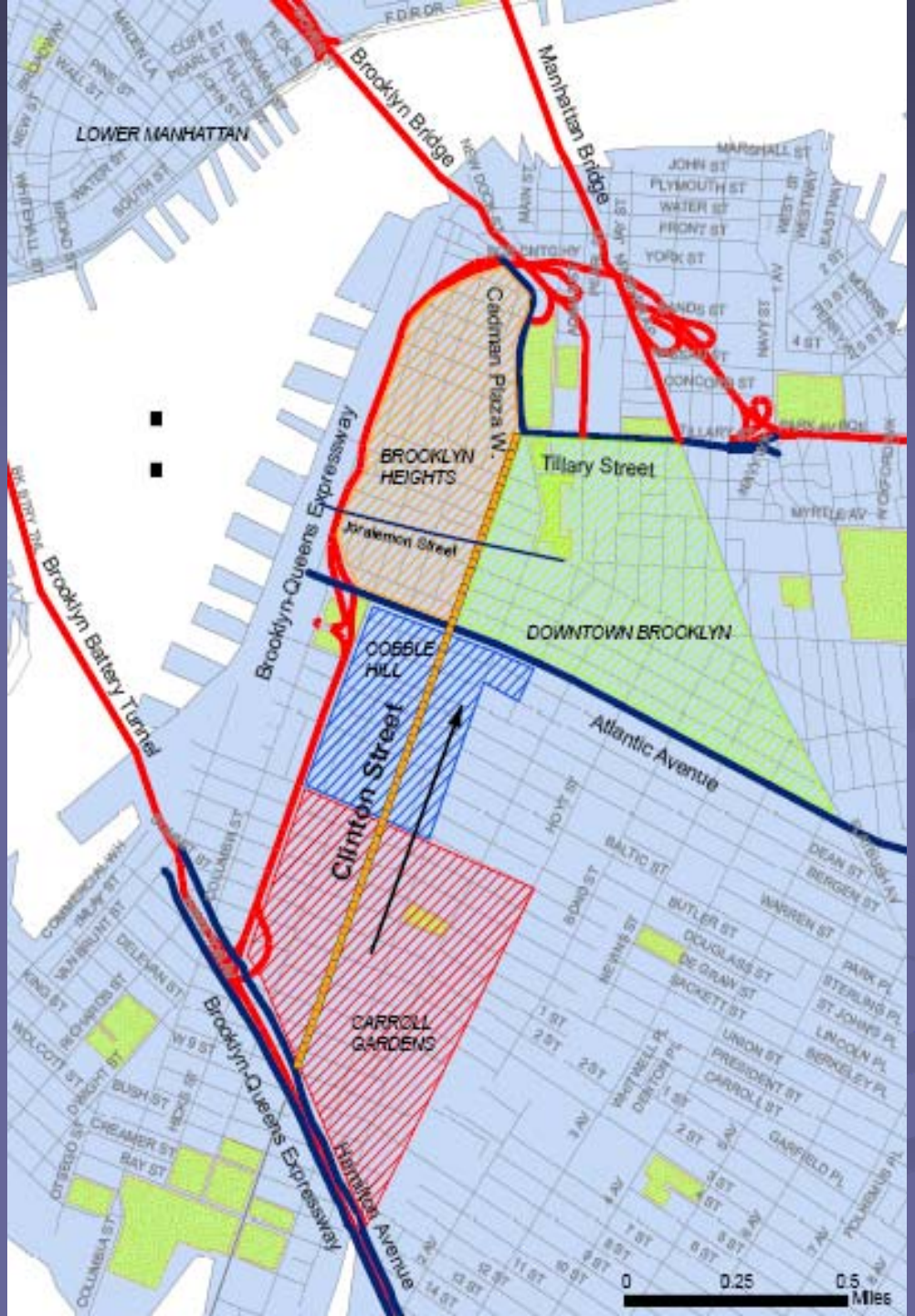
Downtown Brooklyn Traffic Calming Project

Calming Clinton Street with the Traffic Engineering Toolbox

ITE Technical Conference
San Antonio
March 20, 2006


LOWER MANHATTAN
Brooklyn Bridge
Manhattan Bridge
Cadman Plaza W.
BROOKLYN HEIGHTS
Tillary Street
Joralemon Street
Brooklyn-Queens Expressway
Brooklyn Battery Tunnel
DOWNTOWN BROOKLYN
COBBLE HILL
Clinton Street
Atlantic Avenue
CARROLL GARDENS
Hamilton Avenue
Brooklyn-Queens Expressway
0
0.25
0.5
Miles

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

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

Source: US Census 2000

US population density is for urbanized population (222 million) and urbanized land area(92,505 square miles)

NYCDOT - Calming Clinton Street

Clinton Street - 1999

Northbound Traffic Volume, AM Peak Hour, 1999

Corridor	Volume	Percent of Total
Columbia Street	390	5%
Brooklyn-Queens Expressway	4,570	60%
Hicks Street	1,160	15%
Clinton Street	620	8%
Smith Street	880	12%
Total	**7,620**	

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

Corridor	Distance	Average Speed	Travel Time (min)			
			Average		Maximum	Miniumum
Brooklyn-Queens Expressway	4.48	14.6	18.4		26.3	11.7
Hicks Street	4.18	11.7	21.5		26.6	15
Clinton Street	3.46	12.1	17.2		28.4	11.7
Smith Street	3.97	13.7	17.4		22.6	12.1

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

DBTCP Street Management Framework

- 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

Travel

- Critical Transportation Function
- Commercial/ Institutional
- Desirable for Traffic / Trucks
- High Ped & Nike Activity
- Transit Routes

Community

- "Main Streets"
- Commercial / Residential
- Provide Important Connectivity
- High Ped & Bike Activity
- Typically Have Bus Routes

Living

- Access is main function
- Residential
- Low Traffic Volumes
- Provide Intra-N'hood Connections

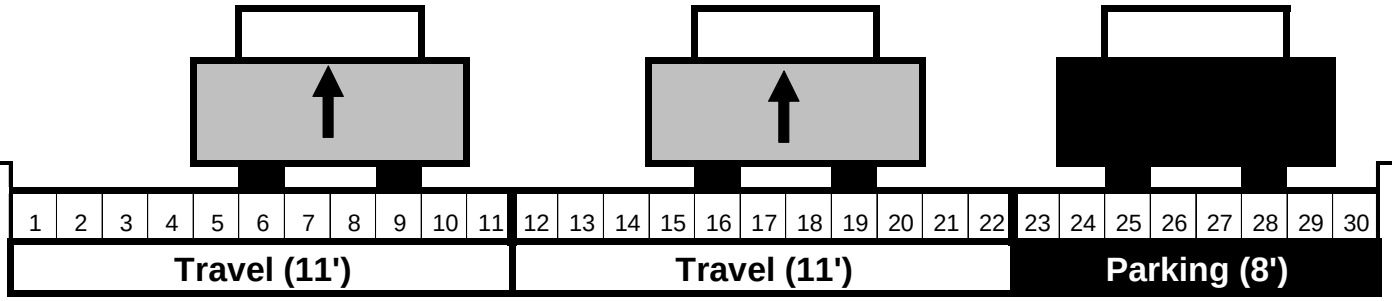
Corridor Evaluation

- 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

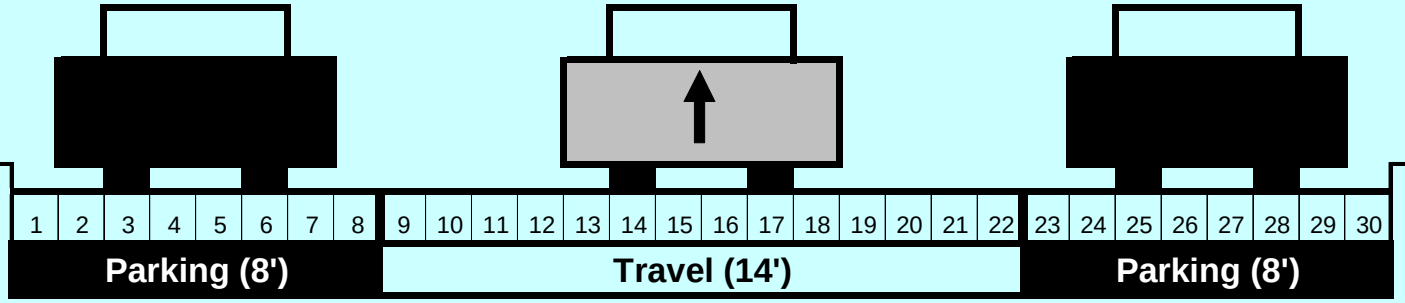
Preliminary Interventions

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

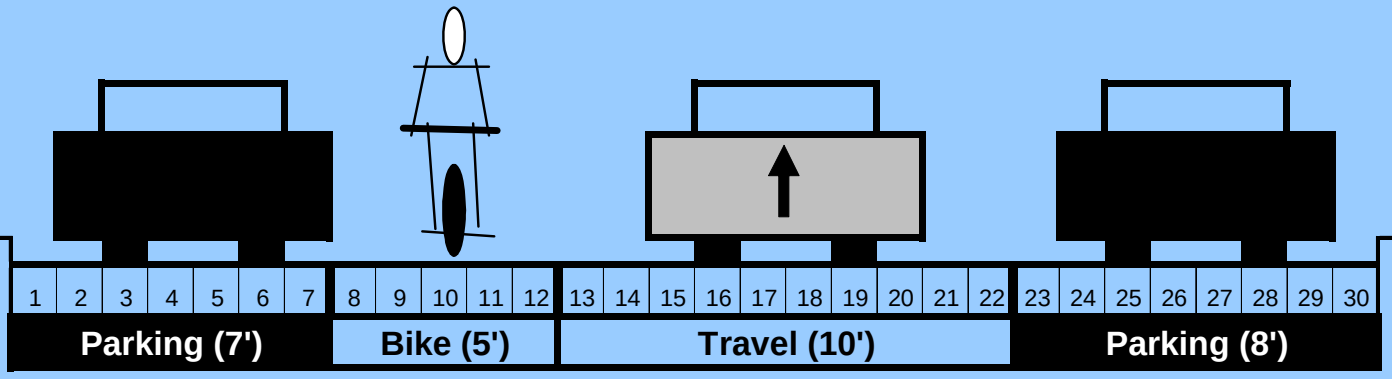
1999 - AM Peak Period Configuration



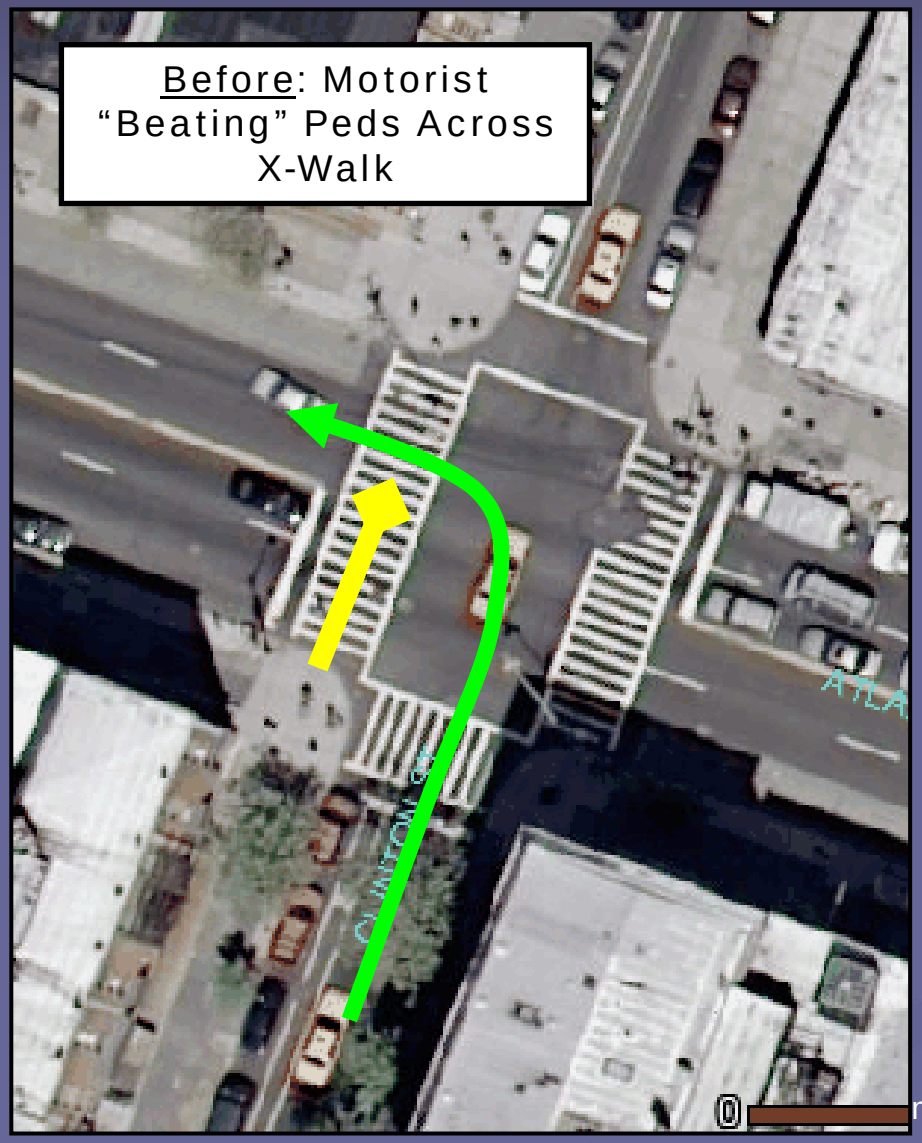
2001 - AM Peak Period Configuration

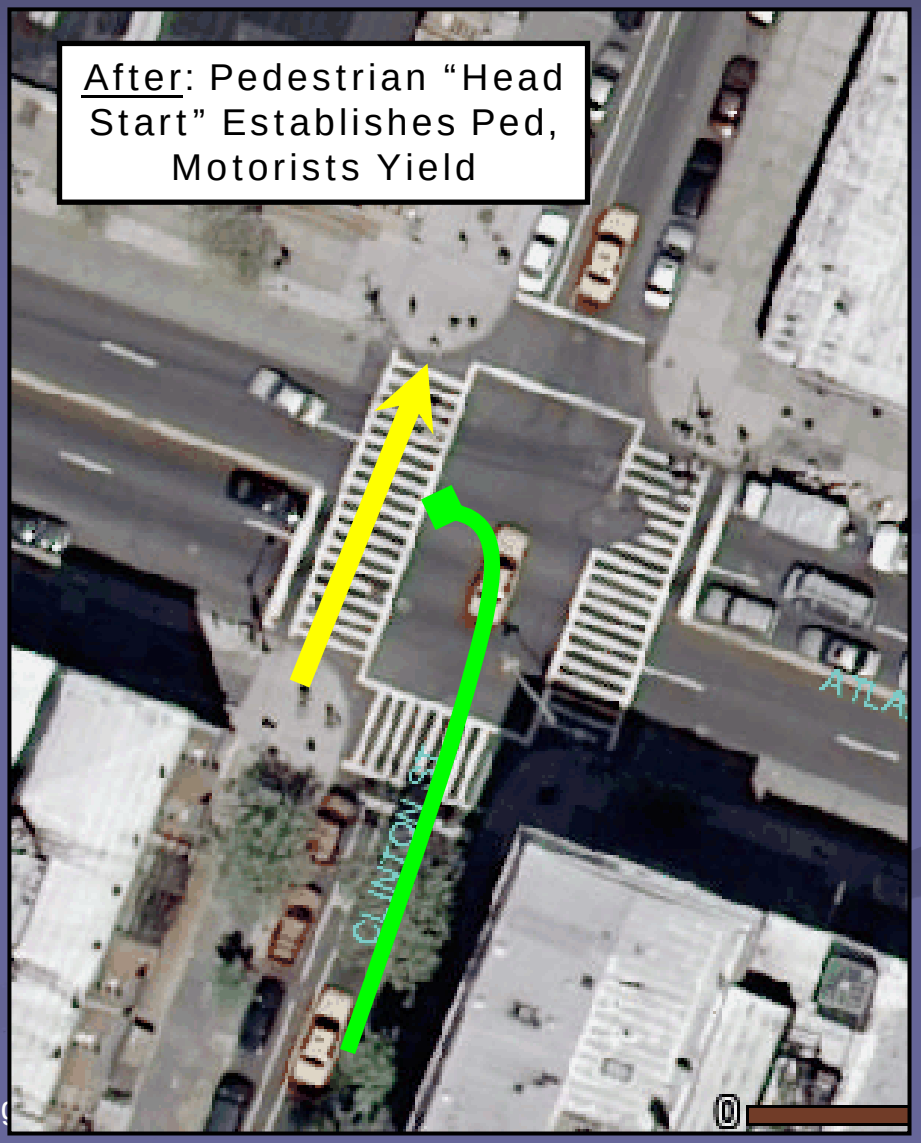


2002 - AM Peak Configuration



Leading Pedestrian Interval (LPI) at Atlantic Avenue





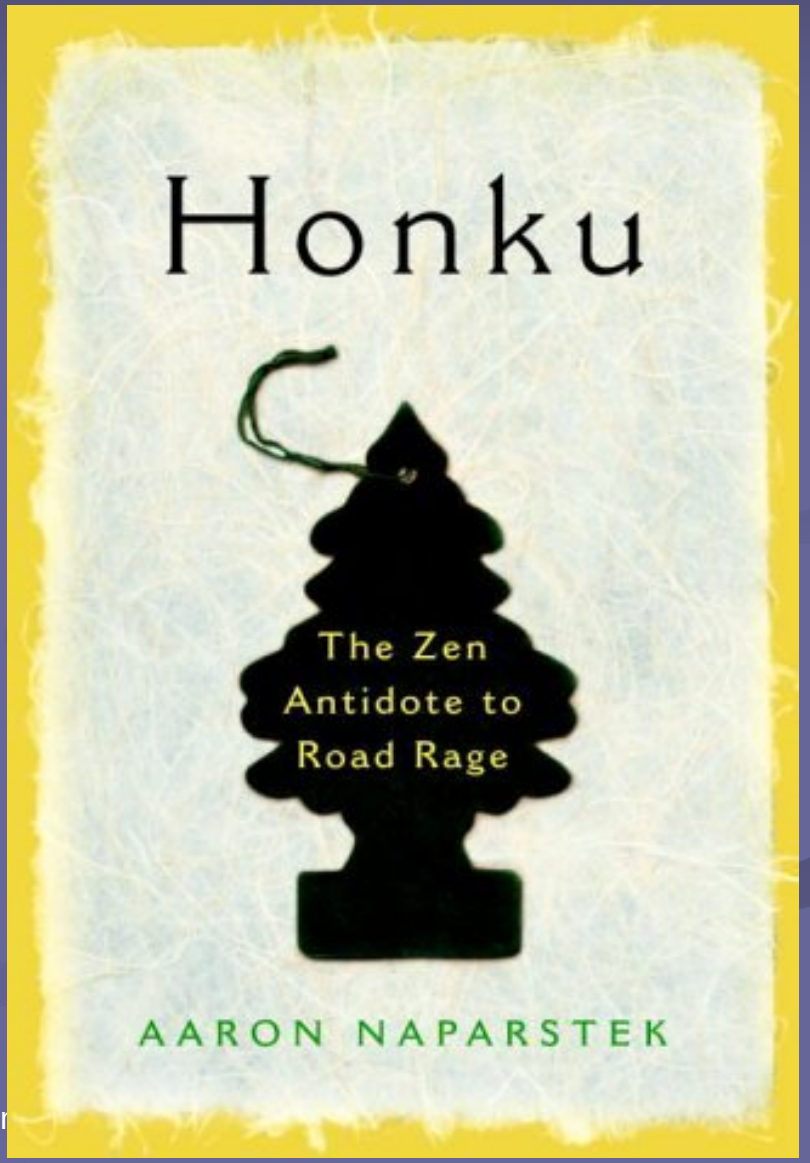
Interim Effects - Positives

- LPI
  - Significant increase in motorists yield rates
  - 89% of peds thought measure improved safety
  - 96% of peds 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 <u>MORE</u> 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

Signal Feathering
Adjustments to Clinton Street Split (%)

	Before	After
Atlanic Ave		
Pacific St	60	**50**
Amity St	60	**50**
Congress St	60	**50**
Warren St	60	*55*
Baltic St	60	*55*
Kane St	60	*55*
DeGraw St	60	60
Sackett St	60	60
Union St	60	60
Carroll St	60	60
President St	60	60
1st Pl	60	60
2nd Pl	60	60
3rd Pl	60	60
Luquer St	60	60
Neslon St	60	60
Hamilton Ave		

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

Northbound Volumes, Local Streets, 7am to 10am

Street	DBTCP Type	June '99	October '04	Change
Columbia	Community	1,030	910	-11%
Hicks	Living	3,060	2,470	-19%
Clinton	Living	1,570	950	-40%
Smith	Community	2,310	1,730	-25%
	TOTAL	**7,970**	**6,060**	**-24%**

Conditions in 2005 - Bike

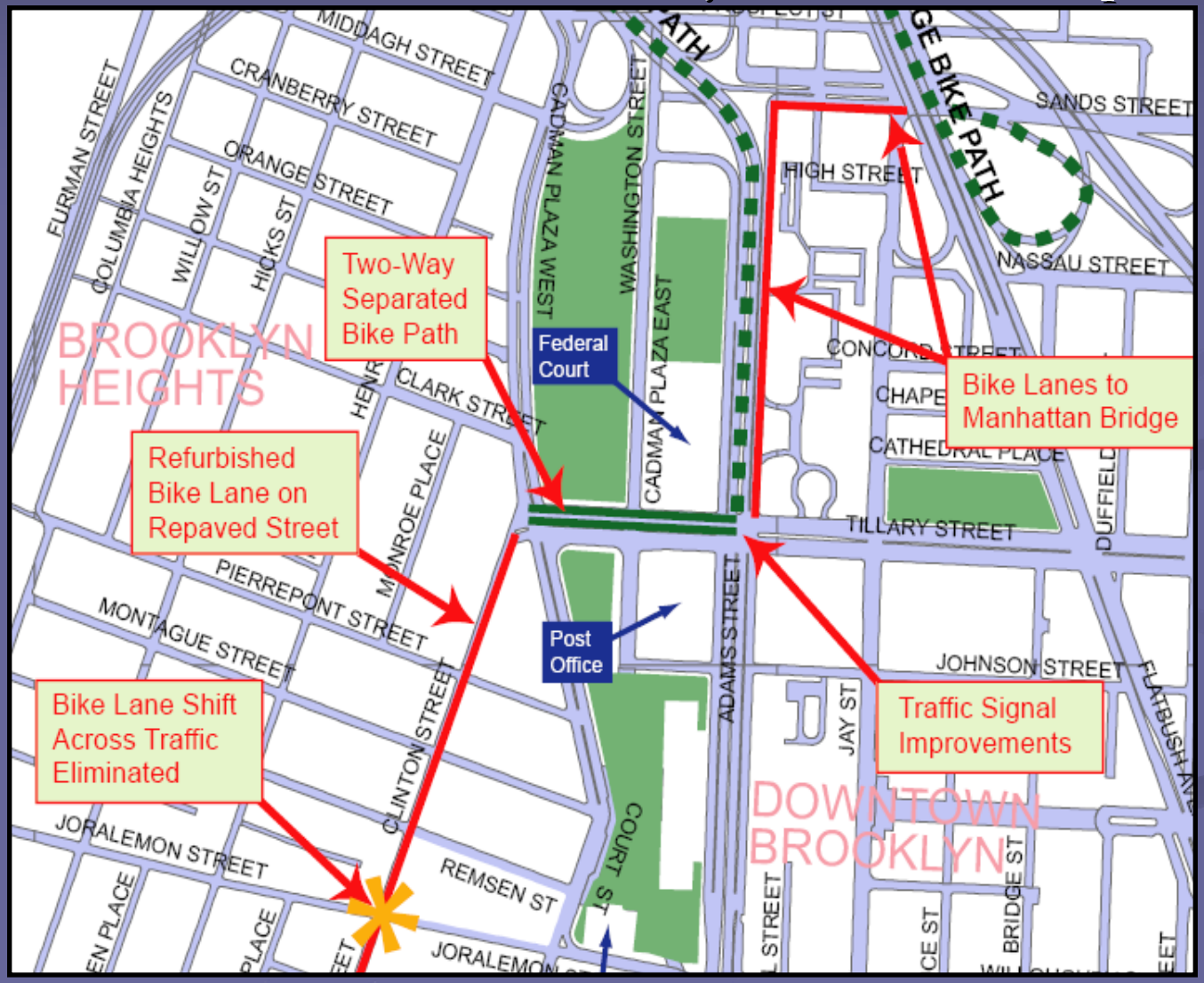
- Popular Cycling Corridor with Steady Volume Growth

Bicycle Lane Volumes, 2002 and 2003

Period	2002	2003	% Change
7-9 am	35	71	103%
10am - 2pm	72	116	61%
4-7pm	64	137	114%
9 Hr Total	**171**	**324**	**89%**

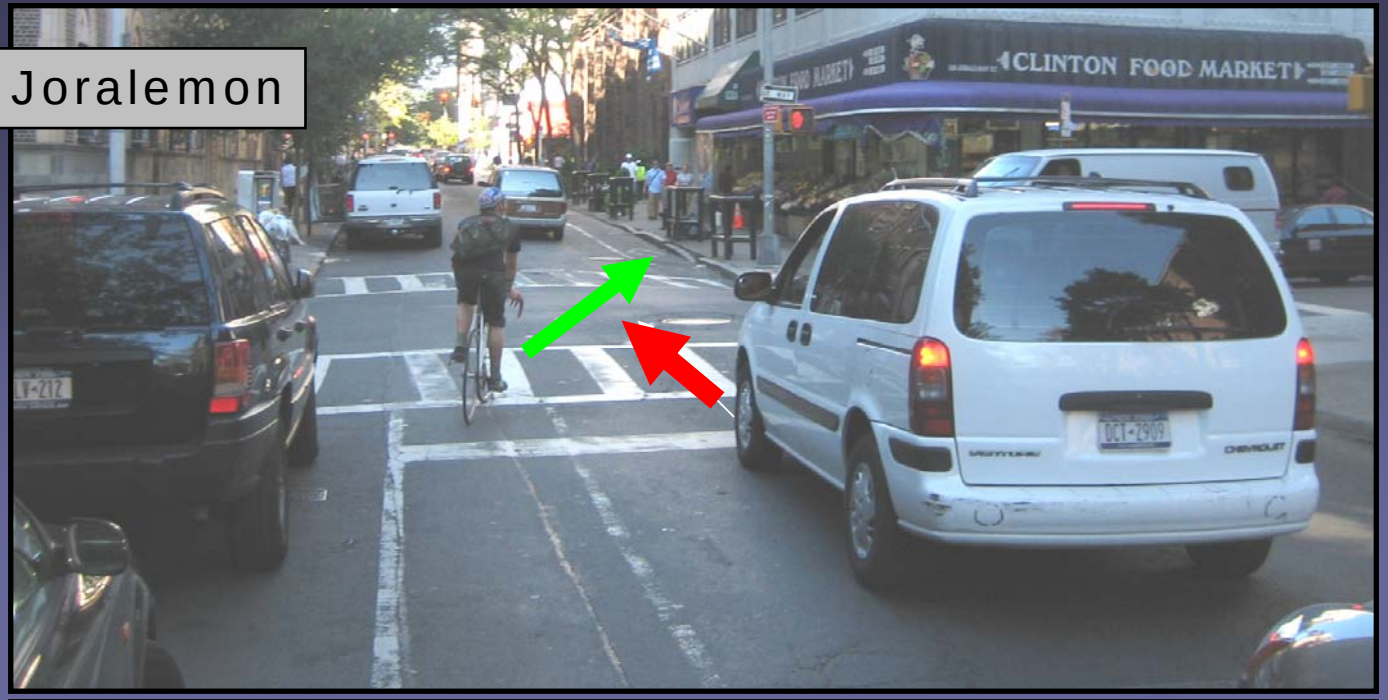
Completing the Bike Connection

- November 2005, DOT Installs "Tillary-Clinton Bike Improvement"



Shift at Clinton & Joralemon

Before



After

Triangle at Clinton & Cadman Plaza W

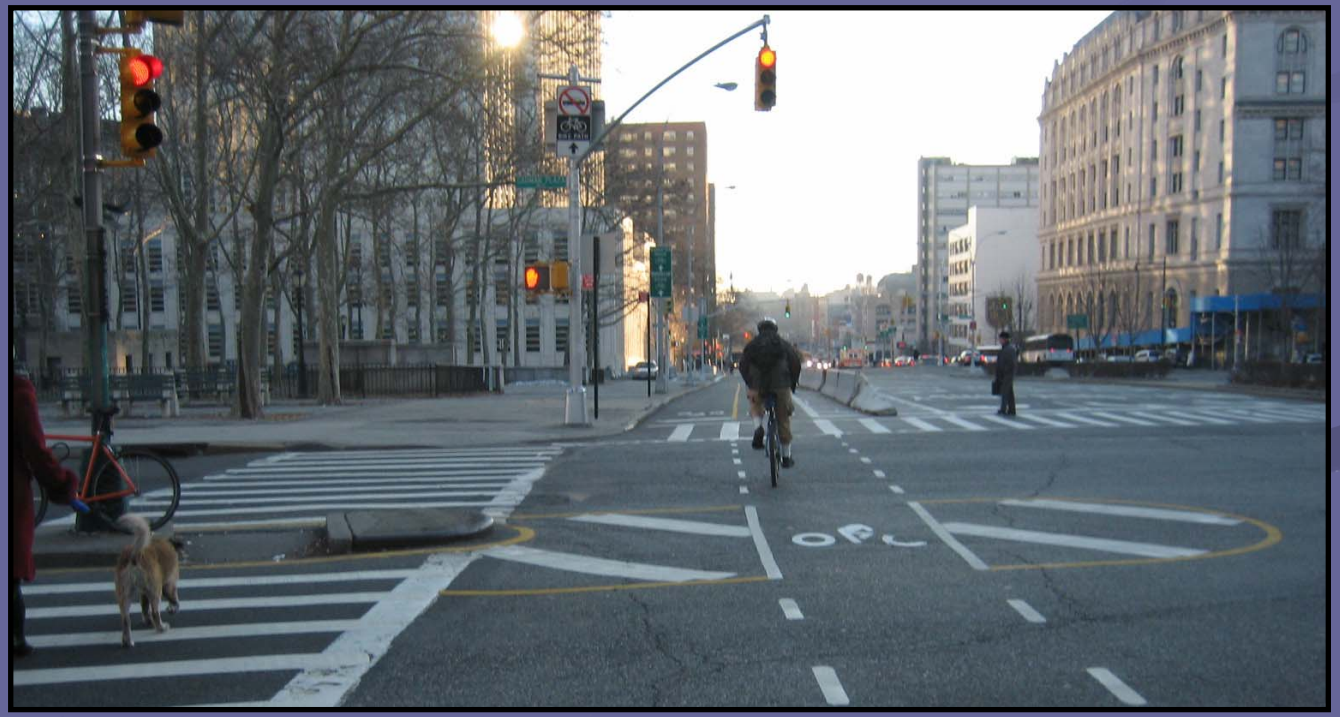
Before

After

Tillary Path Beginning at Cadman Plaza W

Before

After



Tillary Path b/w Cadman Plaza W & E

Before

After

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

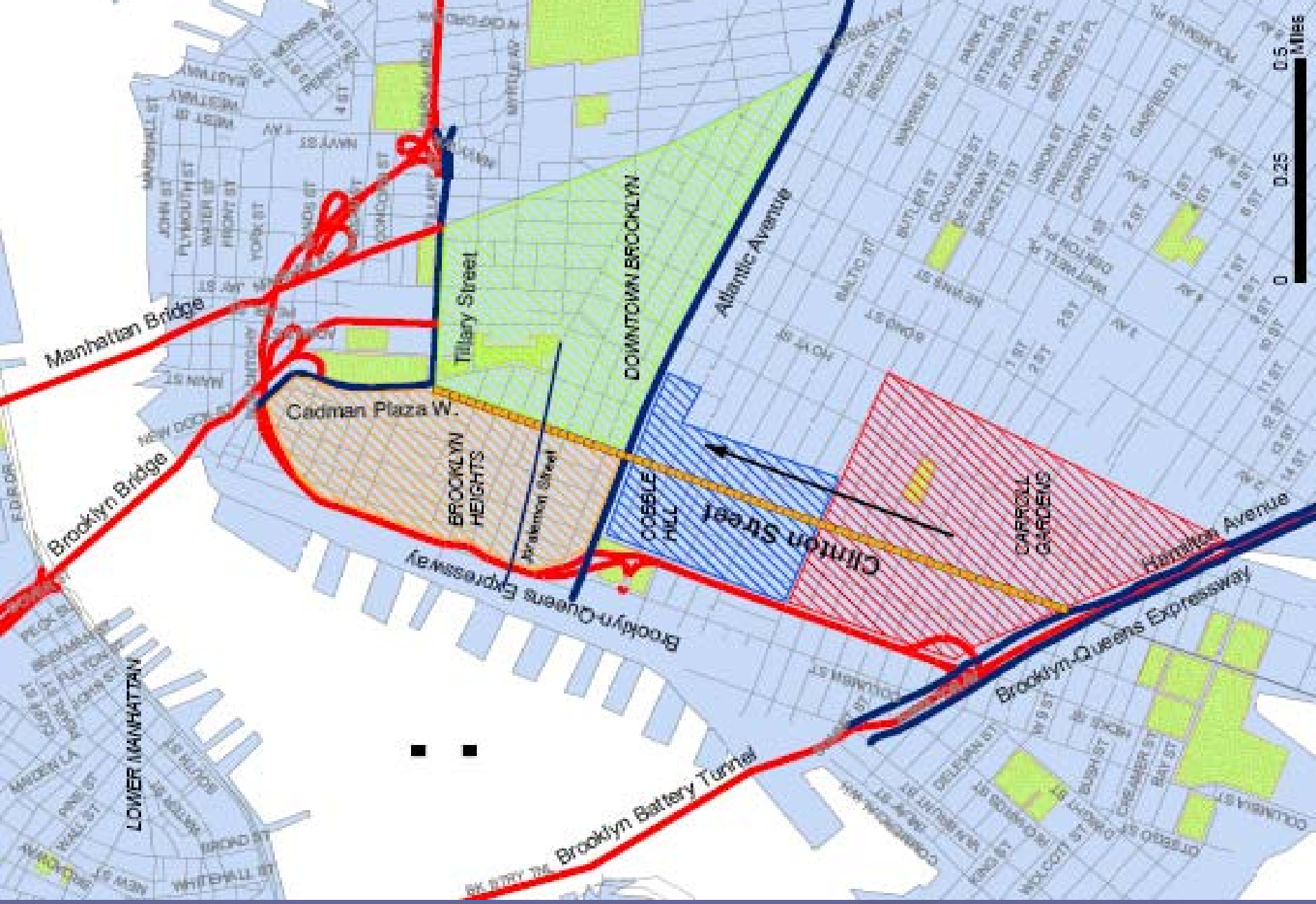
Before

After

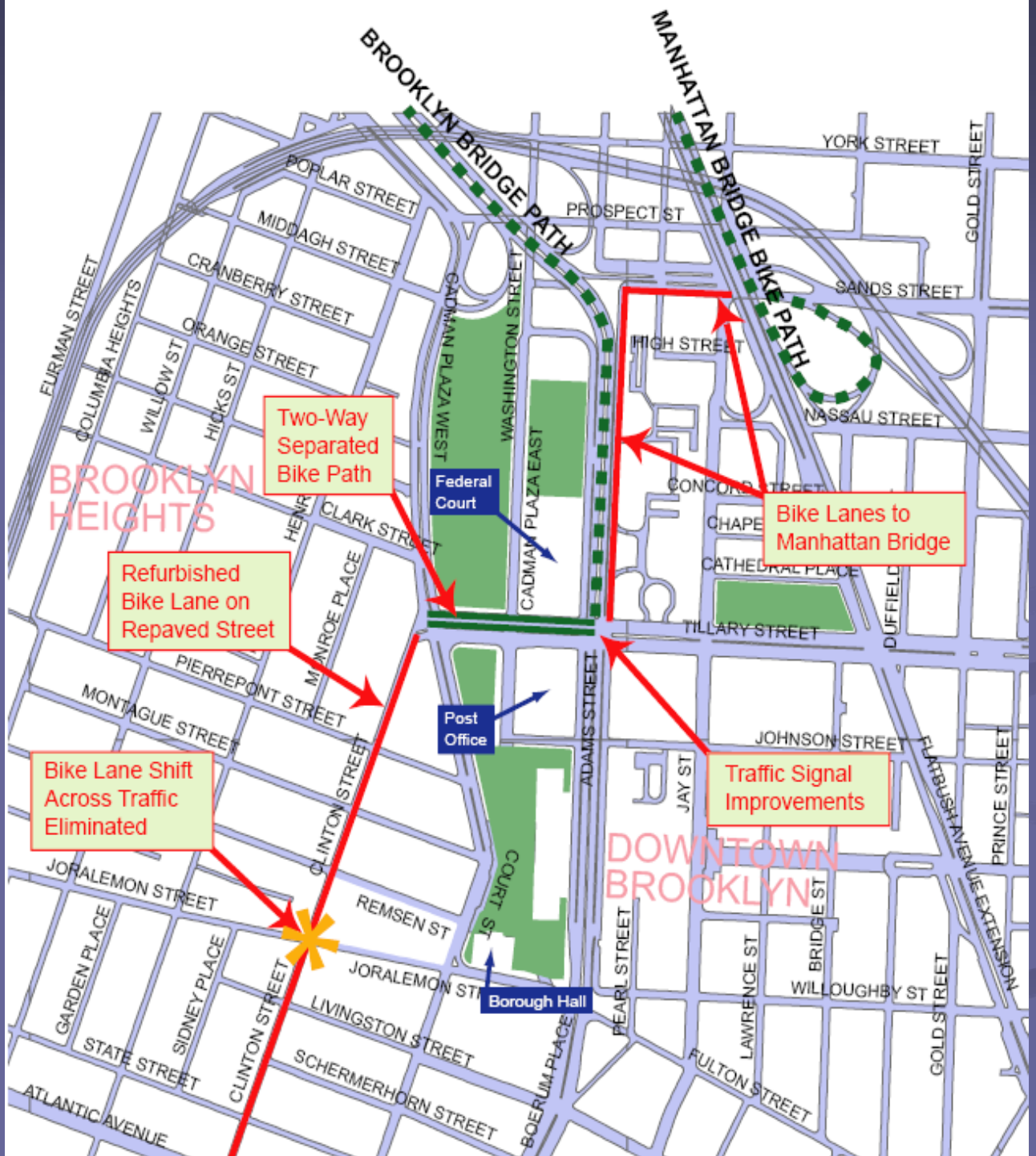

BROOKLYN
BRIDGE

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



NYCDOT - Calming Clinton Street


BROOKLYN BRIDGE PATH
MANHATTAN BRIDGE BIKE PATH
Two-Way Separated Bike Path
Bike Lanes to Manhattan Bridge
Refurbished Bike Lane on Repaved Street
Bike Lane Shift Across Traffic Eliminated
Traffic Signal Improvements
Federal Court
Post Office
Borough Hall
BROOKLYN HEIGHTS
DOWNTOWN BROOKLYN
YORK STREET
GOLD STREET
POPLAR STREET
PROSPECT ST
MIDDAGH STREET
CRANBERRY STREET
ORANGE STREET
SANDS STREET
HIGH STREET
NASSAU STREET
FURMAN STREET
COLUMBIA HEIGHTS
WILLOW ST
HICKS ST
CADMAN PLAZA WEST
WASHINGTON STREET
CADMAN PLAZA EAST
CONCORD STREET
CHAPEL
CATHEDRAL PLACE
DUFFIELD
CLARK STREET
HENRY
MONROE PLACE
TILLARY STREET
PIERREPONT STREET
MONTAGUE STREET
ADAMS STREET
JAY ST
JOHNSON STREET
FLATBUSH AVENUE EXTENSION
PRINCE STREET
CLINTON STREET
COURT ST
JORALEMON STREET
REMSEN ST
BRIDGE ST
WILLOUGHBY ST
GARDEN PLACE
SIDNEY PLACE
LIVINGSTON STREET
PEARL STREET
LAWRENCE ST
GOLD STREET
STATE STREET
SCHERMERHORN STREET
FULTON STREET
ATLANTIC AVENUE
BOERUM PLACE