

16TH STREET NW TRANSIT PRIORITY



Planning Study

Citizens Advisory Group Meeting No. 2

August 18, 2015



Agenda

1. Introduction
2. Data Sources
3. Transit Existing Conditions
4. Next Steps
5. Discussion

INTRODUCTION

Study Area

Primary Study Area

- 16th Street NW from H Street to Arkansas Avenue

Secondary Study Area

- Bounded by 14th Street, 18th Street, Taylor Street and H Street



Project Timeline



The diagram consists of four dark blue chevron-shaped boxes pointing to the right, arranged in a horizontal sequence. Each box contains a white text label representing a project phase. The boxes are connected by white gaps, and the entire sequence is set against a white background.

Project Kickoff

Data Collection & Analysis

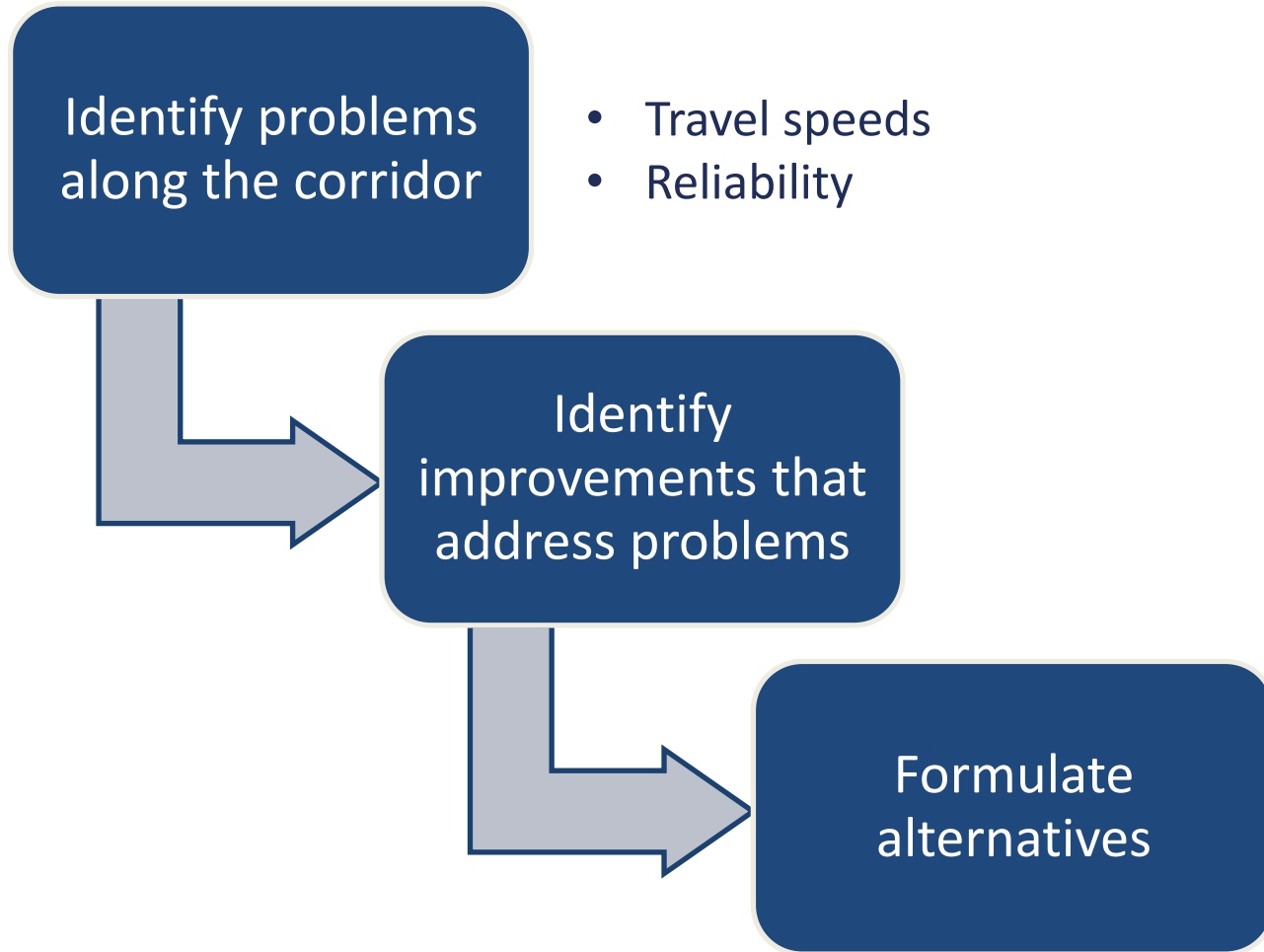
Alternatives Development

Selection of Preferred Alternative

Recap from Last Meeting

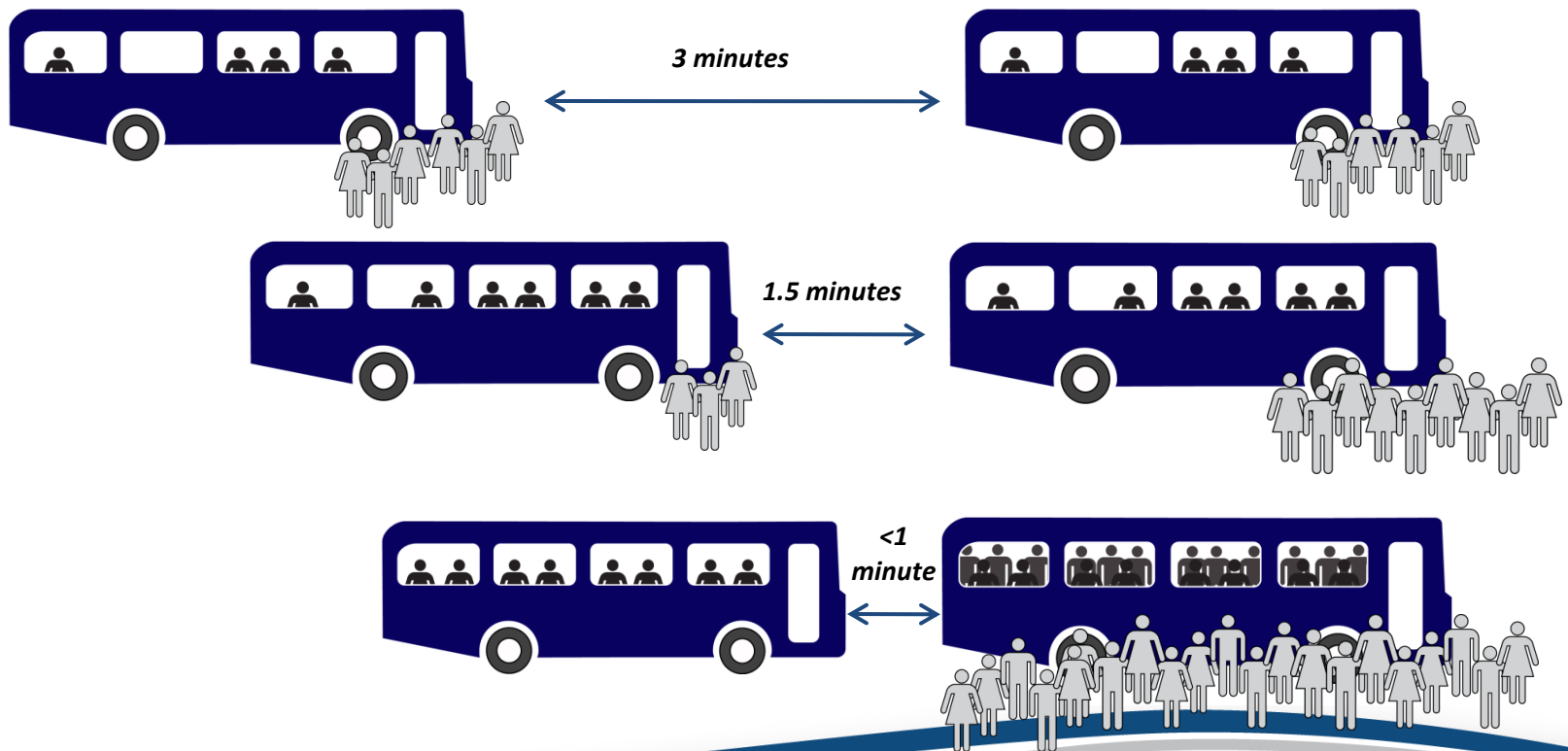
- Existing Conditions Transit Data
 - Additional data collected in June
- Multimodal Traffic Analysis
 - Updated over the summer to incorporate Downtown Signal Optimization
- Public Kick Off Meeting
- Physical Conditions Assessment

Overall Process



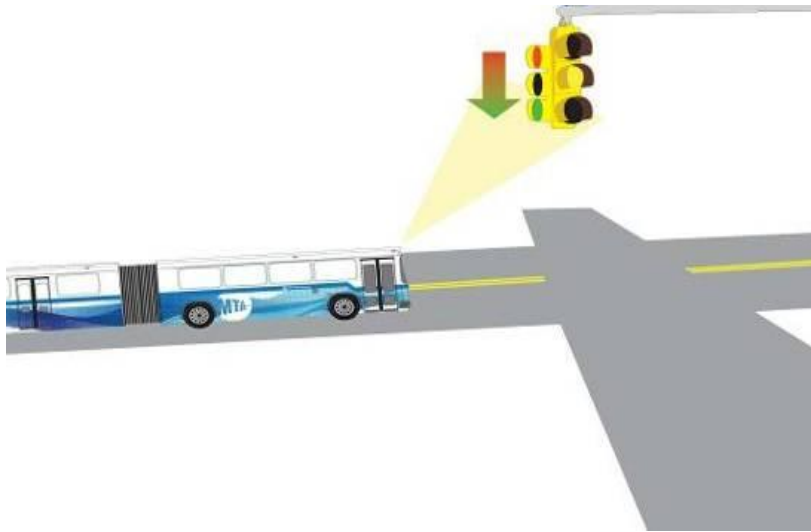
Stop Dwell / Doors Open Time?

- Off-board fare collection
- All-door boarding



Signal Delay?

- Signal priority
- Queue jump opportunities

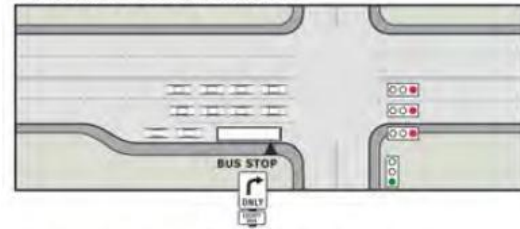


Slow Travel?

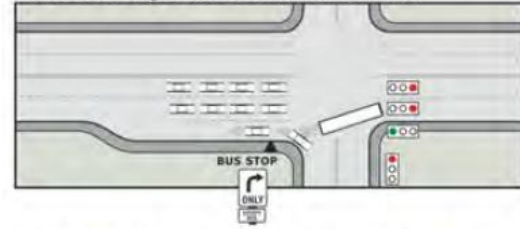
- Strategic use of bus lanes
- Queue jump opportunities



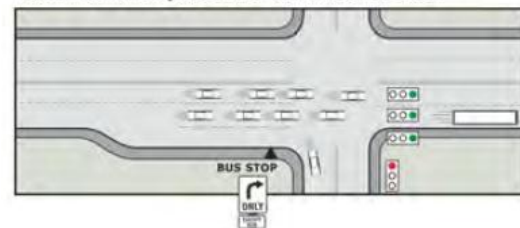
Passengers board during red



Bus receives green before other vehicles



Other vehicles proceed a few seconds later



SOURCE: Kittelson & Associates, Inc.

Enforcement?

- Automated Enforcement



Other Improvements?

- Service Plans
- Articulated Buses
- Number & Location of Bus Stops



Development of 3 Alternatives

Physical Improvements

- Bus lanes
- Queue jumps
- Bus stop relocation and access improvements

Operational Improvements

- Automated enforcement
- Transit signal priority
- Bus zone improvements
- Traffic operations
- Parking restrictions

Service Improvements

- Simplify service patterns
- Off-board fare payment
- All-door boarding
- Stop consolidation
- Skip-stop service
- Fleet changes

DATA SOURCES

Primary Transit Data

- AVL/APC Data (WMATA)
 - October to December 2014
- On-Board Data
 - March and June 2015
 - Doors Open Times
 - Other Delays
 - Boardings and Alightings

Additional Transit Data

- Study Area Bus Lines Patterns
- Frequency by Line by Hour
- Scheduled Service Spans
- Scheduled Miles Hours Trips History
- Stop by Route/Line Variation
- Average Weekday Boardings and Alightings
- Ridership by Time Period
- Transfers
- Bus Loading and Loading Duration
- On-Time Performance
- Time Distance - Typical Days and Monthly Average
- Headway Variation - Reliability
- Travel Speed By Time of Day and Segment

Multimodal VISSIM Model Data

- Multimodal Counts and Signal Timing
 - Provided by DDOT TOA
 - Incorporated April Downtown Signal Optimization
- Bus Operations
 - Dwell times taken from on-board data
 - Frequency based on published schedule

Additional Data

- Pedestrian access and safety
- Roadway configuration and curbside uses
- Bus stop zones and amenities

TRANSIT EXISTING CONDITIONS

Corridor-Level Findings

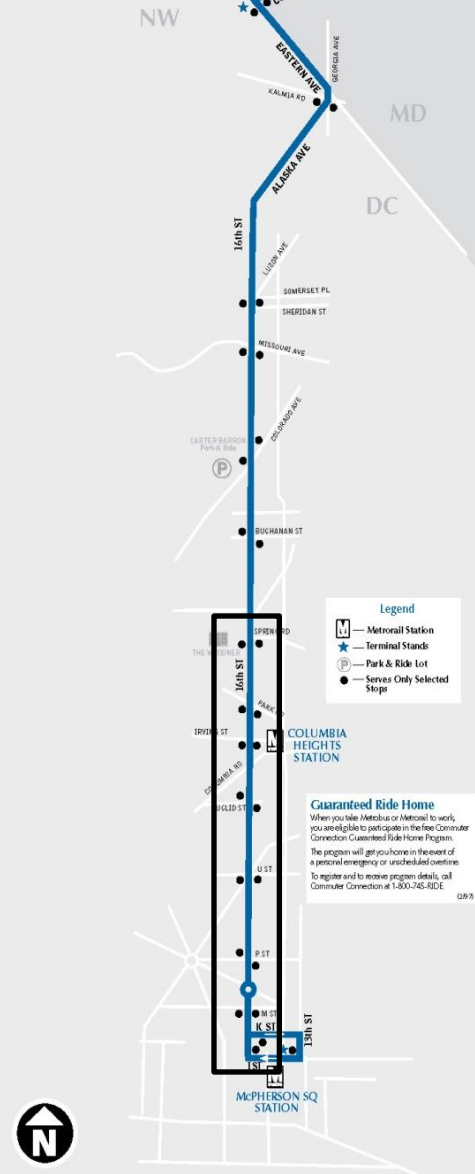
1. Bunching
2. Total Trip Times
3. Travel Speeds by Time of Day
4. Boardings and Loads
5. Average Bus Operations

Bunching

- Buses are already bunched in the AM and PM Peak before they reach the study area
- All AM Peak, Midday, PM Peak and Early Night (7-11pm) bus routes have poor headway adherence = frequent bus bunching or most buses are bunched
- S2 performs worst of all lines in SB AM Peak and NB PM Peak

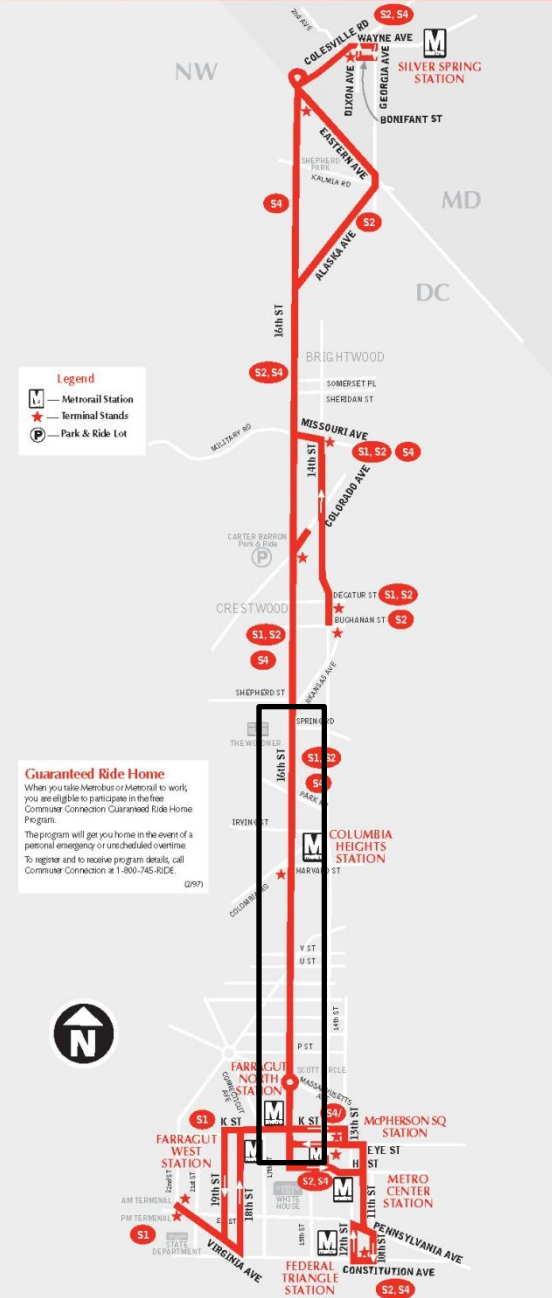
S9 16th Street Limited Line

For route and schedule information
Call 202-637-7000
www.wmata.com



S2, S4 16th Street Line S1 16th Street-Potomac Park Line

For route and schedule information
Call 202-637-7000
www.wmata.com



Existing S Lines

- Multiple service patterns contribute to bunching

Total Trip Times

- Actual trip times are longer than the scheduled trip times, which contributes to bunching
- Total trip time is longer in SB AM Peak than NB PM Peak

Travel Speed by Time of Day

- Travel speed slowdown in AM and PM extends past peak period
- Off-peak speeds are slow too
 - NB speeds are slower in Early Night (7 - 11 PM) than in PM Peak
 - Midday S1/S2/S4 speeds are not significantly faster than peak period peak direction speeds
- Off-peak parking contributes to slowdown

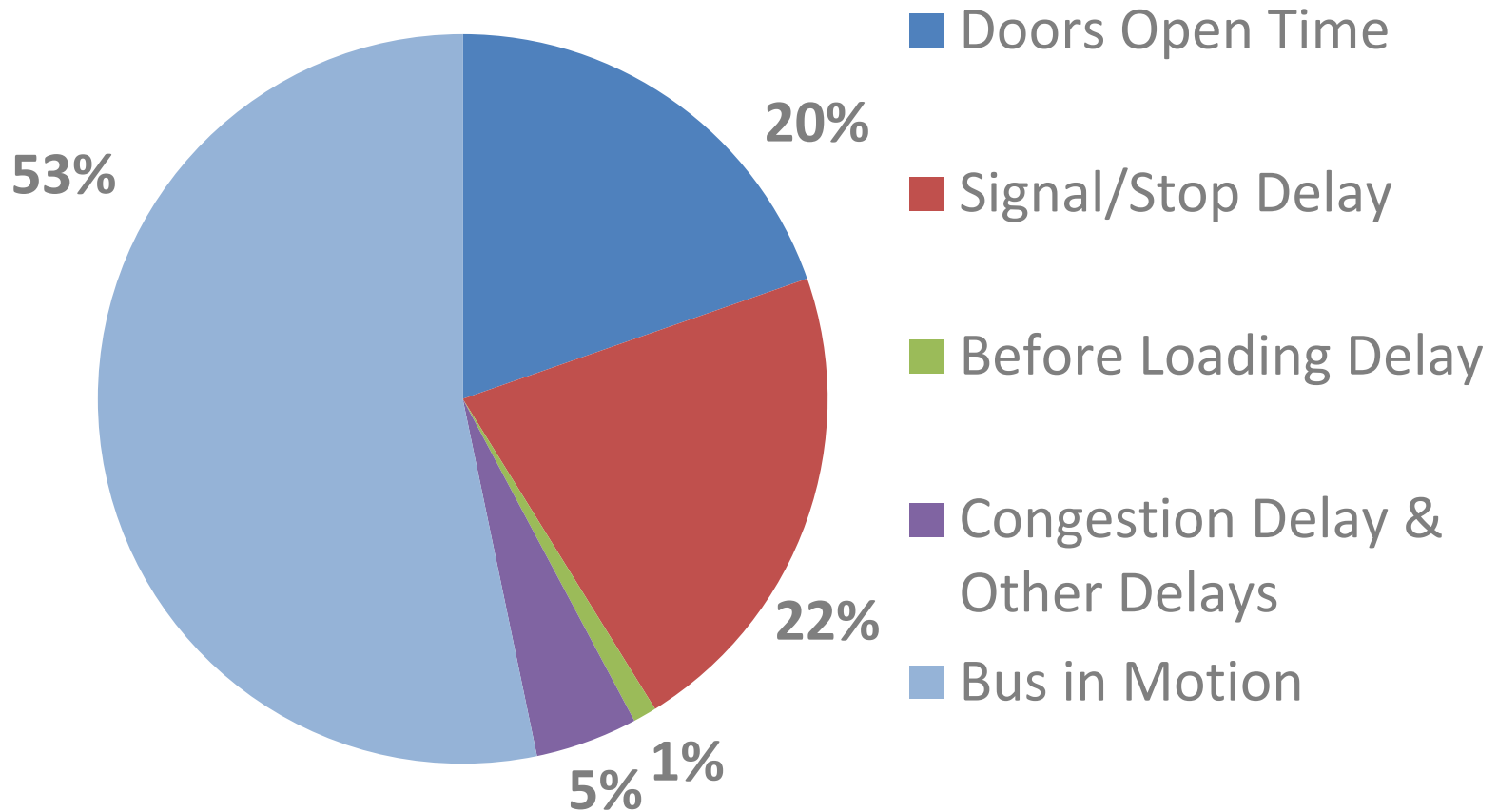
Boardings and Loads

- Boarding and alighting time per passenger is lower for S9 compared to S1/S2/S4
 - S9 has low-floor buses for easier boarding
- Maximum loads and percent of time load exceeds seated capacity are high on all lines
 - Highest % in peak periods is S4
 - Contributes to longer doors open time and pass-bys

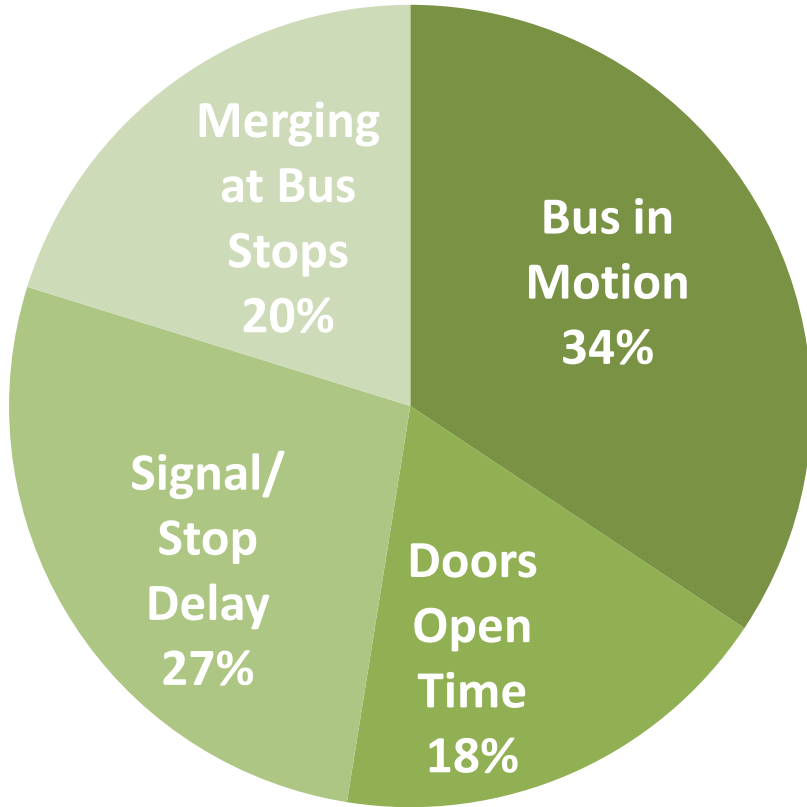
Average Travel Operations

(Source: On-board Data Collection)

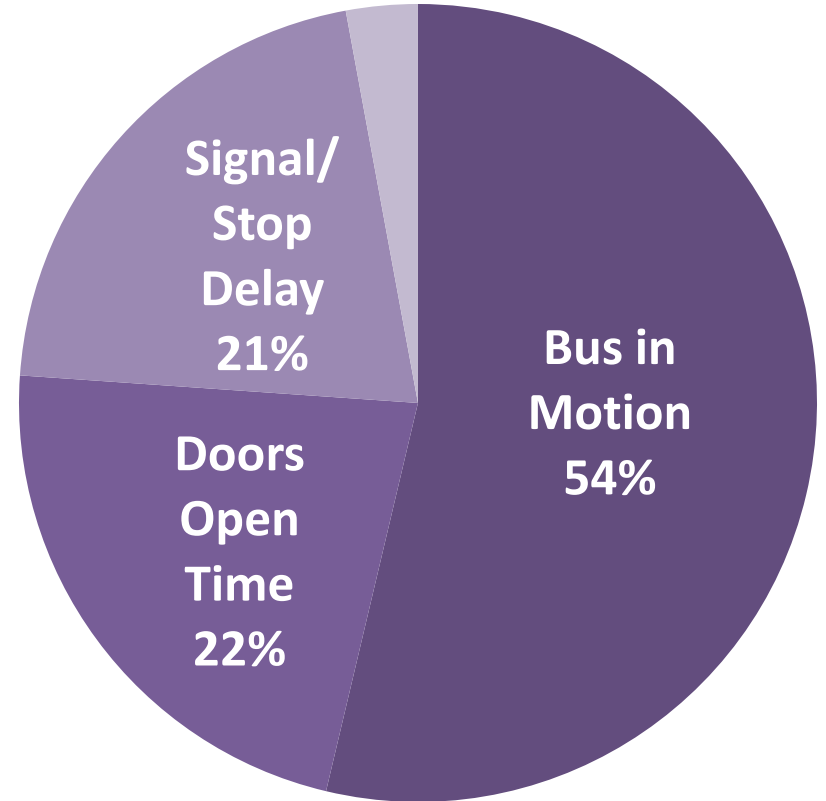
Overall Peak Period Peak Direction Averages



Comparison



NJ TRANSIT Route 10 –
Kennedy Boulevard











MTA NYCT M15 –
First Avenue/Second Avenue

Segment Analysis

GLOSSARY - TRANSIT OPERATIONS FINDINGS

- Red Icons** Findings related to Metrobus S9.
- Blue Icons** Findings related to Metrobus S1, S2, and S4.
- Red + Blue Icons** Findings related to Metrobus S1, S2, S4, and S9.

Icon	Finding	Criteria
 Bus-bunching	Delays or operational issues caused by bus bunching.	Top three largest ranges of doors open times.
 Limited Bus Zone Capacity	Delays or operational issues caused by limited bus zone space available at far-side bus stop.	Capacity for only one bus and bus stop is close proximity to intersection.
 Close Proximity of Stops	Delays or operational issues caused by close proximity of two bus stops.	Located within one block of another stop.
	Delays or operational issues caused by high boardings at stop.	An average of five or more boardings.
	Delays or operational issues caused by high alightings at stop.	An average of five or more alightings.
 Traffic	Delays or operational issues caused by traffic congestion and/or intersection operation.	LOS D.
	High bus-to-bus transfer activities at stop.	Monthly bus to bus transfers greater than 1500 passengers.
 Doors Open	Delays caused by high doors-open times.	Average doors open time of 20 seconds or greater.
NO ICON (Blue and red lines on maps)	Slow bus operations.	Average travel speed of less than 8.0 mph.
NO ICON (Call-out on maps)	Poor headway adherence.	LOS E and F per the Transit Capacity and Quality of Service Manual.

Buses already bunched at entry to Study Area

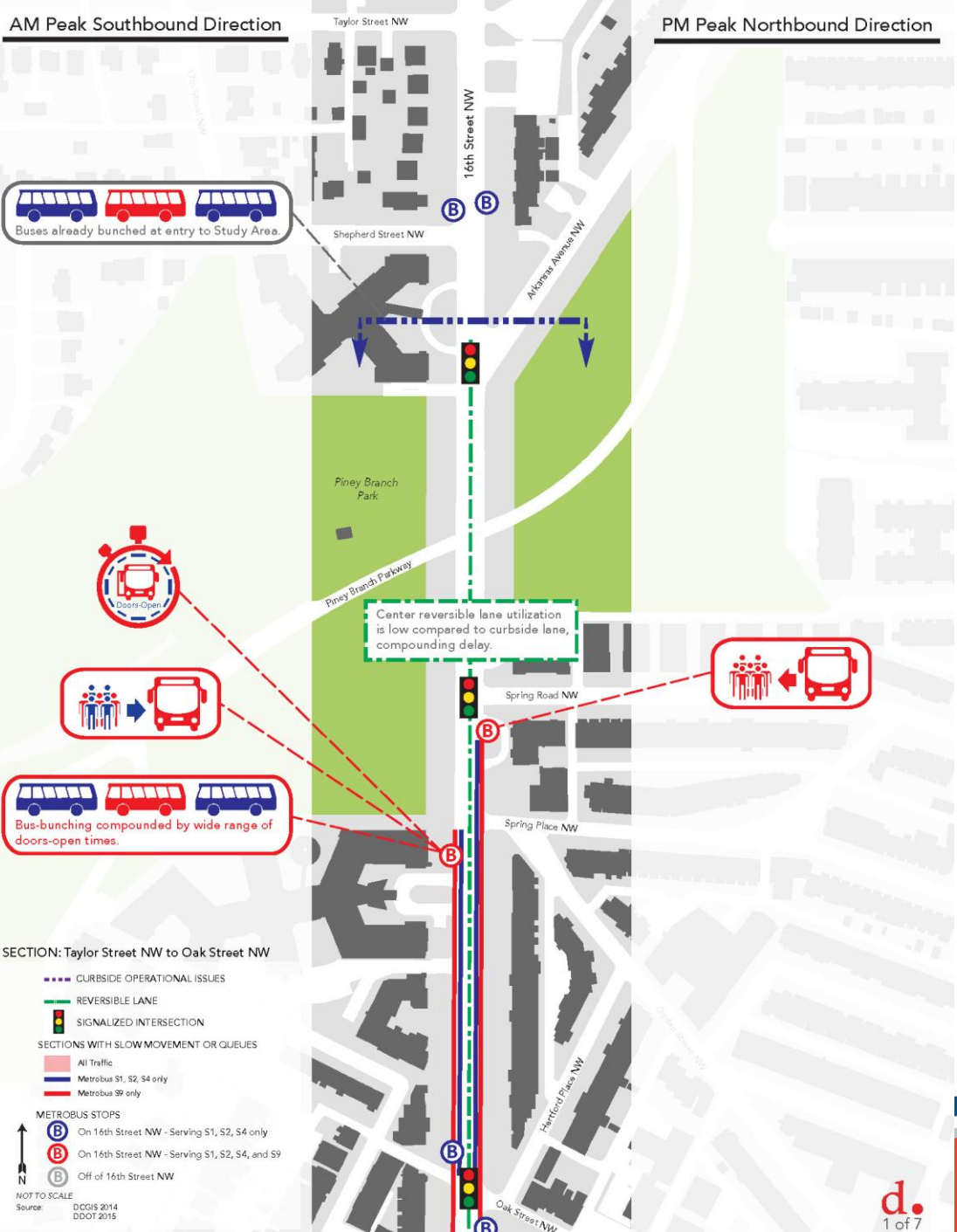
Center reversible lane utilization is low compared to curbside lane, compounding delay.

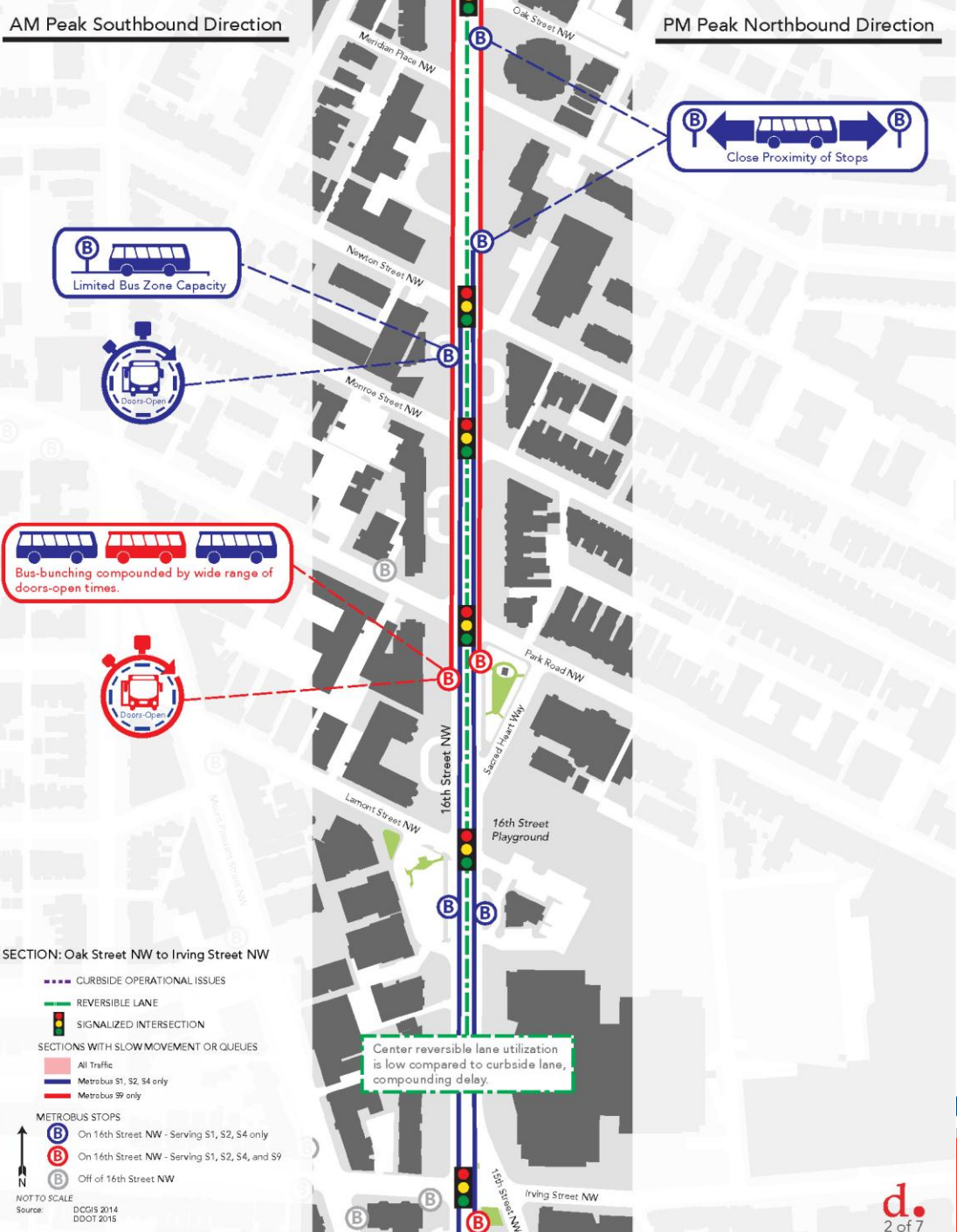
Bus-bunching compounded by wide range of doors-open times.

SECTION: Taylor Street NW to Oak Street NW

- CURBSIDE OPERATIONAL ISSUES
 - REVERSIBLE LANE
 - 🚦 SIGNALIZED INTERSECTION
- SECTIONS WITH SLOW MOVEMENT OR QUEUES
- 🚦 All Traffic
 - 🚦 Metrobus S1, S2, S4 only
 - 🚦 Metrobus S9 only
- METROBUS STOPS
- ⓑ On 16th Street NW - Serving S1, S2, S4 only
 - ⓑ On 16th Street NW - Serving S1, S2, S4, and S9
 - ⓑ Off of 16th Street NW

NOT TO SCALE
Source: DCGIS 2014, DDOT 2015





Close Proximity of Stops

Limited Bus Zone Capacity

Doors-Open

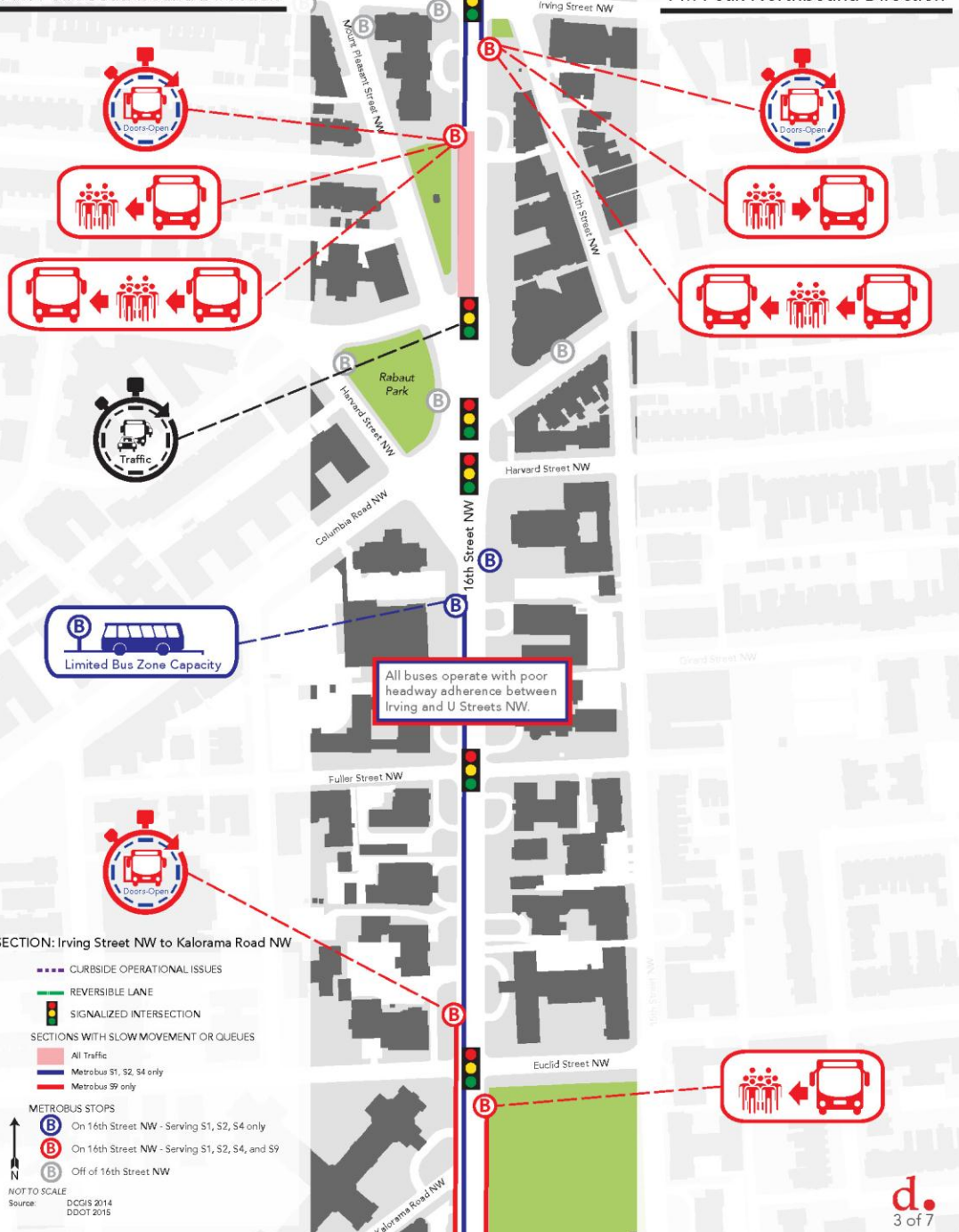
Bus-bunching compounded by wide range of doors-open times.

Doors-Open

Center reversible lane utilization is low compared to curbside lane, compounding delay.

AM Peak Southbound Direction

PM Peak Northbound Direction



All buses operate with poor headway adherence between Irving and U Streets NW.

SECTION: Irving Street NW to Kalorama Road NW

- CURBSIDE OPERATIONAL ISSUES
- REVERSIBLE LANE
- SIGNALIZED INTERSECTION
- SECTIONS WITH SLOW MOVEMENT OR QUEUES
 - All Traffic
 - Metrobus S1, S2, S4 only
 - Metrobus S9 only
- METROBUS STOPS
 - On 16th Street NW - Serving S1, S2, S4 only
 - On 16th Street NW - Serving S1, S2, S4, and S9
 - Off of 16th Street NW

NOT TO SCALE
Source: DDCIS 2014
DDOT 2015

All buses operate with poor headway adherence between Irving and U Streets NW.



Transition from three lanes to two lanes.



Bus-bunching compounded by wide range of doors-open times.

SECTION: Kalorama Road NW to U Street NW

- CURBSIDE OPERATIONAL ISSUES
 - REVERSIBLE LANE
 - SIGNALIZED INTERSECTION
- SECTIONS WITH SLOW MOVEMENT OR QUEUES
- All Traffic
 - Metrobus S1, S2, S4 only
 - Metrobus S9 only
- METROBUS STOPS
- On 16th Street NW - Serving S1, S2, S4 only
 - On 16th Street NW - Serving S1, S2, S4, and S9
 - Off of 16th Street NW

NOT TO SCALE
Source: DDCIS 2014, DDOT 2015



AM Peak Southbound Direction

PM Peak Northbound Direction

Peak Passenger Loading

Bus-bunching compounded by wide range of doors-open times.



Limited Bus Zone Capacity

Close Proximity of Stops

Low boardings and alightings.



SECTION: U Street NW to Q Street NW

- CURBSIDE OPERATIONAL ISSUES
- REVERSIBLE LANE
- SIGNALIZED INTERSECTION

- SECTIONS WITH SLOW MOVEMENT OR QUEUES
- All Traffic
 - Metrobus S1, S2, S4 only
 - Metrobus S9 only

- METROBUS STOPS
- On 16th Street NW - Serving S1, S2, S4 only
 - On 16th Street NW - Serving S1, S2, S4, and S9
 - Off of 16th Street NW

NOT TO SCALE
Source: DCGIS 2014
DDOT 2015



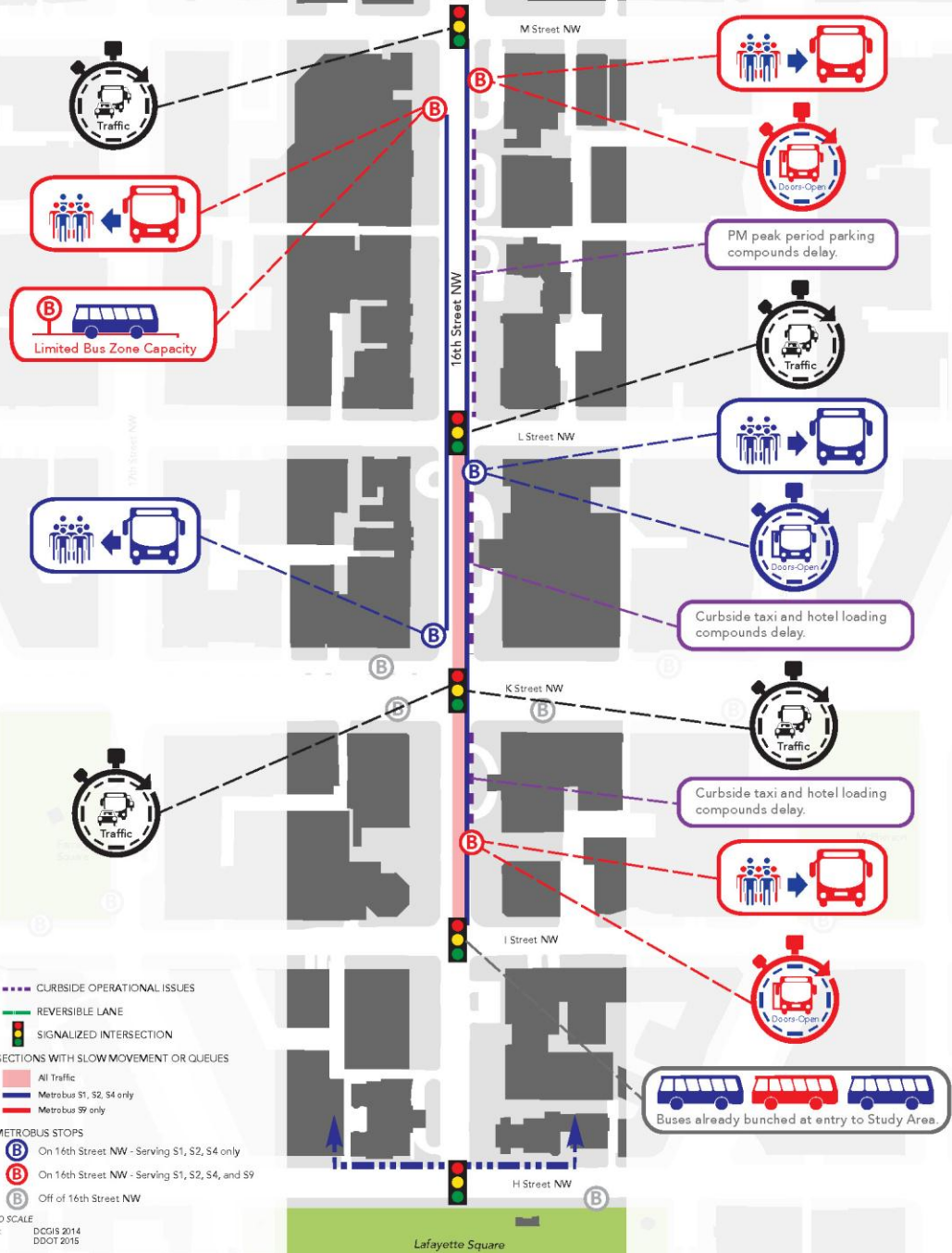
SECTION: Q Street NW to M Street NW

- CURBSIDE OPERATIONAL ISSUES
- REVERSIBLE LANE
- SIGNALIZED INTERSECTION
- SECTIONS WITH SLOW MOVEMENT OR QUEUES
 - All Traffic
 - Metrobus S1, S2, S4 only
 - Metrobus S9 only
- METROBUS STOPS
 - On 16th Street NW - Serving S1, S2, S4 only
 - On 16th Street NW - Serving S1, S2, S4, and S9
 - Off of 16th Street NW

NOT TO SCALE
Source: DCGIS 2014
DDOT 2015

AM Peak Southbound Direction

PM Peak Northbound Direction



NOT TO SCALE
Source: DCGIS 2014
DDOT 2015

Development of 3 Alternatives

Physical Improvements

- Bus lanes
- Queue jumps
- Bus stop relocation and access improvements

Operational Improvements

- Automated enforcement
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- Bus zone improvements
- Traffic operations
- Parking restrictions

Service Improvements

- Simplify service patterns
- Off-board fare payment
- All-door boarding
- Stop consolidation
- Skip-stop service
- Fleet changes

NEXT STEPS

Next Steps

- Early Fall: Existing Conditions report finalized
- Early September: Alternatives development
- Late September: Interagency and CAG Meetings
- October: Alternatives shared at public awareness events
- End of Year: Preferred alternative selected

DISCUSSION