



WT

THE FINAL 50 FEET OF THE URBAN GOODS DELIVERY SYSTEM

EXECUTIVE SUMMARY

The explosion of e-commerce and urban growth are driving innovation in the City of Seattle.

SUPPLY CHAIN TRANSPORTATION & LOGISTICS CENTER

UNIVERSITY of WASHINGTON

College of Engineering



A compound 20% annual e-commerce growth rate from 2018 - 2023 [1, 2, 3] will more than double goods deliveries (by a factor of 2.5) in 5 years. Without changes, this may double delivery trips. [4]

The explosion of e-commerce is shifting the retail landscape at the same time many U.S. cities are adding population and growing denser. Seattle and other major cities face increasing pressure due to the high demand for limited curb and alley space. The City of Seattle Final 50 Feet Program’s strategic partnership with the Urban Freight Lab is a collaborative effort between the public and private sectors to improve freight delivery systems in our vibrant Center City neighborhoods.

Population, Job Growth in One Center City

There are 250,000 jobs in Seattle’s Center City, including its downtown urban centers, and nearly 230,000 people commute in and out of it each day.

The City expects there to be 25,000 more households and 55,000 more jobs in Center City by 2035. [5].

E-Commerce Transforming Delivery System

Online shoppers’ expectations are also rising: 61% expect orders placed by noon to arrive on the same day. 50% are willing to pay a premium for expedited shipping in order to save time, versus visiting physical stores. [6]

Over 8% of all U.S. retail sales - \$395 billion -took place online in 2016. Growth in U.S. online sales has averaged more than 15% year-over-year since 2010. [7]

This is causing the City of Seattle Department of Transportation (SDOT) to rethink how they manage street curb parking and alley operations for trucks and other delivery vehicles. It is also causing building developers and managers to react to the influx of online goods in urban towers.

How will Seattle’s transportation system function when the volume of e-commerce deliveries doubles in the Center City? If e-commerce continues to grow at the historic rate and the city does not add 1 resident or worker, goods deliveries would double by 2022.

U.S. RETAIL SALES

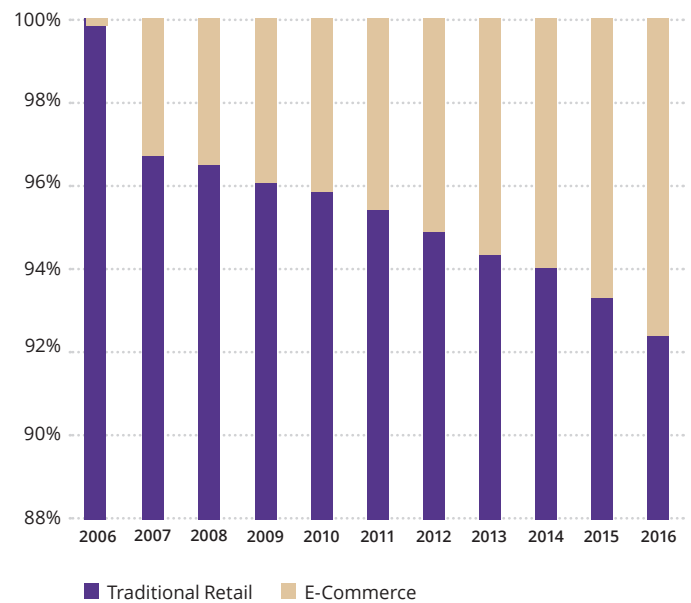


Chart based on data from U.S. Census Bureau. [7]

The role of Amazon and other retailers in this transformation cannot be overestimated. The total value of transactions by U.S. consumers on Amazon.com reached \$147 billion last year, a 31% increase compared with \$112 billion in 2015. [8]

Seattle has several innovative planning efforts underway to manage and improve transportation in the face of such growth. One Center City is a partnership formed by the City of Seattle, Sound Transit, King County, and the Downtown Seattle Association to build an integrated plan that makes it easier to get around and enjoy the Center City both in the near-term and over the next 20 years.

SDOT published Seattle's first Freight Master Plan in 2016. The plan recognizes historic growth and includes high-level policy recommendations and potential strategies to improve the urban goods delivery system.

SDOT partners with UW Urban Freight Lab

SDOT entered into a long-term strategic research partnership with the Supply Chain Transportation and Logistics Center (SCTL) at the University of Washington (UW) in 2016 to analyze the delivery system and provide data-based evidence of the impacts of the Freight Plan's proposed strategies, before they are widely adopted.

This partnership supported the formation of the Urban Freight Lab in the SCTL Center. The 5 founding members of the Urban Freight Lab: Charlie's Produce, Costco Wholesale, Nordstrom, UPS, and USPS committed funds and senior executives' time to the Lab, in large part because SDOT is engaging with them as equal partners to reach common goals.

Other cities have focused on enforcing truck parking codes without much success in changing behavior. By entering into a long-term strategic partnership with SCTL and industry partners, SDOT has demonstrated its interest in developing innovative, system-wide solutions to achieve their policy goals.

The city's willingness to pilot test and potentially adopt strategies that provide both public and private benefits was essential in attracting private sector firms to fully engage in the work.

The Urban Freight Lab uses a systems engineering approach to solve delivery problems that overlap the city's and business sectors' spheres of control. The Lab created a multi-year strategic research plan, partially funded by SDOT and partially by its members, to collect and analyze original data, and pilot test innovative approaches to solve the most important problems.

The Urban Freight Lab brings supply chain, transportation and logistics firms, retailers, building developers and managers, and technology firms into a well-defined work group to accomplish its goals. The Urban Freight Lab is a living laboratory where potential solutions are generated, evaluated, and then pilot-tested on real city streets. Members provide clear and open input as to whether proposed solutions are sustainable in their and other firms' business models.

The Lab recruited internationally-known urban goods delivery experts as external reviewers to provide critical assessments of the project's innovative approaches and methods. These representatives from the New York City Department of Transportation and City College of New York are helping the UW Lab build quality and scalability into the entire project process, so the research team can reshape interim efforts instead of waiting for a pass/fail judgment at the end.





There are 250,000 jobs in Seattle's Center City,
and nearly 230,000 people commute in and
out of it every day. [5]



The Final 50 Feet Research Project

The 'Final 50 Feet' of the urban goods delivery system is a new field of practical research in which city planners, traffic, building code, and parking professionals take action to make truck parking spaces more productive, and reduce the growth of truck traffic.

The Final 50' is shorthand for the supply chain segment that begins when trucks pull into a parking space and stop moving - in public load/unload spaces at the curb or in an alley, or in a building's loading dock or internal freight bay. It tracks the delivery process inside buildings, and ends where the customer takes receipt of their goods.

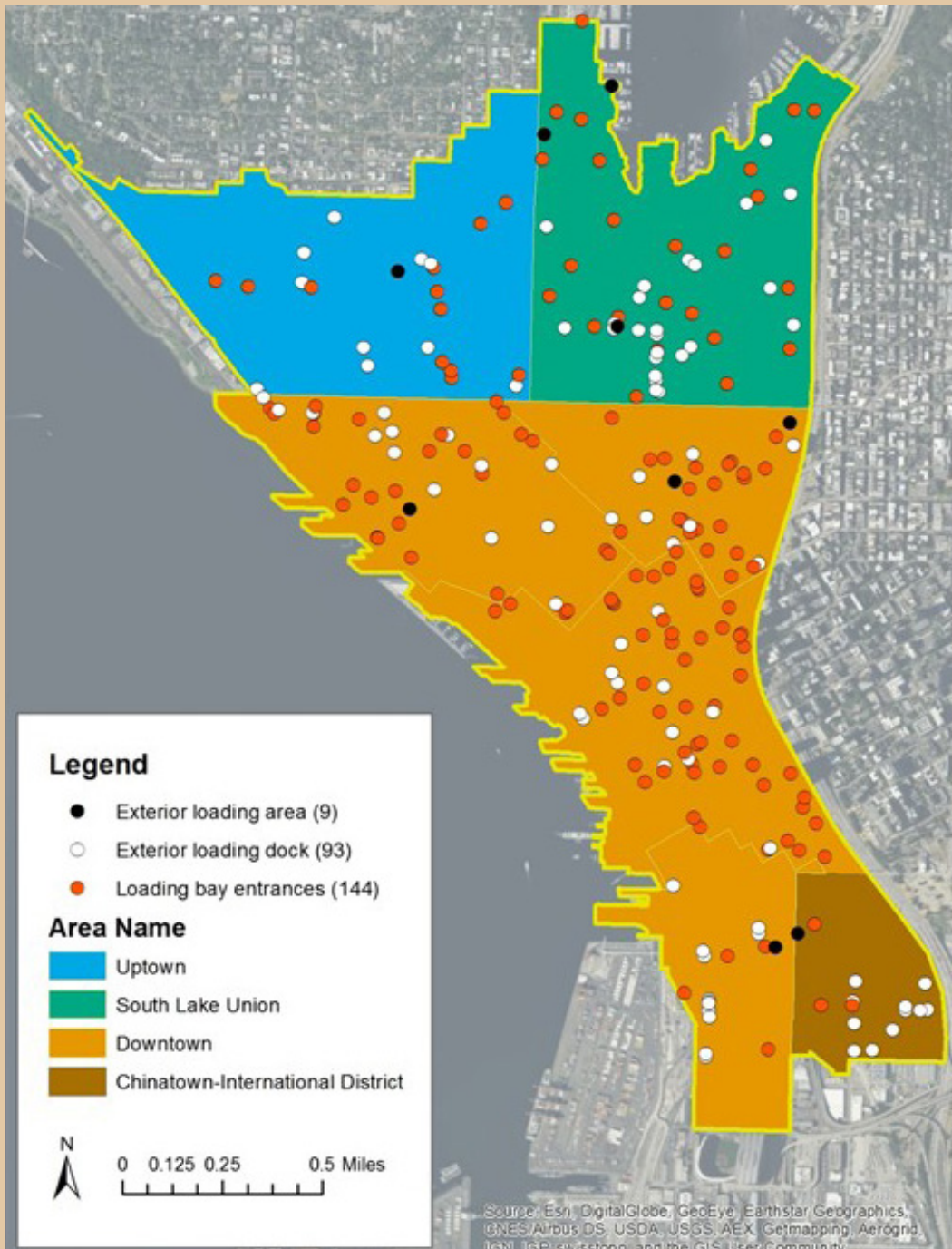
The Final 50' Program partnership with SCTL is the first time that SDOT and researchers have analyzed both the street network and the city's vertical space (office, hotel, retail and residential towers) as one unified goods delivery system.

Are Seattle's Truck Parking Spaces in the Right Places?

Because the urban goods network includes both public and private components, the first task in SDOT's Final 50' Program was to document the locations and features of all private truck load/unload spaces in Seattle's Center City. SDOT needed a comprehensive picture of the truck parking network to plan for the future.

City curb parking space, alleys, and private loading bays and docks are scarce and valuable. There is tremendous competition for this space. In addition to passenger drop-off zones and car parking, and Commercial Vehicle Load Zones for trucks to stop and make deliveries, the curb space, streets and alleys are used as streeteries (temporary food festivals and parks), for utility pole set-backs, signage, transit stops, bike lanes, to hold waste storage units, and more.

There was considerable value in collaborating with private sector members of the Urban Freight Lab on this task. Data collectors in the field initially identified 382 potential freight loading bays and docks in the 3 urban centers. However, in 127 cases the doors were closed during the survey and there was no way to tell if those locations were actually used for freight deliveries. UPS had their local drivers, deeply knowledgeable about city routes, review the closed door locations as part of their work in the Urban Freight Lab. The Urban Freight Lab provided photos and other location information. That review allowed the Lab to rule out 87% (110) of the locations behind closed doors, reducing uncertainty in the findings from 31% to less than 5%.



The research showed that in Seattle’s Center City neighborhoods (downtown, uptown and South Lake Union) private loading bays and docks are scarce, forcing delivery drivers to park in public spaces. There are:

144

ENTRANCES TO
INTERNAL LOADING BAYS;

93

EXTERIOR LOADING
DOCKS; AND

9

EXTERIOR
LOADING AREAS.

Final 50' Program has Prioritized, Measurable Goals

SDOT and the Urban Freight Lab set two priority goals that offer both public and private benefits for urban goods deliveries.

#1

The first goal is to reduce the number of failed first delivery attempts. According to members of the Urban Freight Lab, the failed first delivery rate is over 15% in U.S. cities.

Failed first delivery attempts force delivery firms to take the package back out of the customer's building, re-process it, and try to deliver it again or truck it to an alternative delivery site.

There is a significant opportunity to eliminate thousands of truck trips in Seattle by reducing the number of failed first deliveries.

REDUCING FAILED FIRST DELIVERIES WILL:

- Lower traffic congestion in cities, as delivery trucks could make up to 15% fewer trips while still completing the same number of deliveries;
- Improve urban online shoppers' experiences and protect retailers' brands;
- Cut business costs for the retail sector and logistics firms;
- Cut crime and provide a safer environment for residents and workers;
- Improve an amenity that adds value at multifamily properties – the ability to ensure that their tenants can shop online and get their order when they expect it; and
- Ensure that all city neighborhoods can efficiently receive online orders, not just a few.

#2

The second goal is to reduce dwell time: the time a truck is parked in a load/unload space. The public and private benefits to reaching this goal are:

- Better utilization of public and private truck load/unload spaces will create more capacity without building additional spaces;
- Less block circling as spaces turn over more quickly;
- Room for other vehicles to move through alleys; In Seattle trucks can legally unload at both ends of the alley, but may block alley access to cars; and
- Lower costs for delivery firms, and therefore potentially lower costs for their customers.



87% of all of the buildings in downtown, uptown and South Lake Union must use the city's curb and alley space to receive deliveries. Only 13% have private loading bays and/or docks. [9]

Findings from 5 Real World Buildings

The second project task was to quantify and create maps of the Final 50' delivery process flows in and around 5 prototype city buildings in Seattle. The prototype buildings are:

- 1. The Seattle Municipal Tower, a 62-story office building;**
- 2. Insignia residential towers;**
- 3. The Dexter-Horton historic building;**
- 4. The Four Seasons hotel and condominium; and**
- 5. Westlake Mall retail center.**

The researchers then quantified delay in the process steps for the Seattle Municipal Tower to understand which improvement strategies will have the greatest payoff:

- Clearing security takes 12% of the total delivery time; and
- Looking for tenants and/or their locations, and riding the freight elevator took 61% of the total time.

SDOT Will Use the Research to...

The Final 50' Program partnership has enabled SDOT to:

- Take part in a well-defined working partnership with industry to analyze the goods delivery system, and plan to pilot test proposed delivery system solutions to verify their effectiveness;
- Obtain the locations and features of all of the privately-owned urban goods network in its urban centers;
- Understand the Final 50' delivery process flows in 5 prototype buildings in detail; and
- Identify which delivery process steps offer the greatest opportunity for improvement in and around one of the buildings: the Seattle Municipal Tower in downtown Seattle.

In the next phase of Final 50' Program research, the Urban Freight Lab and SDOT will pilot test promising improvement strategies in and on the streets around the Seattle Municipal Tower over four weeks in 2018.

SDOT may use this research to develop a network of the truck load/unload zones in high demand locations – just like they build bus stops into transit systems. The Final 50' takes into account privately-owned loading bays and loading docks inside and adjacent to buildings, as they are also part of the load/unload space network.

The Final 50' Program findings will be used to provide decision support to city officials and to private-sector firms managing scarce and expensive space in the City of Seattle, and may be used in other cities facing the same issues. By applying systems engineering and evidence-based planning, we can make receiving online goods as efficient as ordering them – without clogging city streets and curb space, or losing packages.



SCTL data showed that a smart locker system in the loading bay level of the Seattle Municipal Tower would reduce the time delivery people spend in the building by up to 73%. It would almost eliminate failed first deliveries and dramatically cut the mean truck dwell time in parking spaces serving the Tower.

References

1. Levy, Adam, "Amazon's North American retail sales increased 25.2% in 2016," Motley Fool, February 10, 2017, <https://www.fool.com/investing/2017/02/10/amazons-us-online-sales-growth-last-year-was-mor-2.aspx>
2. Deloitte Touche Tohmatsu Limited. "Global Powers of Retailing 2017: The Art and Science of Customers," <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/consumer-industrial-products/gx-cip-2017-global-powers-of-retailing.pdf>.
3. Molla, Rani and Jason DelRey. "Amazon's Epic 20-Year Run as a Public Company, Explained in Five Charts," Recode, <https://www.recode.net/2017/5/15/15610786/amazon-jeff-bezos-public-company-profit-revenue-explained-five-charts>.
4. Urban Freight Lab, University of Washington, 2017. A compound 20% annual e-commerce growth rate from 2018 - 2023 will more than double goods deliveries (by a factor of 2.5) in 5 years. Without changes, this may double delivery trips.
5. One Center City, accessed Dec. 1, 2017, <http://onecentercity.org/about>.
6. UPS, "Pulse of the Online Shopper," June 2016, <https://solvers.ups.com/ups-pulse-of-the-online-shopper/>.
7. U.S. Census Bureau News, "Quarterly Retail E-Commerce Sales Report," May 16, 2017, <https://www2.census.gov/retail/releases/historical/ecommerce/17q1.pdf>.
8. Zaroba, Stefany. "U.S. E-Commerce Sales Grow by 15.6% in 2016." Digital Commerce 360. February 17, 2017. Available: <https://www.digitalcommerce360.com/2017/02/17/us-ecommerce-sales-grow-156-2016/>.
9. Seattle Department of Transportation, 2017. These numbers were calculated using UW UFL data and Center City Quarter Scale Map Data. SDOT conservatively estimates 1100 buildings in that area, 144 with private loading docks as determined by the UFL.

PHOTO CREDITS

Barb Ivanov, UW SCTL Center, 2017, pg. 2 (top) and 6

Anna Alligood, UW SCTL Center, 2017, pg. 6

Christopher Eaves, Seattle Department of Transportation, pg. 4 and 8

ACKNOWLEDGEMENTS:

The authors thank the Seattle Department of Transportation for providing much more than project funding, in particular the leadership and policy support of Director Scott Kubly, Christopher Eaves, Jude Willcher, Mary Catherine Snyder and Meghan Shepard. The research team is also very grateful for the active involvement, thought leadership, and funding support from the current members of the UW Urban Freight Lab: Charlie's Produce, Costco Wholesale, Nordstrom, UPS and USPS.



SUPPLY CHAIN TRANSPORTATION & LOGISTICS CENTER
UNIVERSITY of WASHINGTON
College of Engineering

<http://depts.washington.edu/sctlctr/> sctl@uw.edu