

New York City
Department of Transportation

**Downtown Brooklyn
Traffic Calming Project**

May 2004

**FINAL REPORT –
EXECUTIVE SUMMARY**



*City of New York
Michael R. Bloomberg, Mayor*



*New York City Department of Transportation
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NYCDOT

Downtown Brooklyn Traffic Calming Study

May 2004

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E1. INTRODUCTION

E1.1 Downtown Brooklyn Traffic Calming Final Report – An Overview

This report outlines a comprehensive area-wide strategy of physical and operational traffic calming measures in Downtown Brooklyn on a corridor-by-corridor basis. The strategy, which is consistent with the overall objectives of the project, aims primarily to minimize the impact of traffic on the communities of Downtown Brooklyn. The strategy is built on a Street Management Framework arrived at through community consensus. Specific measures in each corridor's strategy link this Street Management Framework to integrated traffic management themes, and employ appropriate physical and operational treatments from the traffic calming toolbox.

The report also details the project's history, motivations, and objectives, and reports in detail on the implementation and impact of the pilot program of traffic calming measures installed as part of the project.

The recommendations in this report were developed in response to concerns raised by the community. The recommendations were based on technical analysis; field observations of conditions; experience gained through the pilot program; and discussions between the consultant and Community Boards, citizens, NYCDOT and other agencies. The recommendations, are, in many cases, conceptual and may require more detailed engineering analysis to determine those that can be implemented. Measures that have already been implemented and those whose implementation is imminent are noted as such in the text.

E1.2 Downtown Brooklyn Traffic Calming - History

The communities of Downtown Brooklyn see their streets as overtaxed with traffic and in need of strong protective measures. The Downtown Brooklyn Traffic Calming Project was conceived through the cooperative efforts of local elected officials and community groups, with additional support from the New York City administration. Elected officials and community groups alike consider revitalization of Downtown Brooklyn and preservation of the historic character of the surrounding residential communities as vital for maintaining a high quality of life locally and citywide. Most importantly, both the Downtown Brooklyn community and New York City administration see this project as signaling a new direction for managing traffic in the city.

The project's goals are to establish a more equitable balance in the use of area streets by pedestrians, bicyclists and motorists, to rationalize circulation and to maintain or improve mobility for all transportation modes without adversely impacting community access and adjacent area traffic. Some of the critical elements that make this project unique include the size of the area under study – the study area is over 10 square miles and contains 254 signalized intersections – and the centrality of community outreach, which has been used to gather information and to develop and refine a pilot program and areawide strategy in an interactive fashion.

In 1997, a task force was established by Borough President Howard Golden to develop a scope of work for the project. This scope of work provided for the application of an areawide traffic calming plan through a collaborative process involving NYCDOT, the community, and the Task Force described below. The Mayor's Office negotiated an agreement with Brooklyn Borough President Howard Golden and Council Member Kenneth K. Fisher to fund a study including a pilot program that would lead to the development of a traffic management plan for the area. Total funding for the project was \$6 million. Council Member Kenneth Fisher provided

\$500,000, and Borough President Howard Golden provided \$1.5 million, for a total of \$2 million. The study and pilot program utilized approximately \$1.2 million of these funds, with an additional \$250,000 provided by Assembly Member Joan Millman to supplement funding for the pilot program. The City has also agreed to provide \$4 million in the future to implement recommendations developed during the study. The consultant team was selected in January 1999 and work began in March 1999.

Understanding the high level of community interest in the project, NYCDOT agreed to vary from usual practice and have three neighborhood representatives - as designated by Borough President Golden and Council Member Fisher - served as voting members of the Selection Committee along with four NYCDOT members. The community-based Task Force chaired by the Brooklyn Borough President monitored the study. NYCDOT chaired a Technical Advisory Committee, which consisted of government agencies, elected officials, and Community Boards. The primary study area and the majority of the secondary study area falls with Brooklyn Community Boards 2 and 6; Community Board 8 encompasses the balance of the secondary study area. *Figure E1* (see next page) shows the project's study area and the boundaries of Community Boards 2 and 6.

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-  Primary Study Area
-  Secondary Study Area
-  Community Board Boundaries

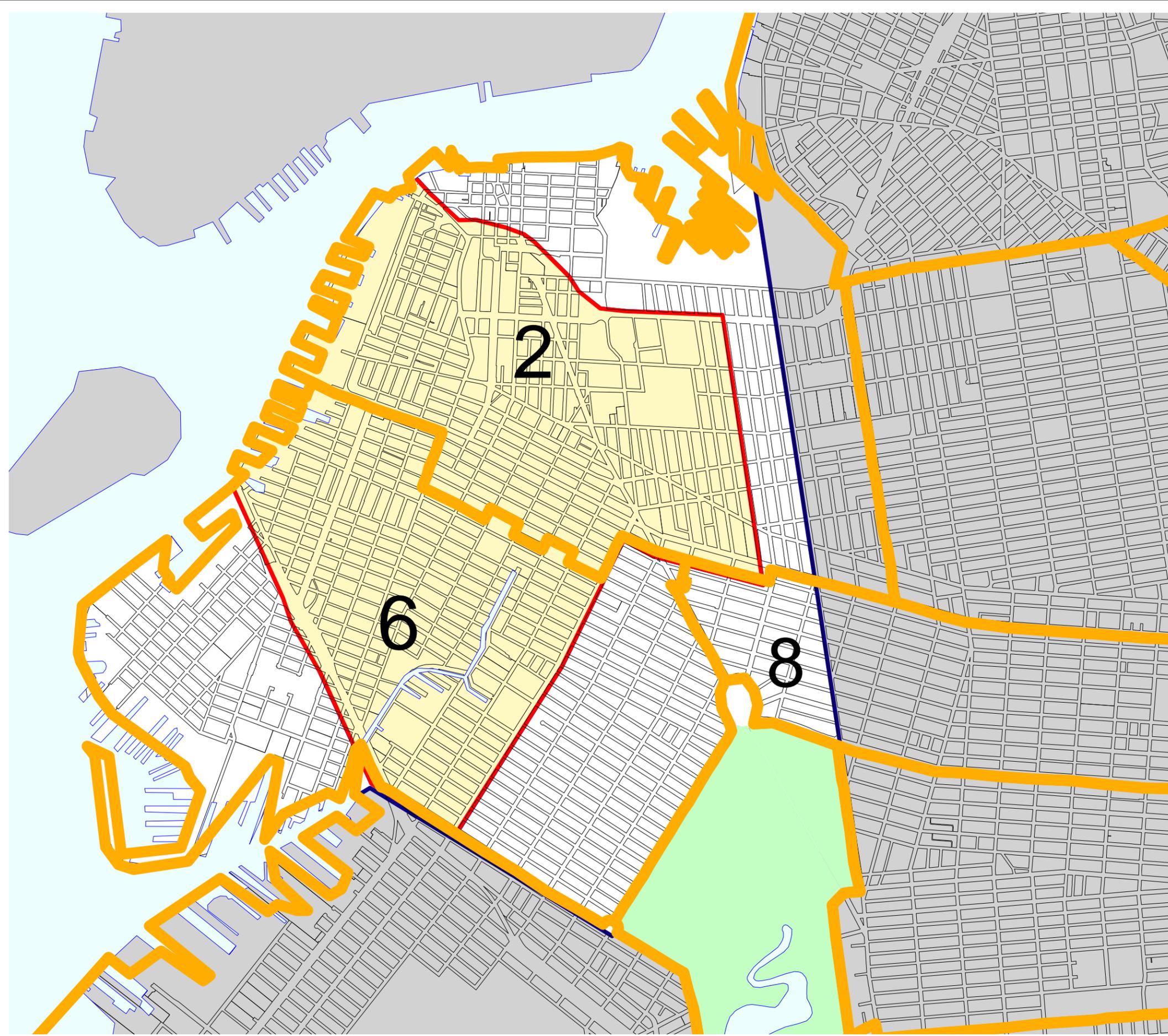
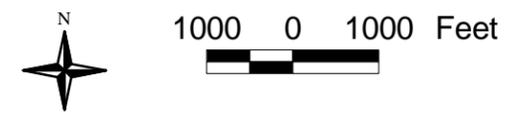


Figure E1

Study Area



E2. COMMUNITY OUTREACH

The overriding objective of the public outreach program was to harness input from as many sources as possible during each phase of the project, from planning to implementation. Input was focused in a structured manner to allow decisions to be informed by as broad a base of interests as possible. Four types of public outreach tools were used: information gathering, idea development, pilot program development and implementation, and strategy development.

The major formal conduits for public outreach consisted of a project Task Force convened by the Brooklyn Borough President; a Technical Advisory Committee convened by NYCDOT; and subcommittees of Brooklyn Community Boards 2 and 6, the two Community Boards within the primary study area. Both Community Boards referred monitoring of the project to their transportation committees. Community Board 6 convened several transportation committee public meetings to review the project strategies. In the latter stages of the project, Community Board 2 convened a task force specifically to address and respond to the draft ideas presented to them.

The outreach approach and process taken and resulting inputs are described below.

E2.1 Information gathering

Like all studies, this one relied on collecting enough useful information to identify problems and to develop a means of addressing them. The information gathering process relied on a partnership between those who know the area best (those who live and work there) and the project team. Residents and businesses have an unparalleled understanding of local issues. A partnership between local stakeholders and the project team was critical throughout the study, but was most important in the early information gathering stage.

For this study, data were gathered in three broad ways:

- collation and limited collection of hard traffic operational data;
- discussions between NYCDOT, the project team, and members of the community; and
- discussions with members of city agencies, including NYCDOT.

The data collection process was the subject of an intensive effort at the beginning and continued throughout the study as the project team's understanding of conditions in Downtown Brooklyn evolved.

A series of workshops was convened under the auspices of the Task Force and Community Boards to gather data regarding specific problem locations, the needs of Downtown Brooklyn, and the role that individual streets should serve. These workshops yielded many valuable insights into traffic issues in Downtown Brooklyn.

E2.2 Idea development

As the project progressed and the team transitioned from identifying problems to examining potential solutions, interaction with members of the general community also evolved. Information flowed in both directions and contact was ongoing. Accordingly, the format for interaction changed from small homogenous groups with a shared geographic interest to open houses set up to encourage area-wide thinking by creating geographically diverse groups of participants. This format allowed the consultant to engage those who are already a part of the process as well as new constituencies.

E2.3 Pilot program development and implementation

Development and implementation of the pilot program was based on community response to the consultant's suggestions that were presented to and discussed with the Task Force. Initial ideas for the pilot program were very limited in scope, reflecting the modest budget allocation made in the contract and the consultant's view of the pilot program's role in the project. However, when the limited scope of the proposed pilot program was discussed, Task Force members indicated they had expected something more substantial. NYCDOT consulted with the other funders of the study and agreed to expand the funding and scope of the pilot program.

An expanded set of suggestions was then developed and taken to Community Boards 2 and 6. Those community boards considered the proposals and, with certain modifications, endorsed the proposals. These suggestions were then developed further, installed, and evaluated.

The pilot program represented a major point at which community expectations and the realities of the project differed. The consultant explained to the community that the purpose of the pilot program was to test specific treatments, and that locations were chosen because of the ease of implementing the treatments. The pilot treatments that were proven effective would then be incorporated into the strategy for the entire study area. Nevertheless it became clear throughout the project that some members of the community felt that the pilot program should represent a temporary but comprehensive version of the overall strategy for the area and that the process of moving from the pilot program to the final strategy should be one of reviewing and refining the pilot program and converting temporary installations into more permanent ones.

The project team took pains to explain that the use of temporary treatments was not only unrealistic but also counterproductive; experience around the world demonstrates the adverse effects of temporary physical treatments on the community view of traffic calming. Notwithstanding these efforts, it was not until the draft ideas for the overall strategy were presented that concerns among some members of the community about the commitment of NYCDOT and the project team were allayed. In this context, the substantial time taken to convert ideas for the pilot program into installed treatments created some difficulties for the study.

E2.4 Strategy development

The final phase of the project revolved around turning the Street Management Framework developed with the community and the ideas for managing traffic in Downtown Brooklyn into a coherent strategy. This was achieved by preparing an ideas paper that formed the basis for intense discussion in various forums: a series of open houses, a series of technical advisory committee meetings, meetings with individual agencies and, most importantly, a series of detailed working sessions with Community Board 6's Transportation Subcommittee and Community Board 2's Downtown Brooklyn Traffic Calming Task Force. These meetings provided the vehicle for creating a draft strategy in a form acceptable to those committees. Committee leaders were able to take their recommendations to their Boards to obtain their endorsement. In this way, the normal disagreements on the details of the strategy were dealt with within the subcommittees and so were resolved without derailing the overall strategy development process.

This process proved very successful, due in large part to the intense efforts made by the members of Community Board 2's Task Force and Community Board 6's Transportation Committee.

E3. TRAFFIC CALMING

At its most general level, the term "traffic calming" describes actions to reduce motor traffic's impact on urban life. Traffic calming practice typically consists of various forms of physical management of vehicles implemented at a street or neighborhood level. Although the most familiar forms of traffic calming action worldwide involve the use of physical treatments at the local street level, international traffic calming practice is not limited to low-volume neighborhood streets. Traffic calming may also describe traffic management in busier streets and corridors. Indeed, in an area such as Downtown Brooklyn in which the adverse effects of traffic are felt on all streets, it is critical that the traffic calming strategy extends beyond the confines of the local neighborhood, and that it is nested within some form of traffic management framework.

An important distinction must be drawn between ameliorating traffic problems and ameliorating their effects. It is possible to reduce traffic as a means of reducing its impacts; throughout the study, many of those actively involved expressed the need to reduce traffic as an objective in its own right. However, this study has maintained a focus on reducing the *effects* of traffic on the environment of Downtown Brooklyn's streets as its key objective. This emphasis on reducing effects is consistent with the generally accepted Institute of Transportation Engineers (ITE) definition of traffic calming and has provided the community and the project team with an achievable traffic calming goal.

In the context of reducing traffic's impacts, the objectives of the study were refined to more closely meet achievable goals. Specific objectives were as follows:

- Do not increase total traffic capacity through the area. Rather, improve efficiency of primary streets while discouraging through movement on other streets in order to redirect traffic from inappropriate routes.
- Reinforce appropriate travel patterns and street usage consistent with the Street Management Framework (see *Section E4*)
- Examine and improve high pedestrian accident locations.
- Examine and reinforce the truck network.
- Examine and reinforce the bicycle network.
- Integrate specific treatments with area-wide strategies.

A process with four broad steps was followed in developing a traffic calming strategy for Downtown Brooklyn:

- **Define street categories** – Classify each type of street by different *characteristics* (physical, land use, movement, connections) and management *objectives* (safety, access, street environment)
- **Classify streets** – Organize the street network to act as a unit, to meet the varying needs of those who use it. This implies that different streets have different functions.
- **Identify conflicts and problems** – Determine where conditions on individual streets fail to meet the ideals, given their functions.
- **Formulate strategies** – Establish what can be done to improve the street environment.

E4. DOWNTOWN BROOKLYN STREET MANAGEMENT FRAMEWORK

Streets are not only parts of the transportation system but also public spaces that serve community roles. A management framework is a way of classifying different types of streets based on both their transportation functions and their community roles. A Street Management Framework provides a basis for developing and evaluating a coherent traffic calming strategy and sets of measures designed to support that strategy. The framework provides a basis for:

- establishing a picture of how different streets should function;
- identifying where streets are functioning poorly (that is, not in accordance with their designated function);
- developing management strategies to help streets function as they should; and
- ensuring management measures are implemented in a coordinated way.

The Downtown Brooklyn Street Management Framework includes the roles streets play as public spaces and community resources in their designation. The following three street categories were defined:

- **Travel Streets** provide critical transportation links and allow for movement, while also serving as destinations in their own right for commercial, cultural and institutional activities. Typically, regional commercial and institutional uses front Travel Streets; in some cases they are mixed with limited residential space.

Travel Streets comprise the skeleton of the roadway system and provide important connections to expressways and other Travel Streets. Travel Streets should be designated as through or local truck routes, typically form part of bus routes, and provide access to subway stations. Because of the types of land use on them, Travel Streets typically experience significant pedestrian activity.

- **Community Streets** serve as “Town Centers” for neighborhoods and the Central Business District (CBD), by providing shopping, services, and entertainment and by acting as gathering places. Community Streets are typically fronted by mixed neighborhood commercial and residential uses and consequently experience high levels of pedestrian activity. These streets also typically provide important transportation connections between Travel Streets and Living Streets. Typically Community Streets form parts of bus routes and in many cases provide access to subway stations. In CBD areas, vehicle mobility may be more limited on Community Streets.
- **Living Streets** provide access to living or working spaces. Living Streets are the local, typically residential streets where quality of life is the primary concern. In some cases, Living Streets exclusively serve industrial or educational uses.

Typically, Living Streets are narrow, are not located directly on transit routes, and have a low level of traffic movement (although some provide important intra-neighborhood connections). Living Streets’ primary role is to provide access to residents and fronting uses. Living Streets should be safe for all users. Motor vehicles should have minimal impact on the local environment and quality of life and traffic volumes should be low.

Figure E2 (see next page) shows the classifications of all Travel Streets and Community Streets in the study area; all streets in the study area not shown in color are Living Streets.

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Street Management Framework

-  Travel Streets
-  Community Streets - Neighborhood
-  Community Streets - CBD

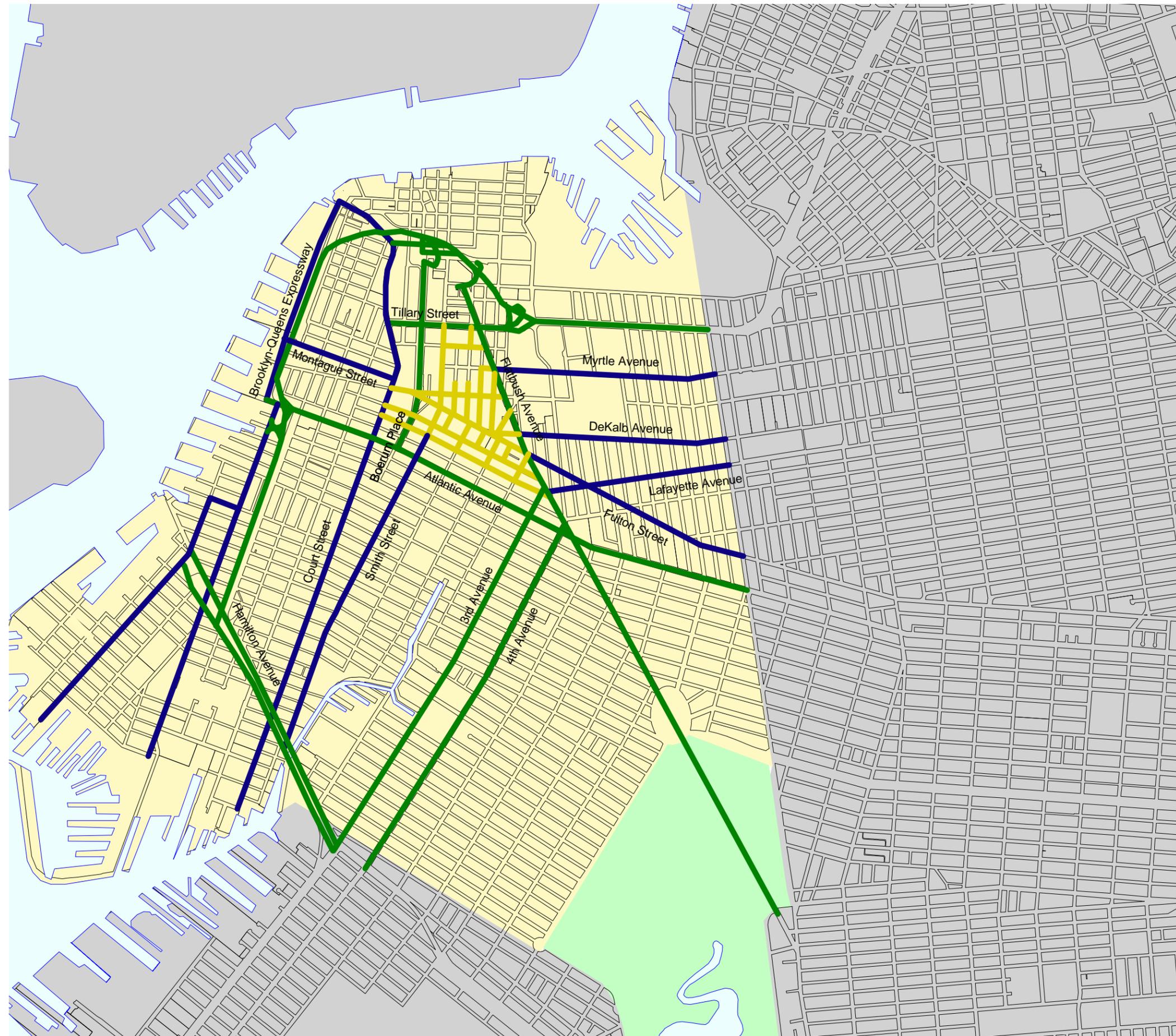
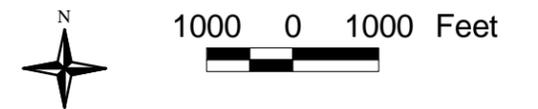


Figure E2

Street Management Framework



E5. PILOT PROGRAM

An important part of the Downtown Brooklyn Traffic Calming Project was the implementation and evaluation of a number of traffic calming treatments in Downtown Brooklyn. The purpose of this pilot program was not to implement a scaled-down version of the overall strategy; such an objective would be impossible to achieve in advance of the strategy's development and within the budget earmarked for the pilot program. The purpose of the pilot program was instead to explore practical issues surrounding implementation of typical traffic calming measures, and to gauge the impacts each had on safety, traffic operations, and public perception. The pilot program has indeed proved a rich source of insights into such practical issues.

At an agency level, the pilot program:

- provided the project team with an understanding of NYCDOT's design approach and allowed the team to expand on that approach and foster acceptance that traffic can be approached in various ways;
- explored issues with emergency service agencies (NYPD and FDNY) and built confidence that traffic calming treatments are workable and that operational and design issues unique to New York can be addressed;
- built confidence among other agencies that such measures are workable;
- provided the project team with an understanding of construction and permitting issues; and
- provided an understanding of inter-agency issues.

At a community level, the pilot program:

- yielded safety and traffic operations data from actual traffic calming measures in the field in Brooklyn; and
- allowed the project team to gauge public acceptance of actual traffic calming measures.

Implementing the pilot program demonstrated to the community what traffic calming treatments look like, allowed the team to investigate how New Yorkers react to traffic calming, and built confidence in these methods. An illustration of the benefits of the pilot program was the changing position of Community Board 6. The Board initially rejected several pilot program treatments based on perceived safety and parking loss concerns, yet eighteen months later, after pilot program implementation, the Board was willing to approve a much more comprehensive set of measures for inclusion in the broad strategy.

An initial set of potential pilot program treatments was developed in consultation with the community and shared with the Brooklyn Borough President's Task Force. While the scope of this initial set of treatments was consistent with the funds available in the project's contract, members of the task force indicated a strong desire that a broader set of measures be implemented for the pilot program. Accordingly, NYCDOT reviewed the funding arrangements for its broader traffic calming program (of which this study is part) and allocated an additional amount for development and implementation of the pilot program utilizing funding supplied by Assembly Member Joan Millman.

An expanded set of pilot program measures was presented to the Brooklyn Borough President's Task Force and thereafter to Community Boards 2 and 6. The expanded set of measures is shown in *Figure E3*, summarized in *Table E1*, and described below. The project Task Force and Community Boards 2 and 6 endorsed the pilot program, with the exception of proposed

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Pilot Program Measures

- # Intersections
- Corridors

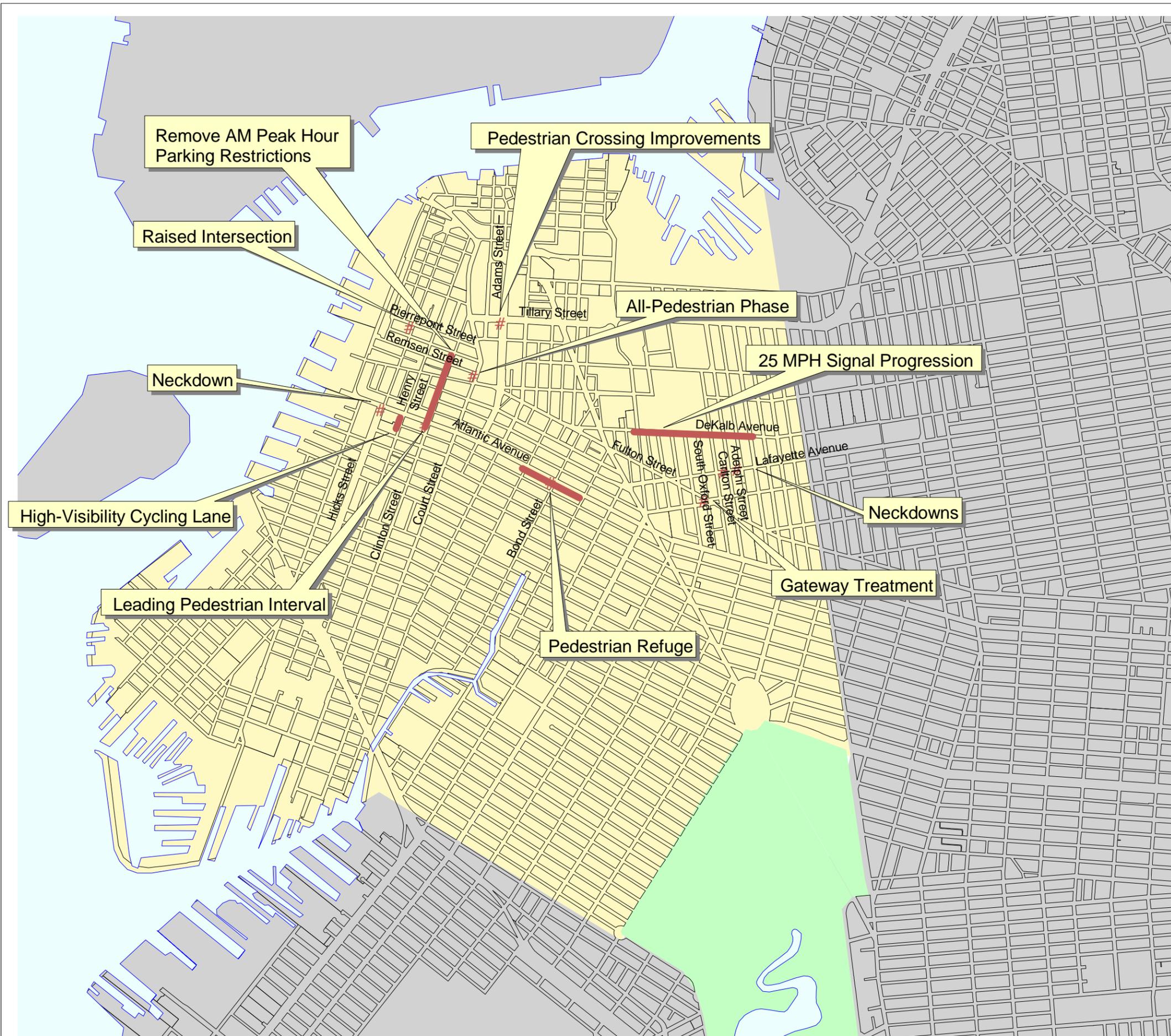
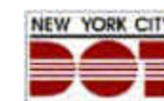


Figure E3

Pilot Program Measures



neckdowns on Court Street at President and Carroll Streets. These latter measures, although endorsed by Community Board 6's Transportation Committee, were rejected by the full board of Community Board 6, based on perceived accident risk, loss of parking (each scheme would have resulted in the loss of two spaces), and FDNY maneuverability concerns. Accordingly, these measures were dropped from the pilot program and an additional pair of neckdowns on Lafayette Avenue at Carlton Street and Adelphi Street was substituted. The proposed pilot program, with the exception of the two measures rejected by Community Board 6 and with the additional measures on Lafayette Avenue, were taken through the design process and constructed by April 2002.

Table E1 Candidate pilot program measures

Measure	Location	Status
Pedestrian island, lane realignment, neckdown	Atlantic Avenue/Bond Street	Implemented April 2002
Leading Pedestrian Interval	Atlantic Avenue/Clinton Street	Implemented 2001
Neckdown	Atlantic Avenue/Hicks Street	Implemented September 2001
Raised intersection	Hicks Street/Pierrepont Street	Implemented October 2001
Remove morning peak parking restrictions	Clinton Street north of Atlantic Avenue	Implemented 2001
Road closure (part of reconstruction of water main)	Clinton Street south of Atlantic Avenue	Implemented 2000
Neckdown	Court Street/Carroll Street	Not implemented ¹
Neckdown	Court Street/President Street	Not implemented ²
All pedestrian phase ("Barnes Dance")	Court Street/Remsen Street	Implemented December 2000
Slower signal progression	DeKalb Avenue	Implemented 2001
Neckdown	Fulton Street/South Oxford Street	Implemented October 2001
Neckdown	Lafayette Avenue/Adelphi Street	Implemented October 2001
Neckdown	Lafayette Avenue/Carlton Avenue	Implemented October 2001
Widen pedestrian island	Tillary Street/Adams Street	Implemented August 2001
High-visibility on-street cycling lane	Henry Street between Atlantic Avenue and Amity Street	Implemented August 2001 Expanded March 2002 ³

Each of the installed pilot program treatments was monitored and its performance evaluated. The monitoring and evaluation process yielded a number of useful insights. Among these were general insights into the applicability of traffic calming treatments to Brooklyn's streets and also detailed design insights that will be useful in their future implementation of such treatments:

- Opportunities exist to broaden traffic control objectives to include issues of importance to traffic calming without adverse impact on motorized traffic. A major focus in reviewing the operations of busy streets was to search for means to improve their traffic operations. Various relatively simple measures could be used to improve intersection operations to provide benefits for all street users.
- The installation of traffic calming devices must follow a set of guidelines called the *Manual of Uniform Traffic Control Devices* (MUTCD) to determine the appropriate use of traffic devices. The Federal Highway Administration (FHWA) publishes the MUTCD, which contains all national design, application, and placement standards for traffic control devices. The purpose of these devices, which includes signs, signals, and pavement markings, is to promote safety, efficiency, and uniformity so that traffic can move efficiently on the Nation's streets and highways. The manual gives certain criteria that should be met before NYCDOT can use a particular device. The MUTCD is a dynamic document because

¹ Neckdowns at Court/Carroll were part of the original pilot proposal, but were rejected by Community Board #6.

² Neckdowns at Court/President were part of the original pilot proposal, but were rejected by Community Board #6.

³ After the cycling community reacted positively to the October 2001 installation of the high-visibility lane between Atlantic and Pacific, the lane was extended in March 2002 to the block of Henry Street between Pacific and Amity Streets.

standards change to address travel patterns and road conditions, and to incorporate technology and materials advancements. The job of totally rewriting the manual is undertaken about every 10 to 20 years. The FHWA has previously relied on periodic updates, usually every 2 to 3 years, to revise existing manuals. For example, the 1988 edition has been updated 7 times. It is recommended that the MUTCD be updated to reflect the increased use of traffic calming devices and to provide statutory support for their implementation.

- An important virtue of traffic calming treatments is that they can in many cases be implemented inexpensively. However, the need to relocate catch basins and other utilities to accommodate treatments can add significantly to their cost. In designing the pilot program treatments, the project team investigated various design options with NYCDOT staff that minimized the need for relocation of utilities. However, the realities of maintenance and cleaning practice in New York City mean that it is generally not possible to avoid relocating catch basins or raising service pits. This is an issue to investigate further as acceptance of traffic calming devices matures in New York City.
- Because many pilot treatments had not been tried before in New York City, various design compromises were reached in the interests of implementing the designs as part of this study. These compromises gave NYCDOT and other agencies more confidence in the treatments' safety. As traffic calming becomes more familiar to city agencies responsible for street design, these compromises warrant further consideration.
- While communities in Downtown Brooklyn were eager to take advantage of the New York State law that permits local jurisdictions to establish slow speed zones in residential neighborhoods, NYCDOT is reviewing the law to determine the spacing of traffic calming treatments that are needed to qualify as a low speed zone. The pilot measures show that speed control can be effected by strategically placed traffic calming measures and that further analysis of the slow speed zone law is in order. That said, slow speed zones are more effective when a series of traffic calming measures are implemented. Ultimately, a site-by-site examination is recommended to determine what is reasonable and how "physical" traffic calming treatments need to be.
- Notwithstanding the previous lesson about strategic speed reductions, it is also clear that certain traffic calming devices like gateway treatments are not enough to slow vehicles once they are downstream of the device. While aggressive driving is not by any means unique to New York, it seems clear that treatments located at transition points between Travel Streets and Living Streets require further downstream reinforcement.
- A lesson learned around the world in relation to implementation of traffic calming treatments is that use of temporary materials can be entirely counterproductive. Physical treatments implemented temporarily can create opposition to their more permanent implementation that more than outweighs the construction cost savings. This notwithstanding, the most appropriate construction materials and design solutions are not necessarily the most expensive. When doubts arise about construction materials, the default solution should be to use familiar materials whose installation, reliability and maintenance schedules will be predictable.
- Some color-texture surface treatments are effective. However, they demand ongoing maintenance due to inevitable utility and resurfacing projects and the time and skill required to maintain a non-standard road surface. Installation of such treatments should be coordinated with DOT staff responsible for road surface maintenance.

- Emergency service concerns about the impact of traffic calming treatments on their operations were generally not borne out by experience. This is consistent with experience elsewhere in the world, where appropriately designed physical treatments do not hinder emergency service access or movement. In any event, emergency service workers reported that they are used to taking actions necessary to access their destinations (witness the common practice of emergency vehicles traveling the wrong way down one-way streets) and so during discussions they indicated their pragmatic acceptance of allowing their vehicles to mount curbs if absolutely necessary to enter a street.
- The design of traffic calming treatments must recognize the Department of Sanitation's vehicle operations and cleaning practices. Unlike emergency vehicles, street sweepers do not have the ability to mount curbs and still be effective, and any difficult-to-sweep locations will impact their operations.
- Maintenance of the road surface is a major issue in New York. Coordinating maintenance, installation and construction activities is extremely problematic, with the result that road surfaces are routinely opened by any of a number of agencies authorized to do so. In many cases, the quality of road reinstatement is poor, with the result that road surfaces very quickly become uneven and inconsistent. In this environment, any unusual road surface treatments are extremely difficult to maintain. Throughout the city, examples can be found of well-meaning attempts to improve the street environment through use of unique surface treatments that have been rendered ineffective through maintenance practices that do not restore the roadway treatment. This is a problem that cannot be solved through specification but through implementation of much more stringent maintenance practices. Whether this is achievable or how lies beyond the scope of this study.

E6. ACTION PROGRAM

This section outlines the actions that were developed with the community to implement the area-wide strategy described above. *Section E6.1* introduces a number of themes that underlie the strategy; *Section E6.2* describes the action plans for each corridor that form the bulk of the strategy. In developing the action plan, the project team, community, and elected officials reached a consensus that development of plans for a number of areas should be deferred to separate investigation. These areas are noted in *Section E6.2*.

E6.1 Traffic Management Themes

A number of themes underlie the traffic calming strategy for Downtown Brooklyn. These themes, and the appropriate traffic calming tools to address them, are introduced briefly below. Each of these themes was considered in the development of the traffic calming action plan for each corridor. Note that these are not site-specific recommendations, but rather generic actions available to planners in the development of the areawide traffic calming strategy.

E6.1.1 Pedestrian circulation and connectivity

Because Brooklyn's surface streets carry large volumes of vehicles, some high-traffic streets are difficult for pedestrians to cross during peak hours and logical pedestrian desire lines go unserved. Strategy recommendations that address pedestrian connectivity issues include:

- **neckdowns** and **medians** to shorten crossing distances,
- signalized **mid-block crossings** to introduce connections on long blocks, and

- **leading pedestrian intervals, all-pedestrian phases, and turn restrictions** to build pedestrian confidence and visibility at key intersections.

E6.1.2 Improving transit operations

Although eighteen New York City Transit bus routes serve Downtown Brooklyn, roadway congestion slows bus speeds, causes bus bunching, and hinders the ability of buses to merge back into traffic after stopping. Illegal parking and standing in bus stops create difficulties for bus drivers and for boarding and exiting passengers. Strategy recommendations that address transit operations issues include:

- **bus bulbs** to simplify bus maneuvers and improve the bus-to-sidewalk interface, and
- improved **subway/sidewalk passenger** connection.

E6.1.3 Developing the bicycle network

Although many neighborhoods in Downtown Brooklyn have dedicated bicycle lanes, critical gaps still exist in the area-wide cycling network. Strategy recommendations that address bicycle network issues include:

- **new bike lanes** to give cyclists safe, dedicated routes to ride,
- **neckdowns, gateways,** and other measures aimed at slowing traffic, and
- **enhanced bike lanes** to clearly delineate routes

Since the Downtown Brooklyn Traffic Calming Project began, NYCDOT has developed a policy regarding using high-visibility treatments to enhance bicycle lanes. Lanes adjacent to the curb will receive priority for high-visibility bicycle treatments; this will clearly indicate that the lane is designated for movement of bicycles and should not be blocked by parked vehicles. This is a higher priority than “non-curb-side” lanes because violations by parked vehicles in curbside lanes result in blockage of cyclists’ movement. The Department’s goal is to implement bicycle lanes identified in this report and the New York City Bicycle Master Plan in as expeditious a manner as possible. Therefore, “non-curb-side” lanes will be implemented using standard treatments.

E6.1.4 Truck access and routing

While trucks are blamed for many traffic problems in Downtown Brooklyn, they are the primary mode of freight access in the City. Maintaining a clear and logical truck network is critical to the local economy. Strategy recommendations that mitigate truck impacts while maintaining truck access to Downtown Brooklyn include:

- **neckdowns and gateways** to keep trucks off Living Streets, and
- **improved street management** to improve conditions for trucks on Travel and Community Streets.

E6.1.5 Managing through traffic

The concept of a Street Management Framework argues that Travel Streets are the appropriate places to accommodate through traffic in Downtown Brooklyn. At the same time, through traffic should be discouraged from using Community and Living Streets, and its impacts should be mitigated on all streets. Strategy recommendations that address through traffic issues include:

- **neckdowns, gateways, raised intersections**, and other measures to discourage through traffic from using Living and Community Streets and to reclaim street space for pedestrians,
- **improved signal progressions** on Travel Streets to create “green waves” that allow for appropriate free-flow travel speeds, and
- **channelization** of intersections with high pedestrian volumes to delineate vehicle and pedestrian space.

E6.1.6 Local traffic permeability

While many traffic calming measures aim to reduce vehicular impacts and keep regional traffic off Living and Community Streets, it is important that the street grid remain permeable to appropriate volumes of local traffic. Strategy recommendations that aim to preserve local permeability include:

- **raised intersections and crosswalks**, and **slow signal progressions** that slow but do not block traffic,
- **gateways**, and **neckdowns** that discourage but do not prevent traffic from entering Living Streets.

E6.1.7 Emergency vehicle access

Traffic calming projects are sometimes criticized for decreasing access and slowing response times for emergency vehicles. In the Downtown Brooklyn Traffic Calming project, every recommendation that changes street geometry was tested to ensure that turning fire engines and other large emergency vehicles were able to negotiate the new street alignments safely. Every recommendation that alters the normal flow of traffic was tested to make sure emergency vehicles can still permeate the entire street grid easily. Strategy recommendations that required this testing included:

- **neckdowns, raised intersections, and gateway treatments**: tested for safe vehicle movements
- **partial diverters and street direction changes**: tested for continued network permeability

E6.2 Action Plans

Coordinated action plans were developed for all streets in the study area on a corridor-by-corridor basis. These action plans are consistent with the Street Management Framework described in *Section E4*, the traffic management themes and tools described in *Section E6.1*, and the overall street management strategy. Community Boards that were directly affected reviewed each action plan, and engaged the project team in a detailed discussion of their own ideas for improving the plan. These discussions led to a final action plan for each corridor, with the reviewing community board’s endorsement. In each case, the full Community Board adopted the endorsement of the Community Board’s designated review committee (the Transportation Subcommittee in the case of Community Board 6 and a specially constituted review panel in the case of Community Board 2).

The action plans reflect the objectives for each street, based on the agreed street designation. These specific objectives are:

Travel Streets

- Alleviate traffic bottlenecks with traffic management strategies,

- Facilitate pedestrian and bicycle movement,
- Improve the street environment for pedestrians, bicyclists, businesses and residents,
- Discourage excessive speeds and aggressive driving,
- Improve access to businesses and institutions, and
- Reduce the degree to which Travel Streets are barriers between neighborhoods.

Community Streets

- Facilitate pedestrian crossings,
- Improve the street environment for pedestrians, bicyclists, businesses and residents,
- Discourage excessive vehicle speeds and aggressive driving, and
- Improve access to businesses and reinforce neighborhood commercial cores.

Living Streets

- Protect the street environment,
- Discourage excessive speeds and aggressive driving,
- Discourage through traffic, and
- Discourage inappropriate truck activity.

Inevitably some areas could not be resolved through this process, either because the issues are too broad to be resolved within the ambit of a traffic calming study such as this (for example Tillary and Adams Streets) or because a decision logically needed to be deferred until other matters were resolved (such as in the area around the Brooklyn Bridge Park). Areas deferred to a different forum include:

- Flatbush Avenue/Atlantic Avenue/4th Avenue
- Flatbush Avenue/Schermerhorn Street
- Tillary Street/Adams Street
- Fulton Ferry/two-way Furman Street

E7. COST AND STAGING

A staging strategy for implementing the Downtown Brooklyn Traffic Calming strategy has been developed. The staging strategy balances several considerations:

- costs must be spread evenly over several years of construction,
- strategies must be implemented to prevent sudden increases or decreases in capacity that might induce additional driving in Downtown Brooklyn, and
- visible progress must be made in order to build and maintain momentum (see *Section E8.3*).

The staging program outlined in the Final Report spreads out the strategy's \$10 million cost over four distinct phases, each roughly equal in cost. Estimated costs include all individual physical works associated with the treatments and any necessary utilities relocation. The actions in each phase are coordinated so that traffic impacts result in a logical fashion consistent with

the Street Management Framework, and so that visible locations are treated early in the process to maintain visibility and enthusiasm. The order of the phases is not meant to imply a hierarchy of importance among the corridors or an indication of priorities. Instead, it is intended to group corridors on a systematic basis for implementation. Implementation phasing should be based on community priorities and coordination with the City’s Capital Plan. In fact, the phases are interchangeable in two senses – each phase bundles a coordinated set of actions that can stand alone from a traffic operations point of view, and the costs are roughly equal among phases. A summary of costs, by phase, is given in *Table E2*.

Table E2. Summary of cost estimates, by implementation phase⁴

<i>Phase</i>	<i>Corridor Locations</i>	<i>Cost Estimate</i>
1	Atlantic Avenue, Brooklyn Heights	\$ 2.5
2	Area South of Atlantic Avenue	\$ 2.0
3	Fort Greene, CBD	\$ 2.7
4	3 rd and 4 th Aves	\$ 2.2
Total		\$ 9.4

E8. IMPLEMENTATION ISSUES

E8.1 Building Support

When thought of as a demand for rational sharing of space rather than as a battle between cars and pedestrians, it is hard to disagree with the idea of traffic calming. It is important to hold on to this idea. Traffic calming does not represent a radical new approach to managing streets, but a more balanced one – an approach that reflects a clearer perception of broad community objectives.

Promoting the debate over traffic calming in these terms is an important element underpinning continued and expanded support for implementation of Downtown Brooklyn’s Traffic Calming program and development of similar projects elsewhere in the City. This project has helped to break down some of the barriers of distrust that were erected many years ago and that have provided the framework for conflict ever since. It would be easy but counterproductive for stakeholders to raise these barriers again. Of course, it would be inaccurate to imply that the Downtown Brooklyn Traffic Calming study has created a harmonious environment of uniform agreement. In spite of extensive community involvement with the project, some people feel disenfranchised; others feel the project has not met their aspirations.

E8.2 Expanding the Envelope

Some stakeholders have criticized the actions identified in this study for not going far enough, for not representing the radical change that they had hoped for. It must be recognized that change inevitably is slow and proceeds by increments. A review of the different ways in which streets are managed in other countries or in other parts of the US shows that these differences were not created instantaneously, but came about either because of a difference in the initial

⁴ These figures are mid-range estimates. A detailed breakout of costs by corridor and treatment, including low- and high-end costs, can be found in *Section 7.4* of the full report.

philosophy of street management or because of a program of change that has lasted a number of years. Nowhere has a city changed its street management approach radically and overnight and nowhere has such a change occurred in the absence of broad community support. Implementation of sophisticated traffic management schemes seen elsewhere has in almost all cases followed a long period of development of support, understanding and sophistication in use of the road system.

Brooklyn is no different. New York City has gone some way in the process of improving its management of traffic to meet broader community needs and this process will continue. However, it is unrealistic to expect that the city's first focused traffic calming plan can immediately change the street environment in a radical way. This report outlines a strategy that delivers important benefits in relation to the livability of the study area and that is achievable over a short time period. Some parts of it may be regarded initially as challenging; however, it should be possible over time to implement the strategy in its entirety with the support of all stakeholders.

To do so, it will be necessary to continue the education process begun as part of this strategy development process and to harness the support of all stakeholders in gradually developing the strategy until it is achieved.

E8.3 Maintaining Enthusiasm

It is also important that active steps be taken to maintain the enthusiasm generated through the course of this project. Many traffic calming programs around the world have foundered as focus has been lost and enthusiasm waned. In general, programs that are directed and supported work better than those that are not.

The best means of maintaining drive in implementing this traffic calming program must be determined by the community and NYCDOT. A small joint committee with a representative from each of NYCDOT, the office of the Brooklyn Borough President, and Community Boards 2 and 6 (and perhaps 8) could adopt responsibility for ensuring implementation proceeds. Such a committee could be charged with:

- setting and monitoring implementation targets;
- ensuring implementation proceeds in accordance with the implementation program;
- monitoring the effects of the program;
- refining the program as knowledge accumulates;
- publicizing progress;
- making progress on the difficult issues identified in *Section E6.2*; and
- reinvigorating the process periodically.