

Demystifying Urban Curbside Freight Management

A Strategic Incremental Approach from Washington, D.C.

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Overview

Literature review

DDOT's Strategic Implementation Approach to Curbside Freight Management

- Previous curbside freight management efforts in the District
- Current curbside freight management efforts in the District
- Future curbside freight management efforts in the District

Conclusions and next steps

Literature Review

Monitoring use of loading zones and mapping locations

Moving the location of loading zones

Modifying prices and time limits

Adjusting delivery windows and encouraging off-peak deliveries

Providing advanced parking management systems (loading zone reservations)

Installing green loading zones (loading zones used exclusively by electric trucks)

Efforts across the United States

Previous Curbside
Freight Management in
the District



Current Curbside Freight
Management in the
District



Future Curbside Freight
Management in the
District

DDOT's Strategic Implementation Approach to Curbside Freight Management



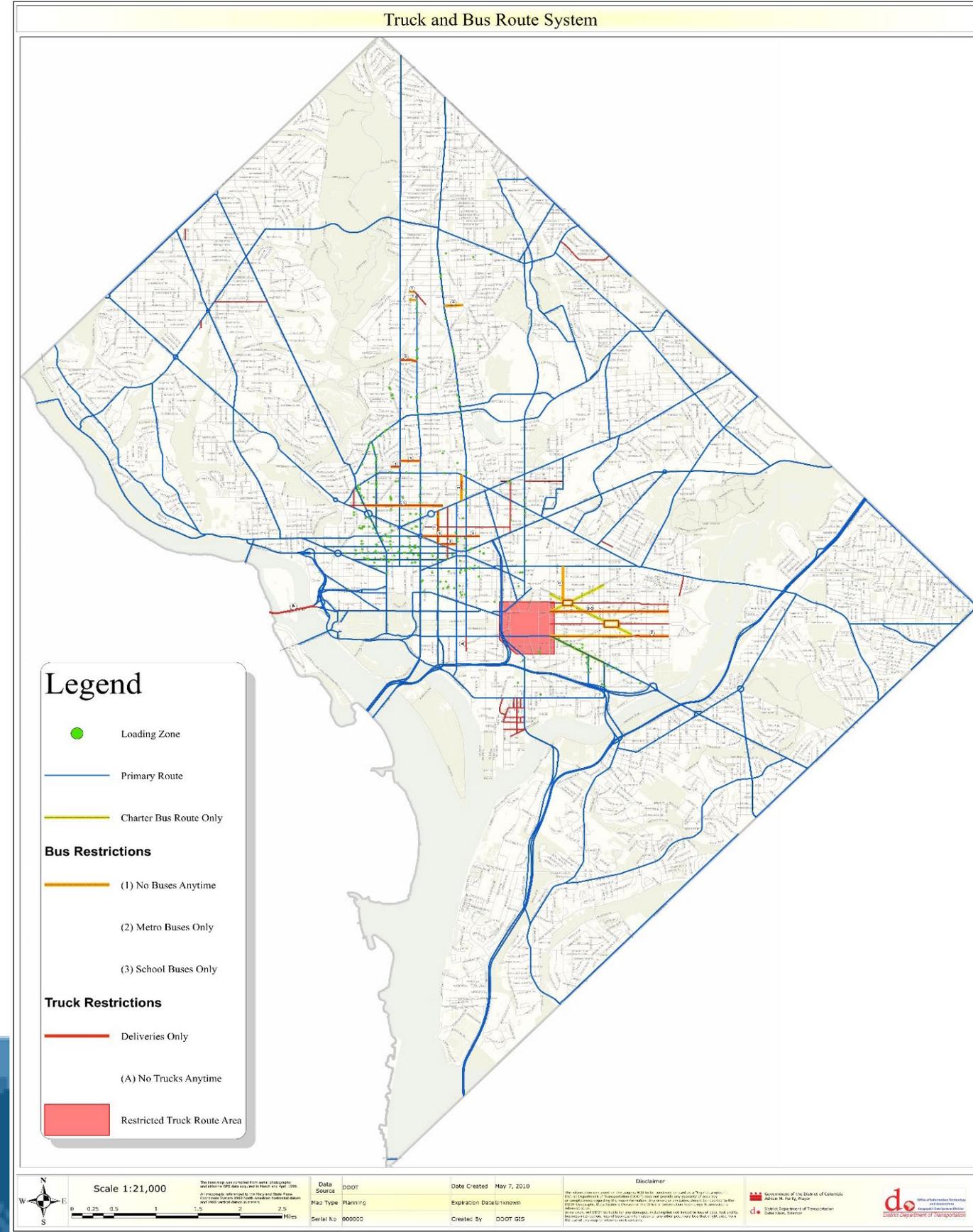
Previous Curbside Freight Management Efforts in the District

Truck and bus route system

Developed in 2010

Identified primary and restricted routes based on:

- Roadway classification
- Planner review
- Industry and community feedback
- Field observations



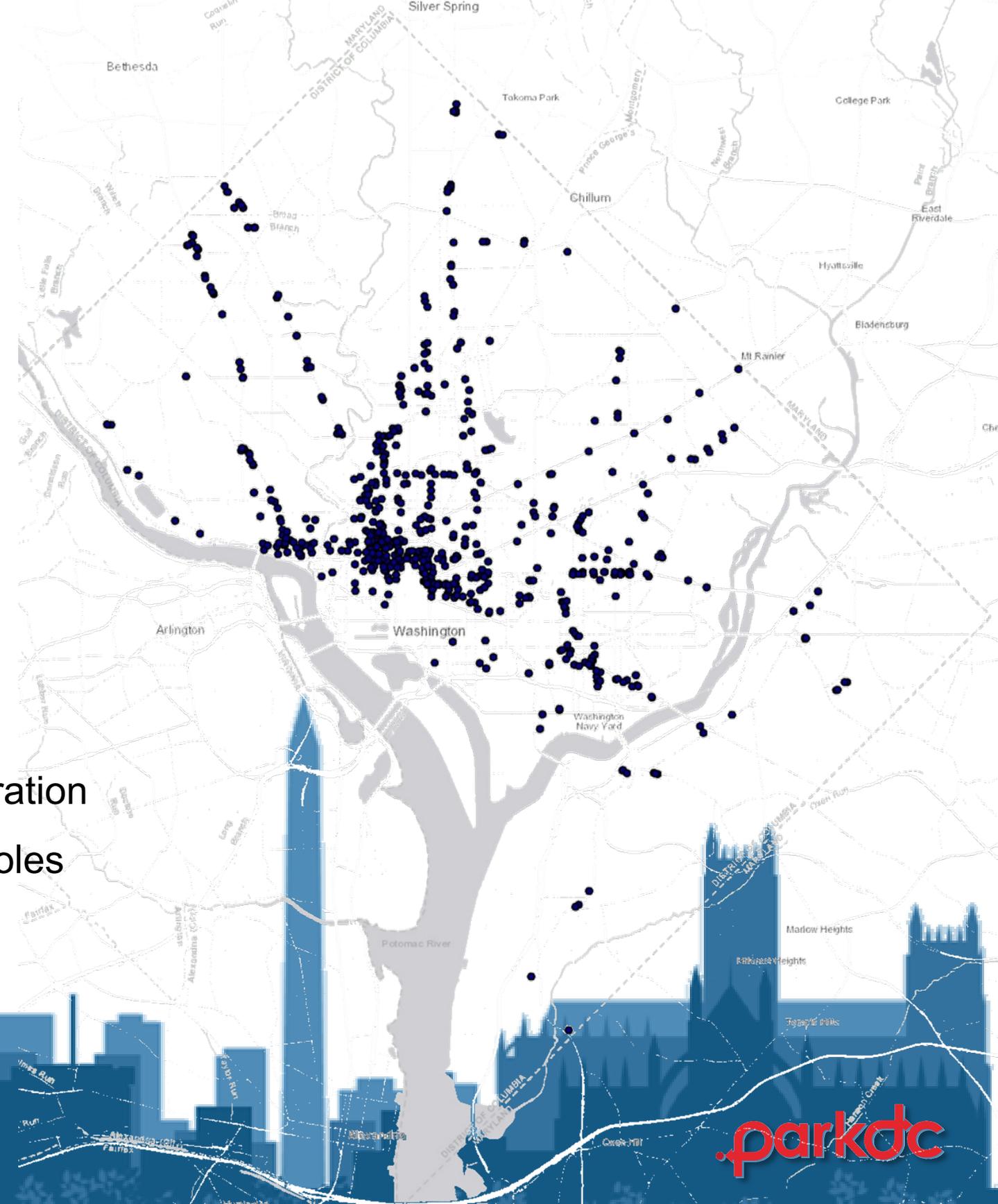
Loading zone inventory

Completed in 2013

Contains information for
580 loading zones in the
District

Includes:

- Closest address
- Length
- Side of street
- Curbside location
- Days and hours of operation
- Pictures of signs and poles

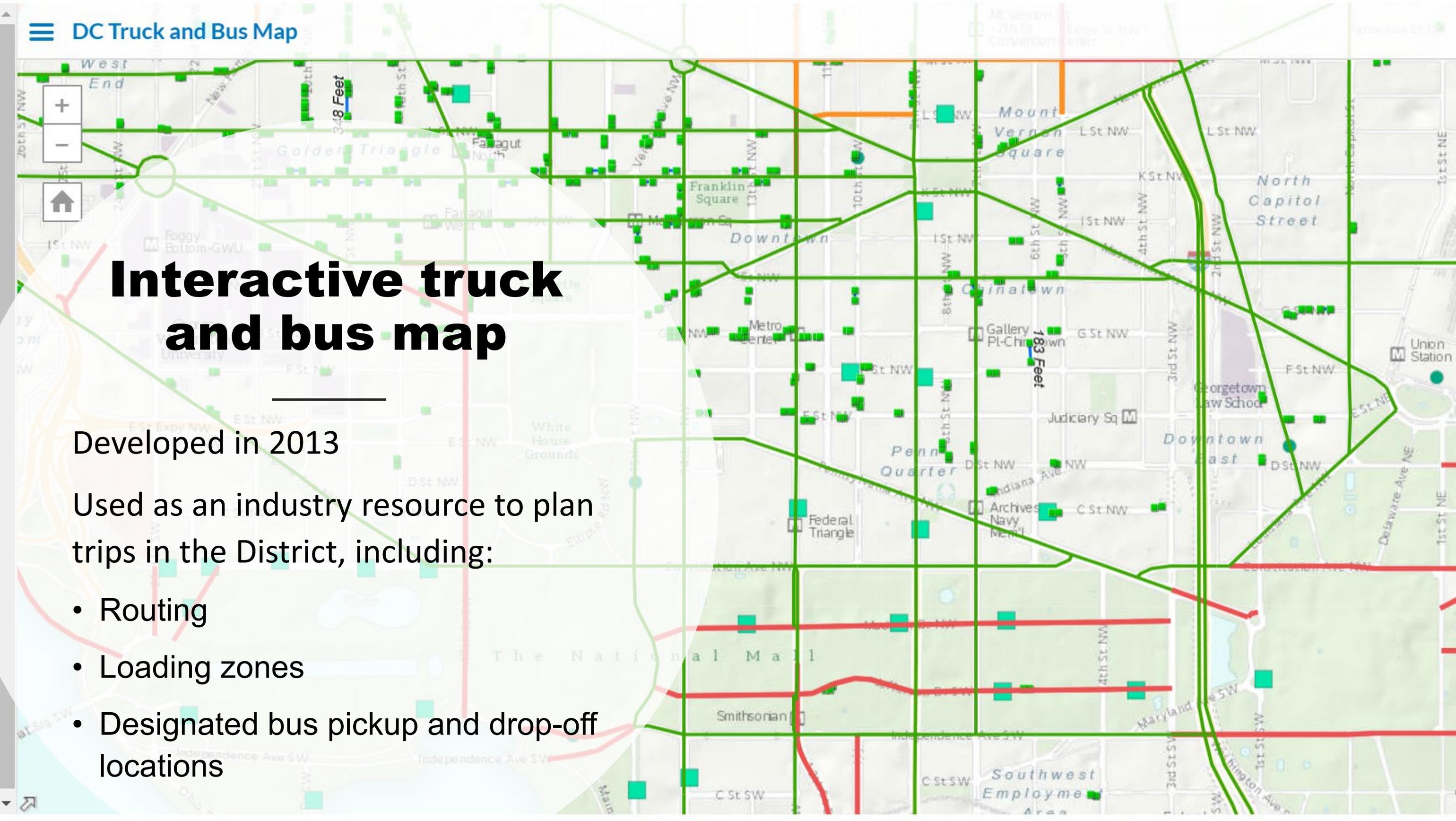


Interactive truck and bus map

Developed in 2013

Used as an industry resource to plan trips in the District, including:

- Routing
- Loading zones
- Designated bus pickup and drop-off locations



Completed in 2014

Freight trip generation model to objectively allocate and evaluate curbside loading zones on a block-by-block basis

DDOT uses the model to respond to loading zone requests, providing a sustainable and repeatable process

The model incorporates:

- Existing loading zones
- Business characteristics
- Zoning requirements
- Delivery pattern data
- Gross freight trip generation (freight trip generation for the entire block face)
- Business and building data
- Average building footage
- Alley access

Loading Zone Allocation Model (LZAM)

Loading Zone Pricing

The District began charging for all curbside loading zones in January 2015

DDOT used an “asset-lite” approach and used pay-by-cell and passes (daily or annual) instead of meters

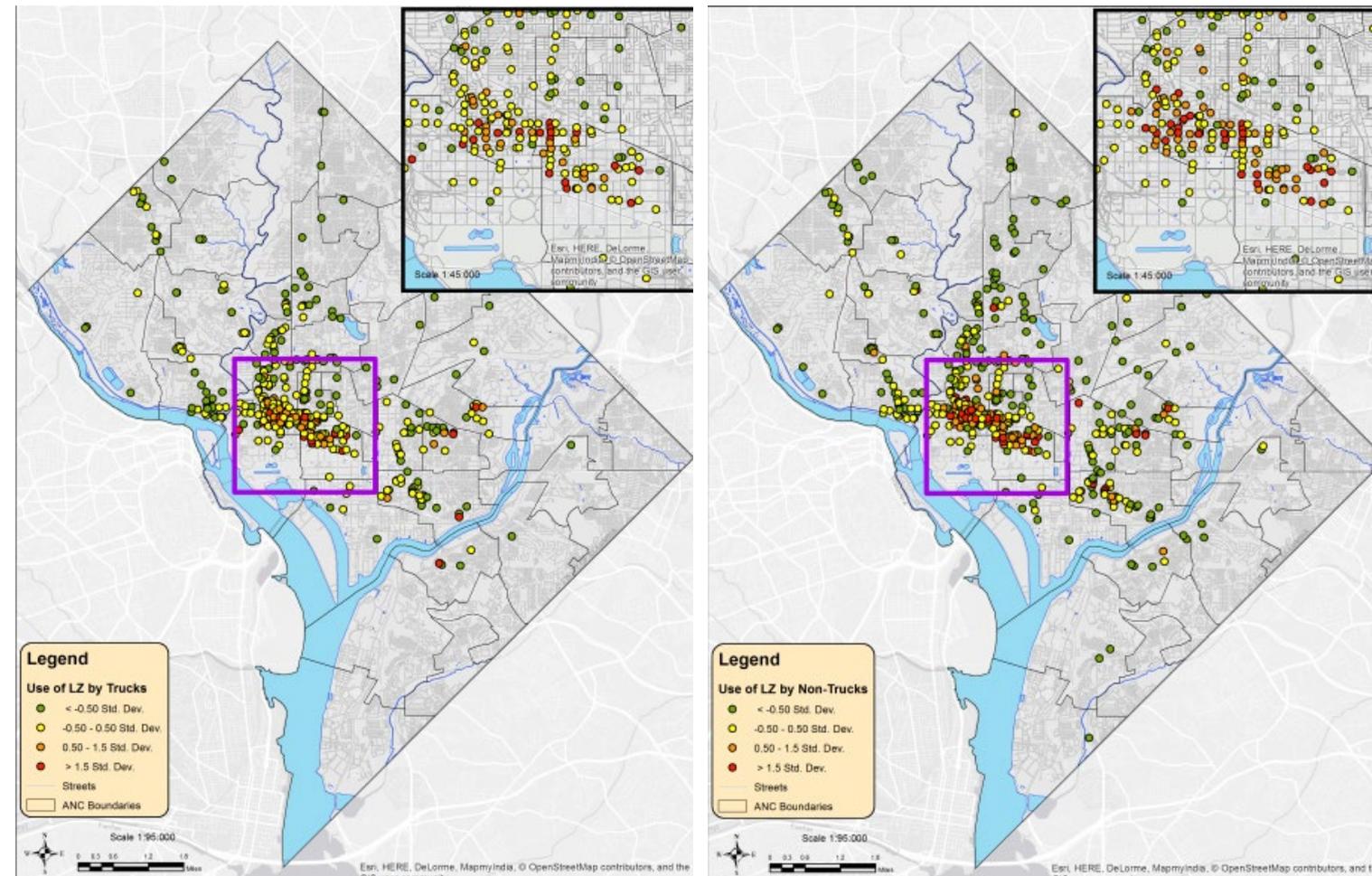
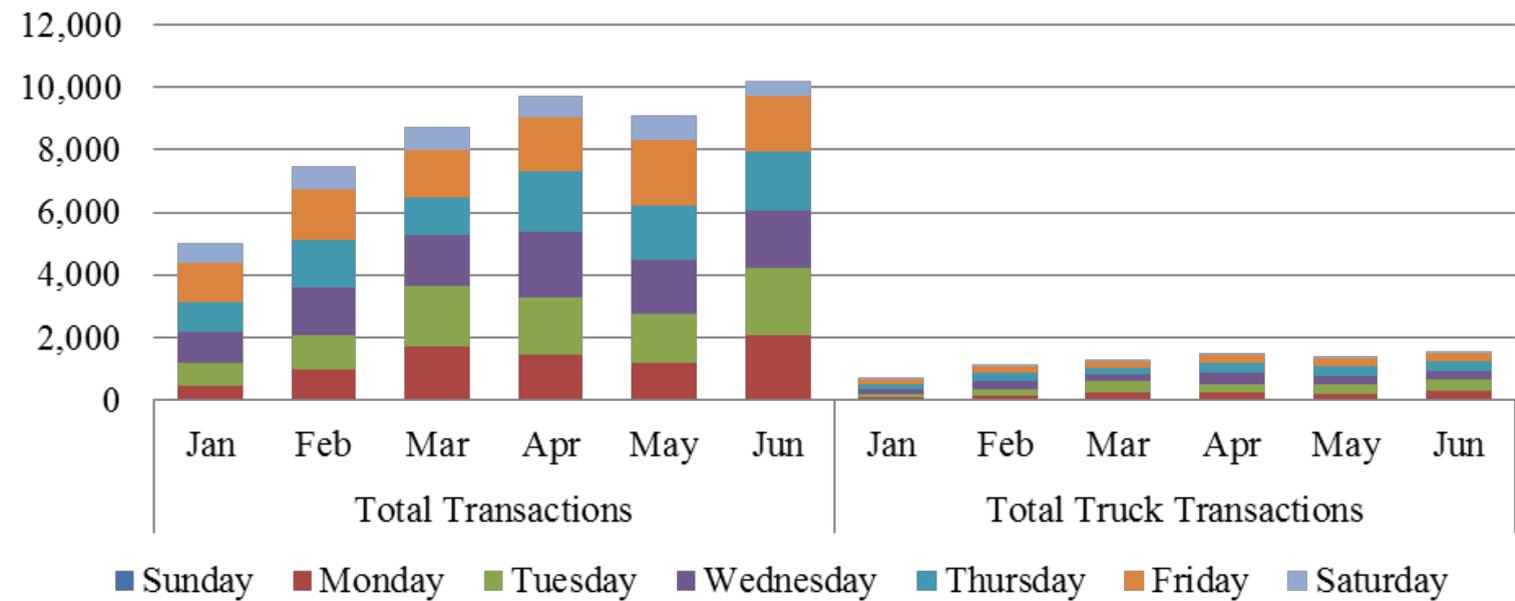
All 580 loading zones received new signs and a unique pay-by-cell identification number

DDOT does not have a mechanism for collecting data on the use of loading zones by commercial vehicles with annual or day passes

Pay-By-Cell Data Review

After loading zone pricing was implemented, DDOT reviewed the pay-by-cell data to identify the effectiveness:

- Usage of loading zones **increased as the program matured**, with the **use by non-trucks becoming apparent**
- The density of both truck and non-truck loading-zone activity is **concentrated in the Central Business District**, consistent with the concentration of commercial activity
- Of the 532 loading zones registering non-truck transactions, **35 were identified to have significant** (more than two standard deviations) **non-truck parking activity**
- **86% of transactions at loading zones were from non-truck vehicles** (including vehicles parked in loading zones legally when the loading zone is not in operation, and vehicles parked in loading zones illegally when the loading zone is in operation)



Distribution of Truck Transactions by Load Zone

Distribution of Non-Truck Transactions by Load Zone

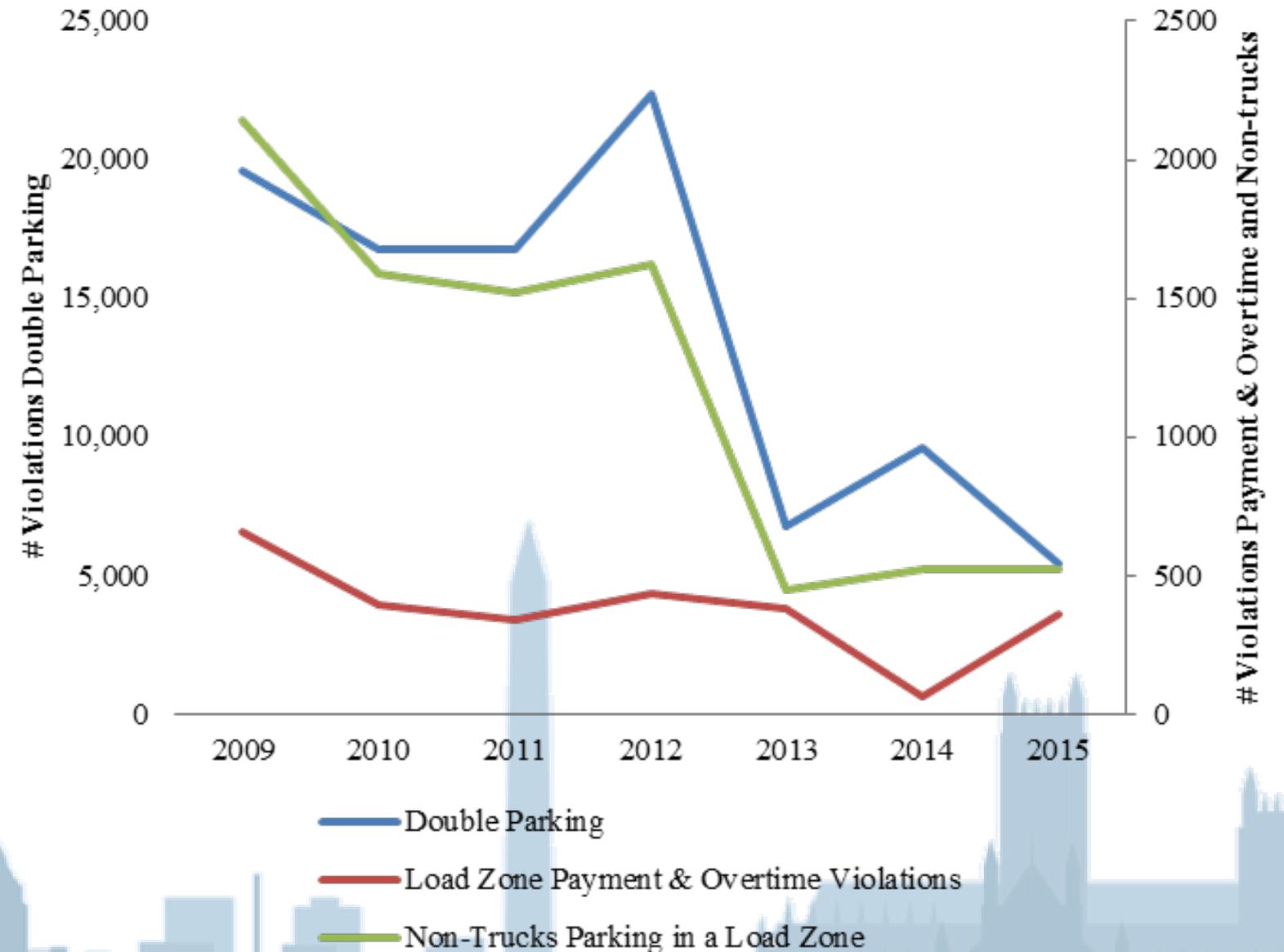
Parking Violation Data Review

The number of violations related to loading zones decreased from 2013 to 2015 compared to the number of violations between 2009 and 2012.

- This is likely due to changes in enforcement actions rather than any specific program or initiative pushed by DDOT

Since 2009, double parking is the most common parking violation for trucks.

- Speculatively, this could be attributed to the lack of availability of loading zones due to high PBC transaction density of non-trucks in loading zones



Loading Zone Pricing Lessons Learned

The data confirms that loading zones are often occupied by unauthorized vehicles

This information informed changes in enforcement strategy

These findings helped guide the freight management efforts explored as part of the parkDC: Penn Quarter/Chinatown

Current Curbside Freight Management Efforts in the District

Oversize/ Overweight Vehicle Routing

The District has developed an enterprise routing tool

Allows drivers to enter their truck load and dimension details to identify a route

The tool is embedded in the permitting process, but is available publicly as well

The screenshot displays the RoutePlanner application interface. At the top, there are navigation controls and a URL bar showing <https://routeplanner.ddot.dc.gov/routeplanner/>. Below this is a control panel with tabs for Route, Permit, Dimensions, View, and Options. The Dimensions tab is active, showing input fields for Height (13' 6"), Width (8' 6"), Length (75' 0"), and Weight (80000 lbs). The View tab shows options for Vehicle, Restrictions, and Help. The Options tab includes Reset All and Avoid Interstates. The main interface is split into a left sidebar and a right map area. The sidebar contains a 'Routing' section with a 'Generate' button and a list of driving directions to '55 M ST SE, WASHINGTON, DC' with a travel estimate of 8.3 mi. The map area shows a pink route starting from 'WISCONSIN AVE NW @ WESTERN AVE @ MD State Line' and ending at '55 M ST SE, WASHINGTON, DC'. The map includes various landmarks and streets in Washington, DC.

Route: Path
WISCONSIN AVE NW @ WESTERN AVE @ MD State Line
55 M ST SE, WASHINGTON, DC

Generate

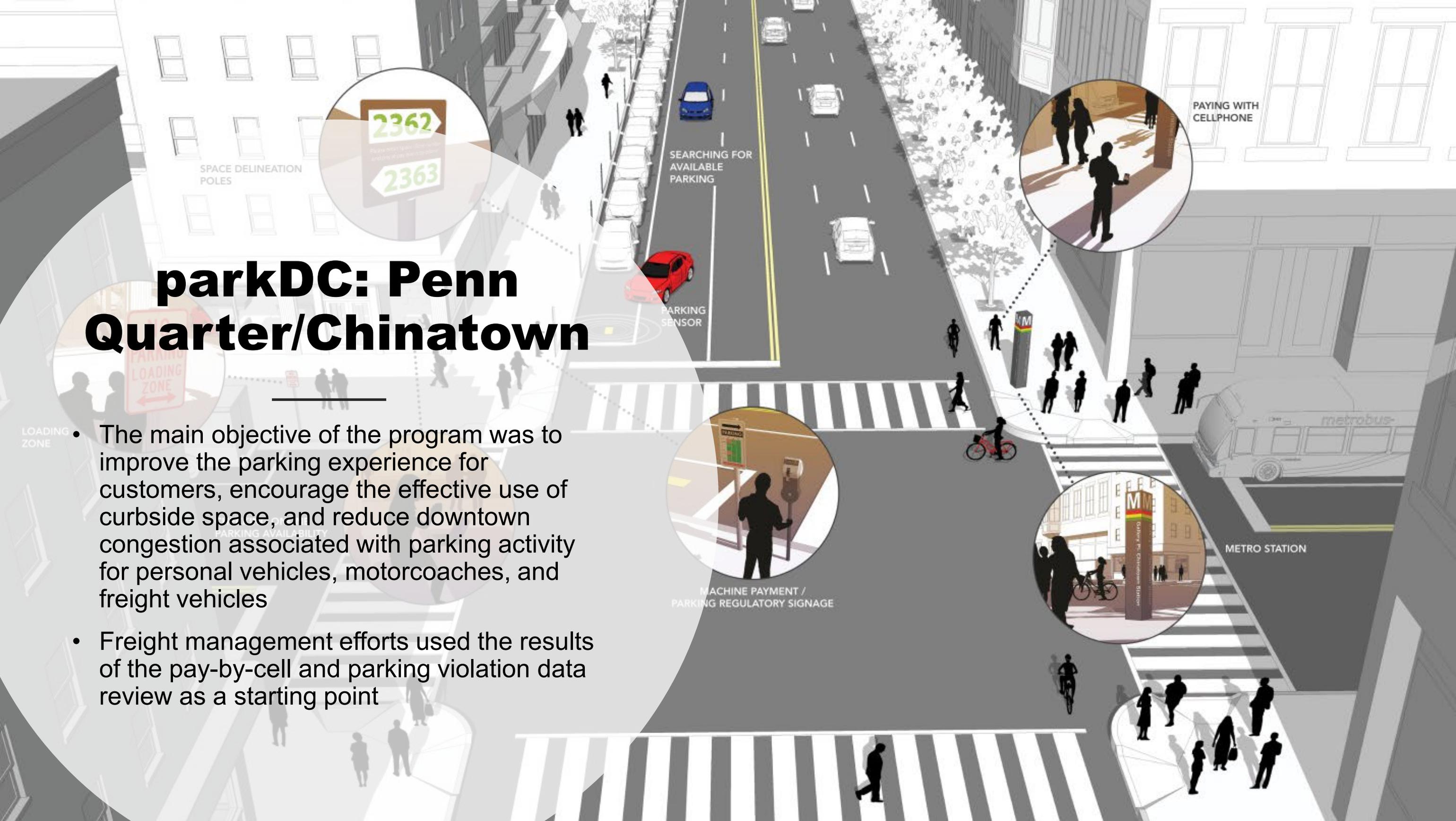
Driving directions to **55 M ST SE, WASHINGTON, DC**
Travel estimate: **8.3 mi**

WISCONSIN AVE NW @ WESTERN AVE @ MD State Line

1	Start on WESTERN AVE	84.2 ft
2	Turn RIGHT onto Wisconsin Ave NW	2.3 mi
3	Turn RIGHT onto Cathedral Ave NW	182.1 ft
4	Make a U-TURN onto Massachusetts Ave NW	1.7 mi
5	MASSACHUSETTS AVE NW	334.4 ft
6	Turn RIGHT onto Massachusetts Ave NW	96.9 ft
7	Continue onto Massachusetts Ave NW	0.3 mi
8	Turn RIGHT onto Massachusetts Ave NW	76.6 ft
9	Continue onto Massachusetts Ave NW	557.6 ft
10	Bear RIGHT onto Massachusetts Ave NW	323.7 ft
11	Continue onto Massachusetts Ave NW	1.0 mi
12	Make a U-TURN onto Massachusetts Ave NW	167.2 ft
13	Turn RIGHT onto 9TH St NW	153.1 ft
14	Continue onto 9TH St NW	153.0 ft
15	Turn LEFT onto K St NW	324.5 ft
16	Continue onto K St NW	264.7 ft
17	Continue onto Massachusetts Ave NW	615.9 ft
18	Turn RIGHT onto 6TH St NW S	218.5 ft
19	Continue onto 6TH St NW S	0.6 mi
20	Turn LEFT onto Pennsylvania Ave NW	392.6 ft
21	Continue onto Pennsylvania Ave NW	0.2 mi
22	Turn RIGHT onto 3RD St NW	207.6 ft
23	Continue onto 3RD St NW	735.7 ft
24	Continue onto 3RD St SW	444.4 ft
25	Turn LEFT onto Independence Ave SW	153.7 ft
26	Continue onto Independence Ave SW	199.4 ft

parkDC: Penn Quarter/Chinatown

- The main objective of the program was to improve the parking experience for customers, encourage the effective use of curbside space, and reduce downtown congestion associated with parking activity for personal vehicles, motorcoaches, and freight vehicles
- Freight management efforts used the results of the pay-by-cell and parking violation data review as a starting point



parkDC: Penn Quarter/Chinatown Pilot Area

114 block faces (91 with parking meters)

Approximately 900 metered parking spaces

30 loading zones

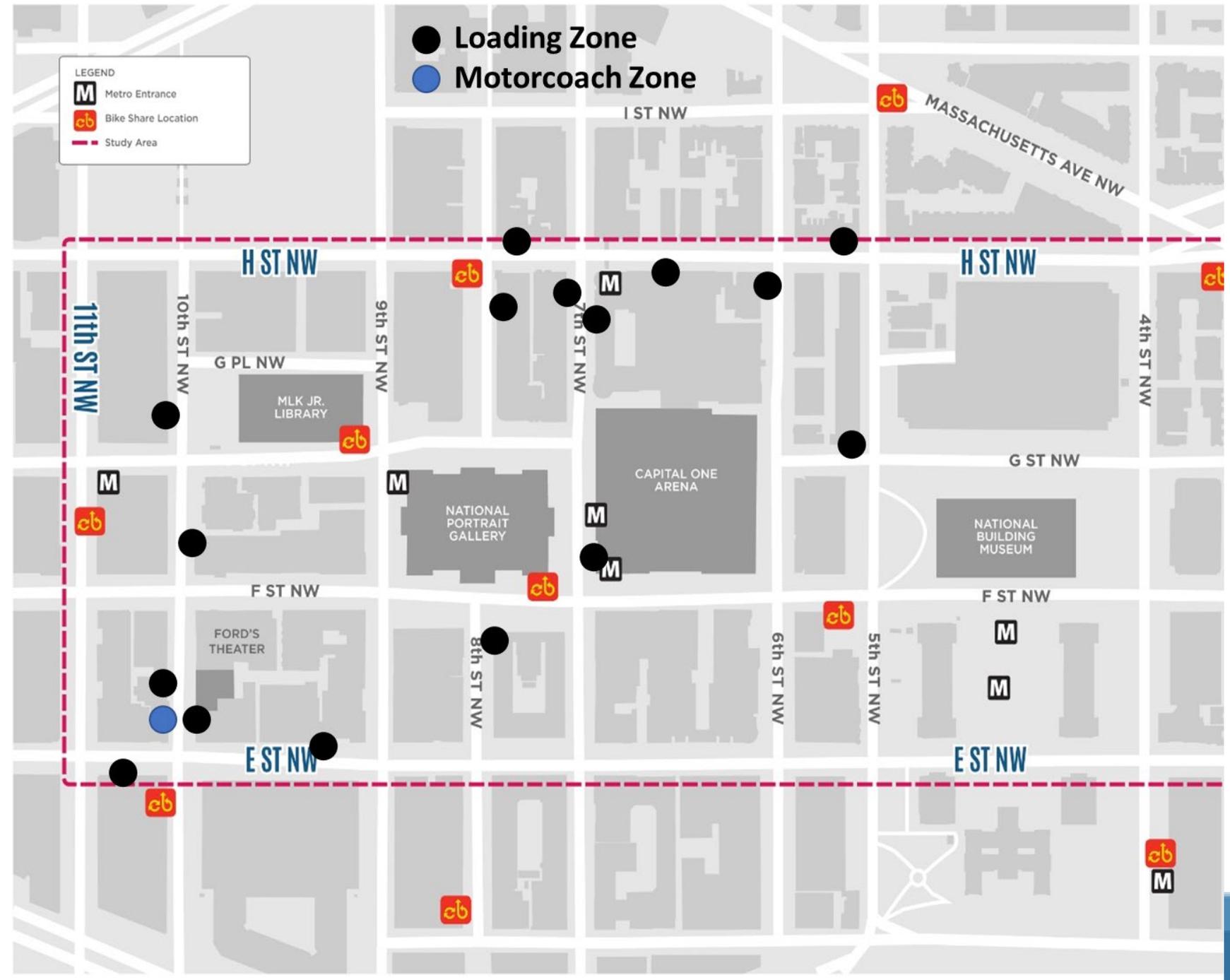
6 Capital Bikeshare stations

2 on-street car-sharing spaces

3 Metrorail stations serving all regional Metrorail lines

Metrobus stops

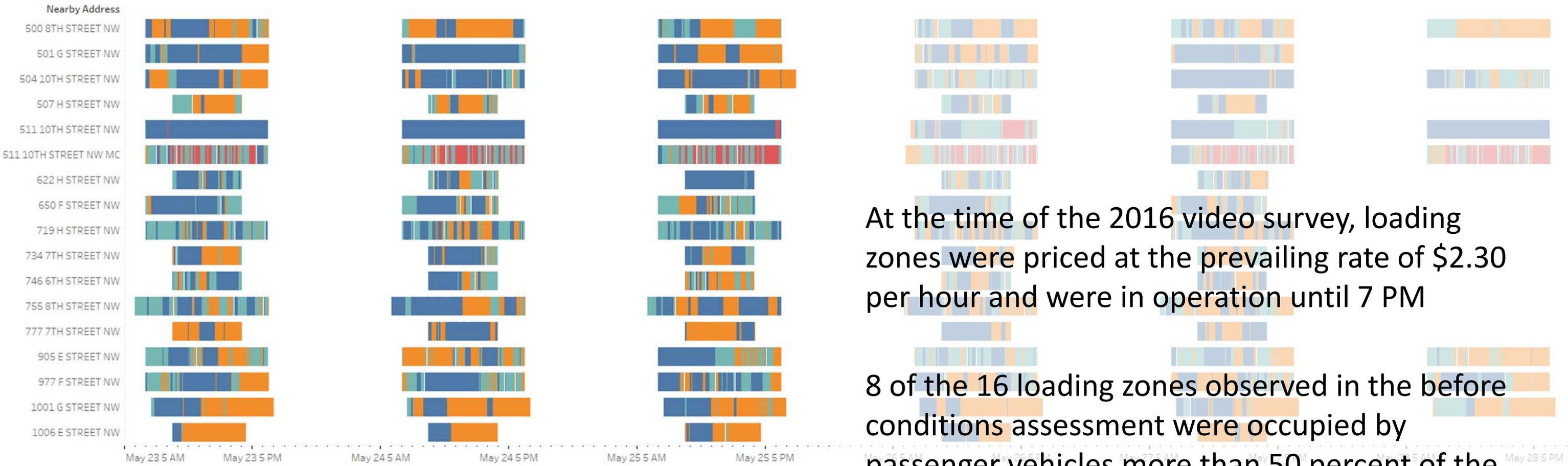
Freeway-arterial interactions to the east of the study area



parkDC Pilot Area Loading Zone Review

- DDOT conducted video surveys using time-lapse cameras
- Review occurred in 2016 before the first demand-based price change and 2017 after the fifth price change
- Collected information on vehicle types, duration of stay, and double parking





Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Bus Commercial Passenger Vacant

parkDC Pilot Area Loading Zone Review

At the time of the 2016 video survey, loading zones were priced at the prevailing rate of \$2.30 per hour and were in operation until 7 PM

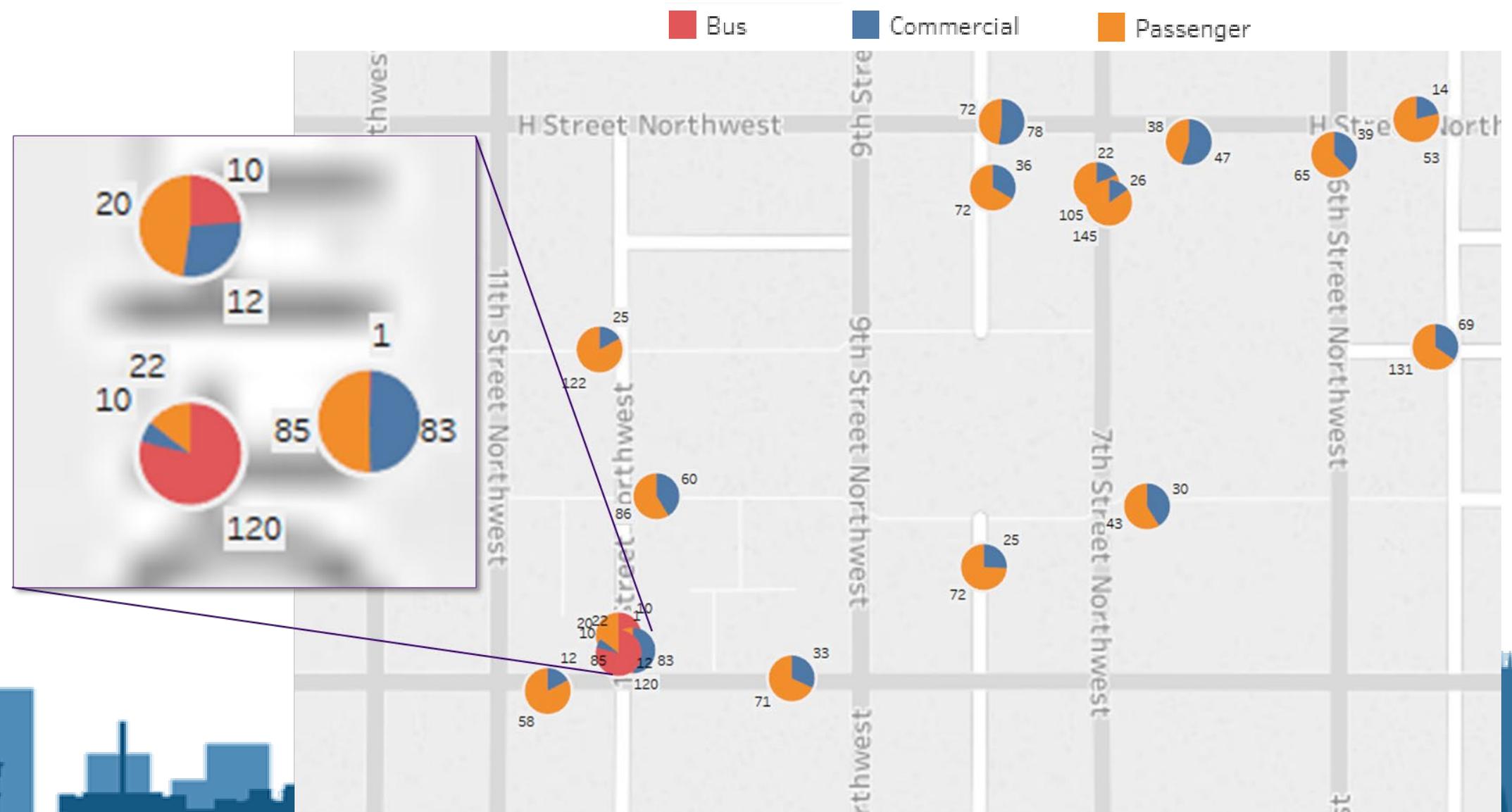
8 of the 16 loading zones observed in the before conditions assessment were occupied by passenger vehicles more than 50 percent of the time they were in operation.

13 of the 16 loading zones experienced a greater number of unique passenger vehicle parking sessions than all other vehicle types.

parkDC Pilot Area Loading Zone Review

The use of loading zones by passenger vehicles is not confined to any one location

Double parking sessions ranged in length from five minutes to eight hours



parkDC Pilot Area Loading Zone Review

DDOT raised the hourly parking rate at all loading zones to match the highest prevailing on-street parking rate on their associated block faces

The price change was intended to serve as a disincentive to passenger vehicles and other unauthorized users

Loading zone hours of operation were extended from 7 PM to 10 PM

The extended hours of operation were intended to improve accessibility for delivery vehicles attempting to access the study area during off-peak hours

DDOT choose not to take other actions to **prevent negative public feedback**

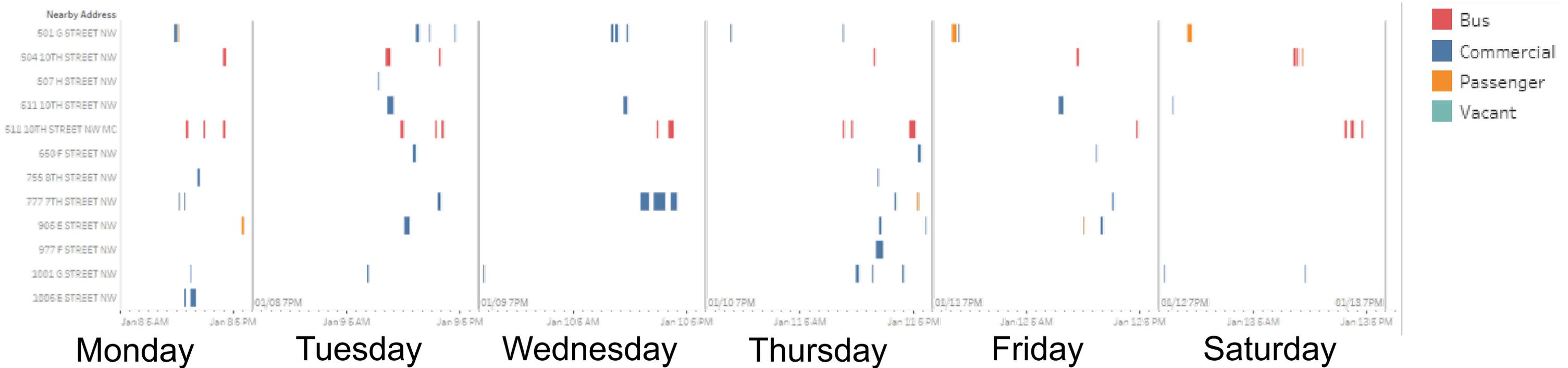
parkDC Pilot Area Loading Zone Review

2017 “After” data collection

- The number of unique instances of double parking increased by 13% after prices increased
- The total amount of time vehicles spent double parking decreased by 43%

	Minutes Before (August 2017)	Minutes After (March 2018)	Percent Change (%)
504 10th Street, NW	463.7	5.0	-99%
511 10th Street, NW	398.6	100.0	-75%
905 E Street, NW	125.0	80.0	-36%
501 G Street, NW	110.0	115.0	5%
719 H Street, NW*	64.9		
511 10th Street, NW (MC)*	55.1		
746 6th Street, NW*	35.1		
977 F Street, NW	30.0	40.0	33%
1006 E Street, NW	20.1	40.0	99%
500 8th Street, NW*	15.0		
755 8th Street, NW	15.0	20.0	33%
777 7th Street, NW	15.0	225.0	1400%
650 F Street, NW	5.0	45.0	800%
1001 G Street, NW*		65.0	
507 H Street, NW*		5.0	
Total Minutes (only values with data in both time periods)	1182.4	670.0	-43%
Average (only values with data in both time periods)	131.4	74.4	

Vehicles Observed Double Parking (After Data)



Vehicles Observed Using Loading Zones (After Data)



Future Curbside Management Efforts in the District

Future curbside management efforts in the District

- Increased and targeted loading zone enforcement
- Increased disincentives for violations
- Expand value pricing to stadium zone
- Data-driven modifications to the loading zone program
- Pilot separating zones for service vehicle parking and commercial deliveries
- Update loading zone maps & migrate to integrated sign management platform
- Install signage along truck routes for better wayfinding
- Strategy for dealing with on demand deliveries

Conclusions

Conclusions

- Data shows that loading zones are often occupied by unauthorized vehicles
- DDOT will continue to improve data collection through programmatic changes
- Conduct a more detailed evaluation to better manage loading zone activity and curbside space allocation
- Restricting pay-by-cell transactions in loading zones to legitimate vehicles is a DDOT priority, although technological and logistical hurdles remain

Thank You

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