



Office of Inspector General | United States Postal Service

RISC Report

Package Delivery in Rural and Dense Urban Areas

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Executive Summary

In 2019, carriers delivered nearly 6 billion packages to every corner of America—more than 19 million every day. This represents an 87 percent increase in the U.S. Postal Service's package volume since 2013, driven by booming ecommerce sales. Whether they live in an urban high-rise apartment or a rural farm, Americans eagerly await the delivery of their items, which may include household goods, clothing, and prescription drugs. However, delivery to dense urban cores and sparsely populated rural areas are different from delivery to the rest of the country, with distinct operational, market, and financial challenges for the Postal Service.

To explore these issues, the U.S. Postal Service Office of Inspector General (OIG) organized the country into High Density, Medium Density, and Low Density areas based on specific characteristics, such as delivery point density. We examined operational challenges and package volume trends primarily in High and Low Density locales, where the Postal Service's profit margins are lowest.

In High Density areas, which we defined as the densest urban centers, the Postal Service faces competition from the major carriers as well as an assortment of regional services and app-based start-ups. While the Postal Service frequently performs last-mile delivery for the major carriers, those carriers are rapidly expanding their own last-mile delivery capabilities.

Despite strong ecommerce growth, the Postal Service's package volume in High and Medium Density areas began falling during FY 2019 due to self-delivery by, and competition from, the major carriers. In addition to the changing competitive environment, mail carriers in High Density areas often face operational challenges including a large number of apartment buildings and the potential for package theft. While package deliveries in High Density areas can be very efficient if a building has a concierge or mail room, many buildings do not have such amenities. In this case, for security reasons the carrier may need to deliver packages to individual apartments, perhaps walking up and down multiple flights of stairs many times each day. In addition to the potential for carrier fatigue and injury, this is an inefficient and costly way to deliver packages.

Highlights

The Postal Service's package volume increased 87 percent between 2013 and 2019, driven largely by the Parcel Select last-mile delivery product.

Package delivery challenges in urban areas include competition from other carriers, the potential for walking up and down stairs to deliver packages to individual apartments, and the threat of package theft.

Package delivery challenges in rural areas include the distance between delivery points and the separation between the mailbox and the door.

USPS could make package delivery more efficient with parcel lockers, larger curbside mailboxes, and by better tracking parcel-related operational data.

The Low Density category captures parts of the country where the houses are far apart and most of the land is farmland or undeveloped. Unlike other areas, package growth in Low Density areas remained strong in FY 2019, given that the Postal Service faces less competition there for last-mile delivery. But operational challenges remain. Carriers may spend a great deal of time driving down country roads to deliver to the most remote locales. Depending on the residence or the size of the package, carriers may also be required to walk a package from their vehicle to the front door, a potentially long distance over uncertain terrain. In addition, a new system for evaluating Rural Carrier pay will make door deliveries more costly for the Postal Service. That new system is expected to be implemented within the next year or two, and USPS does not have a mechanism to recoup those higher costs—beyond general price increases.

Opportunities in High and Low Density Areas

In both High and Low Density areas, door deliveries can decrease the efficiency and potentially increase the cost of package delivery for the Postal Service, but there are ways to avoid so many trips to the door while still meeting customer needs. In High Density areas, the Postal Service could work with residential buildings to install parcel lockers, which could improve security and reduce costs. Parcel lockers may also benefit Low Density areas. Lockers could be installed next to clusters of roadside mailboxes, which would reduce carrier detours to customers' homes and protect packages from the elements. USPS may also incentivize or mandate larger roadside mailboxes, known as Next Generation Mailboxes, in Low Density areas. These larger boxes can fit roughly 70 percent of all USPS parcels and would reduce the number of times a carrier must walk from

the vehicle to the front door. In addition, USPS could better track data that are critical to the efficiency of package delivery, including carriers' second trips and the location and number of parcel lockers. These changes could help improve the efficiency and profitability of the USPS package business.

What the OIG Recommends

We recommend management:

1. Develop a national plan, based on key data factors, to help reduce the aggregate costs of door deliveries along rural routes and in urban apartment buildings.

Observations

Introduction

For most of the U.S. Postal Service's history, letters, cards, and magazines were its bread and butter. Naturally, its delivery infrastructure was primarily designed with mail in mind—from the vehicles to the facilities to the mailboxes. Packages were historically a smaller part of the business. In 1997, when Amazon was still a startup online bookstore, packages brought in just 11 percent of the Postal Service's revenue.¹ But as ecommerce swept across America, packages became a key focus for USPS and its only major source of revenue growth. Packages now account for nearly a third of USPS revenue.²

While package delivery has been a financial boon, the network was not initially created to deliver so many packages. The Postal Service has made adjustments to accommodate the delivery of more parcels, but operational challenges remain, particularly in densely populated urban areas and sparsely populated rural areas. ZIP Codes of extremely high or low density often feature environments which make the delivery of packages more difficult.

This report explains why these environments are uniquely challenging and what the Postal Service might do to make them less so. Improved efficiency in these areas is imperative if USPS is to thrive in the highly competitive package delivery industry.

ZIP Codes of extremely high or low density often feature environments that are not efficient for package delivery.

The OIG conducted analysis for this white paper before the President of the United States issued the national emergency declaration concerning the novel coronavirus disease outbreak (COVID-19) on March 13, 2020. Our findings do not reflect operational changes, service impacts, and/or changes in consumer behavior that may have occurred as a result of the pandemic.

Package Delivery is a Lifeline for the Postal Service

Ecommerce spending in the United States has doubled in the last six years to about \$600 billion in 2019.³ The Postal Service has been a major beneficiary; its package volume has grown 87 percent over that time (Figure 1).⁴ In particular, volume for the Postal Service's last-mile delivery product, Parcel Select, which is used by many large ecommerce shippers, increased by 125 percent over the six-year period. However, Parcel Select volume declined slightly in FY 2019, causing the Postal Service's overall package volume to plateau.⁵

Meanwhile, revenue from letters and flats fell over the same period.⁶ Ecommerce packages are critical to filling the gap left by the decline in letter mail. The Postal Service must also maximize the profitability—or “contribution,” in postal terminology—of those deliveries. However, profitability is not uniform across the Postal Service's delivery network.

1 This analysis includes the Priority Mail, Express Mail, and Standard 2 products as reported in the 1997 Cost and Revenue Analysis Report.

2 This analysis relies on the FY 2019 Cost and Revenue Analysis report and includes the following products: Priority Mail Express, First-Class Package Service, Priority Mail, Ground, Bound Printed Matter Parcels, Media and Library Mail, and Marketing Mail Parcels.

3 U.S. Census Bureau, “Quarterly retail e-commerce sales 4th quarter 2019,” https://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf, p. 1 and U.S. Census Bureau, “E-Stats 2013: Measuring the electronic economy,” <https://www.census.gov/content/dam/Census/library/publications/2015/econ/e13-estats.pdf>, p. 2.

4 USPS Office of Inspector General (OIG) analysis of USPS Revenue, Pieces, and Weights reports.

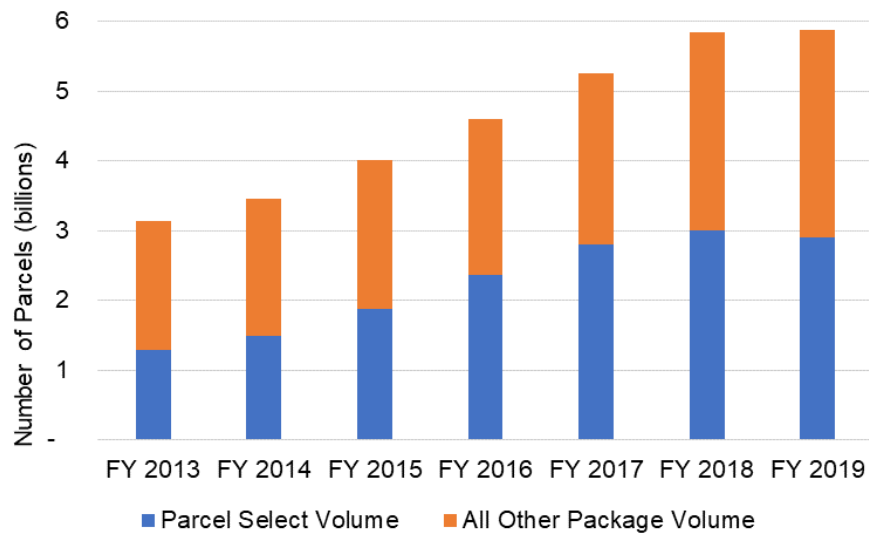
5 Ibid.

6 Ibid.

Figure 1: Package Volume Over Time

GROWTH IN USPS PACKAGE BUSINESS HAS SLOWED

The Postal Service's package volume has grown 87 percent in six years, though that growth slowed in FY 2019 amid a decline in its last-mile delivery product, Parcel Select.



Source: USPS Revenue, Pieces, and Weights Report. The products included are: Priority Mail Express, First-Class Package Service, Retail Ground, Priority Mail, Parcel Return Service, Bound Printed Matter Parcels, and Media and Library Mail.

A recent Postal Service study sought to identify differences in the profitability of mail delivery (letters, flats, and packages) across a range of six different geographies, from “very rural” to “very urban.”⁷

Suburban delivery routes often feature single family homes in residential neighborhoods. Mailboxes are located close to the house, either on the curb or

at the front door, making it easy and efficient for a carrier to drop packages at the house. Many are served by “park-and-loop” style routes, in which a carrier is already walking from house to house to deliver mail, so package delivery often involves little additional work.

Profit margins were lowest at the two ends of the geographic spectrum: very rural and very urban geographies (Figure 2). Though the analysis included all mail deliveries, not just parcels, research by the USPS Office of Inspector General (OIG) indicates that parcels may be one of the reasons for lower margins in urban and rural areas. Other reasons for lower margins may include the distance between delivery points and the type of carrier route. As this report will show, parcel deliveries come with special operational complexities in urban and rural areas that letter deliveries do not. Very dense urban areas are characterized by a lack of parking, heavy traffic, numerous tall apartment and office buildings, and cramped delivery facilities. Very rural areas feature homes that are far apart, homes located far away from their own mailbox, and unpaved roads. Clearly, package delivery in rural and dense urban areas comes with additional challenges not experienced in suburban areas.

What Constitutes Urban or Rural?

To study package delivery in different environments, the OIG needed to segment the country into urban, suburban, and rural areas. Unfortunately, there are no widely accepted definitions of these terms. Different academic institutions and government agencies use their own definitions, while media sources often have no exact definitions. Commonly used criteria include population, commuting

patterns, or self-reports from survey respondents. The OIG created its own framework based on Postal Service operational considerations, such as the prevalence of large buildings, the availability of parking, and the distance between homes and their mailboxes. A detailed explanation of our methodology is in [Appendix B](#).

Using multiple criteria, we defined most ZIP Codes as either High, Medium, or Low Density. The High Density category captures busy urban cores like those in Los Angeles or New York City. The Low Density category captures parts of the country where the houses are far apart and most of the land is farmland or undeveloped. We categorized everything that did not qualify as High or Low Density as Medium Density. Medium Density—by far the largest category by delivery points—includes not only most suburbs but also the portion of cities outside of the urban core. It also includes many small cities and larger towns where there may be some apartment complexes and townhomes.

Figure 3 breaks down FY 2019 Postal Service package operations into our three density categories. High Density areas made up 7 percent of delivery points while Low Density areas made up 15 percent.⁸ At the same time, they respectively accounted for 0.04 percent and 86 percent of the U.S. land area served by the Postal Service.⁹

⁸ USPS identifies a total of five different types of routes. In addition to City and Rural Routes, Highway Contract Routes sometimes include delivery to homes, especially in very remote areas. Box and General Delivery routes involve the delivery of mail to P.O. Boxes and post office counters, respectively. The package data described here excludes Box and General Delivery routes and routes with no delivery points. Taken together, excluded routes account for about 5 percent of all package deliveries.

⁹ This excludes uninhabited land not covered by ZIP Codes, such as National Parks.

Figure 3: High, Medium, and Low Density Areas

PACKAGE DELIVERY IN HIGH, MEDIUM, AND LOW DENSITY GEOGRAPHIES

The OIG calculated package delivery statistics for High, Medium, and Low Density areas. It shows that High and Low Density areas together account for 22 percent of the delivery points in the country. These figures are based on FY 2019.

	High Density	Medium Density	Low Density
Total Routes	12,653	173,478	49,351
Total Delivery Points	9,193,514	107,751,376	21,224,156
Share of Total Delivery Points	7%	78%	15%
Delivery Points per Route (Average)	727	621	430
Daily Package Volume per Route (Average)	92	82	56
Daily Package Revenue per Route (Average)	\$351.67	\$304.82	\$214.42
Monthly Package Volume per Delivery Point	3.19	3.34	3.29
Monthly Package Revenue per Delivery Point	\$12.22	\$12.39	\$12.59
Share of U.S. population	6%	76%	16%
Share of U.S. land area*	0.04%	14%	86%

*Excludes uninhabited land area not covered by ZIP Codes, such as National Parks.

Note: Calculations for daily statistics use a denominator of 303, which assumes no delivery on Sundays or federal holidays.

Source: OIG analysis of FY 2019 USPS Product Tracking and Reporting data. Analysis excludes box routes, general routes, and routes with no delivery points. Analysis includes routes present in all four quarters of FY 2019.

Although the terms High, Medium, and Low Density are rough proxies for dense urban, suburban, and rural, we chose not to use these common terms because they mean different things to different people. Our categories also do not align with the names that the Postal Service uses to classify its mail delivery routes:

City Delivery and Rural Delivery. These two names are not always representative of where the routes exist.¹⁰ For example, Figure 4 depicts a City Route located in a decidedly rural area.¹¹

Figure 4: USPS Route Classification

USPS ROUTE CLASSIFICATIONS DO NOT ALWAYS ALIGN WITH DELIVERY CONDITIONS

While the USPS classifies routes as “City” or “Rural,” these labels do not always align with the reality on the ground. The addresses shown below are served by City Carriers.



Photo source: OIG photos.

¹⁰ Sixty-one percent of routes USPS defines as “Rural” are in areas the OIG has classified as Medium Density. In 2004, the city and rural carrier unions and the Postal Service agreed that Rural Routes in areas that have been fully developed need not be converted to City Routes just because of their urban or suburban characteristics. United States Postal Service, National Association of Letter Carriers, National Rural Letter Carriers’ Association National Joint City/Rural Task Force, *Guideline Principles to Address City/Rural Issues*, M-01520, May 4, 2004 <http://mseries.nalc.org/M01520.pdf>, p. 1.

¹¹ The two route names are more useful for classifying their different operations: Rural Carriers are paid differently and follow different work rules than City Carriers.

Why Would High Density Package Delivery be Less Profitable?

It is difficult to pin down the precise profitability of package delivery in urban and rural areas because the Postal Service does not track package delivery costs by geography.¹² This section describes some reasons why urban delivery may be less profitable than suburban delivery, including competition from other carriers, a large number of apartment buildings, and the potential for package theft.

The Urban Delivery Market Is Highly Competitive

In FY 2019, the Postal Service delivered more than 350 million packages in High Density areas.¹³ However, data suggest that High Density package volume is under threat. The number of parcels USPS delivered in these areas fell by █ percent in both the third and fourth quarters of FY 2019 compared to the same periods in FY 2018.¹⁴ Given the Postal Service's increasing reliance on parcels to cover for the decline of First-Class Mail, this is a troubling sign. Despite volume declines, revenue increased by █ percent overall between FY 2018 and FY 2019, thanks to pricing changes.¹⁵

The Postal Service faces substantial—and growing—competition for package delivery in High Density areas. █

█. FedEx and UPS use sophisticated routing systems to identify which of their upcoming deliveries are in close proximity to one another and are, therefore, most efficient to do themselves; the less efficient deliveries often go to the Postal Service.¹⁶ Since more addresses are closer together in High Density areas, competitors keep a greater share of those last-mile deliveries. In addition,

several large USPS customers, including Amazon, FedEx, and Walmart, are making long-term strategic decisions to handle more of their own deliveries.¹⁷

12 Interview with USPS representatives, July 29, 2019.

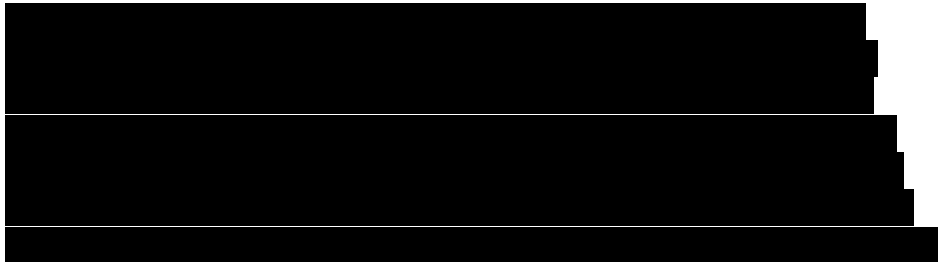
13 OIG analysis of USPS Product Tracking and Reporting data.

14 Ibid.

15 First, the Postal Service raised the overall price of Competitive parcel products by an average of 7.8 percent. Second, it moved First-Class Package Service to a zone-based pricing system, allowing the Postal Service to charge a higher rate for packages that are traveling a longer distance. Third, the Postal Service implemented dimensional weight pricing for some package products, including Priority Mail. With dimensional weight pricing, large but lightweight packages are moved into a higher price tier.

16 FedEx, "FedEx Ground announces seven-day residential delivery year-round," May 30, 2019, <https://newsroom.fedex.com/newsroom/fedex-ground-announces-seven-day-residential-delivery-year-round/> and UPS, "Q1 2014 earnings conference call," April 24, 2014.

17 Ibid. and Sebastian Blanco, "Amazon buying so many commercial vans, it's a boon for Mercedes, FCA, and Ford," *Car and Driver*, December 20, 2019, <https://www.caranddriver.com/news/a30295937/amazon-commercial-vans-ford-mercedes-fca/> and Paul Sawers, "Walmart launches Spark Delivery, a crowdsourced pilot delivery program similar to Amazon Flex," *VentureBeat*, September 5, 2018, <https://venturebeat.com/2018/09/05/walmart-launches-spark-delivery-a-crowdsourced-pilot-delivery-program-similar-to-amazon-flex/>.



These reductions happened despite a rapid growth in ecommerce shipments nationwide.¹⁹

In addition to competition from other national carriers and large retailers, the Postal Service faces competition from smaller regional carriers and crowdsourced delivery services offering delivery of retail purchases.²⁰ The increasing availability of these services in cities may be shifting customer expectations; a 2018 OIG survey found that 11 percent of urban residents expected their packages to arrive same-day or next-day, compared to only 2 percent of rural residents.²¹

Less Space Leads to Less Efficiency

Lack of space is a fundamental characteristic of High Density cities. This causes several problems for the Postal Service as it performs last-mile delivery of packages.

Delivering to apartment buildings

Apartments represent a large portion of housing units in many of America's large cities: New York City (41 percent), Los Angeles (34 percent), Houston (30 percent), San Francisco (33 percent), and Seattle (31 percent).²² These numbers have been increasing in recent years; apartment buildings with 20 or more units constituted the fastest growing category of housing in the nation's 380 largest metro areas in the decade from 2009 to 2018 (Figure 6).²³

It can be more difficult to deliver to apartments than to street-level suburban homes. The mailboxes found in many apartment buildings were built for letters and often cannot accommodate packages bigger than a paperback book. While some apartment buildings have secure mail rooms or concierges who can easily receive parcels, many buildings do not have a good place to leave packages.

If there is not a secure place to leave parcels, carriers can bring them to the doors of individual apartments throughout the building, which is more convenient for customers. The Postal Service's City Carrier manual does not give special instructions for parcel delivery to apartment buildings, though the manual says generally that if a parcel does not fit in a mailbox or parcel locker, then the carrier should attempt delivery to the door.²⁴

18 An analysis by Morgan Stanley estimated that 89 percent of Amazon's self-deliveries are in urban and suburban areas, against just 11 percent in rural areas, according to media reports. Michael Sheetz, "Watch Out, UPS. Morgan Stanley Estimates Amazon is Already Delivering Half of its Packages," CNBC, December 12, 2019, <https://www.cnbc.com/2019/12/12/analyst-amazon-delivering-nearly-half-its-packages-instead-of-ups-fedex.html>.

19 Ecommerce sales grew 15 percent in 2019. U.S. Census Bureau, "Quarterly retail e-commerce sales 4th quarter 2019," p. 1. A range of app-based competitors offering same-day delivery also are competing in the market. USPS OIG, *Same-Day Delivery: Implications for the U.S. Postal Service*, RISC-WP-20-002, January 8, 2020, <https://www.uspsoig.gov/sites/default/files/document-library-files/2020/RISC-WP-20-002.pdf>, pp. 1-2.

20 Crowdsourced delivery enables independent drivers to act as package carriers through a smartphone app. Crowdsourced delivery may be poised to grow; nearly 90 percent of retailers expect to use a crowdsourced delivery option by 2028. It remains to be seen if crowdsourced delivery is viable in the long term, since several on-demand delivery providers including UberRush, Sidecar, and Shyp have failed to generate a viable business model. Zebra Technologies, "Reinventing the Supply Chain: The Future of Fulfillment Vision Study," 2018, https://www.zebra.com/content/dam/zebra_new_ia/en-us/solutions-verticals/vertical-solutions/retail/vision-study/fulfillment-vision-study-report-en-us.pdf, p. 6.

21 The OIG conducted its "Postal Omnibus Survey" in the summer of 2018. The survey employed a complex quota sampling methodology to provide a representative sample of U.S. residents, covering a wide variety of topics, and having a large sample size (3,395). Respondents self-identified as living in a city/urban area, a suburb/small town, or rural/remote area.

22 U.S. Census Bureau American Community Survey, "Selected Housing Characteristics, Table DP04."

23 U.S. Census Bureau American Community Survey, "2009 1-year estimates, Selected Housing Characteristics, Table HC01-02," and U.S. Census Bureau American Community Survey, "2018 1-year estimates, Selected Housing Characteristics, Table DP04."

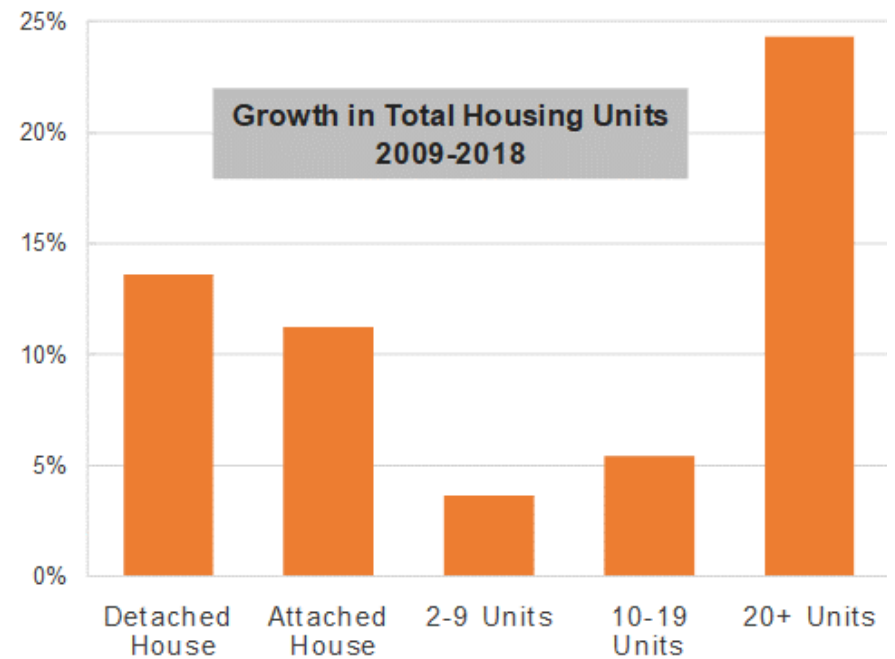
24 U.S. Postal Service, *City Delivery Carriers Duties and Responsibilities*, June 2019, <https://www.nalc.org/workplace-issues/resources/body/M-41-City-Delivery-Carriers-Duties-and-Responsibilities-June-2019.pdf>, pp. 46, 75.

Apartment-by-apartment delivery in large buildings comes with a host of problems. Namely, it takes more time than a multi-package drop-off in a central location. Carriers must wait for elevators or climb flights of stairs, then walk to each apartment unit. A large load of parcels for one building means multiple trips up and down to grab another armful of parcels, which increases fatigue. Holding heavy or awkward packages while walking can also lead to injuries such as slips, trips, and pulled muscles. This is especially true when walking up narrow staircases to the top floor of a multi-story walkup. If the customer is not home to take their parcel, the carrier can leave it at the door if the package is marked “Carrier – Leave If No Response.” Otherwise, the carrier may have to haul it back down to the truck.²⁵

Figure 6: Growth in Housing Units by Type

MULTI-UNIT HOUSING HAS GROWN RAPIDLY

In the 380 largest metro areas, large apartment and condominium complexes saw the most rapid growth in total units of any housing type between 2009 and 2018. Delivering packages to these types of housing units can cause challenges for the Postal Service.



Source: U.S. Census Bureau, 2009 and 2018 American Community Survey.

²⁵ Ibid., pp. 46-47.

City Carriers are paid hourly, and time spent making door deliveries to individual apartments can become costly. For example, during an OIG ride along with a parcel only carrier in New York City, it was not uncommon for him to spend 10 extra minutes making door deliveries in a single apartment building. Based on the average pay of City Carriers, those 10 extra minutes could cost the Postal Service \$1,400 annually for each such building.²⁶ While this is just one example of how a carrier might deliver parcels in an apartment building, it illustrates the need for further study. Identifying the buildings that require additional time to make individual door deliveries can help the Postal Service generate efficiencies.

Packages are More Vulnerable to Theft in Cities

Packages left on the stoop on a busy street are exposed to hundreds of potential “porch pirates” every day. Even packages left inside an apartment foyer can be grabbed by anyone with building access. In 2019, thieves stole an estimated 90,000 packages per day in New York City and 12,000 per day in Chicago, according to media reports.²⁷

The threat of package theft can affect how carriers perform their jobs. For example, the OIG traveled with one City Carrier who delivered packages to the most high-risk neighborhoods on his route early in the morning, when he hoped residents would still be home. If they were not, he sometimes chose to bring the packages back to the post office rather than leave them in a vulnerable place. That meant carrying packages up the stairs only to turn around and carry them back down.

Why Would Low Density Package Delivery be Less Profitable?

Package delivery in Low Density areas comes with its own challenges that may make delivery to these areas less profitable than delivery to suburban neighborhoods. OIG analysis suggests that the Postal Service maintains a [REDACTED] market position in Low Density areas, but delivery across wide swaths

of land and longer distances between a customer’s mailbox and their house pose operational challenges.



²⁶ City Carriers were paid \$27.71 per hour on average in FY 2019. Ten minutes of work would have earned \$4.62. This amounts to \$1,399 over the course of 303 annual delivery days.

²⁷ Winnie Hu & Matthew Haag, “90,000 packages a day disappear daily in NYC. Is help on the way?” *The New York Times*, December 2, 2019, <https://www.nytimes.com/2019/12/02/nyregion/online-shopping-package-theft.html> and Tim McNicholas, “At least 12,000 packages disappear every day in Chicago, expert says,” *CBS Chicago*, December 24, 2019, <https://chicago.cbslocal.com/2019/12/24/at-least-12000-packages-are-stolen-every-day-in-chicago-expert-says/>.

[REDACTED] in a Vast Delivery Area

[REDACTED]
[REDACTED]
[REDACTED] This may be because of less competition.

Consider Parcel Select, [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED] does not make delivery there more profitable.³² Low population density means the Postal Service must carry relatively few packages across wide expanses of land. In addition, half of all rural counties had fewer residents in 2016 than they did in 2000.³³ Declining population puts downward pressure on the number of items the Postal Service delivers in those areas and the profitability of the routes.

Added Time for Door Delivery

When a Rural Carrier delivers a letter, he or she drives up to the curbside mailbox, sticks the letters and flats out the car window into the box, and drives away. Packages, though, can only be delivered the same way if they are small enough to fit in the mailbox. If the parcels are too big, or if there are too many small parcels to fit in the mailbox, the carrier must deviate from his or her route by going to the customer's home to make a door delivery.³⁴ This could be as simple as pulling into a driveway and walking the package to the door. But frequently rural mailboxes are not adjacent to the home. Customers that live in more remote spots are often required to put their mailboxes at the nearest point along the delivery route, which could be far from their home.³⁵ In those cases, package delivery involves a deviation from the route to the faraway house.

The Rural Carrier manual mandates door delivery of large packages if the address is within a half-mile of the route or if the customer has pre-arranged daily home delivery.³⁶ The Postal Service also has mandated that all Sunday deliveries go to the door even if they fit in the mailbox because customers do not check their mailboxes on Sundays.³⁷ In all other cases, the carrier is supposed to either leave the package next to the mailbox or put a note in the box asking the customer to come pick up their package at the post office.³⁸ Some carriers make door deliveries anyway in an effort to provide better customer service.

28 OIG analysis of USPS Product Tracking and Reporting data.

29 Ibid.

30 [REDACTED]

31 Ibid.

32 The internal USPS study, titled "Last Mile Delivery Economic Analysis for Rural Versus Urban Geographic Areas," found that areas with population densities of less than 125 people per square mile carried very low profit margins.

33 Kim Parker, Juliana Menasce Horowitz, Anna Brown, Richard Fry, D'Vera Cohn, and Ruth Igielnik, "Demographic and Economic Trends in Urban, Suburban, and Rural Communities," Pew Research Center, May 22, 2018, <https://www.pewsocialtrends.org/2018/05/22/demographic-and-economic-trends-in-urban-suburban-and-rural-communities/>.

34 According to USPS representatives, there are about 500,000 planned door deliveries on Rural Routes out of more than 44 million rural delivery points; planned door deliveries are generally reserved for businesses as well as customers with medical conditions preventing retrieval from a curbside mailbox. In practice, carriers make many more door deliveries each day, often to deliver packages that do not fit in the mailbox. OIG analysis of FY 2019 delivery scans showed that in Low Density areas, 30 percent of packages were delivered to the customer's door.

35 U.S. Postal Service, *Postal Operations Manual*, <https://www.apwu.org/sites/apwu/files/resource-files/POM%209%20Postal%20Operations%20Manual%20%5Bupdated%20through%2010-13%5D.pdf>, 632.524, 632.525, 652.33, and 653.1.

36 U.S. Postal Service, *Rural Carrier Duties and Responsibilities*, https://apwu.org/sites/default/files/po-603_rural_carrier_duties_and_responsibilities_sep_2013.pdf, 331.21.

37 Interview with a USPS representative, April 25, 2019.

38 U.S. Postal Service, *Rural Carrier Duties and Responsibilities*, 331.22.

Rural Carriers Will Get Paid More for Packages

Currently, Rural Carriers are not paid more when deliveries take longer. Unlike City Carriers, who are paid hourly, Rural Carriers get a flat salary based on the “evaluated” time for their routes. The Rural Carriers union and the Postal Service have agreed to a set of time standards that apply to all of a Rural Carrier’s actions. For example, carriers are allowed 20 seconds to sort a package in the office and 10 seconds to deliver it.³⁹

However, the Postal Service will soon be transitioning to a different evaluation system to account for the number of door deliveries each Rural Carrier makes. The Rural Route Evaluated Compensation System (RRECS) will use parcel scan data to determine how many packages were delivered to the door on a given day and compensate the carrier accordingly.⁴⁰

Large and Heavy Packages are Especially Difficult to Deliver

Packages got an average of 18 percent heavier between FY 2013 and FY 2018.⁴¹ Mattresses, furniture, and dog food are among the bulky items now being delivered directly to your front door. The vast majority of parcels delivered by the Postal Service are small and lightweight, with [REDACTED] percent coming in at two pounds or less.⁴² But the number weighing 30 pounds or more has jumped [REDACTED]

Figure 8: Large Parcels

BIG PACKAGES ARE HARD TO DELIVER

Packages are getting heavier on average. They may be getting larger, too. Carriers, who typically work alone, must get unwieldy items from the vehicle to the customer’s front door without hurting themselves.



Photo source: National Rural Letter Carriers Association.

- 39 NRLCA, *NRLCA Mail Count Guide*, January 2018, p. 38. Because their salary is basically pre-determined, changes to a Rural Carrier’s package volume or delivery times do not result in an immediate salary change. The financial impact of a volume increase is only felt when the route is re-evaluated, which generally happens, at most, once per year. The impact of a delivery time increase – for instance, if larger parcels are forcing more door deliveries – may not be felt for years. There is no opportunity for a Rural Carrier to get paid more based on time alone; there must be a volume increase for her salary to change. The exception is if a Rural Carrier works enough to earn overtime pay, which is 150 percent of regular pay. Although Rural Carrier overtime is rare, it has been growing. U.S. Postal Service Office of Inspector General, *A Closer Look at Postal Labor Costs*, Report No. RISC-WP-20-001, December 2, 2019, <https://www.uspsog.gov/sites/default/files/document-library-files/2019/RISC-WP-20-001.pdf>, p. 14.
- 40 Instead of a time standard of 30 seconds per package, carriers will receive 2.443 minutes of pay for each door delivery, 0.602 minutes of pay for a parcel locker delivery, and 0.403 minutes of pay for a curbside mailbox delivery. Door delivery scans represent just one aspect of a complicated compensation system for Rural Carriers. The Postal Service expects RRECS to be implemented within the next two years. The cost of door deliveries will add up quickly under the new evaluation system. Currently, about 30 percent of packages in Low Density areas are delivered to the customer’s front door. These door deliveries add an additional 41 minutes per day to each route. Under RRECS, those 41 minutes per day would cost the Postal Service \$139.3 million in annual wage payments.
- 41 OIG analysis of Postal Service Revenue, Pieces, and Weight reports, 2013-2018.
- 42 OIG analysis of FY 2019 Competitive Billing Determinants for Parcel Select, Priority Mail, Priority Mail Express, First-Class Package Service, and Retail Ground. The figure excludes volume flowing through Negotiated Service Agreements (NSAs) for Parcel Select, Priority Mail, and Priority Mail Express, as the data were not available. However, the average weight per piece for those NSAs suggest that a vast majority of that volume also is lightweight.
- 43 OIG analysis of parcel weights for Parcel Select, Priority Mail, and Retail Ground products.

Although the Postal Service, per policy, is not supposed to accept any package weighing more than 70 pounds, carriers say it is happening anyway.⁴⁴ In FY 2018, the number of Parcel Select Ground packages entered into the system as 70 pounds was [REDACTED] times higher than the number entered as 69 pounds.⁴⁵ Unless there happens to be an unusual number of items that weigh exactly 70 pounds, it may be that heavier packages are being improperly accepted and entered into the system at the maximum recordable weight of 70. Further study on the acceptance of packages over the weight limit is warranted to understand the scope of this issue.

Similarly, the Postal Service may be accepting packages that are too big or difficult to maneuver.⁴⁶ USPS parcel size limits vary by product, but in no instance is a package allowed to be more than 130 inches in length plus girth. Figure 8 depicts carriers holding packages that appear to violate the 130-inch rule. They are also encountering cumbersome packages like ones labeled “Team Lift,” yet carriers have no partner to assist them.⁴⁷ Regardless of weight, cumbersome boxes like these are hard to get in and out of the vehicle and hard to carry to the customer’s front door.

Is the Postal Service Getting Stuck with the Packages that are Hardest to Deliver?

Big, heavy, or oddly shaped boxes are difficult to handle under any circumstance. They can be even harder in Low Density areas, where the walk from vehicle to house may cross gravel or uneven ground. Low Density areas saw a [REDACTED] increase in the average weight of Parcel Select Heavyweight packages between 2017 and 2019.⁴⁸

44 Interview with NRLCA representatives, July 8, 2019.

45 OIG analysis of Parcel Select Ground package weights. These data only include Parcel Select Ground packages coming from non-NSA customers.

46 Interview with a USPS representative, April 29, 2020.

47 Interview with NRLCA representatives, July 8, 2019.

48 OIG analysis of Parcel Select Heavyweight data.

49 Mark Solomon, “FedEx, UPS to slap major handling surcharges on more parcels,” *FreightWaves*, November 19, 2019, <https://www.freightwaves.com/news/fedex-ups-to-slap-major-handling-surcharges-on-more-parcels>.

50 FedEx, “What is dimensional weight?,” <https://www.fedex.com/en-us/shipping/packaging/what-is-dimensional-weight.html>, and UPS, “Billable weight,” <https://www.ups.com/us/en/help-center/packaging-and-supplies/determine-billable-weight.page>.

51 [REDACTED]

FedEx and UPS recoup the additional cost of hard-to-deliver packages through the application of “additional handling surcharges” on heavy parcels. While the weight threshold for these surcharges was previously 70 pounds, both UPS and FedEx lowered the threshold to 50 pounds in 2020.⁴⁹ The carriers also have long had sophisticated systems for surcharging packages based on their size, which is known as dimensional weight pricing.⁵⁰ The Postal Service does not apply a surcharge to heavy packages. While the lack of special handling fees compared to FedEx and UPS can make the Postal Service a more attractive option for price-conscious shippers, it also makes it a potential dumping ground for bulky, hard-to-deliver packages. [REDACTED]

Opportunities in High and Low Density Areas

The Postal Service has already made some accommodations for the unique delivery environments of urban cores and sparse rural areas. While some of these opportunities could be time-consuming and complex, implementing further changes in these geographic areas could increase efficiency, lower costs, enhance security, and improve customer service. Some suggestions are listed below.

Work with Apartment Buildings to Install More Parcel Lockers

Not all High Density package deliveries are difficult. In fact, some of the most efficient deliveries in the nation can be found in high-rise buildings. If a building has a concierge desk, carriers often can hand off many packages at once, which are then stored and distributed by the concierge. Alternatively, some newer buildings feature parcel lockers built specifically to accommodate the upsurge in packages. Carriers can efficiently distribute packages into the lockers. In a 2018 experiment, Seattle’s Urban Freight Lab installed parcel lockers in a 62-story

office tower to measure how much it would reduce carrier parking time. The experiment, in which the Postal Service participated, resulted in a 78 percent reduction in delivery time in the building.⁵²

Centralized deliveries like these are far more efficient than making door deliveries around an apartment or office building. It behooves the Postal Service to encourage large buildings to use centralized delivery systems wherever possible. For new apartment construction, the Postal Service already requires a minimum of one parcel locker for every ten mailboxes.⁵³ For existing buildings, the Postal Service could work with building owners to install parcel lockers near the mailboxes.⁵⁴ Since lockers would add value for tenants by keeping their packages safe and clean, landlords may be able to charge higher rents to recoup the cost of their investment.

The Postal Service also could subsidize the cost of the lockers based on estimates of its future savings on delivery costs. Subsidies could be targeted at a small subset of buildings that represent the costliest delivery locations. Buildings that receive large numbers of packages but lack a safe space to leave them could qualify for a subsidy, as could buildings that lack elevators, have steep or narrow stairways, or other obstacles that make door delivery especially laborious. The Postal Service could plan additional pilot studies to identify, for example, the appropriate subsidy amount or to gauge customer response to the lockers.

To measure the benefits of parcel lockers, recall the OIG ride along in New York City during which the Parcel Post carrier could spend 10 minutes making

door deliveries in a single apartment building. In that case, the Postal Service is spending an average of \$1,400 in annual wage payments for deliveries that could be virtually eliminated if the building had a secure space to leave packages. According to a Postal Service representative, the cost of a 10-locker indoor unit is \$1,025, along with \$150 for installation. This simplified analysis shows such a locker could potentially pay for itself in less than a year.⁵⁵ It could also potentially improve customer satisfaction. And the return on investment is even faster if you consider the costs of failed deliveries, where the customer is not home to receive the package, but the carrier does not feel comfortable leaving it in the hallway. A single failed attempt, in which the carrier must bring the package back to the post office to be processed and picked up by the customer, costs an extra \$1.38 in wages to the carrier and retail clerk, according to USPS analysis.⁵⁶ One failed attempt per day in the same building adds up to another \$418 annually.⁵⁷

Apply Extra Fees for High Cost Deliveries

FedEx and UPS cover the cost of their rural deliveries by charging higher prices for them. The Postal Service does not. Door delivery for any FedEx or UPS package going to one of 23,000+ ZIP Codes must pay a “Delivery Area Surcharge” or “Extended Delivery Area Surcharge” (for more remote deliveries). As of January 2020, surcharges range from \$2.95 to \$5.40 per package.⁵⁸ Of the 17,423 ZIP Codes categorized as Low Density by our analysis, nearly all—97 percent—are subject to a FedEx surcharge.⁵⁹

52 University of Washington Urban Freight Lab, *The Final 50 Feet Urban Goods Delivery System: Common Carrier Locker Pilot Test at the Seattle Municipal Tower*, October 2018, http://depts.washington.edu/sctctr/sites/default/files/SCTL_Muni_Tower_Test_Report_V4.pdf, p. 4

53 U.S. Postal Service, *National Delivery Planning Standards: A Guide for Builders and Developers*, July 2020, <https://about.usps.com/handbooks/po632.pdf>, p. 13. The Postal Service also requires centralized delivery—including parcel lockers—for new single family home developments, though there is no required ratio of parcel lockers to mailboxes.

54 According to a USPS representative, the Postal Service already delivers to multiple third-party lockers, such as Amazon Hub Apartment Lockers. Lockers like the Amazon Hub can be accessed by any delivery company and hold packages from any retailer.

55 This estimate only includes the wage cost and the cost of the parcel locker. It does not account for other potential costs that may be associated with the purchase, installation, and maintenance of the locker.

56 The full cost of a failed first attempt is \$2.17. Minus \$0.79 for the initial delivery attempt, which has already been accounted for, the cost is \$1.38.

57 $\$1.38 \times 303 \text{ delivery days} = \418 .

58 UPS, “2020 changes to value-added services and other charges,” https://www.ups.com/assets/resources/media/en_US/package-accessorial-pricing-preview.pdf and FedEx, “FedEx shipping rates: surcharges and fees,” <https://www.fedex.com/en-us/shipping/current-rates/surcharges-and-fees.html>.

59 OIG analysis of FedEx surcharged ZIP Codes.

While private carriers generate additional revenue from rural delivery surcharges, the Postal Service generates no more revenue from a delivery to the top of a mountain than it does to a suburban mailbox.

The Postal Service does not apply surcharges to particular ZIP Codes or geographic areas. Its package pricing is based exclusively on size, weight, and the distance a package is traveling across the country. The remoteness of the final destination is not taken into consideration. So, while private carriers generate additional revenue from rural delivery surcharges, the Postal Service generates no more revenue from a delivery to the top of a mountain than it does to a suburban mailbox.⁶⁰

Were the Postal Service to consider geography-based surcharges, it could consider doing a careful analysis of its costs in different parts of the country. A hypothetical list of surcharged ZIPs could include a mix of Low, Medium, and High Density areas. Whatever the mix, the Postal Service could start charging higher prices for its higher-cost areas.

Thus far, the Postal Service has not indicated that it is willing to charge more for deliveries to any geographic area.⁶¹ Postal management has noted that the lack of surcharges gives USPS a marketing advantage. Yet, there are ways USPS could charge more for some high-cost deliveries without applying an explicit surcharge.

The Postal Service has already taken some steps to address this suggestion by [REDACTED] UPS and FedEx sometimes surcharge rural packages that they do not actually deliver, instead passing those parcels off to the Postal Service for last-mile delivery. Noting that these carriers are instituting surcharges to their customers, the Postal Service adjusted the [REDACTED]

The Postal Service could expand this pricing strategy by taking steps [REDACTED] The higher cost of some Low Density deliveries would then be passed on to the shipper as appropriate. As long as the new price does not exceed the published price, it would not contradict the Postal Service's no-surcharge sales mantra. And with less competition in Low Density areas, there is less risk of losing business to a lower-priced competitor.

Avoid the Most Difficult Door Deliveries in Remote Areas

Centralized deliveries in Low Density areas—like centralized deliveries anywhere—are generally faster and more efficient. These often take the form of roadside cluster boxes along rural roads (Figure 9). In small towns, centralized delivery is even easier, because customers living within a quarter mile (in some cases a half-mile) of the post office generally must pick up their mail from free P.O. boxes at the post office.⁶²

As discussed earlier, the current Rural Carrier wage system does not pay carriers more when deliveries take longer. The Postal Service has little incentive to centralize package deliveries, especially if it must invest money to do so.⁶³ But once the RRECS compensation system is instituted, Rural Carriers will be paid more for door delivery than for curbside or parcel locker delivery. Under the new pay system, optimizing rural package deliveries will have an immediate financial benefit for the Postal Service.

One way to centralize deliveries is to install more outdoor parcel lockers along Low Density routes. Parcel lockers could potentially be built at road junctions where rural cluster boxes already sit. As long as the package isn't oversized, the carrier would be able to deposit it into the locker in the same location where she or he drops off the mail, thus avoiding a door delivery. Just as urban lockers could be placed in select apartment buildings for maximum impact, rural lockers could be placed at the most advantageous road junctions—avoiding long drives, difficult roads or terrain, and homes that are set far back from the street. As part of the RRECS rollout, the Postal Service is mapping the precise GPS coordinates

60 Revenue per package in Low Density ZIP codes increased 3% between FY 2018 and FY 2019. This is because total revenue growth (13%) outpaced total volume growth (10%).

61 U.S. Senate, Homeland Security and Governmental Affairs Committee, Hearing on U.S. Postal Service Sustainability, March 12, 2019.

62 U.S. Postal Service, *Postal Operations Manual*, 653.2.

63 In fact, the current Rural Carrier evaluation system requires the Postal Service to pay *more* for some centralized deliveries because some activities associated with loading parcel lockers, such as handling the locker keys, are rewarded by the system, according to a USPS representative.

of roadside mailboxes and customers' front doors. The Postal Service could use that location information, along with parcel volume data, to identify the places where parcel lockers would most improve package delivery efficiency and begin some small pilot tests.

Figure 9: Rural Cluster Boxes

CENTRALIZED DELIVERY IS MORE EFFICIENT

In rural areas, carriers often deliver to clusters of mailboxes for local residents. Delivering to centralized locations, including parcel lockers, is a faster and more efficient mode of delivery.



Photo source: OIG photo.

Figure 10: Next Generation Mailbox

NEXT GENERATION MAILBOXES HOLD MORE PACKAGES

The Postal Service estimates that Next Generation Mailboxes can hold 70 percent of all parcels. Increasing the number of packages delivered to a mailbox reduces both the time and cost of delivering packages to the front door.



Photo source: U.S. Postal Service

Using simplified cost assumptions, we can estimate the return on investment of a roadside parcel locker in a Low Density area. Imagine an unpaved road with several houses on it, spaced far apart, where the carrier delivers an average of two large packages a day. Two door deliveries down that road cost the Postal Service \$2.04 in wages each day, or \$617 annually.⁶⁴ According to a USPS representative, buying and installing a common brand of outdoor parcel locker consisting of four compartments costs about \$1,000. If the locker eliminated 90 percent of door deliveries for the addresses it served, USPS would recoup the investment in about 2.4 years.⁶⁵

Not all Low Density package delivery can be centralized, though; many rural homes have standalone curbside mailboxes that are not clustered. In such cases, avoiding door deliveries could be accomplished through bigger mailboxes that fit bigger parcels. In fact, the Postal Service has been promoting a larger “Next Generation Mailbox” since 2015 (Figure 10). Though their size varies slightly by manufacturer, the Postal Service estimates that they can fit 70 percent of all parcels.⁶⁶

It is currently up to residents to install and pay for Next Generation Mailboxes. The Postal Service could incentivize or mandate customers to purchase these new mailboxes and perhaps subsidize the \$60 to \$70 retail price for the most costly delivery points.⁶⁷ Pilot studies could be conducted to determine the appropriate mailbox subsidy and to identify successes and challenges of subsidizing the larger mailboxes prior to large-scale implementation.

Analyze Data on Costly Carrier Activities

The Postal Service collects a large amount of data on parcel delivery operations. These data are used to evaluate carrier routes, calculate extra mileage on

rural routes, and identify the rate of failed delivery attempts, among other uses. However, the Postal Service could better utilize the data to drive efficiencies in package delivery. Conducting more data analysis on the challenges of High and Low Density package delivery would allow the Postal Service to better understand the scope of delivery inefficiencies and identify the costliest deliveries. While the Postal Service measures the average national costs of parcel delivery, it does not address the distinct costs of deliveries in Low Density areas or urban apartment buildings. The Postal Service could collect more and better data on these costs. It also could analyze that data more deeply and broadly to understand how the costs of parcel delivery vary across the country and in the more rural and urban parts of the country. To be clear, this is beyond the accurate capture of delivery costs in urban and rural areas. Rather, USPS should analyze its data with operational efficiencies in mind.

One way to analyze existing data with an eye toward operational efficiency is by using the Postal Service’s ‘breadcrumb’ data of carriers’ GPS locations. These data are used primarily at the local level to track individual routes. However, local managers may not have the bandwidth to analyze these data or to identify systemic issues that result in delivery inefficiencies. Breadcrumb data could be used to identify delivery points that require more time, or to determine how often carriers make second trips or backtrack on their route to deliver missed parcels. Currently, the Postal Service collects backtracking data from the annual route inspection (PS Form 3999), though the data are only a one-day snapshot of a carrier’s route. The Postal Service could also analyze aggregate data from route inspection forms to identify certain characteristics associated with more or fewer second trips or backtracking, including whether carriers who used the Package Lookahead feature on their scanners had fewer instances of backtracking.⁶⁸ On

64 The RRECS system allots 2.443 minutes per door delivery, or 4.886 minutes for two. 4.886 minutes times \$0.417 in salary per minute (\$24.99 hourly salary divided by 60) equals \$2.04 per day. Multiplied by 303 delivery days, the annual salary payments equal \$617.

65 RRECS allots 0.602 minutes for a parcel locker. Assuming a carrier delivers two packages per day down this rural road and assuming a parcel locker can accommodate 90 percent of those packages, the carrier would deliver 545.4 packages per year to the parcel locker and the remaining 60.6 packages to the customers’ door. The total cost of delivering 90 percent of packages to a locker and 10 percent of packages to the door would be \$198 annually. The cost savings from installing a parcel locker would be \$419 per year (\$617 - \$198). If the parcel locker costs \$1,000 to purchase and install, the Postal Service would recoup its investment in about 2.4 years. This estimate only uses the wage cost and the cost of the parcel locker. It does not account for other costs, such as a carrier’s mileage allowance or additional costs associated with the purchase, installation, and maintenance of the locker.

66 “Big test,” *USPS Link*, March 18, 2015, <https://link.usps.com/2015/03/18/big-test/>. Next Generation Mailboxes are approximately 13.63” wide x 12” tall at center x 16.5” deep.

67 Home Depot, “Storehouse galvanized steel black extra-large parcel mailbox,” <https://www.homedepot.com/p/Gibraltar-Mailboxes-Storehouse-Galvanized-Steel-Black-Extra-Large-Parcel-Mailbox-SH400B01/30003508?modalType=drawer>.

68 The scanners carriers use have a variety of features that carriers can choose to turn on, including a feature that alerts them about an upcoming package on their route.

rural routes, the Postal Service could use data from the Rural Carrier Trip Report (PS Form 4240) to determine how often second trips are occurring due to parcels. These examples demonstrate some ways the Postal Service could analyze existing data within the framework of increasing parcel delivery efficiency.

The Postal Service is already using some package data to identify and address inefficiencies. New carriers receive training on tools designed to reduce the time spent on backtracking and searching for packages. In addition, the Postal Service analyzes data on failed first attempts to identify geographic areas with high rates of failed package delivery attempts. Parcel lockers are installed in some of these areas, and the reduction in failed first attempts is monitored. This is one example of how existing data can be used to drive efficiencies in package delivery. These data do have limitations, as USPS has only partial knowledge of the number and location of its parcel lockers.⁶⁹ The tracking tool was only rolled out in 2018 and has no historical record of prior locker installations. Also, it does not record lockers installed by developers as part of new housing construction. Similarly, it does not know how many customers have installed Next Generation Mailboxes. USPS could pilot efforts in a few regions to measure the savings it gains from the larger mailboxes.

We noted earlier that USPS does not measure how package delivery costs differ in cities and rural areas. It has estimates for the national average cost associated with different modes of City Delivery (door vs curbside vs cluster box), but those estimates do not account for the wide array of conditions within each mode. A door delivery up three narrow flights of stairs is significantly harder than dropping off those pieces with a concierge or a door delivery to a sidewalk-adjacent suburban home. It would benefit the Postal Service to know the degree of difference so that it can target innovations toward the most difficult or costly deliveries. It could start by studying the most time-consuming types of delivery points to estimate how delivery costs to those types of addresses differ from the overall average.

OIG Recommendations

This white paper describes how package delivery in High Density and Low Density areas can present unique challenges. An integral step in addressing these costly deliveries would be to analyze data to identify inefficiencies and quantify their magnitude.

To lower the costs of national package delivery, the OIG recommends that the Postal Service do the following:

Recommendation 1:

The **Vice President of Delivery Operations** develop a national plan, based on key data factors, to help reduce the aggregate costs of door deliveries along rural routes and in urban apartment buildings.

Conclusion

As letter mail declines and ecommerce rises, package delivery has taken on greater importance for the Postal Service. Postal package volume had been rising steadily until FY 2019. But the slowing growth, and even retreat, of volume was not felt equally across the country. High and Medium Density areas lost volume while Low Density areas flourished.

While Low Density areas saw volume growth, package delivery there comes with unique challenges. Delivery points are far apart, and delivery to a customer's door may involve long detours from the route and require carriers to haul big boxes across uneven terrain. In High Density areas, door delivery sometimes means making multiple trips carrying heavy boxes up several flights of stairs to get to each customer's apartment door. This takes time, for which the Postal Service is paying carriers hourly. Door delivery can also cause fatigue and lead to injuries. Carriers in High Density cities must also deal with the threat of package theft.

⁶⁹ Email communication with a USPS representative, April 2, 2020.

To combat these delivery obstacles, the Postal Service can focus its analytic efforts on better understanding the degree of the inefficiencies and the locations where they are most prevalent. It can reduce the number of door deliveries through the installation of parcel lockers or bigger mailboxes. Where higher costs are inevitable, it can consider charging shippers more for delivery to particular areas, which other carriers already build into their existing pricing structure.

Whatever strategies the Postal Service employs, it must recognize both the importance of package volume to its future and the extent to which the extremes of the country require different creative approaches. This will ensure that the Postal Service continues to serve the American public in the most efficient and effective way.

Management's Comments

Management agreed with the OIG recommendation. The Postal Service will use parcel delivery scan data to identify possible locations for new parcel lockers and analyze the cost effectiveness of parcel locker installation. The planned completion date is March 2021.

Evaluation of Management's Comments

The OIG considers management's comments responsive to the recommendation. For the recommendation to be closed, management should provide documentation of a detailed national plan.

All recommendations require OIG concurrence before closure. Recommendations should not be closed in the Postal Service's follow-up tracking system until the OIG provides written confirmation that the recommendations can be closed.

Appendices

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Appendix A: Objective, Scope, and Methodology

Objective and Scope

The objective of this white paper is to explore the unique issues related to package delivery in remote rural and dense urban areas, and to identify opportunities to remedy the challenges. Further, this paper examines the Postal Service's position in the package delivery market in rural and dense urban areas.

To meet these objectives, the OIG analyzed a significant amount of Postal Service data, including route-level package delivery data for fiscal years 2017, 2018, and 2019; participated in field visits to postal facilities; and interviewed key USPS representatives with knowledge of package delivery in rural and/or urban settings. We also reviewed relevant documentation, such as carrier manuals describing package delivery procedures. Each of these data sources contributed to a more complete understanding of the challenges, complexities, and potential opportunities that might be realized in rural and urban areas.

The OIG conducted analysis for this white paper before the President of the United States issued the national emergency declaration concerning the novel coronavirus disease outbreak (COVID-19) on March 13, 2020. Our findings do not reflect operational changes, service impacts, and/or changes in consumer behavior that may have occurred as a result of the pandemic.

Methodology

In order to study package delivery in urban, suburban, and rural areas, the OIG created a classification system based on delivery environment and the associated operational challenges. We classified all ZIP Codes as High, Medium, or Low Density based on multiple criteria. A detailed explanation of our classification methods is in [Appendix B](#).

The OIG contracted with Laurits R. Christensen Associates Inc. to obtain route-level package delivery data for fiscal years 2017, 2018, and 2019. We also obtained data on carrier injuries, employment, Parcel Select customers, heavy parcels, NSAs, delivery code scans, and other topics. We analyzed these data in High, Medium, and Low Density areas to assess geographic differences in Postal Service operations and changes over time.

OIG analysts conducted field visits to a total of four postal facilities in High, Medium, and Low Density areas in the New York, Capital, and Appalachia Districts. Field visit locations were selected by the OIG, in coordination with the Postal Service. Multiple analysts participated in each visit, which consisted of observing mail sorting and other office activities, following a carrier on their route, and interviewing carriers, clerks, postmasters, and other staff about mail processing and delivery procedures.⁷⁰ The information gathered from field visits informed further research for this white paper.

The OIG interviewed representatives from the Postal Service, the National Association of Letter Carriers, and the National Rural Letter Carriers Association in order to gather a more complete picture of the challenges of urban and rural delivery and how the Postal Service is working to improve package delivery in those environments.

The OIG also drew on the results of its 2018 "Postal Omnibus Survey," which it conducted in the summer of 2018. The survey employed a complex quota sampling methodology to provide a representative sample of U.S. residents. Through the survey, 3,395 respondents answered a wide variety of questions concerning their usage and perceptions of the Postal Service. Respondents self-identified as living in a city/urban area, a suburb/small town, or rural/remote area.

We conducted this work in accordance with the Council of the Inspectors General on Integrity and Efficiency, Quality Standards for Inspection and Evaluation.

⁷⁰ One of the Medium Density field visits did not include a carrier ride along.

Table 1: Prior Coverage

Report Title	Objective	Report Number	Final Report Date	Monetary Impact
<i>Maintaining Rural Retail Networks: Best Practices Abroad and their Implications for the U.S. Postal Service</i>	To understand how international postal operators are preserving their networks of rural post offices amid mounting financial pressures.	RISC-WP-20-003	March 25, 2020	N/A
<i>Addressing the Diverse Needs and Wants of Rural America: Opportunities for the U.S. Postal Service</i>	To determine what rural customers across the country need and want from the Postal Service.	RISC-WP-19-009	September 16, 2019	N/A
<i>Rural and Urban Origins of the U.S. Postal Service</i>	To provide a historical perspective on the Postal Service's role in rural and urban communities.	RISC-WP-19-007	August 26, 2019	N/A
<i>Delivery and Customer Service Operations – Bronx, NY</i>	To evaluate mail delivery delays and customer retail service at selected stations in the Bronx.	DR-AR-17-004	April 20, 2017	N/A
<i>Package Services: Get Ready, Set, Grow!</i>	To examine a possible new strategic positioning for the Postal Service in the critical and growing package business.	RARC-WP-14-012	July 21, 2014	N/A

Appendix B: Defining “Urban” and “Rural”

Critical to this paper was the study of package delivery in very rural and very urban environments. The definition of urban and rural areas varies substantially. Commonly used criteria include population density, commuting patterns, and even self-reports from survey respondents. Even within the federal government, different agencies have different standards. The U.S. Census Bureau defines two classes of urban areas: Urban Areas (UAs) are continuously built-up areas of 50,000 people or more and Urban Places, which include incorporated and unincorporated places with at least 2,500 residents. Meanwhile, it defines rural areas as anywhere that does not fall into one of the two urban categories. It does not define “suburban” areas.⁷¹

The Departments of Transportation and Agriculture often use a system called the Rural-Urban Commuting Area (RUCA) code. This system provides 10 codes that determine an area’s rurality or urbanity on the size and direction of the largest commuting flow.⁷²

For this study, the OIG combined RUCA codes with delivery point density to classify geographic areas. Using the data from the Postal Service’s Product Tracking and Reporting database, the OIG and data consultants LR Christensen and Associates obtained data on the number of packages delivered by USPS at the 5-digit ZIP Code and route levels. These data were compiled quarterly and range from the first quarter of FY 2017 until the fourth quarter of FY 2019. These ZIP Codes were matched to RUCA codes for 5-digit ZIP Code Tabulation Areas (ZCTA): geographic approximations of ZIP Codes used by the Census Bureau to track demographic data. To match the RUCA codes to ZCTAs, we used a crosswalk developed through a partnership between the Department of Health and Human Services, the Department of Agriculture, and the University of North Dakota.⁷³ In addition to gathering RUCA data at the ZIP Code level, the OIG downloaded ZCTA land area and population data from the U.S. Census. Using the land area and the package delivery data, the OIG was able to calculate the approximate delivery point density at the ZIP Code level.

We opted to categorize geographic areas as High Density, Medium Density, or Low Density rather than urban or rural. The use of High, Medium, and Low Density better conveys the operational challenges faced by a mail carrier in certain geographic areas. Although the High Density classification is a rough proxy for urban cores and Low Density is a rough proxy for rural areas, we chose not to use the terms “urban” and “rural” in order to distinguish our definitions from that of other government agencies or general public perceptions.

The classification of ZIP Codes as High Density, Medium Density, and Low Density is as follows:

- ZIPs with a RUCA code of 6 through 10 → Low Density
- ZIPs with a RUCA code of 1 through 5:
 - Delivery density ≥ 5000 delivery points per square mile → High Density
 - Delivery density ≥ 50 but < 5000 delivery points per square mile → Medium Density
 - Delivery density > 0 and < 50 delivery points per square mile → Low Density

71 U.S. Census, *The Urban and Rural Classifications*, <https://www2.census.gov/geo/pdfs/reference/GARM/Ch12GARM.pdf>, p. 12-1.

72 U.S. Department of Agriculture, “2010 Rural-Urban Commuting Area (RUCA) Codes,” <https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/documentation/>.

73 University of North Dakota Center for Rural Health, “Temporary ZIP RUCA 3.10 file access page,” <https://ruralhealth.und.edu/ruca>.

The project team determined the above cut points for categorization after extensive analysis, experimentation, and evaluation. As part of this process, we visually examined the density characteristics of hundreds of ZIP Codes near the potential cut points between categories using Google Maps 3D Satellite view and street view.

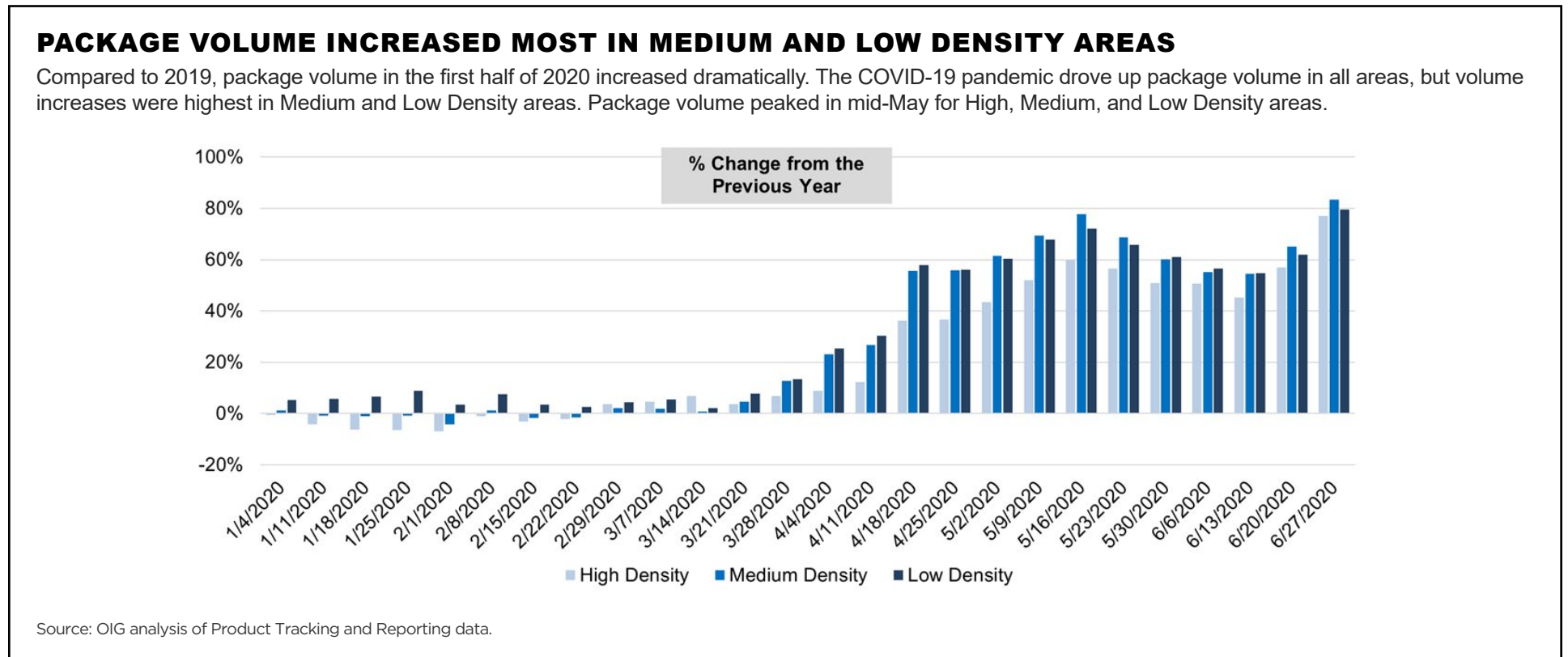
For High Density areas, we looked for the prevalence of multi-unit buildings, such as apartments, condos, high rises, and skyscrapers, as well as a likely lack of readily available parking. These are key factors that make package delivery more difficult. For Low Density areas, we looked for areas where most of the land is undeveloped or farmland, resulting in a prevalence of delivery points that are far apart. We also observed that these areas tended to feature homes with relatively long distances between the mailbox and the house. These are key factors impacting the efficiency of package delivery in Low Density areas.

Appendix C: Package Volume During COVID-19

The package volume data presented in this paper reflect volume trends prior to the outbreak of the COVID-19 pandemic in the United States. In March 2020, states began implementing shelter-in-place orders in an attempt to limit the spread of the virus. Reports indicate that during this time, package volumes for all major package carriers increased significantly as Americans increasingly turned to online retail to fulfill their daily needs and to avoid potential exposure to COVID-19.⁷⁴

To supplement the package volume analysis presented in this report, the OIG analyzed weekly volume for calendar year 2019 and calendar year 2020 through July 3, 2020, both overall and in High Density, Medium Density, and Low Density areas. The purpose of this analysis is to quantify the package volume increase that the Postal Service experienced in the wake of the initial COVID-19 outbreak.

Figure 11: COVID-19 Package Volume



74 Kelly Yamanouchi, "UPS grapples with Christmas-like shipping surge amid coronavirus," *The Atlanta Journal-Constitution*, June 8, 2020, <https://www.ajc.com/business/ups-grapples-with-christmas-like-shipping-surge-amid-coronavirus/385VeOyytXJ8UPrqDhzO/>, and Thomas Black, "FedEx follows UPS in raising delivery prices amid package surge," *Bloomberg*, June 3, 2020, <https://www.bloomberg.com/news/articles/2020-06-03/fedex-follows-ups-in-raising-delivery-prices-amid-package-surge>.

Comparison of Total Package Volume to Same Period Last Year

The Postal Service reported that competitive product volume increased 35 percent in April and 61 percent in May compared to the same months in 2019.⁷⁵ OIG analysis showed a similar package volume pattern, with weekly volume changes peaking the week of May 16, 2020, before easing in June.⁷⁶

Package Volume in High, Medium, and Low Density Areas

In the first two months of 2020, package volume in High, Medium, and Low Density areas continued in the same patterns described earlier in this paper, with volume declines in High Density areas and volume increases in Low Density areas (Figure 11). These patterns began to shift in March as package volume increased everywhere.

Package volume peaked the week of May 16th. During that week, the Postal Service delivered 187 million packages, which was 73 percent more than the previous year. However, the greatest percentage increases in package volume came at the end of June when Medium and Low Density areas saw year-over-year volume increases of 83 percent and 79 percent, respectively.

Volume increases in High Density areas were generally not as pronounced as those occurring in Medium and Low Density areas. In High Density areas, volume increases compared to the same period the previous year increased as much as 77 percent.

Comparison to Holiday Package Volume

Package volume during the COVID-19 pandemic approached package volume typically seen during the holiday season. Pandemic-related package volume increases peaked the week of May 16, 2020. Compared to 2019 holiday volume, pandemic-related package volume soared to as much as 96 percent of holiday volume in High Density areas (Figure 12).⁷⁷ COVID-19 package volume was as high as 92 percent of holiday volume in Medium Density areas and 91 percent of holiday volume in Low Density areas.

Pandemic-related volume changes began to ease in June 2020, though volume continued to remain well above expected levels. It remains to be seen whether the Postal Service's package volume will return to more typical levels or whether the surge in online retail represents a fundamental shift in package volume trends for the Postal Service.

Changes to the Competitive Landscape

Like the Postal Service, both FedEx and UPS experienced package volume surges resulting from COVID-19. While shipments to businesses fell sharply for the two carriers, residential deliveries increased dramatically; these deliveries are less profitable for FedEx and UPS.⁷⁸ Both carriers implemented special temporary surcharges for residential deliveries to offset the pandemic-related decrease in profit margins.⁷⁹ The Postal Service has not implemented any surcharges in the wake of COVID-19.

75 U.S. Postal Service, "April 2020 Monthly Financial Report to the PRC," May 26, 2020, <https://www.prc.gov/docs/113/113243/2020.5.26%20April%202020%20Monthly%20Financial%20Report%20to%20the%20PRC.pdf>, and U.S. Postal Service, "May 2020 Monthly Financial Report to the PRC," June 24, 2020, <https://www.prc.gov/docs/113/113760/2020.6.24%20May%202020%20Monthly%20Financial%20Report%20to%20the%20PRC.pdf>.

76 OIG analysis of Product Tracking and Reporting data.

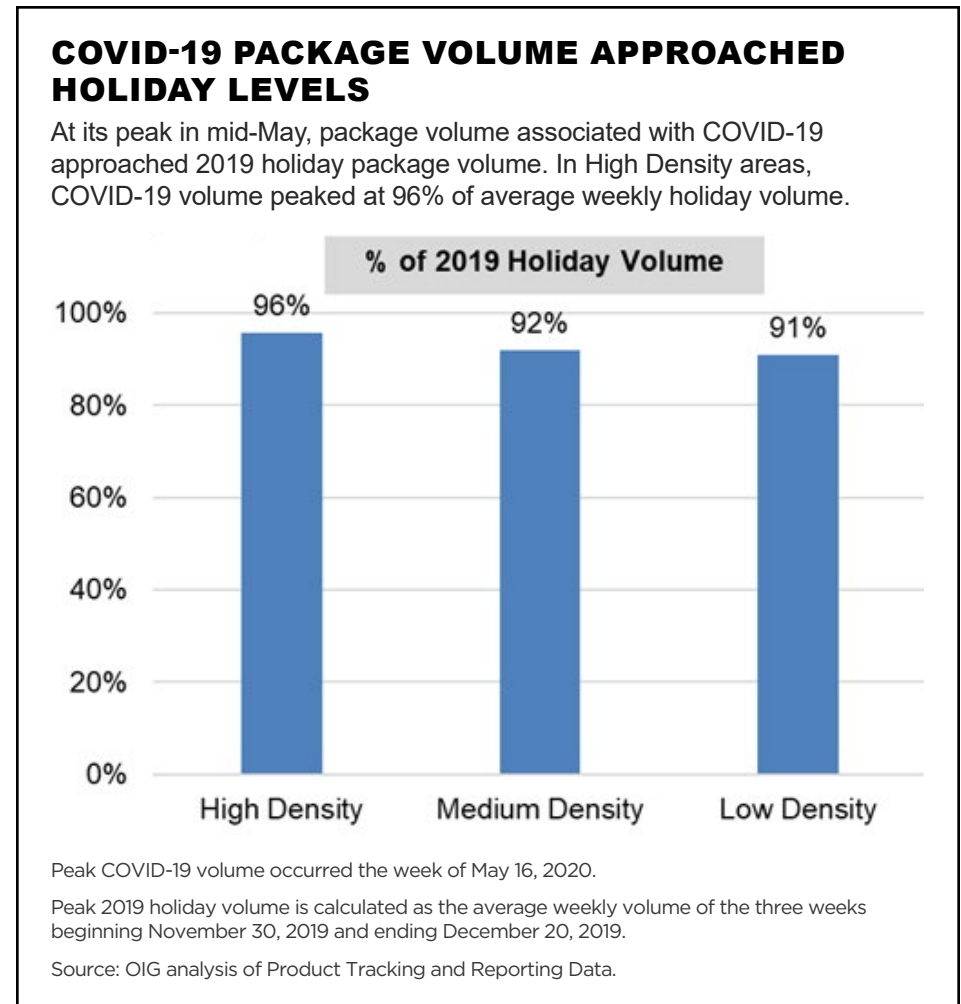
77 Ibid.

78 Elly Cosgrove, "Investors punish FedEx as it struggles to adapt to rise in e-commerce amid slowing global growth," cnbc.com, December 18, 2019, <https://www.cnbc.com/2019/12/18/investors-punish-fedex-as-it-struggles-to-adapt-to-rise-in-e-commerce.html>.

79 "FedEx shipping rates," June 23, 2020, <https://www.fedex.com/en-us/shipping/current-rates/surcharges-and-fees.html#peak-surcharge>, and UPS, "UPS peak surcharges," June 28, 2020, https://www.ups.com/assets/resources/media/en_US/2020_UPS_Peak_Surcharges.pdf.

COVID-19 may be upending some of the competitive trends discussed in this paper. Rather than continuing to insource packages, FedEx may be returning some lost package volume to the Postal Service in an effort to manage the extraordinary volume, particularly to residential addresses.⁸⁰ Amazon struggled to keep up with its orders and responded by prioritizing the shipment of “essential” goods. This decision may have negatively impacted Amazon’s reputation for fast shipping and may have driven customers to purchase goods elsewhere.⁸¹ Finally, COVID-19 may have accelerated the use of automated delivery cars and robots, which offer quick, “contactless” delivery.⁸² As with changes in package volume, it is unclear whether changes in the package delivery competitive landscape will be temporary or whether they signal a lasting shift.

Figure 12: COVID-19 Volume Compared to Peak Volume



⁸⁰ Frank Witsil, “FedEx in Michigan struggles with timely delivery, turns to post office,” *Detroit Free Press*, June 27, 2020, <https://amp-freep-com.cdn.ampproject.org/c/s/amp.freep.com/amp/3263313001>.

⁸¹ Jay Greene, “Frustrated Amazon shoppers vent at record levels,” *The Washington Post*, May 21, 2020, <https://www.washingtonpost.com/technology/2020/05/21/amazon-shopper-complaints/>.

⁸² Paul Lienert and Jane Lanhee Lee, “Automated delivery cashes in on pandemic-driven demand,” *Reuters*, May 18, 2020, <https://www.reuters.com/article/us-health-coronavirus-delivery-robots-fo/automated-delivery-cashes-in-on-pandemic-driven-demand-idUSKBN22U1F8>.

Appendix D: Management's Comments

JOSHUA D. COLIN, PhD
VICE PRESIDENT, DELIVERY OPERATIONS



September 8, 2020

EVGENI DOBREV
ACTING MANAGER, OPERATIONS CENTRAL RESEARCH AND INSIGHTS
SOLUTION CENTER

SUBJECT: White Paper – Package Delivery in Rural and Dense Urban Areas
(Project Number RISC-WP-20-00X)

Thank you for the opportunity to review and comment on the white paper, "Package Delivery in Rural and Dense Urban Areas". As stated in the paper, with letter mail declining and ecommerce rising, package delivery has taken on greater importance for the Postal Service.

The Postal Service does have concerns on the title for Figure 2 on page 3, Delivery Margins by Geographic Sector. We note the costs include mail processing and transportation costs, not just delivery costs.

Management agrees with the recommendation to develop a national plan to reduce the aggregate costs of door deliveries. The Postal Service is already using some package data to identify and address inefficiencies. The Postal Service has a current strategy that analyzes data on failed first attempts to identify geographic areas with high rates of failed package delivery attempts. Management will review and enhance its current strategy and use it as a guide for potential locations to install parcel lockers. Current package scan data showing locations with frequent door deliveries can also be used to identify locations to install parcel lockers. In both cases, management will need to analyze the cost of the installation of parcel lockers versus the potential savings to determine where it is cost effective.

To lower the costs of national package delivery, the OIG recommends that the Postal Service do the following:

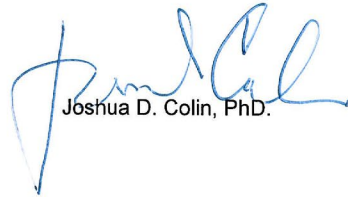
Recommendation 1: The Vice President of Delivery Operations develop a national plan, based on key data factors, to help reduce the aggregate costs of door deliveries along rural routes and in urban apartment buildings.

Management: Agrees

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Management Response / Action Plan: Management agrees there is a need to develop a plan to reduce the aggregate costs of door deliveries. HQ Delivery Operations will work with HQ Strategy and Planning to review and enhance its current strategy in place to identify locations with failed first delivery attempts to identify potential locations for parcel lockers. Current package scan data showing locations with frequent door deliveries can also be used to identify locations to install parcel lockers. Management will also need to evaluate the cost effectiveness of installing parcel lockers at identified locations.

Target Implementation Date: March 2021



Joshua D. Colin, PhD.



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We conducted work for this white paper in accordance with the Council of the Inspectors General on Integrity and Efficiency's Quality Standards for Inspection and Evaluation (January 2012).