The Central Avenue Corridor

- Serves Westchester County between White Plains and Yonkers, and links Westchester to New York City.
- 14.4 mile long corridor.
- Major destinations include:
  - Downtown White Plains
  - Westchester County Center
  - Shopping areas along Central Avenue
  - Cross County Shopping Center
  - Yonkers Raceway
  - New York City Subway
  - Other Bee-Line routes
Central Avenue Corridor: 3 Bee-Line Bus Routes

- Route 20 (local) and 21 (limited) connect Westchester with the New York City subway and bus – approximately 30% of Bee-Line customers transfer.

- Route BxM4C (Westchester – Manhattan Express) links Westchester to Midtown and Lower Manhattan.

- 3.6 million annual riders.

- Average Route 20 daily weekday ridership approximately 12,000 riders – 10% of Bee-Line system ridership.
High Concentration of Residential, Retail and Commercial Development

- High density residential and retail uses provide opportunities to attract more riders.
- Underutilized or vacant properties have potential to be redeveloped.
Incomplete or narrow sidewalks and wide crossings are challenging for pedestrians.
Traffic Signals and Bus Stops

- 71 bus stops in corridor, spaced approximately every 2/10 of a mile.
- 44 traffic signals along corridor, approximately every 3/10 of a mile.
Objective of the Central Avenue Bus Rapid Transit Assessment

To identify components of Bus Rapid Transit for the Central Avenue Corridor that will:

- Reduce travel times.
- Attract new riders.
- Improve mobility in corridor.
- Create an integrated and customer friendly transit service.
- Improve operating efficiency.
Existing Conditions Analyses

In order to understand conditions along the Central Avenue corridor, the following analyses were conducted:

- Public involvement – 2 open houses, 2 newsletters, on board survey, website
- Bus ridership
- Traffic
- Travel time analysis
- Land use
Existing Conditions – Bus Ridership

- From 2003 to 2007:
  - Route 20 weekday boardings increased by 23%.
  - Route 21 weekday boardings increased by 11%.

- From 2007 to 2008:
  - Route 20 boardings increased by 28%.
  - Route 21 boarding increased by 22%.

- Ridership increases due to:
  - MetroCard (April 2007)
  - Empire City at Yonkers Raceway (October 2006)
  - Growth in Downtown White Plains
Existing Conditions - Traffic

Average Weekday Volumes

Traffic volume peaking for a retail-oriented roadway
Existing Conditions - Traffic

Average Saturday Volumes

Fort Hill Road weekday comparison
• How a bus spends its time from route origin to terminal.
• Most congestion occurs during mid-day and pm peak periods, consistent with retail orientation.
Existing Conditions – Land Use

*BRT system design, especially station locations, is influenced by land use and zoning.*

- Evaluated areas subject to change:
  - Vacant parcels
  - Underutilized properties
  - Proposed station areas

- Under existing zoning, land uses are generally segregated.

- Land use decisions are made at a local level.
BRT Concepts for Central Avenue

- Faster operations.
- Intelligent Transportation Systems (ITS).
- Preferential lane treatments.
- Attractive stations with customer amenities.
- Stylized vehicles with low floor boarding.
- Access to stations.
- Faster fare collection.
- Strong brand identity.
- Transit-Oriented Development (TOD).
BRT Concepts for Central Avenue

Operations Solutions

- BRT service will run daily.
- BRT will operate every 10-15 minutes.
- Only 25 BRT stations on BRT route (71 local stops).
- Free transfers between BRT and local buses. Existing free transfers to NYCT subways and buses remain.
BRT Concepts for Central Avenue

ITS Treatments

- **Traffic Signal Priority** at most intersections except:
  - At those with split north/southbound signal phasing (e.g., Yonkers Ave and Tuckahoe Rd).
  - Side streets operating at or overcapacity during peak periods (i.e., Hartsdale Ave and Ardsley Rd).
  - Intersections with a high volume of bus movements on intersecting approaches (i.e., near TransCenter).

- **Queue Jumpers** at selected intersections that are wide enough for a queue jump lane (e.g., Hartsdale Avenue).

Signal priority and queue jumpers give BRT vehicles a head start over traffic.
BRT Concepts for Central Avenue

Preferential Roadway Treatments

- Exclusive lanes for BRT and other Bee-Line buses on Central Avenue.
- Reduce travel times by allowing buses to run faster and avoid other traffic.
- Could be implemented from Yonkers/Greenburgh line to Sadore Lane with minor parking impacts.

Rendering of proposed exclusive lane at Ft. Hill Road.
BRT Concepts for Central Avenue

Stations

- Stations are the gateway to BRT.
- Designed to provide both shelter and information to customers.
- At BRT stations, free transfers to Route 20 local bus.

Rendering of proposed BRT station at Fort Hill Road
BRT Travel Time Savings

- Limited stops.
- Headway based dispatching.
- Transit priority (BRT lanes, queue jumpers, signal priority).
- Prepaid boarding (POP, all-door boarding, level or near level boarding).
- In-line station at Cross County Shopping Center.
## Potential Time Savings Weekdays - Southbound direction

<table>
<thead>
<tr>
<th>Time savings category</th>
<th>Low</th>
<th>Midpoint</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limited stop operation</strong> (fewer bus stops compared to Route 20)</td>
<td>3.00</td>
<td>6.00</td>
<td>9.00</td>
</tr>
<tr>
<td><strong>Headway based dispatching</strong> (no intermediate timepoints)</td>
<td>1.00</td>
<td>2.00</td>
<td>3.00</td>
</tr>
<tr>
<td><strong>Pre-paid, POP fare collection, all door boarding, level boarding</strong></td>
<td>5.00</td>
<td>6.50</td>
<td>8.00</td>
</tr>
<tr>
<td><strong>Transit priority</strong>: BRT lanes, queue jumpers, traffic signal priority</td>
<td>2.00</td>
<td>4.25</td>
<td>6.50</td>
</tr>
<tr>
<td><strong>In-line Cross County Station</strong> - more direct Cross County shopping center routing – Southbound direction time savings</td>
<td>7.00</td>
<td>8.25</td>
<td>10.50</td>
</tr>
<tr>
<td><strong>Time savings with In-line Cross County Station</strong></td>
<td>18.00</td>
<td>27.00</td>
<td>37.00</td>
</tr>
<tr>
<td><strong>Current Route 20 travel time:</strong></td>
<td>63.00</td>
<td>75.50</td>
<td>88.00</td>
</tr>
<tr>
<td><strong>BRT travel time:</strong></td>
<td>45.00</td>
<td>48.50</td>
<td>51.00</td>
</tr>
<tr>
<td><strong>% time savings</strong></td>
<td>28.57%</td>
<td>35.76%</td>
<td>42.05%</td>
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</tbody>
</table>
# Potential Time Savings Saturdays - Southbound direction

<table>
<thead>
<tr>
<th>Time savings category</th>
<th>Low</th>
<th>Midpoint</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limited stop operation</strong> (fewer bus stops compared to Route 20)</td>
<td>3.00</td>
<td>6.00</td>
<td>9.00</td>
</tr>
<tr>
<td><strong>Headway based dispatching</strong> (no intermediate timepoints)</td>
<td>1.00</td>
<td>2.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Pre-paid, POP fare collection, all door boarding, level boarding</td>
<td>5.00</td>
<td>6.50</td>
<td>8.00</td>
</tr>
<tr>
<td><strong>Transit priority:</strong> BRT lanes, queue jumpers, traffic signal priority</td>
<td>1.50</td>
<td>4.00</td>
<td>6.50</td>
</tr>
<tr>
<td><strong>In-line Cross County Station</strong> - more direct Cross County shopping center routing –</td>
<td>6.00</td>
<td>8.25</td>
<td>10.50</td>
</tr>
<tr>
<td>Southbound direction time savings</td>
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<td></td>
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<tr>
<td><strong>Total Time Savings</strong></td>
<td>16.50</td>
<td>26.75</td>
<td>37.00</td>
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<tr>
<td>Current Route 20 travel time:</td>
<td>60.00</td>
<td>76.50</td>
<td>93.00</td>
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<tr>
<td>BRT travel time:</td>
<td>43.50</td>
<td>49.75</td>
<td>56.00</td>
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<tr>
<td>% time savings</td>
<td>27.50%</td>
<td>34.97%</td>
<td>39.78%</td>
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</tbody>
</table>
Transit Oriented Development

- A land use strategy to create compact, walkable communities centered around transit systems that reduce dependence on auto travel, create more human scale environments and more livable communities.
Transit Oriented Development

- Traditionally focused on train stations.
- Fixed nature of system gives more permanence and visibility that is necessary to attract development.
- Relationship of TODs to bus systems not as widely documented but domestic and international examples exist:
  - Pittsburgh, Boston, Los Angeles
  - Ottawa, Curitiba, Bogota, Brisbane
Transit Oriented Development

- Communities can be proactive in taking steps to promote TOD and reduce auto dependency through Transit Efficient Development (TED) as well.

- Incentives include:
  - Land use plans, policies, zoning
  - Capital improvements
  - Density bonuses
  - Tax incentives
  - Streamlined development process
TOD for Central Avenue

- Community support critical – traffic engineers and land use planners on study Steering Committee.

- 3 areas selected for conceptual TOD designs based on community input:
  - Harding Avenue in White Plains.
  - Former Barnes & Noble site in Greenburgh.
  - Former Yonkers Avenue Parking Garage in Yonkers.

- Identified opportunities/constraints and potential new uses at each site.
TOD Solution – Harding Avenue

- Gateway to White Plains
TOD Solution – Harding Avenue

- New residential and commercial construction to the sidewalk
TOD Solution – Harding Avenue

- Recommend relocating church and moving parking to rear of building
TOD Solution – Harding Avenue

- Reconfigure and redevelop parcels
- Mixed use residential, office and retail.
- Streetscape improvements to sidewalks and crosswalks.
- Shared parking and possible park & ride.

Proposed TOD uses at Harding Avenue.
TOD Solution – Former Barnes & Noble Site

Original Carvel Store
TOD Solution – Former Barnes & Noble Site

- Recommend physical and visual connection with Hartsdale Avenue intersection
TOD Solution – Former Barnes & Noble Site

- Tie into BRT station at Hartsdale Ave.
- Mixed use residential, office and retail.
- Streetscape improvements to sidewalks and crosswalks.
- Shared parking and possible park & ride.

Proposed TOD uses at former Barnes & Noble site.
TOD Solution – Former Barnes & Noble Site
TOD Solution – Former Yonkers Avenue Parking Garage

7 acre vacant site
TOD Solution – Former Yonkers Avenue Parking Garage
Currently used for parking
TOD Solution – Former Yonkers Avenue Parking Garage

- Mixed use hotel and retail.
- Destination in its own right.
- Animated plaza.
- Improved streetscapes such as sidewalks, street trees and seating area.
- Shared parking and possible park & ride.

Proposed TOD uses at former Yonkers Avenue parking garage site.
TOD Solution - Former Yonkers Avenue Parking Garage
Park and Ride Locations

Central Park Ave & Ardsley Rd (SB)
- Approx. 50 spaces
Sample TOD Overlay Zone

Allowed Uses (examples):

- Apartments/townhouses – minimum 7 dwelling units per acre
- Mixed uses w/ground floor retail
- Banks, government bldgs, hospitals, hotels, retail under 10,000 sq. ft., restaurants (not fast food), service oriented offices, cultural facilities, transit stations
Sample TOD Overlay Zone

Prohibited Uses (examples):

- Low density housing (less than 7 units per acre)
- Strip commercial development
- Drive through facilities
- Auto sales, service, repairs, rentals, car washes
- Manufactured home/RV sales, boat sales/storage
- Industrial uses, salvage yards, heavy equipment sales and services
- Storage facilities, warehouses, distribution
- Golf courses
- Freight terminals
- Cemeteries
Sample TOD Overlay Zone – Major Components

- Maximum parking requirements, shared parking, parking at rear of buildings
- Form based codes emphasizing visual aspect of development
- Limited setbacks
- Building heights to encourage density but sensitive to the context of the surrounding area
- Sidewalks, bike racks, streetscapes
- Design guidelines for building facades
- Minimize curb cuts
<table>
<thead>
<tr>
<th>Phasing</th>
<th>&lt; 1 year</th>
<th>&lt; 3 years</th>
<th>3-6 years</th>
<th>6+ years</th>
<th>Depend. on other entities</th>
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</thead>
<tbody>
<tr>
<td>7-day, all day Route 21 service in both directions</td>
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<tr>
<td>Additional free transfer between Route 20 &amp; 21</td>
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<tr>
<td>Implement transit signal priority</td>
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<tr>
<td>Implement queue jumpers</td>
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<tr>
<td>Install bus lanes at specified locations</td>
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<tr>
<td>Open mini Park &amp; Ride lots along corridor</td>
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<tr>
<td>Initial BRT branding</td>
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<tr>
<td>New planning principles (guidelines) along corridor</td>
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<tr>
<td>Implement headway based dispatching</td>
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<tr>
<td>Install BRT stations with level boarding</td>
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<tr>
<td>Activate real time message signs</td>
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<tr>
<td>Install interim Proof of Payment fare collection</td>
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<tr>
<td>BRT vehicles to replace 2002 vintage buses</td>
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<tr>
<td>Construct CCSC In Line station</td>
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<tr>
<td>Full BRT branding roll out</td>
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<tr>
<td>Complimentary TOD along corridor</td>
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<tr>
<td>Implement smart card Proof of Payment</td>
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</table>
BRT - Conclusion

- BRT is feasible on the Central Avenue corridor.
- BRT could offer travel time savings of 16 to 37 minutes one way. (25-35%)
- With BRT, ridership in corridor could increase by 35%.
- BRT can help change Westchester County’s perception of bus travel.

*BRT...it’s about time!*
BRT and Land Use - Conclusion

- BRT can influence land use
- Community support is critical
- Communities can be proactive in encouraging TOD and Transit Efficient Development (TED) through specific policies
- Full BRT treatment will have the greatest presence and the most potential to create land use changes
Next Steps

- Begin Implementation – Transit Signal Priority and Exclusive busways – in progress
- Work with communities on promoting land use changes – Greenburgh in progress
For More Information:

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