Outline

• Background
• Design Discussion
• Making it Work
• Alternatives
• Summary
• Next Steps
Background

Network History

2010
- Columbus Avenue Parking Protected Bicycle Lane (96th St to 77th St)

2013
- Columbus Avenue Parking Protected Bicycle Lane (110th St to 96th St and 77th St to 69th St)

2015
- Lincoln Center Bowtie / Columbus Avenue Parking Protected Bicycle Lane (69th St to 59th St)

Northbound Route
- No corresponding northbound protected route serves the community
- CB 7 and electeds asked DOT to study Amsterdam Avenue
- DOT has looked at several NB possibilities
• Logical northbound pairing for Columbus Avenue

• Plaza at the 72nd Street subway station forces Broadway traffic to Amsterdam

• High traffic volumes, bus route, local truck route, active curbside loading
- North of 72nd Street
  - Amsterdam carries traffic from 10th Ave and Broadway
  - Connected to network via CPW and 77th/78th

- South of 72nd Street
  - Network connections
  - Bowtie considerations
In October 2015, 29% of Citi Bike trips that started in CB 7 also ended in CB 7.

In October 2015, 45% of Citi Bike trips that started in Midtown ended in CB7 (CB 4, 5, or 6).

Citi Bike expanded to W 86th Street in the fall of 2015.

Citi Bike will expand to 130th St by 2018.

Source: Citi Bike trip data between September 1st and September 30th, 2015.
## Background

### Bike Volumes

<table>
<thead>
<tr>
<th>Amsterdam Ave</th>
<th>12-hour Bike Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 85&lt;sup&gt;th&lt;/sup&gt; to W 86&lt;sup&gt;th&lt;/sup&gt; St</td>
<td></td>
</tr>
<tr>
<td>October 2007</td>
<td>217</td>
</tr>
<tr>
<td>October 2011</td>
<td>515</td>
</tr>
<tr>
<td>October 2015</td>
<td>609</td>
</tr>
</tbody>
</table>

- A three fold increase in cycling on Amsterdam since 2007 and almost double on Columbus.

<table>
<thead>
<tr>
<th>Columbus Ave</th>
<th>12-hour Bike Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 87&lt;sup&gt;th&lt;/sup&gt; to W 86&lt;sup&gt;th&lt;/sup&gt; St</td>
<td></td>
</tr>
<tr>
<td>October 2007</td>
<td>486</td>
</tr>
<tr>
<td>October 2011</td>
<td>594</td>
</tr>
<tr>
<td>October 2015</td>
<td>724</td>
</tr>
</tbody>
</table>

Source: ATI Data, Bicycles btw. W 85<sup>th</sup> St and W 86<sup>th</sup> St on Amsterdam Ave and btw. W 87<sup>th</sup> St and W 86<sup>th</sup> St on Columbus Ave in October 2007, 2011, and 2015. 7am-7pm.
Amsterdam Ave has a KSI (killed or severely injured) of 8.9 per mile for pedestrians (KSI of 19.7 for all).

Injury Summary 2009-2013 (5 years)

<table>
<thead>
<tr>
<th></th>
<th>Injuries</th>
<th>Severe Injuries</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian</td>
<td>157</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Cyclist</td>
<td>62</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Motorist</td>
<td>294</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>513</td>
<td>36</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: NYPD AIS/TAMS Crash Database
Design

Existing Issues

59% of vehicles are speeding at off-peak times

Long crossing distances

High peak vehicle volumes

Current design encourages bad driver behavior

Not designed to a neighborhood scale

Source: Radar speed study taken on October 6, 2015 btw. W 81\textsuperscript{st} St and W 82\textsuperscript{nd} St on Amsterdam Avenue
Curbside parking protected lane
Pedestrian safety islands
Lane reduction with turn lanes
Updated curb regulations
Design Proposal

- Off-peak traffic calming
- Bicycle lane protected from traffic
- New trees
- Reduced crossing distances
- Neighborhood scale design

Columbus Avenue at W 107th St
In general protected bike lanes in Manhattan improve safety for all users:

- Crashes with injuries have been reduced by 17%
- Pedestrian injuries are down by 22%
- Cyclist injuries show a minor improvement even as bicycle volumes have dramatically increased
- Total injuries have dropped by 20%

Protected bicycle lane projects with 3 years of after data include the following: 9th Ave (16th-31st), 8th Ave (Bank-23rd, 23rd-34th), Broadway (59th-47th, 33rd-26th, 23rd-18th), 1st Avenue (Houston to 34th), 2nd Ave (Houston-34th), Columbus Ave (96th-77th) Note: Only sections of projects that included protected bicycle lanes were analyzed

Source: NYPD AIS/TAMS Crash Database
The **volume-to-capacity** ratio is a measure of how “full” a roadway feels and is calculated as a ratio between the measured traffic volume and calculated capacity of the roadway. The result is expressed as a number between 0 and 1. A value of “1” would indicate that the roadway is “full.”

**Delay** is a measure of the average time a vehicle will spend processing through an intersection.
Making it Work
Daily Volumes

Amsterdam Avenue Daily Vehicle Volumes
Between W 95th St and W 96th St

Source: ATI Data, Vehicles btw. W 95 St and W 96 St, May 2014
Making it Work
Daily Volumes

Amsterdam Avenue Daily Vehicle Volumes
Between W 78th St and W 79th St

Source: ATI Data, Vehicles btw. W 78 St and W 79 St, October 2014
• From 4pm to 7pm on weekdays there are approximately 16,065 yellow cab trips that start or end in CB 7
• 50% of trips (8,090) are 1.5 miles or less
• 44% of trips (7,000) are wholly within CB 7 (both start and end)
• 32% of afternoon traffic on Amsterdam Ave is taxis (approximately 400 per hour)
• Large potential for a protected lane to shift trips from taxi to Citi Bike

Note: Study period occurred from 4pm to 7pm on weekdays in April 2015.
Mixing zones at all non-two way left turns

- Improves visibility of cyclists
- Provides space to negotiate conflict
- Removes left turns from through lanes
- Creates left turn vehicle storage
Making it Work

Left Turns

Left-turn bays at 79th, 86th, 96th

Turning vehicles queue for turn phase

Bike lane continues the length of the block

Split phase allows through traffic to move while holding left turns, up to 23% more green time given to through

Pedestrians and cyclists have a leading phase to get a head start
Install a paid commercial parking regulation along the east curb of Amsterdam Ave from W. 72\textsuperscript{nd} to W. 96\textsuperscript{th} between 7am and 7pm on weekdays, plus at select locations on west curb

- Maximizes curb space available for trucks loading or unloading on busy commercial corridor
- Reduces the likelihood of trucks double-parking during peak travel times
- Clear through lanes process traffic more efficiently
### Existing

- West Sidewalk
- 10' Parking Lane
- 10' Travel Lane
- 10' Travel Lane
- 10' Travel Lane
- 10' Parking Lane
- East Sidewalk

### Proposed

- West Sidewalk
- 6' 6" Bike Path
- 9' Island / Parking Lane
- 10' Travel Lane
- 10' Travel Lane
- 10' Travel Lane
- 10' Payment Commercial / Parking Lane
- East Sidewalk

#### Key Points
- **3 through lanes**: process efficiently
- **Traffic is organized into through, turns, and proper loading zones**
- **Efficient signal progression**
### Making it Work

#### Expected Outcome

<table>
<thead>
<tr>
<th>Cross Street</th>
<th>Amsterdam 6-7 PM Peak Volumes (veh/hr)</th>
<th>Delay (s)</th>
<th>Volume-to-Capacity Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 96th</td>
<td>1,687</td>
<td>12.8</td>
<td>0.91</td>
</tr>
<tr>
<td>W 86th</td>
<td>1,704</td>
<td>6.5</td>
<td>0.81</td>
</tr>
<tr>
<td>W 82nd</td>
<td>1,545</td>
<td>3.0</td>
<td>0.66</td>
</tr>
<tr>
<td>W 79th</td>
<td>1,330</td>
<td>40.9</td>
<td>0.85</td>
</tr>
<tr>
<td>W 77th</td>
<td>1,377</td>
<td>4.8</td>
<td>0.62</td>
</tr>
</tbody>
</table>

### Proposed

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<td>1,670</td>
<td>5.0</td>
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<tr>
<td>W 86th</td>
<td>1,687</td>
<td>12.7</td>
<td>0.91</td>
</tr>
<tr>
<td>W 82nd</td>
<td>1,530</td>
<td>5.9</td>
<td>0.83</td>
</tr>
<tr>
<td>* W 79th</td>
<td>1,317</td>
<td>35.5</td>
<td>0.72</td>
</tr>
<tr>
<td>W 77th</td>
<td>1,363</td>
<td>4.5</td>
<td>0.69</td>
</tr>
</tbody>
</table>

* Benefit from conversion from LPI to Split LPI

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**Proposed Condition v/c Ratios**

- W 96: v/c - 0.78
- W 86: v/c - 0.91
- W 82: v/c - 0.83
- W 79: v/c - 0.72
- W 77: v/c - 0.69
Parking Consideration

25% of the parking space on the corridor will be repurposed for left turn treatments and pedestrian safety islands.

East curb will be converted to daytime (7am-7pm) commercial loading zones between W 72\textsuperscript{nd} St and W 96\textsuperscript{th} St, plus targeted loading on the west curb.

Columbus Avenue at W 106\textsuperscript{th} St
Alternates Studied

DOT has studied potential alternatives on nearby Broadway and Columbus.

Amsterdam Avenue is the preferred northbound route, however it comes with parking loss and some vehicular capacity reduction.

Note: Any alternative bike route will be paired with pedestrian improvements on Amsterdam to create a safer corridor without bike facilities.
Broadway Route

Buffered bicycle lane against the median in the northbound direction

Existing

- Planted Median
- 10' Travel Lane
- 10' Travel Lane
- 10' Travel Lane
- 8' Parking Lane
- East Sidewalk

39'

Proposed

- Planted Median
- 6' Lane
- 10' Travel Lane
- 11' Travel Lane
- 10' Parking Lane
- East Sidewalk

39'

 Minor traffic impact

Design challenges between 95th and 97th

Requires new left turn design
Columbus Ave Route

- Convert southbound lane to a two-way path
- No changes to vehicular capacity
- Learning curve for users, heavy pedestrian access
- Requires infrastructure upgrades
Phase I – Amsterdam Avenue Preferred Route

- Protected bicycle lane provides northbound route for cyclists
- Reduced pedestrian crossing distances with islands
- Design for neighborhood street with safety benefits expected for all users
- Lane reduction with left turn treatments
- High peak hour traffic volumes require some adjustments
- Left turn treatments and paid commercial spaces reduce parkable area
- Traffic flow will be maintained
- Connections to new route via CPW at 77th/78th and 90th/91st
Phase 1 – 72nd – 110th
- Incorporate feedback into plan and present to board for support
- Implement in Spring 2016, nearly two miles of protected lanes and new infrastructure

Phase 2 – South of 72nd
- Gather feedback & develop proposals
- Consider network connections
- Coordinate with 2016 capital project at 71st/Amsterdam/Broadway
- Complete improvements at Columbus/65th Street/Broadway
- Any route will require careful planning through complex intersection of 71st/Amsterdam/Broadway