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Complete Streets Considerations for Freight (and Emergency) Vehicle Operations

An Overview

Caltrans/LA Metro Delivery Support Workshop

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What is a “complete street”?

- “Complete Streets are streets for everyone. They are designed and operated to enable safe access for **all users**, including **pedestrians, bicyclists, motorists and transit riders** of all ages and abilities. Complete Streets make it **easy to cross the street, walk to shops, and bicycle to work**. They allow **buses to run on time** and make it **safe for people to walk to and from train stations**.”
- A Complete Streets approach integrates people and place in the **planning, design, construction, operation, and maintenance** of our transportation network. This helps to ensure streets are safe for people of all ages and abilities, **balance the needs of different modes**, and support local land uses, **economies**, cultures, and natural environments.

- *National Complete Streets Coalition, Smart Growth America*

Why consider freight vehicles?

- Freight carriers bring goods essential to supporting quality of life
 - Residential deliveries
 - Local business deliveries: retail, restaurants, groceries, etc.
 - Office supplies
 - Healthcare and hospitality supplies

Why consider freight vehicles?

- Freight carriers remove unwanted materials
 - Household and commercial waste
 - Construction and demolition byproducts

(Some of the) Unintended Consequences of NOT Considering Freight Vehicles

- Congestion and associated emission increase;
- Elevated safety risks for non-motorized and pedestrian collisions;
- Unsafe operating conditions for the freight vehicle drivers;
- Damage to vehicles, goods, infrastructure, roadside property, unacceptable emergency response time, and patients in emergency vehicles.

Curbside Challenges

- Providing adequate space for freight vehicle parking, loading, and emergency response operations
- Providing curb and building access
- Managing demand

Other Common Challenges

- Selecting an appropriate design vehicle
- Providing adequate space for large vehicle turns
- Reducing conflicts with vulnerable roadway users
- Safely reducing speeds
- Providing network connectivity and redundancy



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Acronyms

Introduction

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Considerations

- 3.1 Selecting an Appropriate Design and Control Vehicle
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 - 3.7.2 Vertical Clearance Zone
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4 Demand Management Strategies

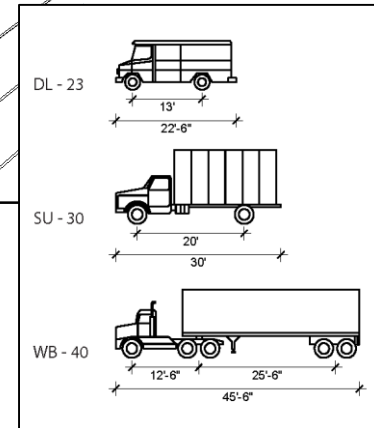
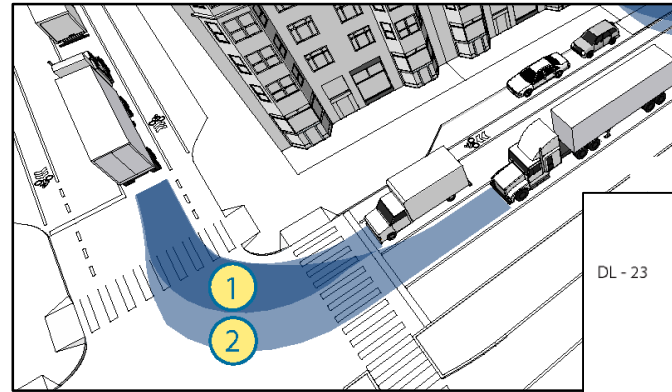
- 4.1 Off-hour Deliveries
- 4.3 Lockers and Pick-up Points
- 4.2 Urban Consolidation Centers
- 4.4 Secondary Referral Services
- 4.5 Building Sprinklers

5 Additional Resources

6 Credits

Freight Design/ Control Vehicle Selection

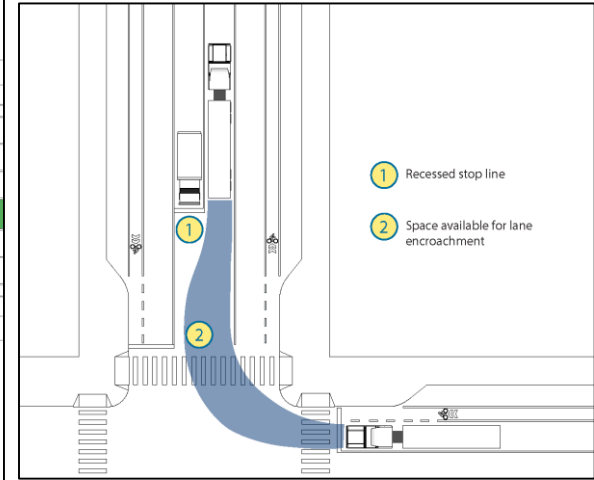
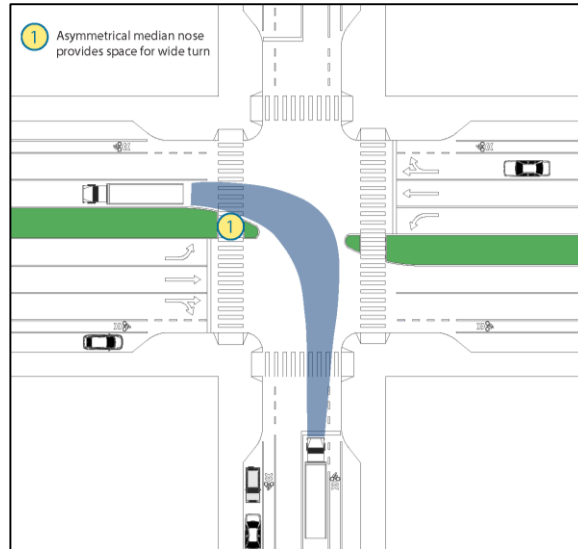
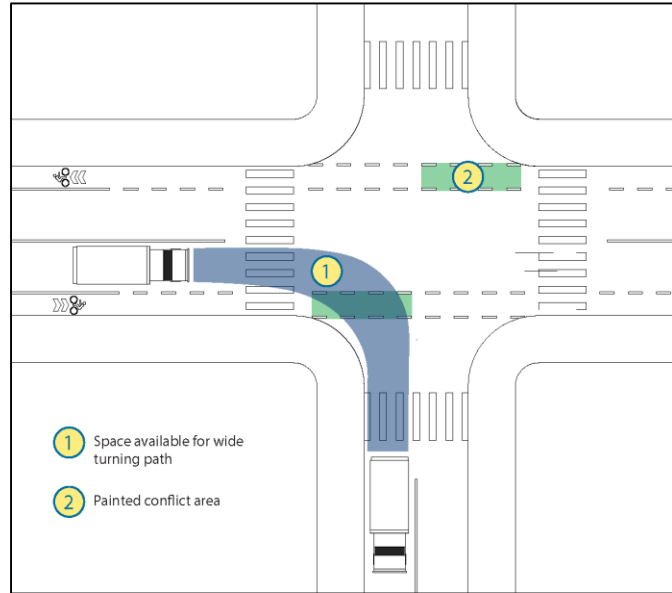
- Current/expected freight trip generating land uses
- Street functional classes and network designations
- Applicable truck size and weight regulations
- Current/expected freight traffic flows
- Historic incident data involving freight vehicles



Large Vehicle Turns

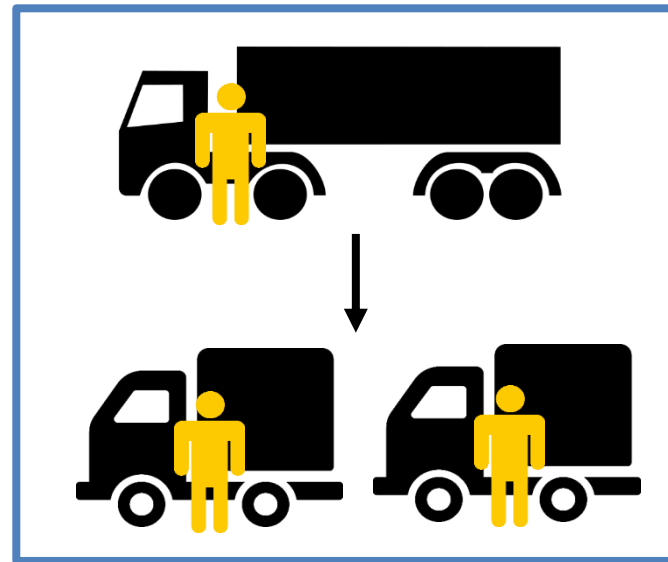


Design Solutions



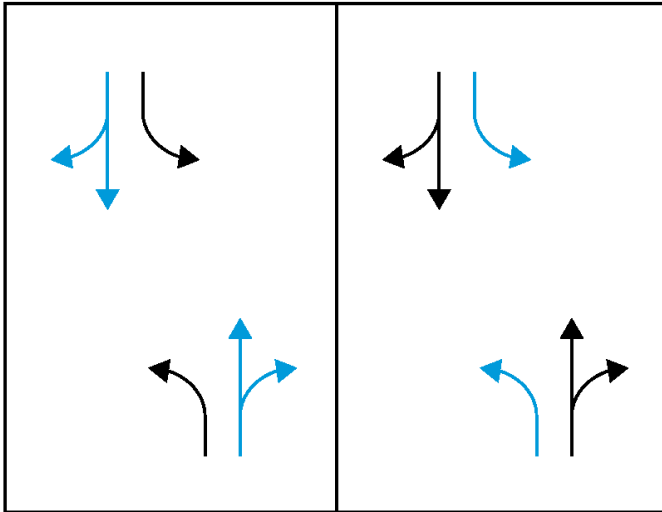
Regulatory Solution: Vehicle Size Restrictions

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

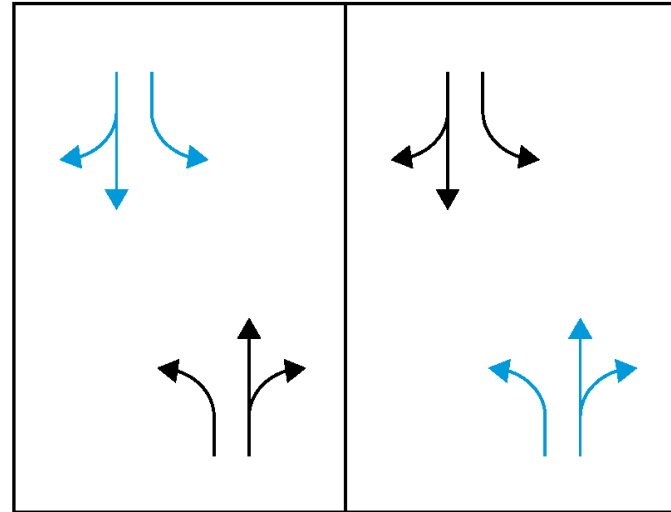


Operational Solution: Dedicated Signal Phases

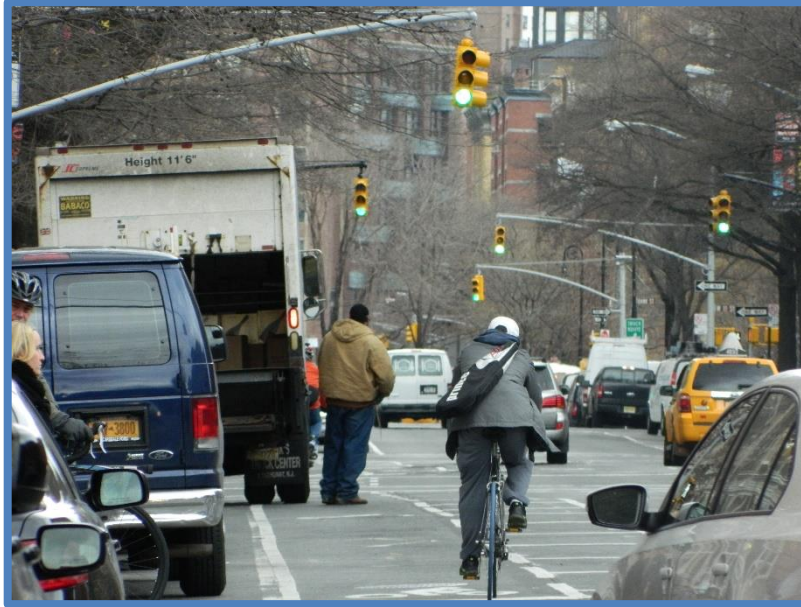
1 Separated turn phases



2 Separated directional movement phases



Conflicts with vulnerable road users



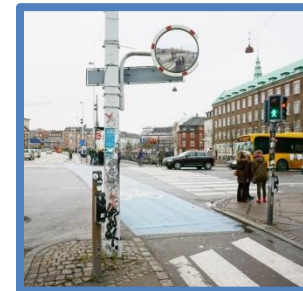
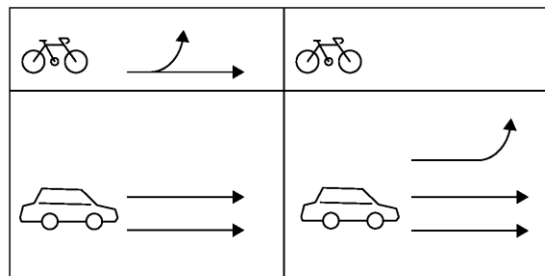
Design Solutions: Bike Infrastructure, Clear Identification of Conflict Zones



Operational Solutions: Dedicated Signal Phases and Roadside Mirrors

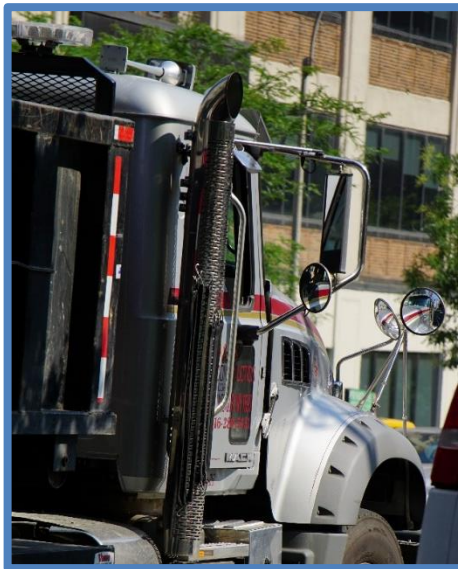
1 Leading bicycle phase

2 Vehicle turning phase



Vehicle-Based Solutions

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



Experiential Education

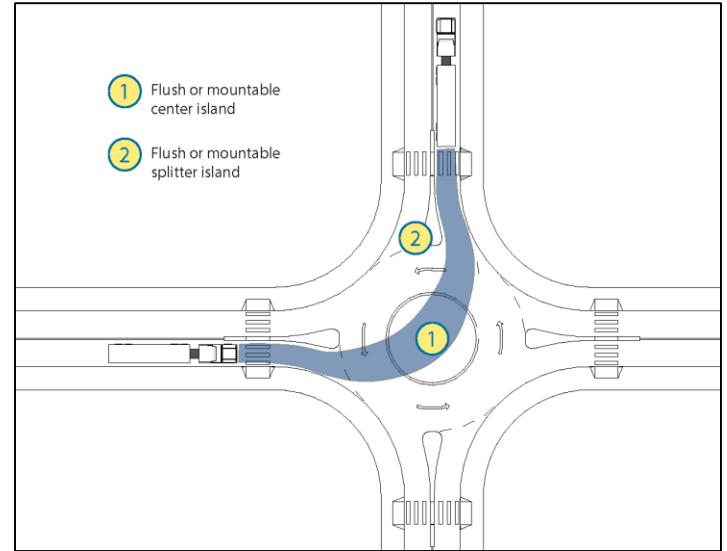
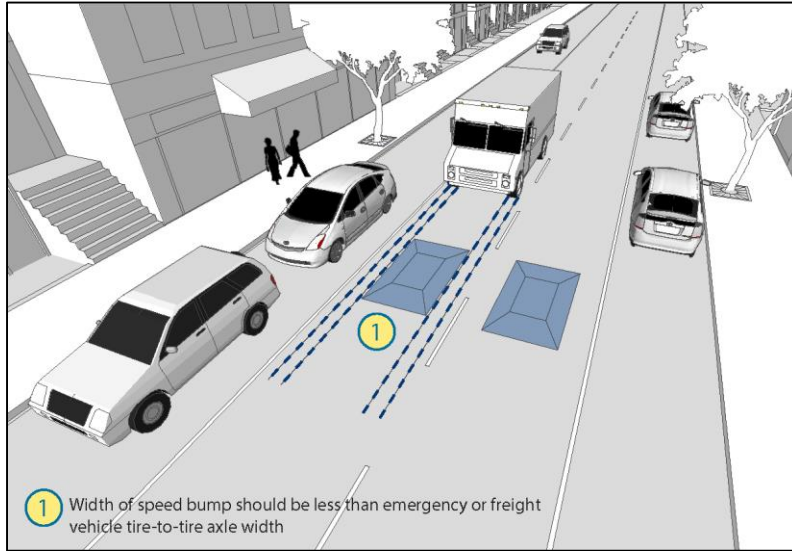
- Drivers
- Non-motorized travelers
- General public



Speed Reducers



Design Solutions



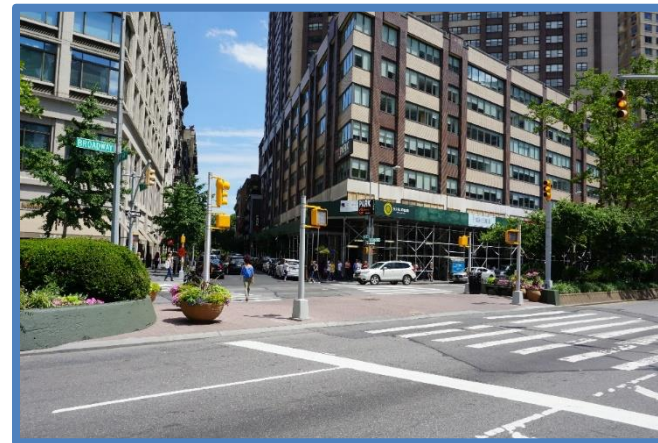
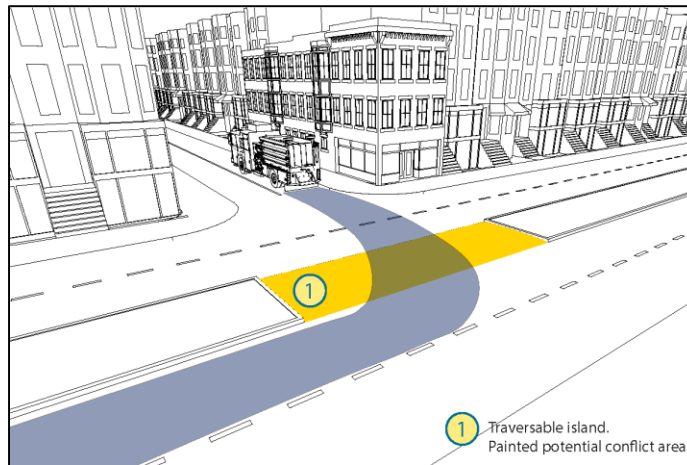
Network connectivity/ redundancy

- Change in street direction
- Non-traversable median
- Removal of bypass lane (e.g. two-way left turn)
- Difficult to navigate street infrastructure

Design Solutions

- Redundant Networks
 - Short blocks/frequent intersections
 - Reasonable alternative routes

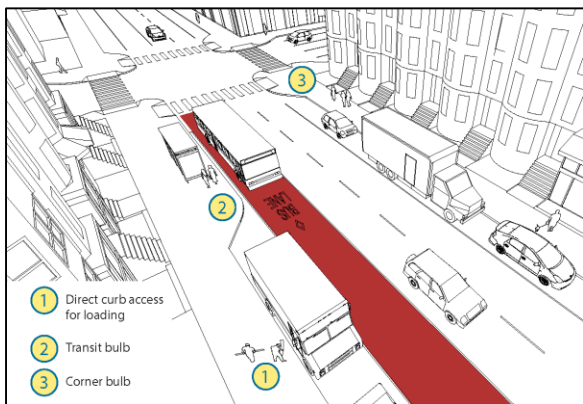
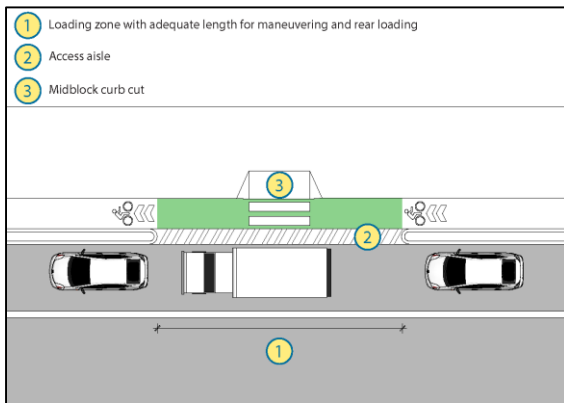
- Mountable medians



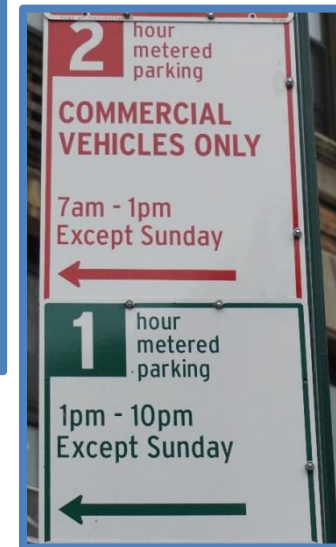
Space for parking, loading, and delivery



Design Solutions



Regulatory Solutions

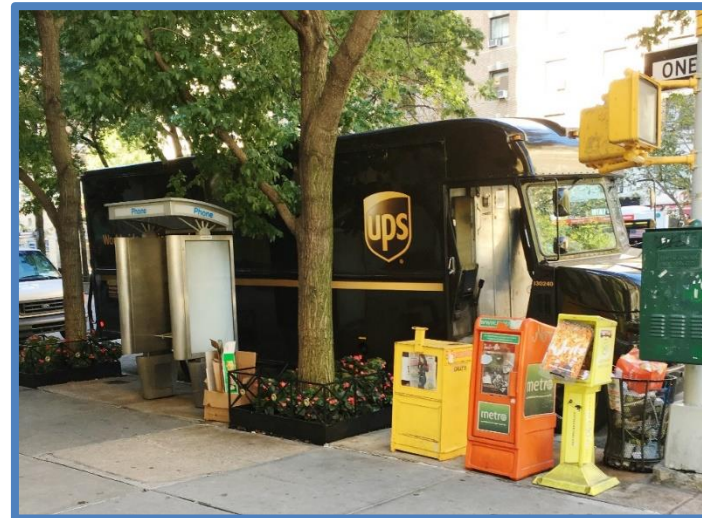


Operational Solutions

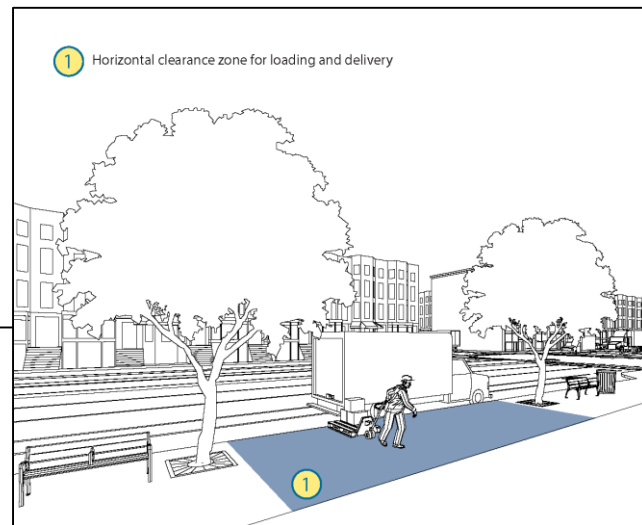
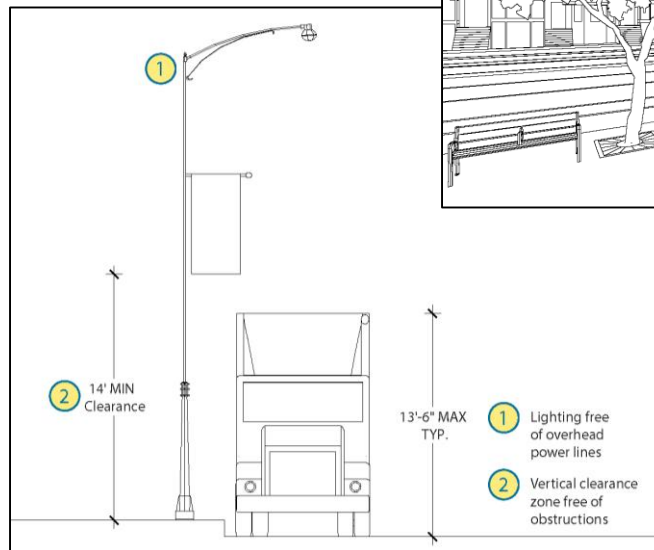
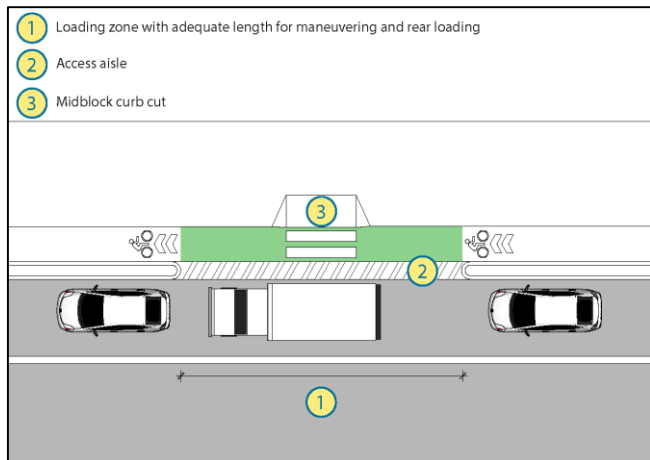
- Building Delivery Management
 - Centralized delivery location
 - Secure storage room
 - Lockers
 - Loading dock appointment system
- Enforcement
 - Commercial vehicles
 - Loading zone obstructions



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

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"> • Avoid expensive last mile costs 	<p>For operator:</p> <ul style="list-style-type: none"> • Increase costs for transloading • Lose final delivery visibility
	<p>For business:</p> <ul style="list-style-type: none"> • May provide value added services • May improve reliability 	<p>For business:</p> <ul style="list-style-type: none"> • May have to pay premium for services
	<p>For neighborhood:</p> <ul style="list-style-type: none"> • Reduce large vehicle trips • Reduce demand for parking • Reduce emissions 	<p>For neighborhood</p> <ul style="list-style-type: none"> • May increase local VMT • May require public subsidy for start-up, operations

Lockers and Pickup Points

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

For more information

Go to METRANS.org

- The Complete Streets Considerations for Freight and Emergency Vehicles Guidebook
- Module 1 – Intro to Freight
- Module 2 – Intro to Emergency Services
- Module 3 – Street Design and Management Approaches



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