

16TH STREET NW **TRANSIT PRIORITY**



Planning Study

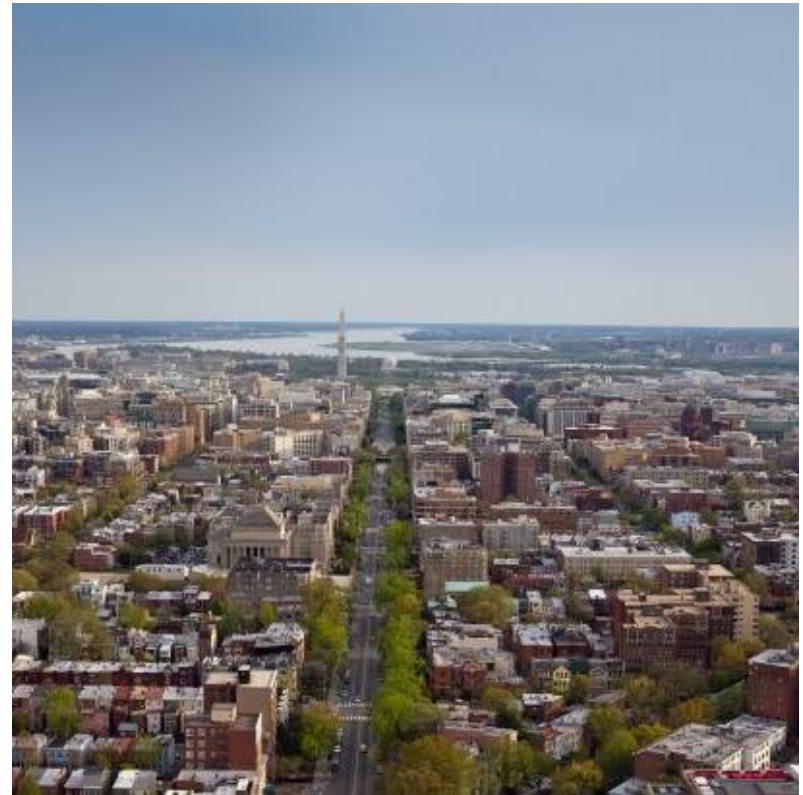
Recommended Alternative Public Meeting

January 21, 2016



Agenda

1. Welcome
2. Background
3. Project Overview
4. Data Collection and Analysis
5. Alternatives
6. Recommended Alternative
7. Next Steps



BACKGROUND

Study Area

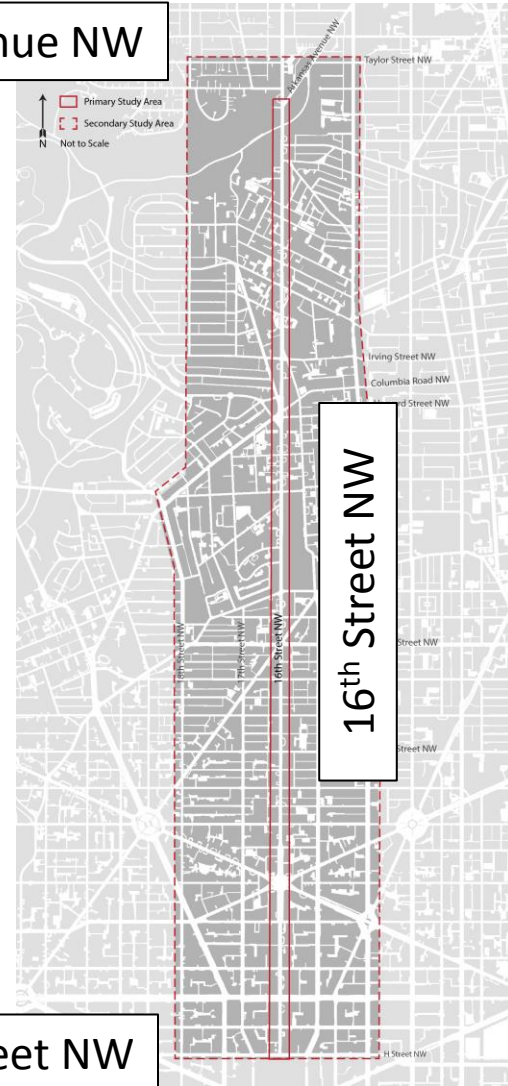
Primary Study Area

- 16th Street NW from H Street to Arkansas Avenue

Secondary Study Area

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

Arkansas Avenue NW



H Street NW

Study Partner

WMATA Metrobus



Issues

- One of the busiest Metrobus corridors
 - 20,000+ riders on average weekday
- Most trips during peak hours at or above seating capacity
- Buses are bunched and generally slow



moveDC

moveDC Plan

- Transit Priority Corridor

2 Year Action Plan

- High Capacity Transit Improvements



PROJECT OVERVIEW

Goals



- Improve travel for persons using public transit
- Develop alternatives based on public and stakeholder input
- Evaluate alternatives in terms of their benefits to transit users, possible impacts on other users of the corridor, and safety

Objectives

- Improve transit service reliability and travel times by identifying and addressing sources of problems
- Prioritize transit while maintaining operations for those traveling by other modes
- Improve rider comfort and safety
- Accommodate current unmet passenger demand for public transit service
- Develop an implementation plan that includes costs estimates

Project Timeline

January 2015

January 2016



CAG: Citizens Advisory Group

DATA COLLECTION AND ANALYSIS

Data Sources

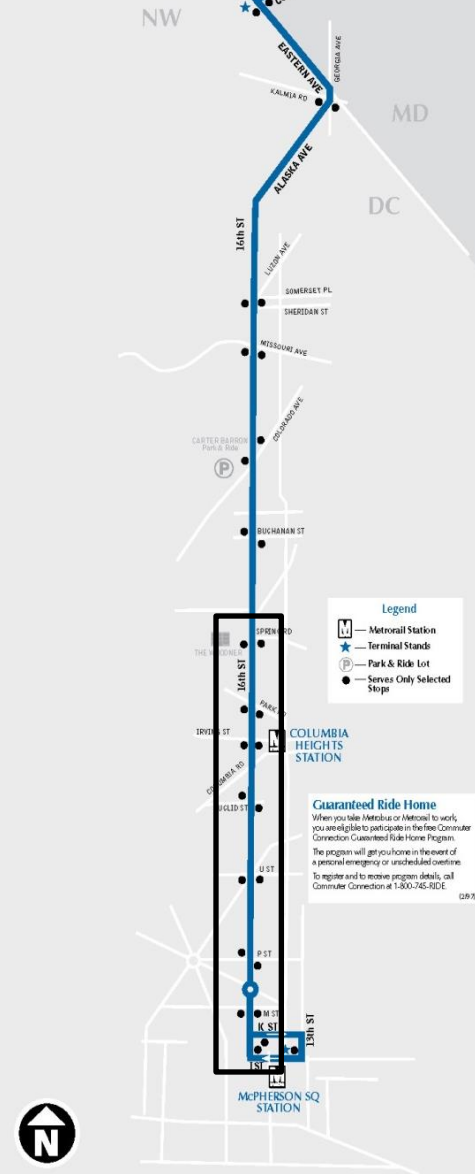
- AVL/APC data (WMATA)
- On-board data
- Multimodal counts
- Pedestrian access and safety
- Roadway configuration and curbside uses
- Bus stop zones and amenities

Corridor-Level Bus Findings

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

S9 16th Street Limited Line

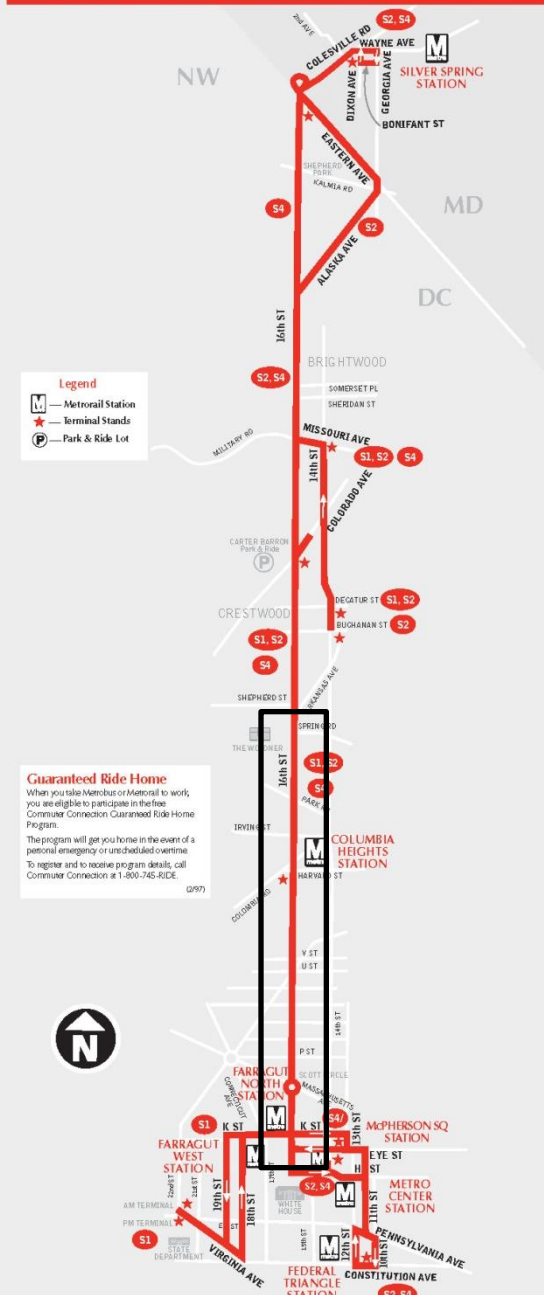
For route and schedule information
Call 202-637-7000
www.wmata.com



S2, S4 16th Street Line

S1 16th Street-Potomac Park Line

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



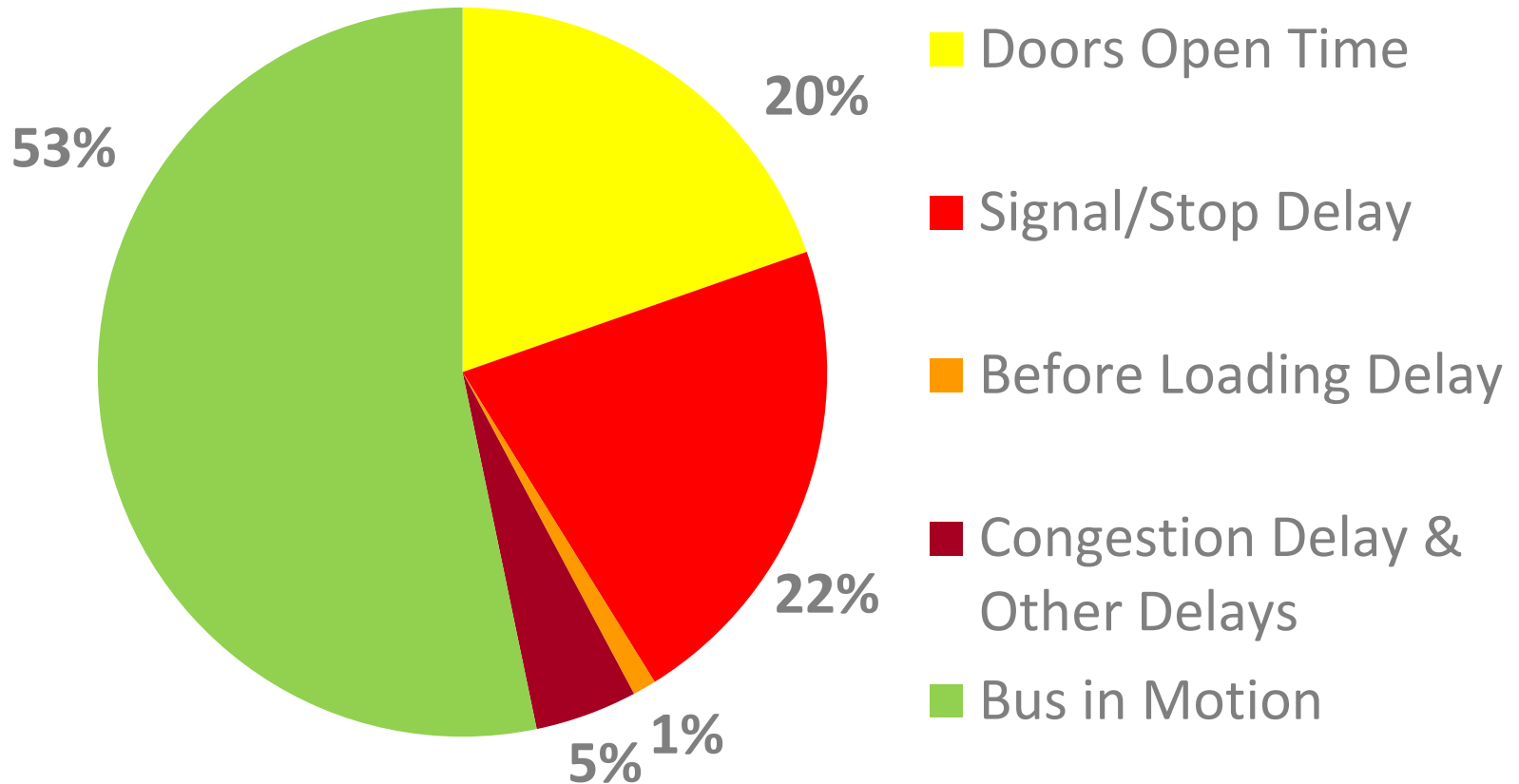
Existing S Routes

- Multiple service patterns contribute to bunching

Average Bus Operations

(Source: On-Board Data Collection)

Overall Peak Period Peak Direction Averages



Note: Congestion also impacts the time the bus is in motion









Segment Analysis

LEGEND

Blue Icons Findings related to Metrobus S9.

Red Icons Findings related to Metrobus S1, S2, and S4.

Blue + Red 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.	Proximity to intersection allows enough bus zone space for only one bus at a time.
 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.	Level of Service D or worse.
	High bus-to-bus transfer activities at stop.	Monthly bus to bus transfers greater than 1500 passengers.
 Long Doors	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.	Levels of service E and F per the Transit Capacity and Quality of Service Manual.

ALTERNATIVES

Overview of Alternatives

- Alternative 1: Service Focus
- Alternative 2: Infrastructure Focus
- Alternative 3: Mixed Service and Infrastructure

Alternatives Matrix

DRAFT ALTERNATIVES COMPARISON

IMPROVEMENT		ALTERNATIVE 1 Service Focus	ALTERNATIVE 2 Infrastructure Focus	ALTERNATIVE 3 Mixed Service and Infrastructure
PHYSICAL IMPROVEMENTS				
BASE IMPROVEMENTS	Bus Stop Removal/Consolidation: - 4 southbound locations (Newton, Lamont, V Streets and Riggs Place) - 5 northbound locations (L, Q, V, Lamont and Newton Streets)	✓	✓	✓
	Far-Side Bus Stop Expansion: 2 southbound locations (Harvard and M Streets)	✓	✓	✓
	Relocate southbound Spring Place bus stop north to Spring Road to improve pedestrian safety	✓	✓	✓
	Upgrade bus stops to WMATA zone lengths	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Bus Lanes		Full length, both directions 7:00 am - 10:00 pm	Full length, extended peak period peak direction: - 7:00 am - 10:00 am southbound - 4:00 pm - 7:30 pm northbound
	Lane configuration changes between U and O Streets due to bus lanes		Addition of center reversible lane	Lane shift: - 2 lanes southbound and 1 lane northbound 7:00 - 10:00 am - 2 lanes northbound and 1 lane southbound 4:00 - 7:30 pm
	Queue Jump Lanes	✓		
	Intersection Reconfiguration at Harvard/Columbia/Mount Pleasant		✓	
TRANSIT SERVICE IMPROVEMENTS (Any proposed service changes would require a future public involvement process led by WMATA)				
BASE IMPROVEMENTS	Headway-based service	✓	✓	✓
	S2 Route patterns reduced to two in each direction	✓	✓	✓
	S1 and S2 service eliminated along 14th Street between Northern Bus Garage and 16th Street	✓	✓	✓
	Running and recovery time added to schedule	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Fleet mix upgraded with low-floor and articulated buses	✓	✓	✓
	Off-Board Fare Payment	All buses, all stops	SmartTrip Card top off only	S9 buses and stops only
	All-Door Boarding	All buses, all stops		S9 buses and stops only
	S1 converted to limited stop service using current S9 stops	✓		
ADDITIONAL IMPROVEMENTS	Service Patterns Truncated in Downtown - Farragut Square for S1 - McPherson Square Metro for S2/S4	✓		
	Deadhead service relocated to Arkansas Avenue from Missouri Avenue	✓		
TRAFFIC OPERATIONS IMPROVEMENTS				
BASE IMPROVEMENTS	Transit signal priority (TSP) at 15 planned locations and five additional locations configured for headway-based service	✓	✓	✓
	Peak period parking restrictions extended to 7:00 - 10:00 am (from 9:30 am) and 4:00 - 7:30 pm (from 6:30 pm)	✓	✓	✓
	Southbound reversible lane extended to 7:00 - 10:00 am (from 9:30 am)	✓	✓	✓
	Southbound left turn lane separation and advance signage at W Street	✓	✓	✓
	Pedestrian safety improvements, including at Arkansas Avenue, Sacred Heart Way, and Harvard/Columbia/Mount Pleasant	✓	✓	✓
	Bus stop amenity and access improvements	✓	✓	✓
	Correct parking restrictions northbound between L and M Streets to prohibit PM peak parking	✓	✓	✓
	Work with Downtown hotels on taxi and loading zone relocation	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Automated Parking Enforcement on Buses	Enforcement of peak hour restrictions	Enforcement of bus lanes	
	Dedicated Towing		Pilot program with potential extension	✓
	Remove Midday Parking	✓		
	Left-Turn Restrictions - Southbound at Irving Street - Northbound at Mount Pleasant Street	✓		✓
	Peak hour signal timing extended for north-south traffic through midday (pending further analysis as part of the ongoing citywide Traffic Signal Optimization effort)			✓
PERFORMANCE METRICS				
Preliminary Travel Time Savings Estimate		★★	★★★★	★★
Preliminary Reliability Estimate		★★★	★	★★

What We Heard

- Large support for bus lanes and off-board fare payment for all buses
- Some concern about S1/2/4 truncation, S1 conversion to limited stop service, stop consolidation, Arkansas Avenue deadhead, left turn restrictions, and parking



Alternatives Analysis

- Transit dwell and travel time estimations
- Multimodal VISSIM model
- Verification of physical space needs and feasibility
- Cost estimates

RECOMMENDED ALTERNATIVE

Recommended Alternative Matrix

RECOMMENDED ALTERNATIVE

IMPROVEMENT	RECOMMENDED ALTERNATIVE
PHYSICAL IMPROVEMENTS	
Bus stop consolidation: - 3 southbound locations (Newton, Lamont, and V Streets) - 5 northbound locations (L, Q, V, Lamont, and Newton Streets)	✓
Far-side bus stop expansion: 2 southbound locations (Harvard and M Streets)	✓
Relocate southbound Spring Place bus stop north to Spring Road to improve pedestrian safety	✓
Upgrade stops to WMATA zone lengths	✓
Bus lanes	Full length, extended peak period peak direction: 7:00 am - 10:00 am southbound 4:00 pm - 7:30 pm northbound
Extension of center reversible lane from Arkansas Avenue to K Street	✓
Install fifth lane W Street to O Street and K Street to H Street	✓
Intersection reconfiguration at Harvard/Columbia/Mount Pleasant	Future Project
TRANSIT SERVICE IMPROVEMENTS (Any service changes would require a future public involvement process led by WMATA)	
Headway-based service	✓
Increase limited stop service (may include converting some local bus trips to limited stops)	✓
Transition to simpler patterns	✓
Running and recovery time added to schedule	✓
Fleet mix upgraded with low-floor and articulated buses	✓
Off-board fare payment	All buses, all stops
All-door boarding	All buses, all stops
TRAFFIC OPERATIONS IMPROVEMENTS	
Transit signal priority (TSP) at 18 locations configured for headway-based service	✓
Peak period parking restrictions extended to 7:00 - 10:00 am (from 9:30 am) and 4:00 - 7:30 pm (from 6:30 pm). No parking from Arkansas Avenue to M Street during AM and PM peak periods.	✓
Pedestrian safety improvements, including at Arkansas Avenue, Sacred Heart Way, and Mount Pleasant Street	✓
Bus stop amenity and access improvements	✓
Automated enforcement	Enforcement of driving and parking in bus lanes
PM peak period southbound left turn restriction at W Street	✓

QUICK STATS

BUS ROUTE	TRAVEL TIME CHANGES
S1/S2/S4	5.9 min savings (Both AM Peak Southbound and PM Peak Northbound)
S9	3.7 min savings (AM Peak Southbound) 4.6 min savings (PM Peak Northbound)

GENERAL VEHICLES	TRAVEL TIME CHANGES
AM Peak Period	Remains the same (Southbound) Lengthens by 1.5 min (Northbound)
PM Peak Period	Lengthens by 1.9 min (Southbound) Lengthens by 2.0 min (Northbound)

Recommended Alternative

- Peak-hour peak-direction bus lanes
 - Southbound in the AM Peak (7 – 10 AM)
 - Northbound in the PM Peak (4 to 7:30 PM)
 - Reversible lane from Arkansas Avenue to K Street
 - Addition of 5th lane from W to O Street and K to H Street
 - Automated enforcement of bus lanes

Recommended Alternative

- Off-board fare payment and all-door boarding
- Bus stop consolidation
- Headway-based service supported by transit signal priority
- Increase limited stop service and transition to simpler patterns

Recommended Alternative: Bus Travel Time Savings

	AM Peak Estimated Travel Time Savings	PM Peak Estimated Travel Time Savings
S1/S2/S4 Southbound	5.9 minutes	2.0 minutes
S9 Southbound	3.7 minutes	0.8 minutes
S1/S2/S4 Northbound	2.4 minutes	5.9 minutes
S9 Northbound	1.1 minutes	4.6 minutes

Recommended Alternative: General Vehicle Travel Times

	AM Peak Estimated Travel Time Increase	PM Peak Estimated Travel Time Increase
Southbound	No Change	1.9 minutes
Northbound	1.5 minutes	2.0 minutes

Recommended Alternative: Cost Estimate

- Estimated capital cost is \$6 million
 - Includes design, construction, equipment, and contingency
- Estimated operating cost is under development
 - Will be finalized as service changes are better defined

metrobus

call us for information

202-637-7000

S1 S2 S4 S9

metrobus express

Limited Stop Service

Let's take a ride!



Boarding the Bus



Photo: NYC DOT



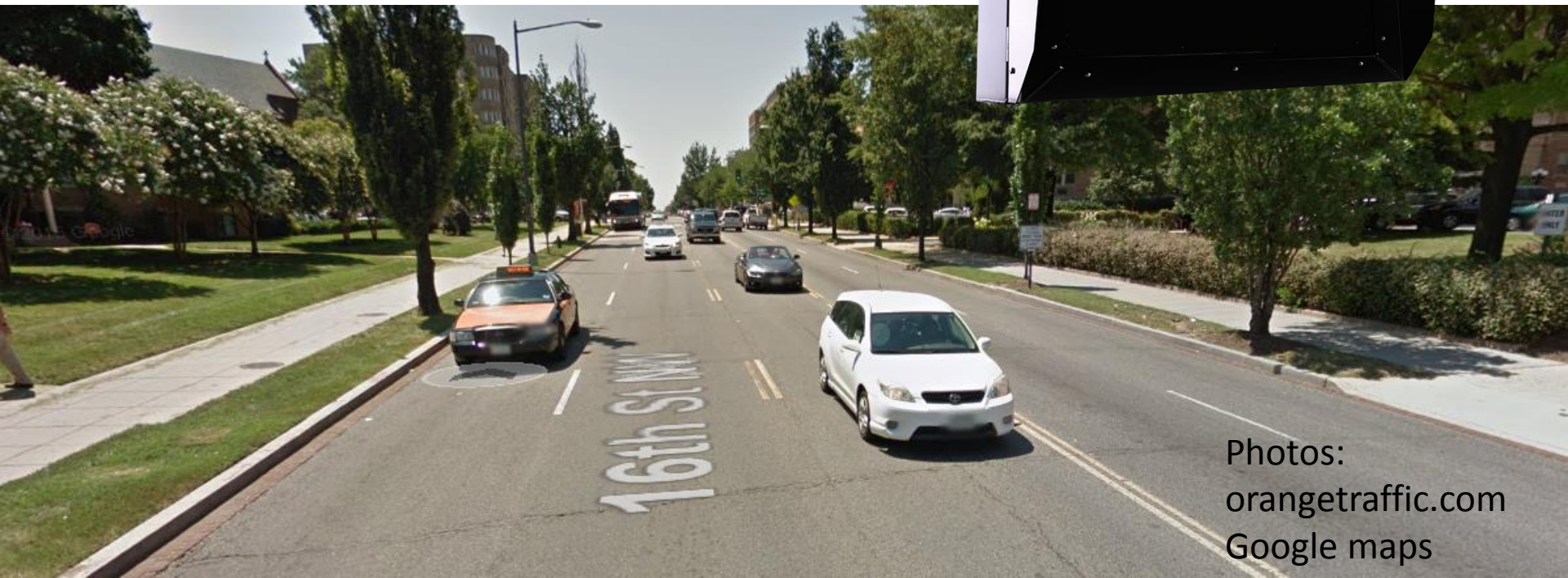
Photo: NYC DOT

Bus Lane

Note: Sign times would be different for 16th Street



Reversible Lane



Photos:
orangetraffic.com
Google maps

NEXT STEPS

Plan for Implementation

PLAN FOR IMPLEMENTATION

PHASE 1 <18 months

PHASE 2 2 - 4 years

PHASE 3 4+ years

Public Engagement

- » Biannual CAG meetings, email updates, coordination with WMATA public participation process for service changes, additional meetings for design process

Short-Term Traffic Operations Improvements

- » Peak period parking restrictions extended to 7-10 am and 4-7:30 pm (Coordinate with DPW)
- » Southbound reversible lane extended to 7-10 am
- » Correct parking restrictions northbound between L and M Streets to prohibit PM peak parking
- » Adjust street sweeping time restrictions on side streets (Coordinate with DPW)

Design

- » New lane markings & signage (bus lanes, reversible lane, addition of 5th lane through Dupont Circle neighborhood and Downtown)
- » Pedestrian safety improvements (Secord Heart Place, Arkansas Avenue, crosswalk at Mt. Pleasant Street) and missing ADA ramps
- » Bus stop and zone improvements (bus stop consolidation, far-side bus stop expansion, relocation of Spring Place stop, upgrade bus stops to WMATA zone lengths, access improvements, siting of off-board fare kiosks)

Construction & Implementation

- » New lane markings & signage (bus lanes, reversible lane, addition of 5th lane through Dupont Circle neighborhood and Downtown)
- » Pedestrian safety improvements (Secord Heart Place, Arkansas Avenue, crosswalk at Mt. Pleasant Street) and missing ADA ramps
- » Bus stop and zone improvements (far-side bus stop expansion, relocation of Spring Place stop, upgrade bus stops to WMATA zone lengths, access improvements, siting of off-board fare kiosks)

Consolidate Bus Stops

Transit Signal Priority

- » Implement all planned locations (S9 only, schedule-based)

Transit Signal Priority

- » Procure equipment for headway-based system for S1/S2/S4 buses

Transit Signal Priority

- » Implement headway-based system for all planned locations (all routes)

Service Planning

- » Add running and recovery time to schedule
- » Develop headway service
- » Increase limited stop service
- » Develop simpler patterns
- » Conduct WMATA public participation

Service Changes

- » Simplify patterns
- » Implement headway-based service
- » Reduce local service (after increase in limited stop service)

Systems Planning (staffing, organizational needs, funding, regulatory structure, equipment needs, etc.)

- » Automated enforcement (Coordinate with MPD)
- » Off-board fare collection and all-door boarding

Begin Automated Enforcement

- » Begin Off-Board Fare Collection and All-Door Boarding

Fleet Mix

- » Upgrade with low-floor and articulated buses

Conduct Studies for Parallel Corridors

- » 14th Street NW Transit Priority
- » North-South Interim Bus Improvements

DDOT is lead

WMATA is lead

DDOT / WMATA are co-leads

Additional Capacity

- » Identify additional garage capacity to enable use of additional articulated buses
- » Identify need and opportunity to add more bus trips in peak periods

Implementation

- Broken down into three phases:
 1. <18 months
 2. 2 to 4 years
 3. 4+ years
- DDOT and WMATA both leading elements of implementation
 - DDOT lead is PTSA
- Bus lanes open in 2 to 4 years

Ongoing Public Engagement

- CAG meetings twice a year
 - Open to the public
 - Additional meetings during design phase
- Project email updates
- Coordination with WMATA public participation process



Comment on the Recommended Alternative

- Submit comments at today's meeting
 - Comment card
 - Post-its on large map
- Email Megan Kanagy through January 25th at megan.kanagy@dc.gov

Stay Connected

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Project Website

bit.ly/16thStreetBus