



**NYSERDA**  
Supported

The City College  
of New York



# Complete Streets: Finding Space for Freight

**Alison Conway**

**Associate Professor of Civil Engineering, City College of New York  
ITDP Webinar, April 22, 2020**

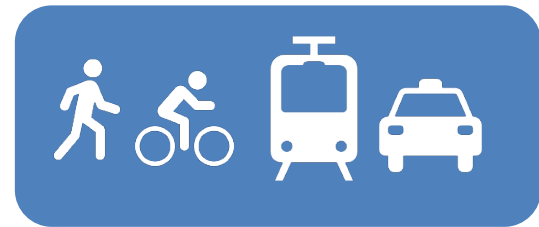
# Externalities on urban streets

- Dangerous collisions
- Pollution
  - Air
  - Noise
- Traffic congestion
- Lane obstructions
- Infrastructure damage

**What are the elements of a livable city?**



**Which of these elements can function without goods movement?**





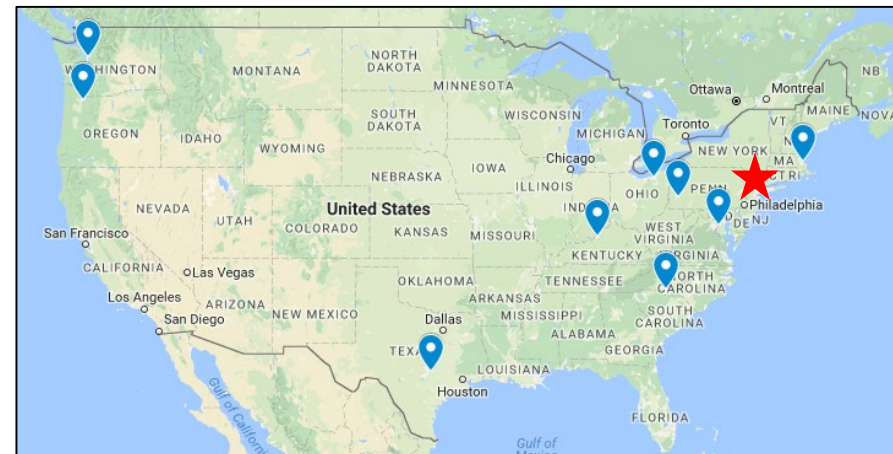
\* If this tree is native and exists  
in a hospitable environment.

# Goods movement is critical to social and economic welfare



# Outline

- 7 Common Challenges and Solution Approaches
- Demand Management
- Urban Freight and COVID



# Potential Areas of Guidebook Application

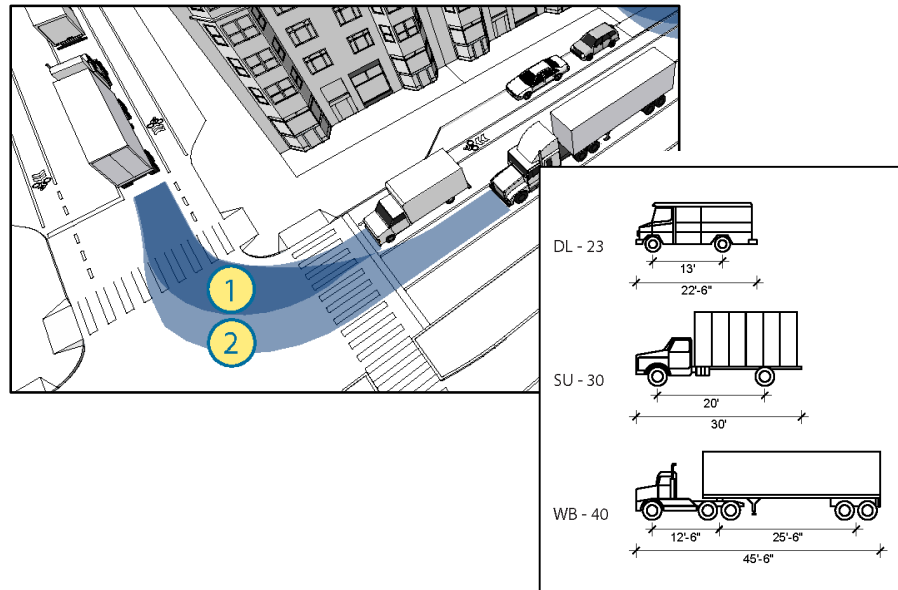
- Urban centers
- Suburban/exurban areas with warehousing/industrial development
- Suburban/small town main streets
- Industrial/commercial campuses

# 7 Common Challenges

- Selecting an appropriate design vehicle
- Vehicle navigation challenges
  - Providing adequate space for large vehicle turns
  - Reducing conflicts with vulnerable roadway users
  - Safely reducing speeds
  - Providing network connectivity and redundancy
- Curbside challenges
  - Providing adequate space for parking, loading, and emergency response operations
  - Providing curb and building access

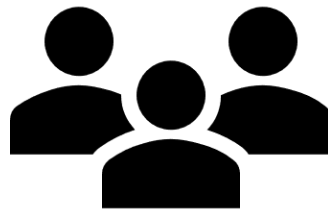
# Freight Design/ Control Vehicle Selection

- Current/expected freight traffic flows
- Freight trip generating land uses
- Street functional classes and network designations
- Applicable truck size and weight regulations
- Historic incident data involving freight vehicles



# Freight Industry Engagement

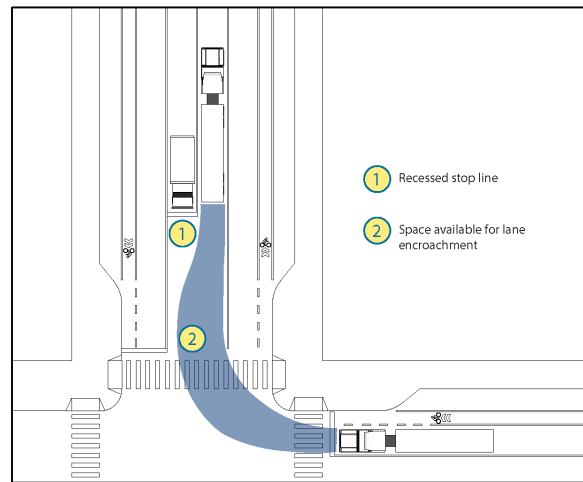
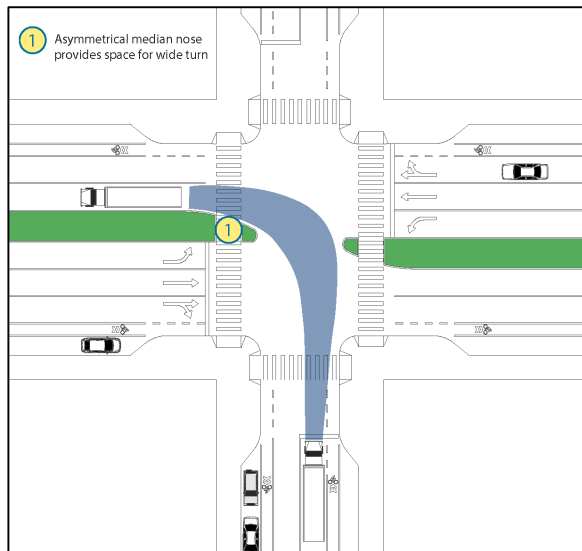
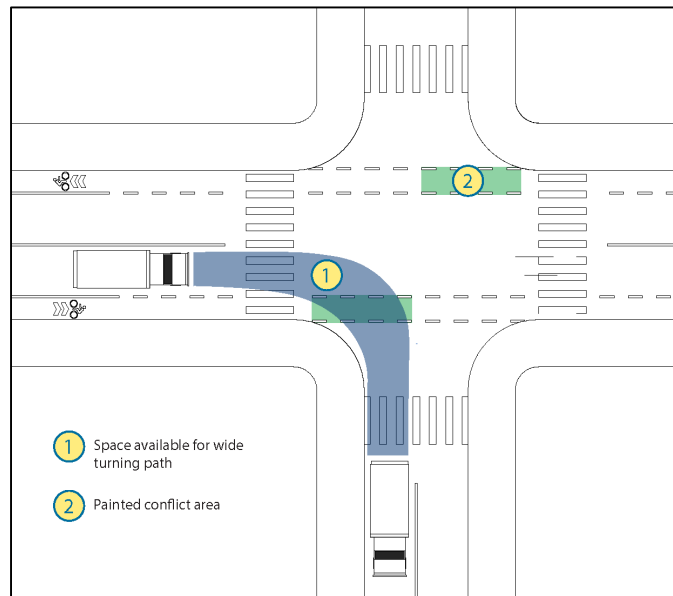
- Internal agency freight experts
- Agency advisory boards
- Local freight quality partnerships
- Freight industry associations
- Business improvement district/association of local business owners
- Local businesses, building managers, or carriers operating in a project area



# Large Vehicle Turns

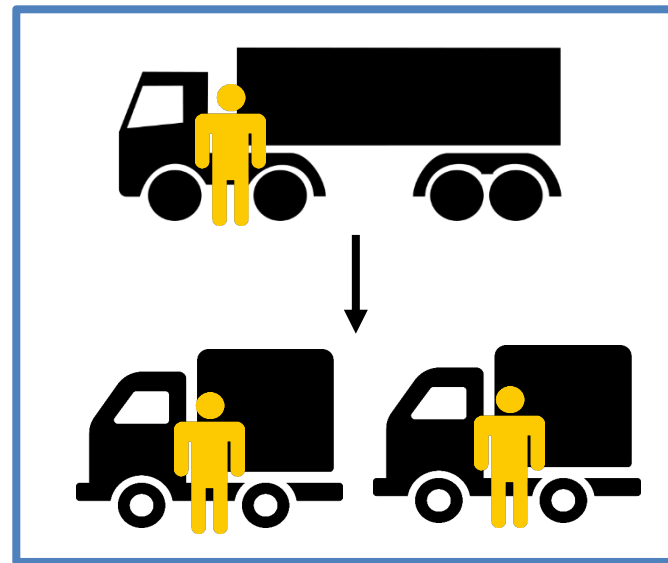


# Design Solutions



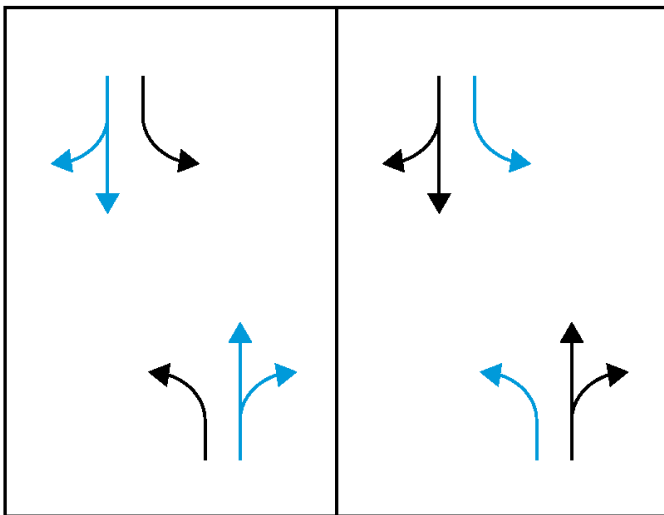
# Regulatory Solution: Vehicle Size Restrictions

- Fixed
- Time-based
- Safety benefits of size restrictions must be carefully weighed against related impacts
  - VMT and congestion
  - Operator costs and industry participation

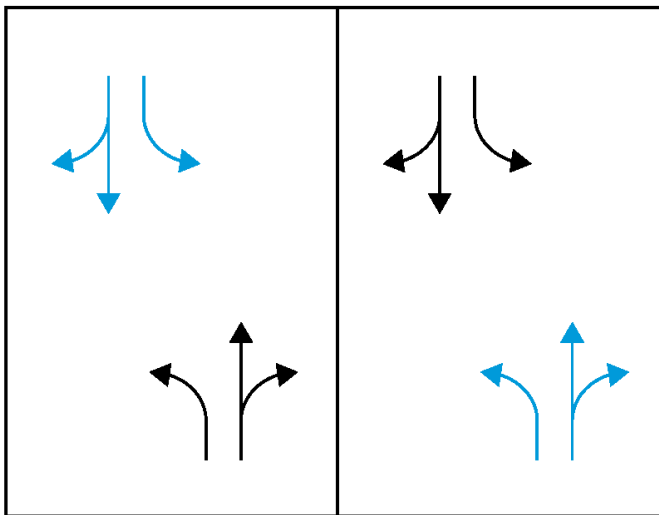


# Operational Solution: Dedicated Signal Phases

1 Separated turn phases



2 Separated directional movement phases



# Conflicts with vulnerable road users

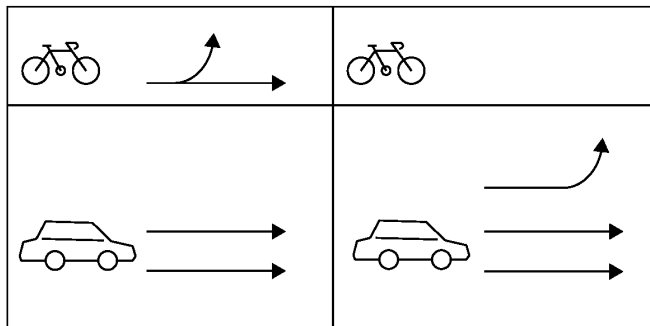


# Design Solutions: Bike Infrastructure, Clear Identification of Conflict Zones



# Operational Solutions: Dedicated Signal Phases and Roadside Mirrors

1 Leading bicycle phase

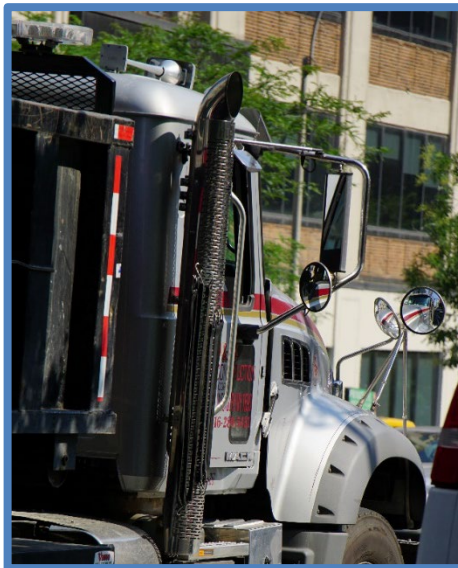


2 Vehicle turning phase



# Vehicle-Based Solutions

- Mirrors
- Fresnel safety lenses
- Cameras
- Side guards
- Direct vision



# Education

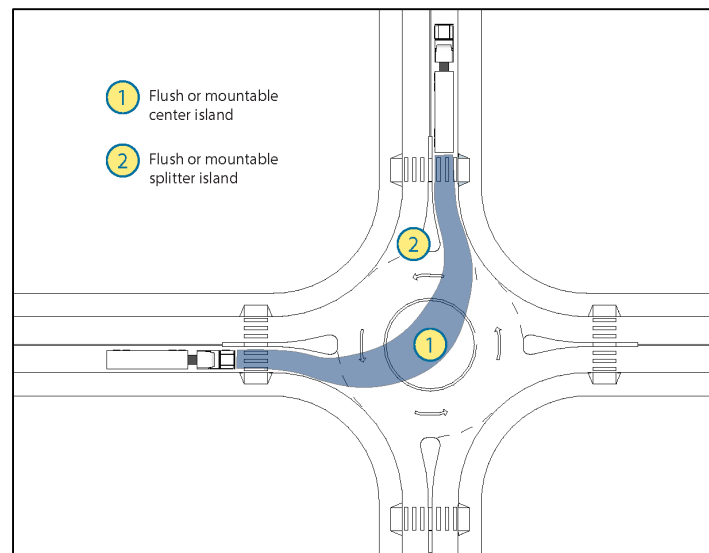
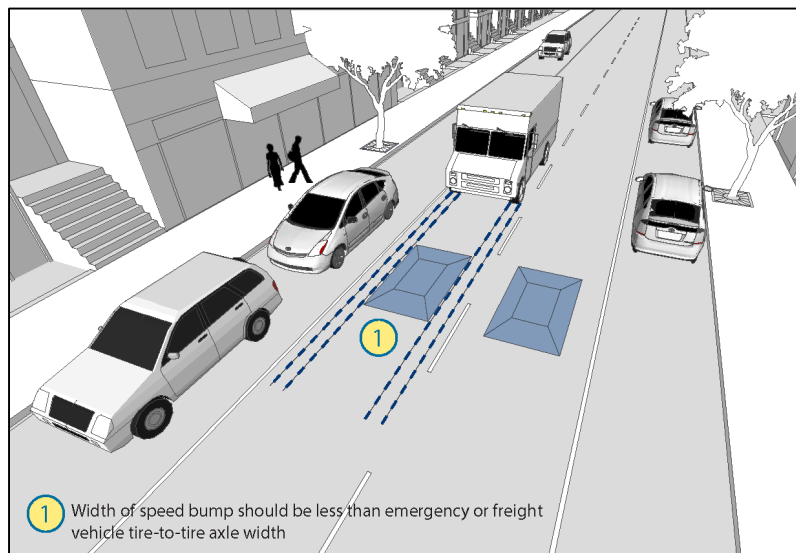
- Drivers
- Non-motorized travelers
- General public



# Speed Reducers



# Design Solutions



# Network connectivity/ redundancy

- Change in street direction
- Network gaps
- Difficult to navigate street infrastructure

# Design Solutions

- Short blocks/frequent intersections
- Reasonable alternative routes

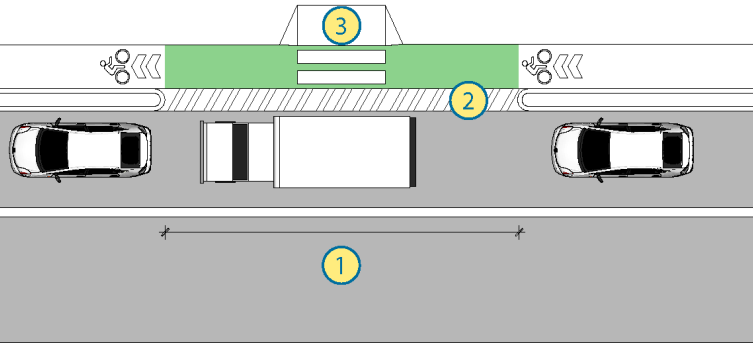
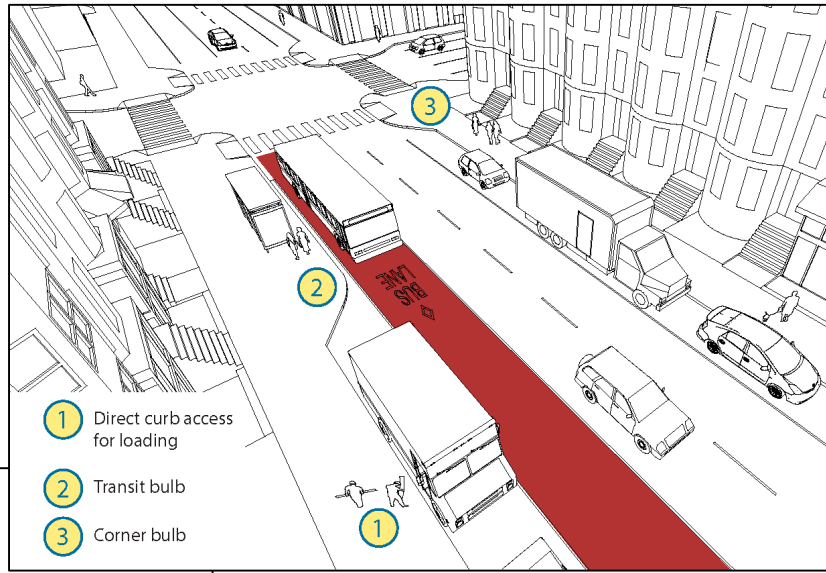


# Space for parking, loading, and delivery



# Design Solutions

- 1 Loading zone with adequate length for maneuvering and rear loading
- 2 Access aisle
- 3 Midblock curb cut



# Regulatory Solutions

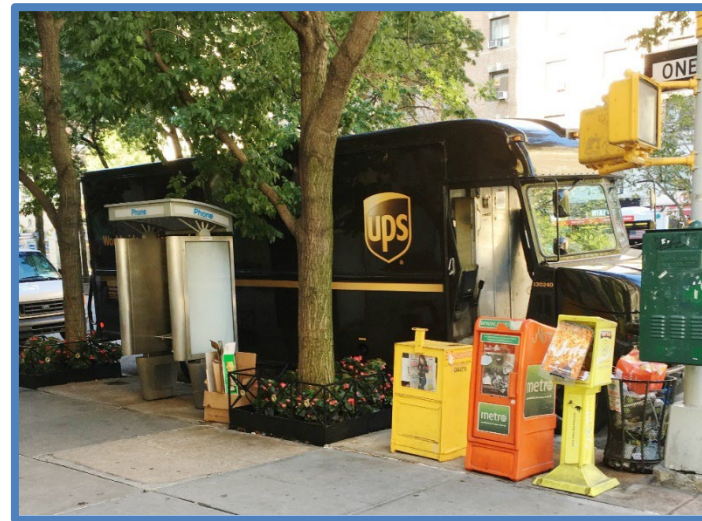


# Operational Solutions

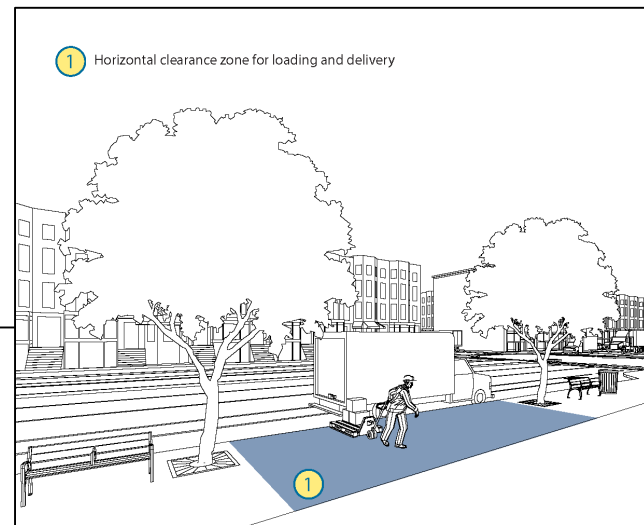
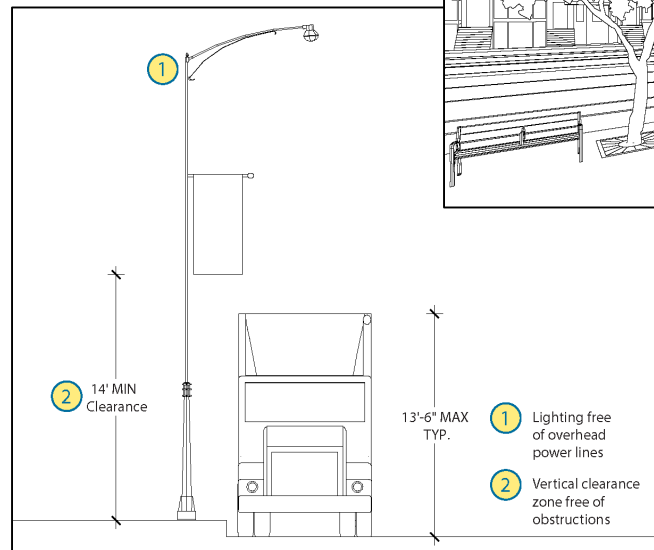
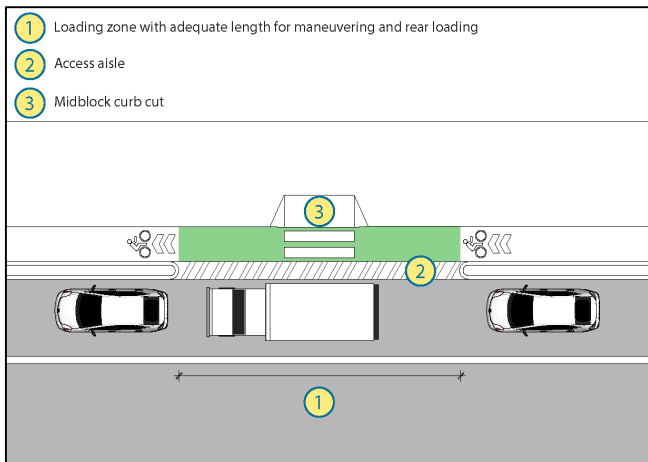
- Building Delivery Management
  - Centralized delivery location
  - Secure storage room
  - Lockers
  - Loading dock appointment system
- Enforcement
  - Commercial vehicles
  - Loading zone obstructions



# Curb and building access



# Design Solutions



# Demand Management

- Change the volume, spatial, or temporal distribution of demands
- May require policy change, infrastructure investment, and/or behavior change by multiple stakeholders
- Will only be implemented if costs are acceptable to decision-makers

# Off-Hour Deliveries

| Method  | Benefits   | Challenges/Concerns   |
|---|--|---|
| Shift deliveries to non-peak hours <ul style="list-style-type: none"> <li>• Early morning</li> <li>• Late evening</li> <li>• Overnight</li> </ul> | For operator: <ul style="list-style-type: none"> <li>• Reduce travel time delays, fuel costs, and parking fines</li> </ul>                     | For operator: <ul style="list-style-type: none"> <li>• Increase driver labor costs</li> <li>• Increase safety risk</li> </ul> |
|   | For business: <ul style="list-style-type: none"> <li>• Receive deliveries when few customers present</li> </ul>                                | For business: <ul style="list-style-type: none"> <li>• Additional staff costs for off-hour receipt</li> </ul>                 |
|   | For neighborhood: <ul style="list-style-type: none"> <li>• Reduce congestion impacts</li> <li>• Reduce demand for shared curb space</li> </ul> | For neighborhood <ul style="list-style-type: none"> <li>• Generate delivery noise at night</li> </ul>                         |

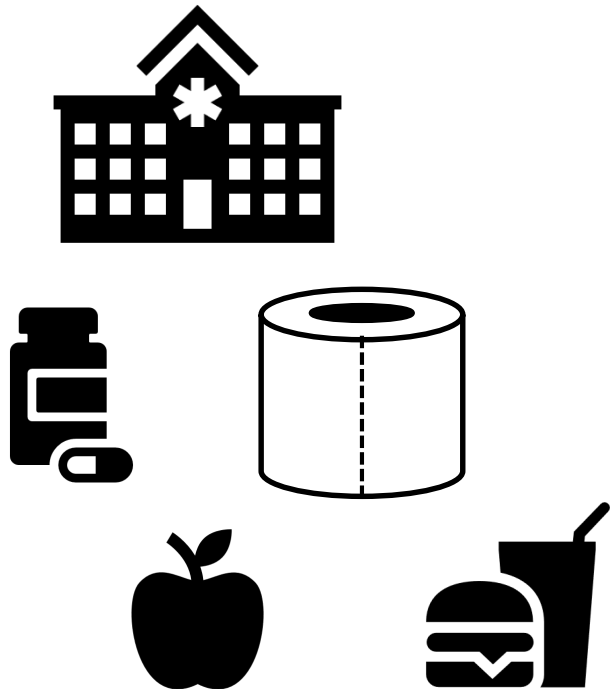
# Consolidation Center

| Method   | Benefits   | Challenges/Concerns   |
|--|--|---|
| <p>Transfer goods from large freight vehicles to small, green vehicles for final delivery</p> <p>Consolidate goods from multiple carriers onto shared vehicles</p> | <p>For operator:</p> <ul style="list-style-type: none"> <li>• Avoid expensive last mile costs</li> </ul>   | <p>For operator:</p> <ul style="list-style-type: none"> <li>• Increase costs for transloading</li> <li>• Lose final delivery visibility</li> </ul>                |
|  | <p>For business:</p> <ul style="list-style-type: none"> <li>• May provide value added services</li> <li>• May improve reliability</li> </ul>                             | <p>For business:</p> <ul style="list-style-type: none"> <li>• May have to pay premium for services</li> </ul>   |
|  | <p>For neighborhood:</p> <ul style="list-style-type: none"> <li>• Reduce large vehicle trips</li> <li>• Reduce demand for parking</li> <li>• Reduce emissions</li> </ul> | <p>For neighborhood</p> <ul style="list-style-type: none"> <li>• May increase local VMT</li> <li>• May require public subsidy for start-up, operations</li> </ul> |

# Lockers and Pickup Points

| Method  | Benefits  | Challenges/Concerns   |
|---|---|---|
| <b>Lockers:</b> Secure locker where package can be accessed via security code; may be located in residential area, public space, or local business<br><br><b>Pick-up Points:</b> Staffed delivery points at local businesses (e.g. pharmacy, grocery store) | For operator:   | For operator:   |
|   | <ul style="list-style-type: none"> <li>Avoid expensive failed deliveries, repeat trips</li> </ul> | <ul style="list-style-type: none"> <li>Difficult to identify host business</li> </ul> |
|   | For residents:  | For residents:  |
|   | <ul style="list-style-type: none"> <li>Provide secure location to leave package</li> </ul>        | <ul style="list-style-type: none"> <li>May be at risk during pickup</li> </ul>        |
|   | For neighborhood:   | For neighborhood:   |
|   | <ul style="list-style-type: none"> <li>Reduce delivery trips</li> </ul>                           | <ul style="list-style-type: none"> <li>May need public space</li> </ul>               |
|   | For host business:  | For host business:  |
|   | <ul style="list-style-type: none"> <li>Generate foot traffic</li> </ul>                           | <ul style="list-style-type: none"> <li>May use floor space</li> </ul>                 |

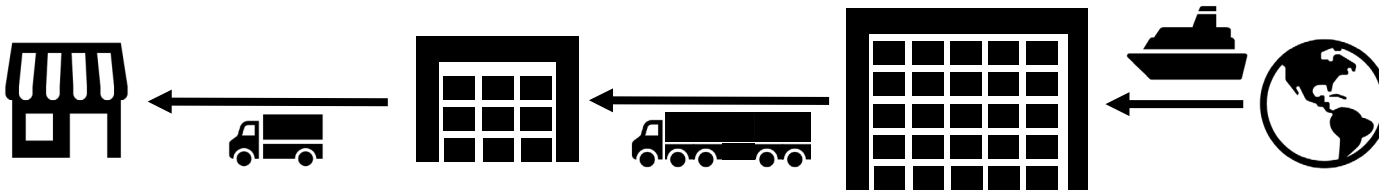
# COVID and Urban Goods Movement



- Access to food and medicine
  - Delivery vs. in-store
    - Availability
    - Equity
    - Prioritization
  - Commercial vs. residential supply chains
    - Restaurants
    - Offices
    - Schools
- Role of shared economy
- Role of density??

# COVID and Urban Goods Movement

- Supply chain resiliency
- Supply chain safety
  - Warehouses
  - Delivery Personnel



# Acknowledgements

- NYSERDA
- NYC DOT
- Volvo Research and Education Foundations
- City College
  - Civil Engineering
    - Quanquan Chen
    - Linette Prasad
  - Architecture
    - June Williamson
    - Marija Gjorgjievska
    - Crystal Xing



# Thanks! Questions?

aconway@ccny.cuny.edu

**Guidebook can be accessed from:**

<https://www.metrans.org/news/new-metrofreight-publication-a-guidebook-for-considering-freight-in-complete-street-design->