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

1. Project Kickoff
2. Data Collection & Analysis
3. Alternatives Development
4. 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

Identify problems along the corridor

- Travel speeds
- Reliability

Identify improvements that address problems

Formulate alternatives
Stop Dwell / Doors Open Time?

- Off-board fare collection
- All-door boarding

3 minutes

1.5 minutes

<1 minute
Signal Delay?

- Signal priority
- Queue jump opportunities
Slow Travel?

- Strategic use of bus lanes
- Queue jump opportunities

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
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
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

- Doors Open Time: 53%
- Signal/Stop Delay: 20%
- Before Loading Delay: 5%
- Congestion Delay & Other Delays: 22%
- Bus in Motion: 1%
Comparison

NJ TRANSIT Route 10 – Kennedy Boulevard
- Merging at Bus Stops: 20%
- Signal/Stop Delay: 27%
- Doors Open Time: 18%
- Bus in Motion: 34%

MTA NYCT M15 – First Avenue/Second Avenue
- Signal/Stop Delay: 21%
- Doors Open Time: 22%
- Bus in Motion: 54%
- Merging at Bus Stops: 20%
- Signal/Stop Delay: 27%
- Doors Open Time: 18%
- Bus in Motion: 34%
### GLOSSARY - TRANSIT OPERATIONS FINDINGS

<table>
<thead>
<tr>
<th>Icon</th>
<th>Finding</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Bus Bunching Icon" /></td>
<td>Delays or operational issues caused by bus bunching.</td>
<td>Top three largest ranges of doors open times.</td>
</tr>
<tr>
<td><img src="image2" alt="Limited Bus Zone Capacity Icon" /></td>
<td>Delays or operational issues caused by limited bus zone space available at far-side bus stop.</td>
<td>Capacity for only one bus and bus stop is close proximity to intersection.</td>
</tr>
<tr>
<td><img src="image3" alt="Close Proximity of Stops Icon" /></td>
<td>Delays or operational issues caused by close proximity of two bus stops.</td>
<td>Located within one block of another stop.</td>
</tr>
<tr>
<td><img src="image4" alt="High Boardings at Stop Icon" /></td>
<td>Delays or operational issues caused by high boardings at stop.</td>
<td>An average of five or more boardings.</td>
</tr>
<tr>
<td><img src="image5" alt="High Alightings at Stop Icon" /></td>
<td>Delays or operational issues caused by high alightings at stop.</td>
<td>An average of five or more alightings.</td>
</tr>
<tr>
<td><img src="image6" alt="Traffic Congestion and/or Intersection Operation Icon" /></td>
<td>Delays or operational issues caused by traffic congestion and/or intersection operation.</td>
<td>LOS D.</td>
</tr>
<tr>
<td><img src="image7" alt="High Bus-to-Bus Transfer Activities at Stop Icon" /></td>
<td>High bus-to-bus transfer activities at stop.</td>
<td>Monthly bus to bus transfers greater than 1500 passengers.</td>
</tr>
<tr>
<td><img src="image8" alt="High Doors-Open Times Icon" /></td>
<td>Delays caused by high doors-open times.</td>
<td>Average doors open time of 20 seconds or greater.</td>
</tr>
<tr>
<td><img src="image9" alt="Slow Bus Operations Icon" /></td>
<td>Slow bus operations.</td>
<td>Average travel speed of less than 6.0 mph.</td>
</tr>
<tr>
<td><img src="image10" alt="Poor Headway Adherence Icon" /></td>
<td>Poor headway adherence.</td>
<td>LOS E and F per the Transit Capacity and Quality of Service Manual.</td>
</tr>
</tbody>
</table>

**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.
AM Peak Southbound Direction

PM Peak Northbound Direction

Limited Bus Zone Capacity

Close Proximity of Stops

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

SECTION: Oak Street NW to Irving Street NW

CURBSTONE OPERATIONAL ISSUES

REVERSIBLE LANE

SIGNALIZED INTERSECTION

SECTIONS WITH SLOW MOVEMENT OR QUEUES

All Traffic

Metrorail B1, S1, S4 only

Metrorail S 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

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

District Department of Transportation
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
- Reverse lane
- Signalized intersection
- Sections with slow movement or queues
- All traffic
- Metrobus 31, 32, 34 only
- Metrobus M only

**METROBUS STOPS**
- On 16th Street NW - Serving 31, 32, 34 only
- On 16th Street NW - Serving 31, 32, 34, and 39
- Off of 16th Street NW
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
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• Skip-stop service
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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