< 50%	8.2%	0.4%	68.8%	0.0%	0.0%
< 40%	0.0%	0.0%	10.3%	0.0%	0.0%

Notes: Table shows the probability that the at-risk tier same-day delivery rate falls below a given threshold across 10,000 iterations. Same-day rate = share of packages delivered on the same day they were dispatched for final-mile delivery. This metric captures the speed dimension of service quality for the 36 percent of NYC throughput directly affected by each scenario.

Sources: AKRF, Inc.

TABLE 4-4

At-Risk Cost Per Package Exceedance Likelihood for Primary Block and Hold Service Simulations

Threshold	S1	S1a	S1b	S2	S2a
Primary (Blended) Block					
> $3.00	32.3%	23.5%	29.3%	47.2%	36.8%
> $3.50	17.5%	10.5%	14.2%	28.3%	19.5%
> $4.00	8.2%	4.5%	5.8%	15.1%	9.2%
> $5.00	1.8%	0.4%	0.9%	3.5%	1.9%
Hold Service					
> $5.00	83.7%	86.7%	88.3%	82.3%	79.4%
> $7.00	70.7%	65.7%	69.2%	51.4%	46.8%
> $10.00	45.6%	28.3%	32.3%	10.7%	8.8%
> $12.00	29.9%	10.7%	14.1%	1.4%	0.9%

Notes: Table shows the probability that the at-risk tier blended cost per package exceeds a given threshold across 10,000 iterations. Primary block = organic cost at the scenario's new operating geometry. Hold Service = the cost operators would need to charge to preserve baseline service rates. At-risk cost/pkg is computed per iteration from sub-tier cost and throughput-share columns.

Note on at-risk cost asymmetry: In the Primary block (organic outcome), S2/S2a have the highest at-risk cost exceedance probability (47 percent/37 percent chance of >$3/pkg vs 32 percent for S1) because their retained-in-city operators face steeper per-package costs, even though the system as a whole is cheaper because less volume is disrupted. Under Hold Service, this relationship inverts: S1/S1b have the highest exceedance (71 percent/69 percent chance of >$7/pkg vs 51 percent/47 percent for S2/S2a) because preserving service quality from distant suburban locations costs far more than from a hybrid in-city/suburban mix.

Sources: AKRF, Inc.

TABLE 4-5

Percentile Distributions of Per Package Cost for Hold Service Simulations

Percentile Grouping	S1	S1a	S1b	S2	S2a
Primary (Blended) Block					
5th Percentile	$1.49	$1.47	$1.47	$1.53	$1.52
25th Percentile	$2.05	$2.02	$2.05	$2.15	$2.08
75th Percentile	$3.18	$3.08	$3.14	$3.32	$3.21
95th Percentile	$4.26	$4.17	$4.20	$4.46	$4.34
Hold Service					
5th Percentile	$2.46	$2.86	$2.89	$2.61	$2.58
25th Percentile	$3.94	$3.85	$3.95	$3.53	$3.46
75th Percentile	$6.34	$5.48	$5.61	$4.96	$4.83
95th Percentile	$8.16	$6.68	$6.88	$6.07	$5.96

Notes: Table shows percentile distributions for all package throughput. The 5th percentile represents a low-end outcome that is exceeded in 95 percent of simulations, while the 25th percentile marks the lower quartile of results. The 75th percentile represents the upper quartile, and the 95th percentile reflects a high-end outcome that is exceeded in only 5 percent of simulations. Together, these metrics describe the spread and asymmetry of the simulated distribution.

Sources: AKRF, Inc.

TABLE 4-6

Annual Incremental Hold Service Cost Exceedance

Threshold	S1	S1a	S1b	S2	S2a
Primary (Blended) Block					
> $1.0 billion	77.0%	75.9%	78.6%	66.1%	63.5%
> $1.5 billion	65.6%	58.1%	61.9%	43.3%	41.5%
> $2.0 billion	53.2%	40.0%	43.9%	24.4%	22.3%
> $2.5 billion	40.0%	24.7%	27.9%	11.5%	10.3%

Notes: Table shows the probability that the annual incremental cost to hold service (relative to the existing-baseline annual cost) exceeds a given dollar threshold. Per-iteration annual cost = cost/pkg × daily volume × 327 operating days. Incremental = iteration annual cost − existing annual baseline.

Sources: AKRF, Inc.

Appendix 5

Detailed Methodology - Traffic and Vehicle Emissions

GEOGRAPHY AND SERVICE AREAS

The analysis covers the entire city, divided into ten service areas across the five boroughs. Each borough is split into two sub-areas to reflect the variation in delivery distances and routing patterns within a single borough. The ten service areas are Manhattan North and South, Bronx North and South, Brooklyn East and West, Queens East and West, and Staten Island East and West. For each service area, two facility configurations are defined. The first is the existing condition, in which a delivery facility sits within or near the service area it serves. The second is the relocated condition, in which that same facility has been moved to a location outside New York City. Facility addresses and service area centroids were geocoded and used as the origin and destination inputs to the routing analysis. Manhattan is a notable exception. The existing facilities serving Manhattan North and Manhattan South are already located in Teterboro, New Jersey, because of the limited availability and high cost of industrial real estate in Manhattan. As a result, the relocated condition for Manhattan is identical to the existing condition, and the incremental impact for Manhattan is zero. Manhattan is kept in the framework for completeness, but the modeled impacts are driven by the other four boroughs.

INPUTS AND ASSUMPTIONS

The model relies on a set of operational, geographic, and environmental inputs that are held constant across all scenarios except where noted. Each facility is assumed to process 25,000 packages per day, which is representative of a large last-mile sorting center. Under existing conditions, each delivery van carries 300 packages per route on average. Once a van is on its delivery route, it is assumed to drive 30 miles within the service area, a figure provided by industry stakeholders. Daily results are annualized using 327 working delivery days per year, which reflects a six-day delivery week with adjustments for holidays.

Inbound supply to each facility is handled by 18-wheeler trailer trucks. The model assumes an average payload of 3,250 packages per truck (the midpoint of a 2,500 to 4,000 package range), which yields about eight 18-wheeler trips per facility per day (25,000 divided by 3,250, rounded to the nearest whole number).

The volume of packages assumed to be displaced from New York City varies by scenario and is the main driver of differences across results. Under Scenario S1, a standalone estimate based on Amazon and FedEx Ground volumes places 1,079,000 packages per day at risk of relocation. Scenarios S1a and S1b draw on output from the cost and service model, which puts the figure at 956,262 packages per day. Scenarios S2 and S2a also use the cost and service output but reflect a more moderate displacement assumption of roughly 620,200 packages per day. Total daily package throughput across the NYC market is roughly 2.65 million packages in all scenarios. What changes between scenarios is the share of that total subject to relocation.

The displaced throughput then flows through the model in a defined sequence. Each scenario's displaced volume is allocated to boroughs in proportion to household share, divided by 25,000 packages per facility, and rounded to the nearest whole number to give a borough-level facility count (43 facilities for S1, 38 for S1a and S1b, 25 for S2 and S2a).[7] Multiplied back by 25,000, those facility counts give what can be thought of as the modeled volume, which is close to but not exactly equal to the input throughput because of integer rounding at the borough level. For S1, the model handles 1,075,000 packages per day across its 43 facilities, compared to the 1,079,000 input. For S1a and S1b the modeled volume is 950,000 (versus 956,262), and for S2 and S2a it is 625,000 (versus roughly 620,200). All downstream calculations of van counts, VMT, and emissions are run against this modeled volume. Importantly, the modeled fleet covers only the displaced subset of NYC's package flow, not the citywide total. Packages handled by carriers that are not assumed to relocate sit outside the scope of the model entirely, since their fleets and routing do not change under Intro 518.

Emission factors come from the EPA's Motor Vehicle Emission Simulator (MOVES) model and are differentiated by both road type and vehicle class. For delivery vans and small trucks on local roads, the CO2e factor is 1,610.18 g/mi, with PM2.5 at 0.01621 g/mi and NOx at 1.0003 g/mi. On arterial roads, the corresponding factors are 993.31 g/mi, 0.01042 g/mi, and 0.6428 g/mi. For heavy-duty trucks, the local road factors are 3,136.30 g/mi for CO2e, 0.03157 g/mi for PM2.5, and 1.9484 g/mi for NOx; arterial factors are 1,934.77 g/mi, 0.02029 g/mi, and 1.2520 g/mi; and interstate or expressway factors are 1,482.05 g/mi, 0.01254 g/mi, and 0.7995 g/mi. These distinctions matter because relocating a facility changes both the total miles driven and the mix of road types those miles are on, and that mix affects the per-mile emission rate.

ROUTE-LEVEL VMT

The model's basic unit of analysis is a single representative facility serving one of the ten service areas. For each facility, VMT is calculated under both existing and relocated conditions, and the difference between the two gives the incremental impact of relocation. Route-level travel data, including distance to the service area, distance from the service area back to the facility, in-city distance, and travel time for each leg, comes from geocoded routing analysis. The metrics are computed for each day of the week and averaged to produce representative daily values, which captures variation in traffic and routing across days.

The central mechanism in the model is the relationship between commute distance and delivery productivity. Under existing conditions, each van has roughly ten hours (600 minutes) in its operating window. Time spent driving to and from the service area is deducted, and whatever remains is the in-area time available for deliveries. The model uses the existing in-area time and the baseline of 300 packages per van to derive a time-per-package rate. Under the relocated scenario, the longer drive to the now-distant facility eats into in-area time. Dividing that reduced in-area time by the same time-per-package rate gives a lower packages-per-van figure under relocation. When each van delivers fewer packages, more vans are needed to cover the same volume. More vans then translate directly into more total VMT.

Total VMT per van per day is the sum of in-area mileage plus the round-trip distance to and from the facility. Total fleet VMT per day is the number of vans multiplied by per-van VMT. This total is split between highway (arterial) and local road segments based on the ratio of commute distance to total route distance. The legs to and from the facility are attributed to arterial roads, while in-area delivery mileage is attributed to local roads. The split matters because emission factors differ substantially by road type.

EMISSIONS AND SCALING

Daily emissions for each facility are calculated by applying the appropriate road-type emission factor to each VMT component. Highway VMT is multiplied by the arterial emission factor and local VMT by the local emission factor, and the two products are summed to give total daily emissions for each pollutant. The same calculation is performed under both existing and relocated conditions, and the incremental emissions are simply the difference between the two.

The model also isolates in-city emissions, meaning emissions from driving that occurs inside New York City boundaries. In-city highway VMT is calculated as the in-city portion of the commute distance, multiplied by two for the round trip and by the number of vans. All local delivery VMT is assumed to occur within the city, since delivery routes serve NYC addresses. In-city emissions are then computed using the same factor-times-VMT approach applied to the in-city VMT components. Daily emissions in grams are annualized by multiplying by 327 working days per year and converted to U.S. short tons for reporting.

The per-facility calculations described above produce results for a single 25,000-package facility. To estimate the aggregate citywide impact, those per-facility results are scaled to reflect the total number of proxy displaced facilities across NYC. The model does this through a set of borough-level facility multipliers. The total volume of displaced packages in a given scenario is first allocated to each borough in proportion to its share of total NYC households. This allocation rests on the assumption that package demand, and therefore the delivery infrastructure serving that demand, is distributed roughly in line with population. The number of displaced facilities in each borough is then calculated by dividing the borough's allocated package volume by 25,000 packages per facility and rounding to the nearest whole number.

HEAVY TRUCK SUPPLY DEDUCTION

Relocating delivery facilities outside the city does not only add van mileage. It also takes certain truck trips off city streets. Under existing conditions, each proxy facility receives roughly eight 18-wheeler supply trips per day, delivering packages from regional distribution hubs. When a facility moves outside the city, those heavy truck trips no longer enter NYC, and the associated in-city emissions are avoided. The model calculates the emissions from these avoided truck trips and presents them as a deduction from the gross incremental impact. For each service area, heavy truck in-city VMT is computed as the in-city distance to the existing facility, multiplied by two for the round trip and by eight trucks. The corresponding emissions are calculated using the arterial emission factors for heavy-duty trucks, which are substantially higher per mile than van factors (roughly double for CO2e and NOx). The heavy truck deductions are scaled using the same service area multipliers and summed across all ten areas. The deduction reduces total CO2e by roughly 8 to 9 percent across all scenarios.

SCENARIO DEFINITIONS AND INTERPRETATIONS

The analysis runs across five scenarios that span a range of assumptions about how many packages would be displaced from New York City under the regulatory conditions created by Intro 518.

Scenario S1 is the baseline high-impact case. It uses a standalone estimate of 1,079,000 displaced packages per day, derived from analysis of parcel volumes in the NYC market. This scenario does not rely on the cost and service model. Instead, it applies a direct estimate of the share of daily throughput attributable to operators most likely to relocate. The resulting 43 proxy displaced facilities and 393 additional delivery routes represent the upper bound of the modeled impact range.

Scenarios S1a and S1b are influenced by the cost and service model, which estimates that 956,262 packages per day would relocate under a set of assumptions consistent with the scenario framework but refined through the model's demand allocation process. Both yield 38 proxy displaced facilities and 275 additional routes. The difference between S1a and S1b lies in their consolidation assumptions, meaning how packages from different carriers or shippers are combined for delivery. Consolidation is relevant for per-package pricing analysis, but it does not affect physical transportation patterns. As a result, S1a and S1b produce identical VMT and emissions outputs.

Scenarios S2 and S2a reflect a more moderate displacement assumption. The cost and service model puts the displaced volume at roughly 620,200 packages per day, yielding 25 proxy displaced facilities and 255 to 256 additional routes. As with the S1 variants, S2 and S2a differ only in consolidation factors and produce identical VMT and emissions results.

LIMITATIONS AND CONSIDERATIONS

The analysis makes several simplifying assumptions that should be kept in mind when interpreting the results. Route-level VMT relies on geocoded routing analysis using representative facility and centroid locations, which may not capture the full variation in actual delivery patterns. The 30-mile in-area VMT figure is drawn from stakeholder input and previous analysis on package delivery behavior in New York City and is applied uniformly across all service areas. The model also does not capture potential behavioral responses to relocation, such as operators shifting delivery windows, or moving to alternative vehicle types. It does not model effects on delivery speed, service quality, or consumer welfare beyond the transportation metrics presented here. The emission factors are static and do not reflect potential fleet electrification or other vehicle technology changes that could shift the per-mile emissions profile over time.

Appendix 6

Environmental Justice and Disadvantaged Communities

REGULATORY BACKGROUND

In 2023, the Climate Justice Working Group (CJWG) used 45 indicators to identify disadvantaged communities (DACs) in New York State. Approximately 35 percent of New York State census tracts were identified as DACs. The criteria for identifying a census tract as a DAC include multiple indicators that represent the environmental burdens or climate change risks within a community, or population characteristics and health vulnerabilities that can contribute to more severe adverse effects of climate change. Census tracts with higher scores relative to other census tracts statewide or to their region (i.e., New York City) were identified as DACs.

According to DEC's Environmental Justice Siting Law Guidance, "a disproportionate pollution burden is a pollution burden within an affected disadvantaged community that is, or would be, significantly greater than that same burden in comparable non-DACs, as a result of the proposed action." Many of the same potential impacts may be identified when evaluating impacts to DACs and non-DACs, such as traffic, noise, air emissions, discharge of pollutants to water bodies, etc. The methods by which those impacts are identified may also be similar. However, DACs are more likely to experience higher pollution burdens and population vulnerabilities than non-DACs, which increases the potential that actions undertaken within or near DACs may significantly impact the community.

DEC's Disadvantaged Community Assessment Tool (DACAT) compares three scores (Combined Score, Burden Component Score, and Vulnerability Component Score) for each DAC to non-DAC comparison scenarios (statewide urban, statewide rural, and urban/rural for each of the ten regions). Vulnerability scores are based on factors such as health incomes and burdens, housing mobility and communications, income, and race and ethnicity. Burden scores are based on factors such as land use and historic discrimination, potential climate change risk, and potential pollution exposure. If the Combined Score is 25 percent higher than in the comparison scenario, and one or both the Burden and Vulnerability Component Scores are 35 percent higher than in the comparison scenario, then DACAT highlights the census tract as having comparatively higher existing burdens or vulnerabilities, which indicates an increased likelihood that a proposed action may have a moderate or large impact on the DAC. If these conditions are not met the DAC is identified as having comparatively lower existing burdens or vulnerabilities and therefore a decreased likelihood that a proposed action may have a moderate or large impact on the DAC.

LITERATURE REVIEW

The objective of the literature review is to understand last-mile facilities' relationship to and influence on DACs, and potential effects of Intro 518 on environmental justice/DACs. AKRF reviewed past publicly available studies related to the effects of last-mile facilities on DACs including:

- New York City Department of City Planning's (DCP) Draft Last-Mile Parcel Delivery Facilities Market Assessment (March 2025);
- New York City Comptroller's Fast Shipping. Slow Justice: Traffic, Worker, and Climate Hazards in Last Mile Delivery (November 2025);
- REBNY's New York City Last-Mile Facility Special Permit Study (May 2025)
- Earthjustice, Fact Sheet: Amending Regulations on Last-Mile Warehouses is Critical to Achieving New York City's Environmental Justice and Racial Equity Goals,

Based on AKRF's literature review, potential effects of locating last-mile facilities in DACs include concerns over increased traffic in the area and resulting pollutants (e.g., nitrous oxides [NO and NO2], Particulate Matter [PM], and carbon monoxide [CO]); effects on local businesses; and outsourcing of local jobs. some New York City Council Members and environmental justice advocates have expressed concerns about the quantity of PDFs in proximity to residential neighborhoods, especially communities of color and low-income communities (DCP 2025, p. 4). Residents living near PDFs, environmental justice organizations, and others have been concerned that diesel-powered vehicles serving PDFs, such as heavy-duty trucks, contribute mobile sources of pollution to poor air quality in these neighborhoods (DCP 2025, p. 50). PDFs may operate 24-7 but generally have peak times that align with common delivery windows in the morning or evening. During these high-traffic times, there have been additional concerns around the potential for conflicts between pedestrians and fleets of delivery vehicles. PDFs, like other industrial buildings, also have largely impermeable, paved or covered lots, which can exacerbate heat island effects and stormwater runoff (DCP 2025, p. 50).

The influx of demand coupled with online retailers' same- or next-day delivery guarantees has accelerated the disproportionate siting of "last-mile" warehouses within or surrounding lower income communities and communities of color in New York State, with resulting traffic, public safety, and air quality impacts (Earthjustice).

According to the Comptroller's report, the high volume of local deliveries has led to increased truck traffic, crashes, and air quality issues, particularly in communities designated as environmental justice priority areas (2025). According to the report, last-mile facilities are concentrated in New York City's environmental justice communities (i.e., disadvantaged communities), which include 68 percent of last-mile warehouses, including Red Hook, East New York, Maspeth, and Hunts Point. These areas are predominantly minority and face higher levels of air pollution. At the same time, the report acknowledges that warehouse-dense areas experience poorer air quality in general (e.g., Newtown Creek, Red Hook, Sunset Park, and Hunts Point), likely tied to truck congestion and industrial activity.

On the flipside, potential effects of Intro 518 may be similar in that potential relocation of these facilities outside of New York City could also contribute to regional traffic and associated emissions and loss of jobs in disadvantaged communities (REBNY 2025). While not the same as Intro 518, REBNY's report on the City's proposed last-mile facility special permit provides valuable insight into the types of issues that may arise from Intro 518, such as by deterring future development of last-mile facilities and conversion of existing warehouses to last-mile use within New York City (REBNY 2025). Other potential drawbacks cited in the report include loss of economic benefits from last-mile facilities, including property taxes and employment.

METHODOLOGY

For this study, AKRF utilized the following methodology:

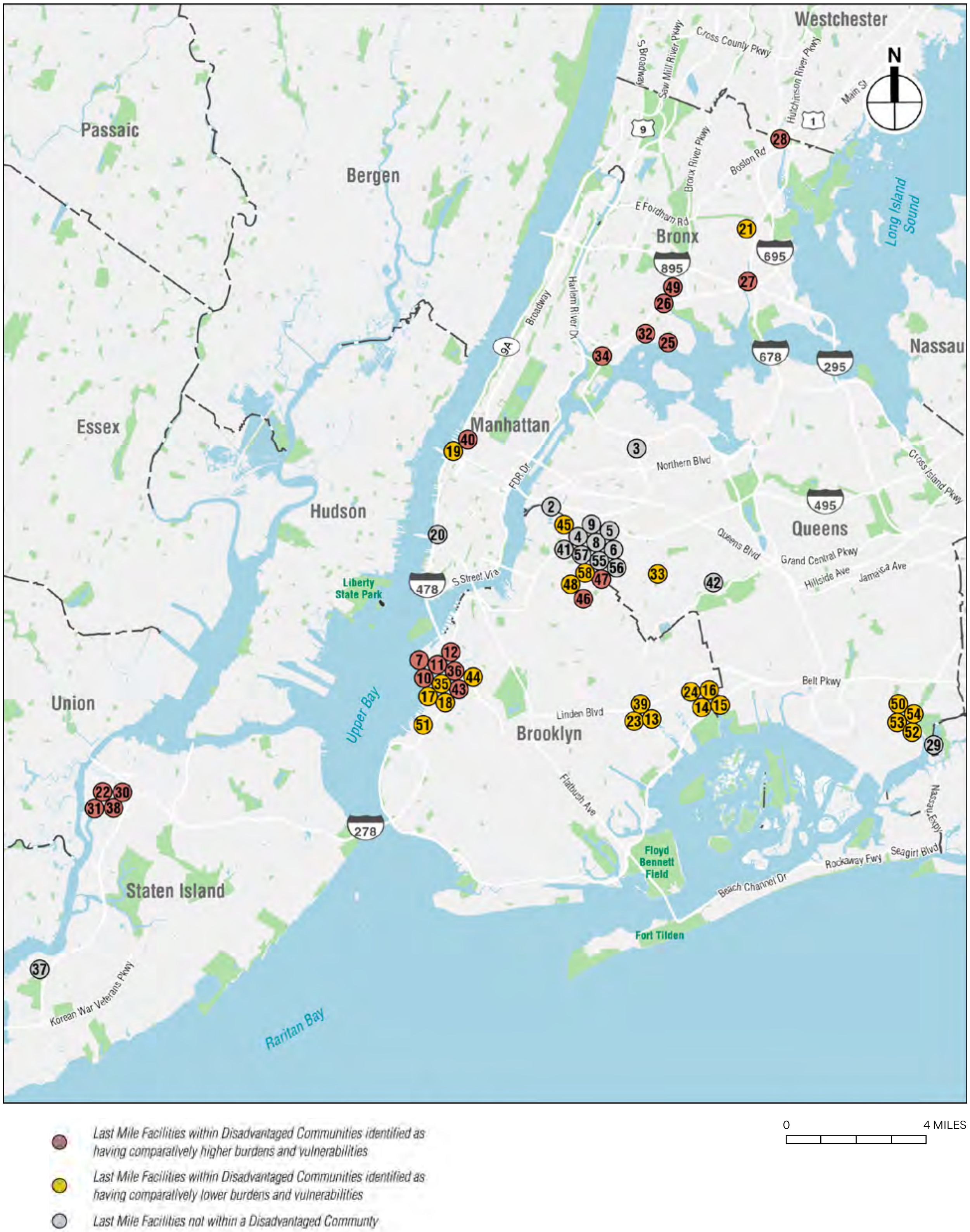
- Review relevant reports to understand last-mile facilities' relationship to and influence on DACs, and potential effects of Intro 518 on environmental justice/DACs.
- Research, tabulate, and map locations of last-mile facilities located within DACs and compare to the percentage in non-DACs
- Gather relevant DAC criteria scores for the census tracts with last-mile facilities (statewide and NYC-only); develop average ranking for last-mile Census Tracts (CTs) for relevant criteria (e.g., Traffic, Benzene, PM2.5, Asthma, Industrial Land Use, Demographics/Income) and weighted average based on square footage
- Compare scores for last-mile CTs to New York City's industrial-heavy DACs and industrial-heavy CTs (i.e., those with Industrial Land Use scores at or above the 80th percentile)
- Determine burdens and vulnerabilities that are highly correlated with the presence of last-mile facilities versus those that are just as prevalent in industrial neighborhoods overall

EXISTING CONDITIONS

Using the Final NYS Disadvantaged Communities shapefile, AKRF researched, tabulated, and mapped the locations of last-mile facilities located within DACs across New York City (see Figures D-1 and K-6). Of the 58 last-mile facilities that AKRF identified, 42 or 72 percent are located in DACs, compared to 16 or 28 percent in non-DACs. Of the facilities that are within DACs, 20 or 48 percent are in DACs with comparatively higher burdens and vulnerabilities and 22 or 52 percent are in DACs with comparatively lower burdens and vulnerabilities. Clusters of last-mile facilities appear in Queens (mostly in non-DACs); and parts of Brooklyn and Staten Island. For example, Red Hook, Brooklyn contains about 6 last-mile facilities in DACs with comparatively higher burdens and vulnerabilities and Sunset Park, Brooklyn contains about 4 last-mile facilities, in DACs with comparatively lower burdens and vulnerabilities. Gulfport, Staten Island contains about 4 last-mile facilities with comparatively higher burdens and vulnerabilities. Last-mile facilities are also scattered along the Hudson River in Manhattan and in the Bronx.

FIGURE 6-1

Identified Last-Mile Communities within Disadvantaged Communities



Source: AKRF, Inc.

AKRF compiled the NYS Disadvantaged Community Criteria rankings for the relevant DACs. Then, AKRF developed average and weighted average rankings for the relevant DACs based on the total square footage of last-mile facilities in each DAC. **Table 6-1** presents "rankings" (using percentiles) of relevant burdens and vulnerabilities for the last-mile facility DACs and the City's industrial-heavy DACs and CTs within New York City and New York State. The rankings are based on environmental burdens data generated by the New York State Climate Justice Working Group (CJWG) and initially mapped by NYSERDA.

TABLE 6-1

Comparison of Average Relevant Burdens Last-Mile Facility DACs and Industrial-Heavy DACs

Burdens and Vulnerabilities	Last-Mile DACs (Weighted Average Percentile)		Industrial-Heavy DACs (Average Percentile)		Industrial Heavy CTs (Average Percentile)	
	NYC	NYS	NYC	NYS	NYC	NYS
Burdens						
Traffic (Diesel Trucks)	85	90	64	75	62	73
Traffic (All Vehicles)	53	69	57	73	55	72
Benzene	25	66	60	82	60	82
PM2.5	65	84	55	80	56	80
Asthma	49	46	64	78	59	73
Industrial Land Use	89	79	96	91	96	90
Vulnerabilities:						
Black or African American	45	52	54	63	50	58
Asian	40	51	42	54	44	54
Hispanic	55	68	69	81	63	76
Below 80% AMI	38	48	68	78	62	73
Below Poverty	49	58	65	72	60	67

Notes: Percentiles refer to rankings compared with all other census tracts in New York City or New York State. For example, a weighted average percentile for diesel truck traffic of 85 in NYC for the City's last-mile facility DACs means that these DACs rank higher than 85 percent of the other tracts in New York City for diesel truck traffic. In other words, these DACs have more diesel truck traffic than 85 percent of the City's census tracts.

NYS percentiles were based off raw data values for all census tracts in New York State; NYC percentiles were based off the statewide percentiles for all census tracts in New York City. For the last-mile facility DACs, a weighted average percentile is provided based on the total square foot of the facilities in each DAC.

Grey shading denotes percentiles at or above the 80th percentile and that are also at least 5 percentage points higher than the corresponding percentile (statewide or NYC only) for the industrial-heavy DACs/CTs.

Blue shading denotes percentiles that are at or above the 80th percentile.

Dark green shading denotes percentiles that are at least 5 percentage points higher than the corresponding percentile (statewide or NYC only) for the industrial-heavy DACs/CTs.

Sources: AKRF, January 2026; NYS Final DAC Map (2023) Shapefile.

As shown in **Table 6-1,** the last-mile facility DACs generally have burdens and vulnerabilities below the 80th percentile, which is a generally accepted threshold for identifying significant burdens. The exceptions are the citywide and statewide percentiles for diesel trucks (85th percentile and 90th percentile, respectively), the statewide percentile for PM2.5 (84 percentile) and the NYC-only percentile for industrial land use (89th percentile). However, of these high-ranking burdens, compared to the City's industrial-heavy DACs/CTs, only the diesel truck traffic burden is significantly higher (at least 5 percentage points). The citywide weighted average percentile of PM2.5 within the last-mile facility DACs is also significantly higher (65th percentile) than that of the industrial-heavy DACs/CTs (55 percentile). Overall, most of the relevant burdens and vulnerabilities in the City's last-mile facility DACs rank lower than the City's industrial-heavy DACs/CTs in New York City and New York State.

FINDINGS

Based on the existing conditions analysis that was performed, AKRF determined that many of the concerns related to the presence of last-mile facilities in DACs are also prevalent in the City's most industrial-heavy DACs/CTs, such as vehicular traffic, benzene, PM2.5, asthma, industrial land use, and the presence of minority and low-income populations. Of particular concern is the presence of diesel truck traffic in last-mile facility DACs.

Diesel truck traffic is associated with:

- Heavy-duty diesel trucks traveling through a census tract
- Truck routes and freight corridors
- Warehouse-related truck trips (inbound/outbound)
- Truck congestion and delays
- Associated diesel emissions (PM2.5, NOx)

Diesel truck traffic may contribute to:

- Higher diesel particulate exposure
- Higher asthma and cardiovascular disease rates
- More noise and congestion
- Greater cumulative environmental burdens

However, as noted above, in comparison to industrial-heavy DACs/CT, the City's last-mile facility DACs do not exhibit unusually high rates of PM2.5 and asthma. While the last-mile facility DACs do have a higher rate of PM2.5 as compared to industrial-heavy tracts, the citywide percentile is below the 80th percentile, suggesting it is not an unusually high concentration.

Endnotes

1 NYC Industrial Plan | December 2025. https://www.nyc.gov/assets/planning/downloads/pdf/our-work/plans/citywide/nyc-industrial-plan/nyc-industrial-plan-final.pdf2 In legal terms, preemption refers to the principle that federal law takes precedence over state laws due to the Supremacy Clause of the United States Constitution.

3 Rowe v. New Hampshire Motor Transp. Assn., 552 U.S. 364 (2008) - detailed syllabus and opinion. Rowe v. New Hampshire Motor Transport Association (Justia)

4 American Trucking Ass'ns, Inc. v. City of Los Angeles, 569 U.S. 641 (2013) - syllabus and opinion. American Trucking Ass'ns v. City of Los Angeles (Justia)

5 U.S. District Court for the District of Massachusetts, No. 1:10 cv 11521 (2015). MDA v. Healey (District Court Opinion)

6 Dan's City Used Cars, Inc. v. Pelkey, 569 U.S. 251 (2013). Dan's City Used Cars, Inc. v. Pelkey (Justia)

7 These facilities are used as a scaling proxy and do not represent a quantitative estimate of actual facility counts in New York City. Each modeled "facility" corresponds to approximately 25,000 packages of daily throughput and is employed solely as a computational unit to scale system-wide volumes to estimated delivery levels.