Downtown Brooklyn Traffic Calming Project

Calming Clinton Street with the Traffic Engineering Toolbox

ITE Technical Conference
San Antonio
March 20, 2006
NYCDOT - Calming Clinton Street
The Downtown Brooklyn Traffic Calming Project

- Begun by Arup in 1999; Study completed 2003
- Rose from “Brownstone Brooklyn” frustration with “through” and “spillover” traffic
- Large study area; Comprehensive scope
- Project and NYCDOT often perceived negatively
- Clinton Street a success story with traditional tools applied innovatively
### Comparative Income, Density & Transportation Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Brooklyn Heights</th>
<th>Cobble Hill</th>
<th>Carroll Gardens</th>
<th>All Brooklyn</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>26,000</td>
<td>10,600</td>
<td>9,100</td>
<td>2.5 mil</td>
<td>281 mil</td>
</tr>
<tr>
<td>Average Household Income</td>
<td>$108,200</td>
<td>$105,900</td>
<td>$72,900</td>
<td>$46,300</td>
<td>$56,600</td>
</tr>
<tr>
<td>Population Density (Persons/sq mile)</td>
<td>52,700</td>
<td>46,000</td>
<td>43,100</td>
<td>34,900</td>
<td>2,400</td>
</tr>
<tr>
<td>Percent of Households w/No Vehicle</td>
<td>65%</td>
<td>55%</td>
<td>57%</td>
<td>57%</td>
<td>10%</td>
</tr>
<tr>
<td>Percent of Workers Commute by Auto</td>
<td>11%</td>
<td>14%</td>
<td>16%</td>
<td>30%</td>
<td>88%</td>
</tr>
</tbody>
</table>

Source: US Census 2000

US population density is for urbanized population (222 million) and urbanized land area (92,505 square miles)
### Northbound Traffic Volume, AM Peak Hour, 1999

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Volume</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia Street</td>
<td>390</td>
<td>5%</td>
</tr>
<tr>
<td>Brooklyn-Queens Expressway</td>
<td>4,570</td>
<td>60%</td>
</tr>
<tr>
<td>Hicks Street</td>
<td>1,160</td>
<td>15%</td>
</tr>
<tr>
<td>Clinton Street</td>
<td>620</td>
<td>8%</td>
</tr>
<tr>
<td>Smith Street</td>
<td>880</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,620</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Downtown Brooklyn Traffic Calming Project, Interim Data Collection Technical Memorandum, Supplement #1, November 1999
Primary Management Features - 1999

- West Curb 7-11 am No Standing Regulation
- Coordinated Signal Progression
  - 60 sec cycle lengths
  - 60% Split at Intersections w/Minor Streets
  - 25 mph offsets
- Bike lane for ¼ mile approach to Brooklyn Bridge
## Northbound Travel Times & Average Speeds
### AM Peak Hour, 1999

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Distance</th>
<th>Average Speed</th>
<th>Travel Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Average</td>
</tr>
<tr>
<td>Brooklyn-Queens Expressway</td>
<td>4.48</td>
<td>14.6</td>
<td>18.4</td>
</tr>
<tr>
<td>Hicks Street</td>
<td>4.18</td>
<td>11.7</td>
<td>21.5</td>
</tr>
<tr>
<td>Clinton Street</td>
<td>3.46</td>
<td>12.1</td>
<td>17.2</td>
</tr>
<tr>
<td>Smith Street</td>
<td>3.97</td>
<td>13.7</td>
<td>17.4</td>
</tr>
</tbody>
</table>

Source: Downtown Brooklyn Traffic Calming Project, Interim Data Collection Technical Memorandum Supplement #1, p. 20, November 1999
Vehicle Classification, AM Peak

- All Streets
  - 0.4% - 2.3% Yellow Cabs
- Clinton Street
  - 36% Yellow Cabs
Method of classifying different types of street based both on their transportation function and other activities that take place on them.

Three Broad Street Types
- Travel
- Community
- Living
### Street Typology

<table>
<thead>
<tr>
<th>Travel</th>
<th>Community</th>
<th>Living</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Transportation Function</td>
<td>“Main Streets”</td>
<td>Access is main function</td>
</tr>
<tr>
<td>Commercial/Institutional</td>
<td>Commercial / Residential</td>
<td>Residential</td>
</tr>
<tr>
<td>Desirable for Traffic / Trucks</td>
<td>Provide Important Connectivity</td>
<td>Low Traffic Volumes</td>
</tr>
<tr>
<td>High Ped &amp; Bike Activity</td>
<td>High Ped &amp; Bike Activity</td>
<td>Provide Intra-N’hood Connections</td>
</tr>
<tr>
<td>Transit Routes</td>
<td>Typically Have Bus Routes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Corridor Evaluation

- As Living Street, Use as Commuter Rush Corridor is Out of Context
- Perceived Speeding in AM Peak
- Evident and Latent Bicycle Demand
- Crossing Atlantic Avenue is Primary Ped Issue
- Limits to Capacity -- Bottlenecks Where Clinton is “Minor” to Travel Streets
  - Atlantic Ave
  - Tillary St
Preliminary Interventions

- Elimination of AM Parking Restriction / Moving Lane
- Bicycle Lane
- Leading Pedestrian Interval (LPI) at Atlantic Avenue
1999 - AM Peak Period Configuration

2001 - AM Peak Period Configuration

2002 - AM Peak Configuration
Leading Pedestrian Interval (LPI) at Atlantic Avenue

Before: Motorist “Beating” Peds Across X-Walk

After: Pedestrian “Head Start” Establishes Ped, Motorists Yield
Interim Effects - Positives

- **LPI**
  - Significant increase in motorists yield rates
  - 89% of ped's thought measure improved safety
  - 96% of ped's thought

- **Bikes**
  - Lane increased popularity of corridor for cyclists

- **Vol reduction**
  - Modest (~9%) initial volume reductions
Interim Effects - Negatives

- Bottleneck at Atlantic Avenue Exacerbated
- Spillback S. of Atlantic
- Honking
  - At Failed Intersections
  - To Vehicles that Yield

*Community demands for MORE traffic capacity*
Subsequent Interventions

- Rejection of Requests for Capacity Increase
- Time Allocated from ‘Major’ (Atlantic) to ‘Minor’ (Clinton)
- Reduced Signal Progression Offsets (Speed)
- Signal “Feathering” of Approach to Atlantic
<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Ave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pacific St</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>Amity St</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>Congress St</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>Warren St</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>Baltic St</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>Kane St</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>DeGraw St</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Sackett St</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Union St</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Carroll St</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>President St</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>1st Pl</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>2nd Pl</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>3rd Pl</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Luquer St</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Nelson St</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Hamilton Ave</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conditions in 2005 - Auto

- Honking, Spillback Essentially Eliminated
- Creation of “a different place”
- Slow but Orderly Traffic Movements
- Volume
- 50% Reduction in 8-9am Volume

<table>
<thead>
<tr>
<th>Street</th>
<th>DBTCP Type</th>
<th>June '99</th>
<th>October '04</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia</td>
<td>Community</td>
<td>1,030</td>
<td>910</td>
<td>-11%</td>
</tr>
<tr>
<td>Hicks</td>
<td>Living</td>
<td>3,060</td>
<td>2,470</td>
<td>-19%</td>
</tr>
<tr>
<td>Clinton</td>
<td>Living</td>
<td>1,570</td>
<td>950</td>
<td>-40%</td>
</tr>
<tr>
<td>Smith</td>
<td>Community</td>
<td>2,310</td>
<td>1,730</td>
<td>-25%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>7,970</strong></td>
<td><strong>6,060</strong></td>
<td><strong>-24%</strong></td>
</tr>
</tbody>
</table>
Conditions in 2005 - Bike

- Popular Cycling Corridor with Steady Volume Growth

## Bicycle Lane Volumes, 2002 and 2003

<table>
<thead>
<tr>
<th>Period</th>
<th>2002</th>
<th>2003</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-9 am</td>
<td>35</td>
<td>71</td>
<td>103%</td>
</tr>
<tr>
<td>10am - 2pm</td>
<td>72</td>
<td>116</td>
<td>61%</td>
</tr>
<tr>
<td>4-7pm</td>
<td>64</td>
<td>137</td>
<td>114%</td>
</tr>
<tr>
<td>9 Hr Total</td>
<td>171</td>
<td>324</td>
<td>89%</td>
</tr>
</tbody>
</table>
Completing the Bike Connection

- November 2005, DOT Installs “Tillary-Clinton Bike Improvement”
Triangle at Clinton & Cadman Plaza W

Before

After
Tillary Path Beginning at Cadman Plaza W

Before

After
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Before

Tillary Path b/w Cadman Plaza W & E

After
Tillary Path i/f/o Federal Courthouse near Bk Bridge

Before

After
Conclusions

- Corridor “remanaged” between 1999 and 2005 (incrementally)
- Balance among modes
- Responsive to context
- Low maintenance, low cost, standard measures
- Evolution of agency approach; Measures replicated
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- Bike Lanes to Manhattan Bridge
- Two-Way Separated Bike Path
- Refurbished Bike Lane on Repaved Street
- Bike Lane Shift Across Traffic Eliminated
- Traffic Signal Improvements
- Post Office
- Borough Hall