Technical Memorandum
Existing and Anticipated Issues

DOWNTOWN BROOKLYN TRANSPORTATION BLUEPRINT

NEW YORK CITY DOT

Submitted to

New York City Department of Transportation

Submitted by

Urbitran Associates, Inc.

Subconsultants

Parsons Brinckerhoff Quade & Douglas, Inc.

Strategic Urban Solutions, Inc.

May 2005

URBITRAN

DOWNTOWN BROOKLYN TRANSPORTATION BLUEPRINT

TECHNICAL MEMORANDUM
EXISTING AND ANTICIPATED ISSUES

TABLE OF CONTENTS

DOWNTOWN BROOKLYN TRANSPORTATION BLUEPRINT

TECHNICAL MEMORANDUM
EXISTING AND ANTICIPATED ISSUES

LIST OF TABLES

LIST OF FIGURES

Executive Summary

Downtown Brooklyn, the city's third largest central business district after Midtown and Lower Manhattan, has experienced significant revitalization and commercial development activity in the recent past. A confluence of conditions, projects and policies has Downtown Brooklyn poised for additional redevelopment activity that may be without precedent. Already, the transportation system is heavily utilized and experiences significant congestion. Pending growth will pressure the transportation system to perform at a higher level and provide better service to all users, including pedestrians, drivers, transit riders and bicyclists.

The Downtown Brooklyn Transportation Blueprint (DBTB) is a transportation planning study designed to consider the implications of this growth by developing goals, policies, strategies and initiatives that are focused on maintaining and enhancing access, mobility and quality of life, as development occurs. The focus of the study is on issues related to the core Downtown Brooklyn area which contains a variety of activities including judicial, governmental, commercial, academic, retail and cultural. Significant sub-districts exist within this core.

This Technical Memorandum provides an overview of past land use and transportation trends and an assessment of projected changes in land uses and identifies existing and anticipated transportation issues and opportunities facing Downtown Brooklyn.

Past Land Use and Transportation Trends

Beginning in the second half of the 20th century, Downtown Brooklyn has been the subject of numerous studies and development/revitalization plans. Historical planning and zoning initiatives, combined with public and private investments, resulted in impressive growth, particularly in the office, retail and residential sectors. There has also been significant expansion in academic institutions and cultural facilities.

In 2004, Downtown Brooklyn housed 11 million square feet of office space, including 6 million of prestigious Class A space. Currently, approximately 70,000 workers commute into and out of Downtown Brooklyn per day. The retail sector has also expanded significantly in the last 20 years. Large-scale shopping centers, like Atlantic Center and the Gallery at Fulton Street, and most recently the Atlantic Terminal Mall have created economic activity by providing extensive shopping opportunities, attracting visitors and creating jobs.

Significant revitalization and additional development occurred in every residential neighborhood surrounding the Downtown Brooklyn core, increasing the population in the study area by 4.5% from 1990 to 2000. Downtown Brooklyn is also increasingly becoming a place for students to live as well as study as evidenced by over 32,000 students attend a number of academic institutions in the downtown area.

Though the roadway network serving Downtown Brooklyn carries substantial through and local traffic, investment in additional vehicle capacity has been modest and focused on location-specific improvements. While most elements of a 1987 Master Plan for Downtown Brooklyn have now been implemented, the two major capital projects from that plan (an off ramp from westbound BQE and a

two-way vehicle underpass on Adams Street under Tillary Street) from that plan were not implemented.

On the other hand, MTA investment measuring billions of dollars increased the reliability, capacity and appeal of transit travel to and from Downtown Brooklyn, which in addition to unlimited ride Metrocards and free subway-to-bus transfers made transit trips to downtown more convenient for a larger area of the city and outside of peak commute periods.

The Downtown Brooklyn Traffic Calming Project, begun in the late 1990s, yielded a street management strategy that reversed historical practices in the area which focused on improvements to vehicle capacity. Instead, capacity reductions have been selectively implemented in order to gain other benefits such increasing pedestrian safety and providing a cycling network in the area. By 2004, most of the bicycle network, including the first bicycle only path across the East River on the Manhattan Bridge had been implemented and bicycle usage has been growing.

While use of alternative modes has grown significantly in the area, the percentage of commuters who drive alone to work in the downtown core appears to have grown, increasing from 21% in 1980 to 28% in 2000, according to US Census data. Nevertheless, transit still captures a large share commute trips in Downtown Brooklyn with a 59% transit mode share, exceeding the transit share in several other major downtowns in the country. Despite this apparent shift in commute mode, growth in overall vehicle volumes, as measured by use of the major downtown crossings, has been modest. Between 1980 and 2000, the three river crossings between Downtown Brooklyn and Manhattan experienced a combined 17% increase in volume, an equivalent of 0.8% per year.

Downtown Brooklyn has for many years experienced recurring congestion. The 1984 *Downtown Brooklyn Transportation Factbook* (NYCDOT) and other planning studies identified corridors and areas that then experienced congestion and spillover traffic. Most, if not all, of these problems continue to face Downtown Brooklyn today, and many of them are exacerbated.

Reflecting the high vehicle and pedestrian volumes along major corridors, there are intersections and corridors with high numbers of crashes and injuries in the downtown area relative to other places in Brooklyn. However, the greater downtown area experiences fewer traffic injuries and fatalities on a *per resident* basis than the average for all of Brooklyn. The number of pedestrian and bicycle injuries in the greater downtown area decreased by 52% between 2000 and 2004. In the core Downtown Brooklyn area, pedestrian and bicycle injuries showed a reduction of 33% during the same time period.

Projected Changes

Over the past two decades, Downtown Brooklyn has enjoyed a revitalization that has brought economic growth to this area of dense, diverse urban neighborhoods. Recent zoning changes, combined with a desirable location and excellent transportation access, has the greater Downtown Brooklyn area positioned for unprecedented growth. Increased development is expected in many sectors, including office, retail, academic/institutional, residential and recreational.

Downtown Brooklyn commercial office area, equal in size to the downtowns of Atlanta and St. Louis, is poised to attract even more jobs. The zoning changes in the recently approved *Downtown Brooklyn Development Plan* is expected to lead to lead to the development of an additional 4.5 million square feet of Class A office space by 2013. An additional 2 million square feet of office space related to the rezoning can be expected to be developed between 2013 and 2025. In the Atlantic Terminal/Atlantic Yards Area, an 875,000 square foot office tower would anchor the Atlantic Yards project. In total, nearly 11 million square feet of office space would be added in the next 20 to 25 years. Combined with projects recently completed or pending completion, this would equate to double the amount of office space that existed in 2003, adding about 35,000 jobs to the downtown core.

Over the next 20 years, significant retail growth is expected to occur within, and adjacent to the Study Area. This includes both destination (regional) retail as well as neighborhood retail potentially totaling over 3 million square feet. Though outside the area, the most significant retail development from a transportation perspective will be the recently approved 346,000 square foot IKEA in Red Hook which is expected to be opened in 2006.

The market for housing, and in turn the pace of new residential development and conversion in and around Downtown Brooklyn, are on the rise. The most significant change in the future is the growth of housing in the core downtown area which has traditionally been a primarily commercial area.

Near the core, the most significant development would be the more than 5,000 housing units developed as part of the Atlantic Yards project. The plan for Brooklyn Bridge Park is expected to yield 700 units plus an estimated 500 units related to the redevelopment of 360 Furman Street. In the DUMBO area, 10 new developments are expected to be built or converted by 2006, quadrupling the number of units.

Four major projects/plans, the Arena project at Atlantic Yards, Brooklyn Bridge Park, the Brooklyn Academy of Music (BAM) Cultural District and a cruise ship terminal at Pier 12 in Red Hook are expected to significantly expand recreational and cultural activities in the greater downtown area.

Downtown Brooklyn's role as a major academic center is expected to grow over the coming years with expansion exceeding over 1.1 million square feet. New facilities, including court-related facilities, will solidify downtown's role as a center of government.

Existing and Anticipated Issues

Surface Transportation

- An already overloaded roadway network is carrying heavy volumes of traffic to and from the Brooklyn and Manhattan Bridges, while also serving the diverse, dense districts of the downtown area. Despite transit service levels competitive with Lower Manhattan and Midtown, over one-third of workers in the downtown core arrive by automobile. If future employees in projected office developments commute by auto at rates near existing rates, existing traffic levels combined with future vehicular demand would not be accommodated on the existing roadway network.

- Motorists preference for the bridges rather than the Brooklyn Battery Tunnel add to the congestion on the roadways in downtown.

- The discontinuous street in Downtown Brooklyn results in many streets not serving a role in carrying through traffic, or effectively used for circulating local traffic. With only a few roadways available to carry significant traffic levels and a number of barriers to expanding their supply, there is little capacity to accommodate additional vehicle traffic in peak periods.

- A likely outcome of the anticipated growth in traffic volume would be the utilization of unused capacity during the shoulder hours and possible further spreading of the shoulder hours.

- Despite recent progress in traffic volume reduction in some corridors, regional and commuter-related traffic continues to bypass the congested major arterials and opt instead for parallel roadways through residential neighborhoods. Traffic generated by new developments would reasonably be expected to exacerbate both the recurring congestion and spillover traffic issues.

- The average price of parking in Downtown Brooklyn has increased considerably as jobs have been added to the core. To rebalance supply and demand, parking operators are likely to increase parking rates as growth occurs. Higher off-street parking fees also increases the attractiveness of lower priced metered parking or free parking in residential neighborhoods and contributes to double parking, impacts quality of life residents and add "search" traffic to downtown streets.

- Reflective of an intense concentration of government uses in the downtown area, many commuters park all day and at no charge along curbs not designated for this use. This practice inconveniences residents and businesses, reduces traffic capacity, leads to double parking, impedes pedestrian and bicycle movements, and reduces the competitiveness of transit as a choice of commute mode by virtue of providing de facto free all day parking for downtown workers.

- Although most future developments in Downtown Brooklyn would provide off-street loading and unloading facilities, the demand for short-term curbside pick-up and drop-off activities by autos, taxis and livery vehicles would exacerbate the existing supply-demand imbalance for curbside space.

- Since high-occupant vehicles, such as carpools, commuter vans and buses operate in mixed traffic, traffic congestion has significant adverse impacts on these modes by slowing travel speeds, reducing their competitiveness as mode choices. Expected increases in traffic volume and worsening of congestion on the roadways in and around Downtown Brooklyn in the future would further exacerbate these conditions.

Rail Transit

- In peak commute periods, the subway system experience congestion and crowding. This is significant because the subway system is expected to accommodate the bulk of travel demand from Downtown Brooklyn area growth. Concerns have been expressed that future demand may eventually exceed available capacity on certain lines. However, in comparison to the vehicle arteries in the area the subway system appears to have significant available capacity in the overall peak commute periods. This is because capacity exists in the "shoulder" periods of the peak.

Pedestrians

- The effort to balance the competing needs between pedestrians and vehicles, such as restricting vehicle turning movements to provide conflict-free pedestrian movements or reducing the green time for vehicular movements to provide for leading pedestrian intervals, poses a critical transportation challenge in Downtown Brooklyn. On one hand is the concern about reducing much needed vehicular capacity, while on the other is the need to safely and efficiently accommodate a growing number of pedestrians, with both groups of road users competing for the same resources. The magnitude of planned development in Downtown Brooklyn, which will generate thousands of pedestrians, many during the peak vehicular periods, will obviously heighten this challenge.

Bicycles

- While there have been several recent accomplishments to encourage and expand bicycling in Downtown Brooklyn, some gaps still remain in the bicycle network. In addition, bicycle amenities, such as indoor bicycling parking opportunities and bicycle parking facilities at major subway and bus stations are scarce. Due to these deficiencies, the expected increase in bicycling as a result of the planned residential and recreational uses in Downtown Brooklyn and the potential for bicycling as a more viable transportation mode may not be fully maximized. Real or perceived safety concerns on or crossing major vehicular travel corridors may also suppress cycling rates.

Waterfront Connections

- Transit, pedestrian and vehicular connections to the Downtown Brooklyn waterfront are not as robust as between other districts. With significant growth envisaged for DUMBO, Red Hook and the Brooklyn Bridge Park area, the weak connections will increase in significance.

Enforcement

- As the levels of vehicular and non-motorized traffic volumes increase in Downtown Brooklyn, the need for enforcement of parking regulations and other traffic rules will become more critical in order to maximize capacity, maintain and/or improve safety levels, and improve quality of life. Parking enforcement being under the jurisdiction of a non-transportation related organization - the NYPD, is particularly problematic.

Institutional

- While Downtown Brooklyn is larger than many cities, being situated within a City with numerous business districts, it does not receive comparable or separate policy/planning attention.

- There is no single authoritative oversight of overall transportation issues and priorities in Downtown Brooklyn. Multiple agencies are responsible for operations, planning, design, construction, enforcement, and funding. The separated responsibility for transit planning and operations to the Metropolitan Transportation Authority and street operation to NYCDOT presents challenges in Downtown Brooklyn where transportation modes are interdependent and should operate as a seamless, integrated system.

Downtown Brooklyn Transportation Goals

Based on the existing and anticipated transportation issues facing Downtown Brooklyn, the following six broad goals were developed.

Goal 1: **Travel Demand Growth -** Accommodate the travel demand growth that comes with development.

Goal 2: **Managing Congestion -** Manage congestion in a way that preserves and enhances quality of life and network integrity.

Goal 3: **Through versus Local Travel** – Respond to changes in the balance of demand for travel through Downtown Brooklyn and travel to, from and in the area as demand for each component changes over time.

Goal 4: **Physical/Fiscal Constraints -** Develop an effective response that recognizes physical space limitations and generally scarce funds.

Goal 5: **Street Management and Safety** - Continue to improve safety and effectively manage the public right-of-way) streets, sidewalks, intersections

Goal 6: **Institutional** - Overcome institutional (interagency, interdepartmental, etc.) challenges to effect responses.

These goals are intended to provide broad outcomes which agencies, policymakers and other stakeholders should work to affect. In future tasks, measurable objectives will be developed based upon these goals.

1.0 Introduction

Downtown Brooklyn, the city's third largest central business district after Midtown and Lower Manhattan, occupies a valuable and unique position in New York City as a highly desirable location because of its proximity to Lower Manhattan and its excellent local and regional mass transit access.

Capitalizing on its strengths, the area has experienced significant revitalization and commercial development activity in the recent past. A confluence of conditions, projects and policies has Downtown Brooklyn poised for additional redevelopment activity that may be without precedent. Already, the transportation system is heavily utilized and experiences significant congestion. Pending growth will pressure the transportation system to perform at a higher level and provide better service to all users, including pedestrians, drivers, transit riders and bicyclists.

The Downtown Brooklyn Transportation Blueprint (DBTB) is a transportation planning study designed to consider the implications of this growth by developing goals, policies, strategies and initiatives that are focused on maintaining and enhancing access, mobility and quality of life, as development occurs. The Blueprint study area (herein referred to as the DBTB Study Area) is bordered by Union Street to the south, Washington Street to the east and the waterfront to the north and west. The Study Area comprises a variety of land uses including commercial, institutional, cultural, retail and residential.

The focus of the study is on issues related to the core Downtown Brooklyn area which is bounded generally on the north, south, east and west by Tillary Street, Schermerhorn Street, Flatbush Avenue and Clinton Street, respectively. This core contains a variety of activities including judicial, governmental, commercial, academic, retail and cultural. Significant sub-districts within this core include the Commercial Office Center Area, Civic Center Area, Jay Street and Long Island University Academic Areas, Fulton Mall Area, the Brooklyn Academy of Music (BAM) Cultural District and the Atlantic Terminal/Atlantic Yards Area (see Figure 1).

This Technical Memorandum provides an overview of past land use and transportation trends and an assessment of projected changes in land uses in an effort to identify existing and anticipated transportation issues and opportunities in the Study Area. Based on the issues identified, appropriate project goals are identified. Input from the study's Steering Committee and public meetings was considered in issue identification.

2.0 PAST LAND USE AND TRANSPORTATION TRENDS

2.1 Historical Planning and Development Framework

Beginning in the second half of the 20th century, Downtown Brooklyn has been the subject of numerous studies and development/revitalization plans. In the period between 1950 and 1969, Downtown Brooklyn experienced a significant amount of government-related development.

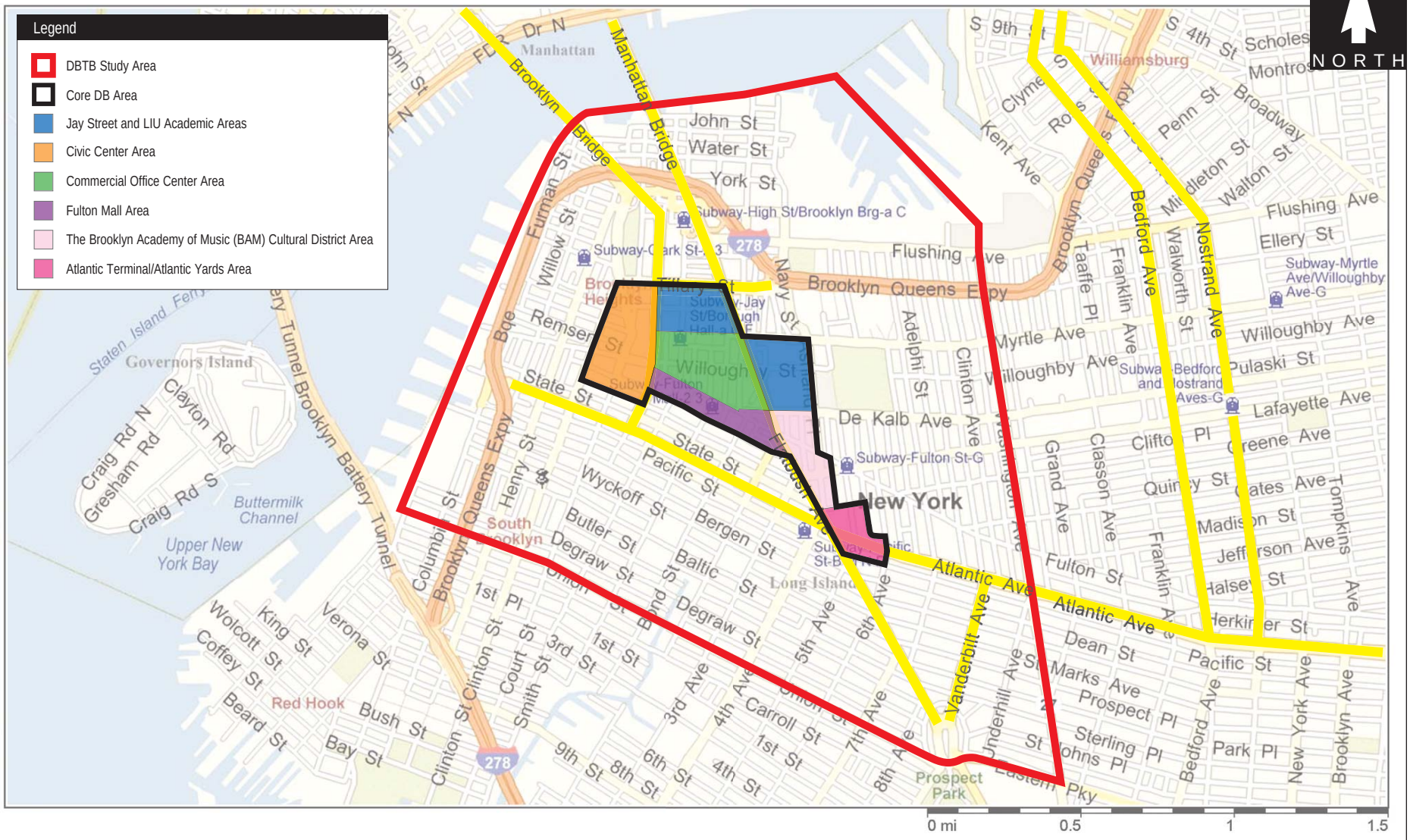


Figure 1 - DBTB Study Area with Core DB Area and Subdistricts

Downtown Brooklyn Transportation Blueprint

Prepared by Urbitran Associates

During this time the City of New York built approximately 700,000 square feet of court and municipal office space in the Downtown Area, and the State and Federal governments added almost 550,000 square feet, strengthening the area's role as a government center. Some of the area's educational and cultural institutions, including the Brooklyn Law School and New York City College of Technology, also expanded during these two decades.

In addition to the Civic Center's growth, during this period the Fulton Street retail corridor was thriving. Fulton Street became the City's second most important regional shopping center, after Herald Square in Midtown Manhattan. The office market added three new office buildings in the 1960s and another three in the early 1970s. The remainder of the 1970s and early 1980s was marked by less activity and some notable signs of decline.

AT-A-GLANCE: Downtown Brooklyn Transportation Blueprint Study Area

2000 Population	165,396
Community Districts	2, 6, 8
Neighborhoods	Downtown Brooklyn, Boerum Hill, Brooklyn Heights, Clinton Hill, Fort Greene, Fulton Ferry, Vinegar Hill, Carroll Gardens, Park Slope, Prospect Heights
Census Tracts	40 Census Tracts
Police Precincts	76, 78, 84, 88
Attractions	Civic Center, Brooklyn Academy of Music and Cultural District, Fulton Street Mall, Atlantic Center/Atlantic Yards, Commercial Office Center, MetroTech

In the mid-1980s, however, revitalization efforts in Downtown Brooklyn began to reverse this trend. In 1983, the Regional Plan Association produced a report that encouraged the redevelopment of regional sub-centers to promote economic revival in Downtown Brooklyn. During this decade, Borough Hall was renovated and large office buildings were erected at One Pierrepont Plaza and Livingston Plaza.

Perhaps the most significant office development in this period was MetroTech Center, which was constructed as part of an urban renewal effort sponsored by the City. Through the Metro Tech Urban Renewal Plan, this part of the core Downtown Brooklyn area became occupied by major employers including Chase Manhattan bank (now JP Morgan Chase) as well as City agencies.

In 1999, Renaissance Plaza, a major office and hotel complex, was completed. This development, also located in the core Downtown Brooklyn area, offered Brooklyn its first new major hotel since the 1920s. Meanwhile, rising rents in Manhattan bolstered demand for both residential and commercial space in other boroughs, particularly Brooklyn. This accelerated the City and State's efforts to move some of their agencies from the Manhattan Civic Center to other borough centers, including Downtown Brooklyn.

Historical planning and zoning initiatives, combined with public and private investments, resulted in impressive growth, particularly in the office, retail and residential sectors. There has also been significant expansion in academic institutions and cultural facilities.

2.1.1 Office Growth in Core Downtown Brooklyn Area

Because of its close proximity to Lower Manhattan (two subway stops away) and excellent local and regional mass transit access, Downtown Brooklyn occupies a valuable and unique position in New York City as a competitive, back-office alternative to New Jersey In 2004, Downtown Brooklyn housed 11 million square feet of office space, including 6 million of prestigious Class A space. Downtown Brooklyn office tenants include Con Edison, Bear Stearns, KeySpan, Morgan Stanley and Goldman Sachs. Currently, approximately 70,000 workers commute into and out of Downtown Brooklyn per day.

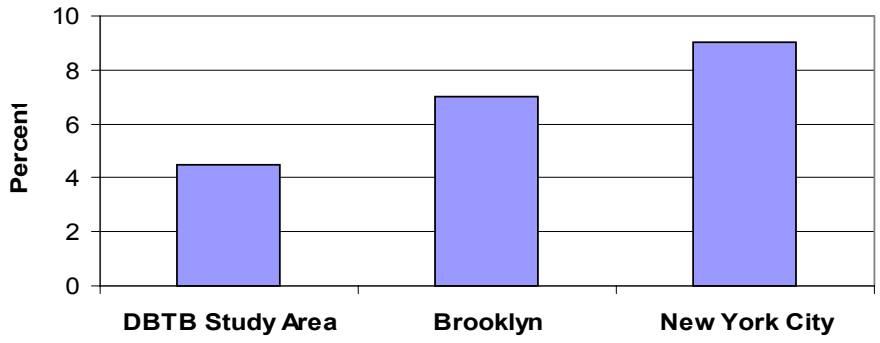
2.1.2 Retail Expansion

The retail sector has also expanded significantly in the last 20 years. Large-scale shopping centers, like Atlantic Center and the Gallery at Fulton Street, have created economic activity by providing extensive shopping opportunities, attracting visitors and creating jobs. Most recently, the Atlantic Terminal Mall, anchored by a 194,000 square foot Target opened in 2004 above the complex of subway and rail lines at Atlantic and Flatbush Avenues. In addition, medium to small scale establishments have continued to flourish, primarily along the Fulton Street Mall and along Atlantic Avenue.

2.1.3 Revitalization of Residential Neighborhoods

The historic housing stock, improved transportation to Manhattan, and marked declines in crime, have contributed to significant revitalization and additional development in every residential neighborhood surrounding the Downtown Brooklyn core. In 2000, 165,396 people resided within DBTB study limits, a 4.5% increase from the 1990 population. Figure 2 compares the population growth rate of the DBTB study area with Brooklyn and New York City.

Figure 2: Population Growth Rates (1990-2000)



Source: U.S. Census Bureau

2.1.4 Enlarged Presence of Academic and Cultural Institutions

Over 32,000 students attend a number of academic institutions in the DBTB Study Area, including Polytechnic University, Long island University, New York City College of Technology and the

Brooklyn Law School. Downtown Brooklyn is increasingly becoming a place for students to live as well as study as evidenced by a number of dormitory projects including a new 371-bed facility for Brooklyn Law School on Boerum Place. With approximately 300,000 square feet of space, cultural institutions such as the Brooklyn Academy of Music, attract hundreds of thousand of visitors annually. A new building housing the Mark Morris Dance Group and the restoration and renovation of the BAM's Peter Jay Sharp Building are signs of the increasing presence of cultural activities in the area.

2.2. Transportation Planning and Investment

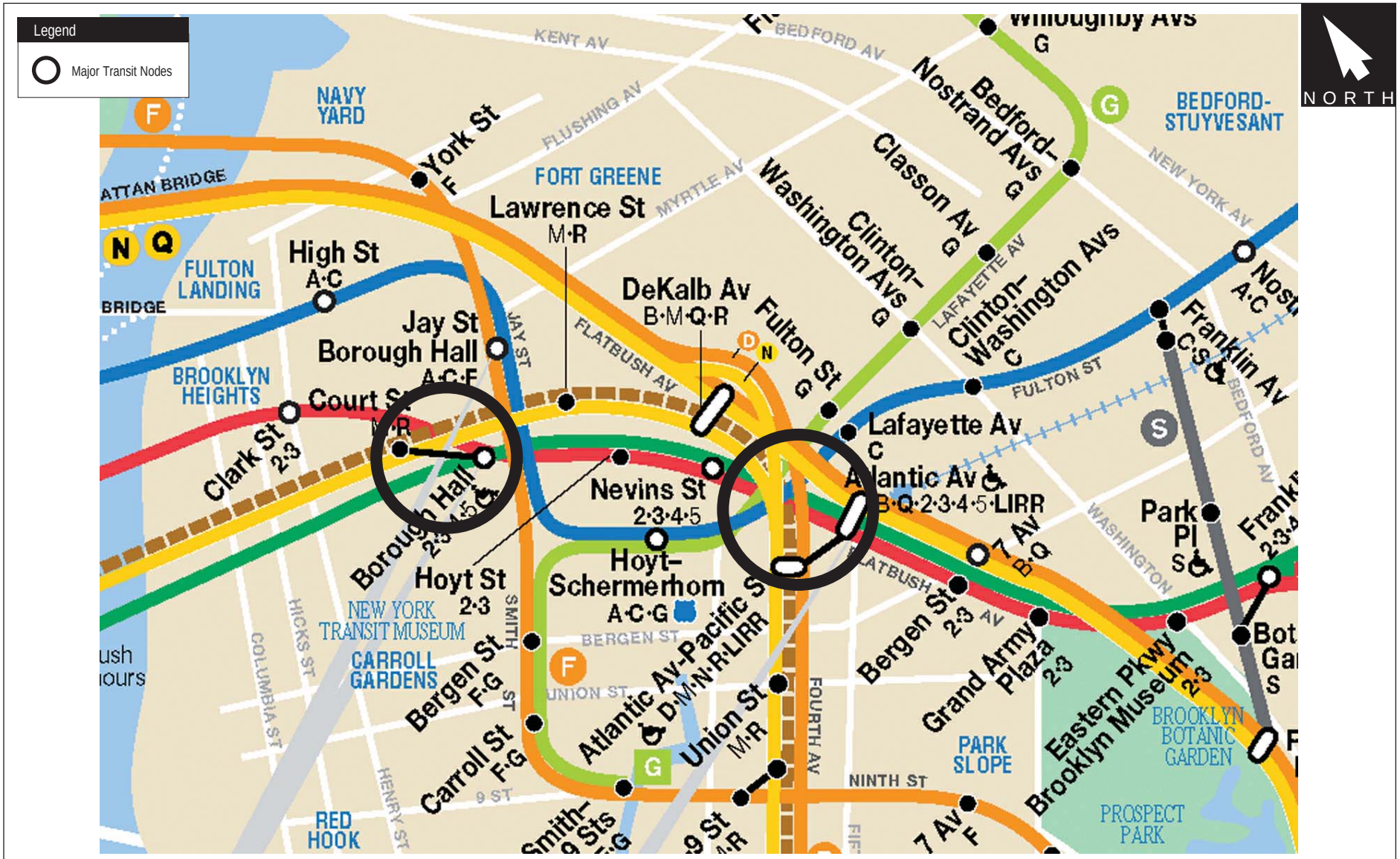
2.2.1 Modest Improvements to Vehicle Capacity

The Downtown Brooklyn roadway network provides access to the Brooklyn-Queens Expressway, the only limited access facility in the study area, and the Brooklyn and Manhattan Bridges (via Adams Street and Flatbush Avenue, respectively). These two gateways, along with the Brooklyn Battery Tunnel, a toll facility, provide direct connections between Downtown Brooklyn and Manhattan, creating a vital transportation link. The existing street network contains a number of north-south and east-west roadways, which carry heavy volumes of through traffic as well as minor roadways, which serve local downtown traffic.

Though the roadway network carries substantial through and local traffic, investment in additional vehicle capacity has been modest and focused on location-specific improvements. NYC EDC's 1987 *Downtown Brooklyn Master Planning Improvement Study* recommended a number of improvements ranging from major capital projects to low-cost operational improvements (such as eliminating parking on the approach to an intersection to provide an additional moving lane). Most elements of the Master Plan have now been implemented, including the widening of Flatbush, Atlantic and 4th Avenues where they intersect (Times Plaza). A number of capacity improvements (widening, addition of left turn lanes, and provision of a service road) were also implemented along Flatbush Avenue between Atlantic Avenue and Tillary Street in the downtown core. However, the two major capital projects from the 1987 master plan were not implemented. The first project would have provided a new off-ramp from the westbound BQE east of Navy Street, allowing motorists destined from the Manhattan Bridge to avoid using the Flatbush Avenue/Tillary Street intersection and those heading downtown to use Navy Street/Ashland Place rather than Flatbush Avenue. The second project was to provide a two-way vehicle underpass on Adams Street under Tillary Street. These projects have not been implemented due to a combination of factors, including subsequent air quality improvements in downtown, the failure of future projected traffic growth to materialize, and fiscal constraints.

2.2.2 Significant Rehabilitation of Transit Infrastructure

While a citywide effort, the overall rehabilitation of the subway system which has taken place over the last 25 years was particularly beneficial for Downtown Brooklyn due to the dense cluster of subway lines in the area (see Figure 3 for subway lines and stations that serve Downtown Brooklyn).



Source: MTA New York City Transit

Figure 3 - Subway Service in Downtown Brooklyn

Downtown Brooklyn Transportation Blueprint

MTA investment measuring billions of dollars in tunnels, tracks, stations, subway cars, signals and transit technology increased the reliability, capacity and appeal of transit travel to and from Downtown Brooklyn. The provision of unlimited ride Metrocards and free subway-to-bus transfers made transit trips to downtown more convenient for a larger area of the city and outside of p[eak commute periods.

Direct investment in Downtown Brooklyn has come in the form of a number of station rehabilitation projects. Most notably, the Atlantic Avenue-Pacific Street, a major point of interchange between subway and bus lines and the Long Island Rail Road received a full renovation that included a skylight and the significant widening of passageways and stairways. This project and the rehabilitation of the DeKalb Avenue station on the B/M/Q/R line were completed in 2004.

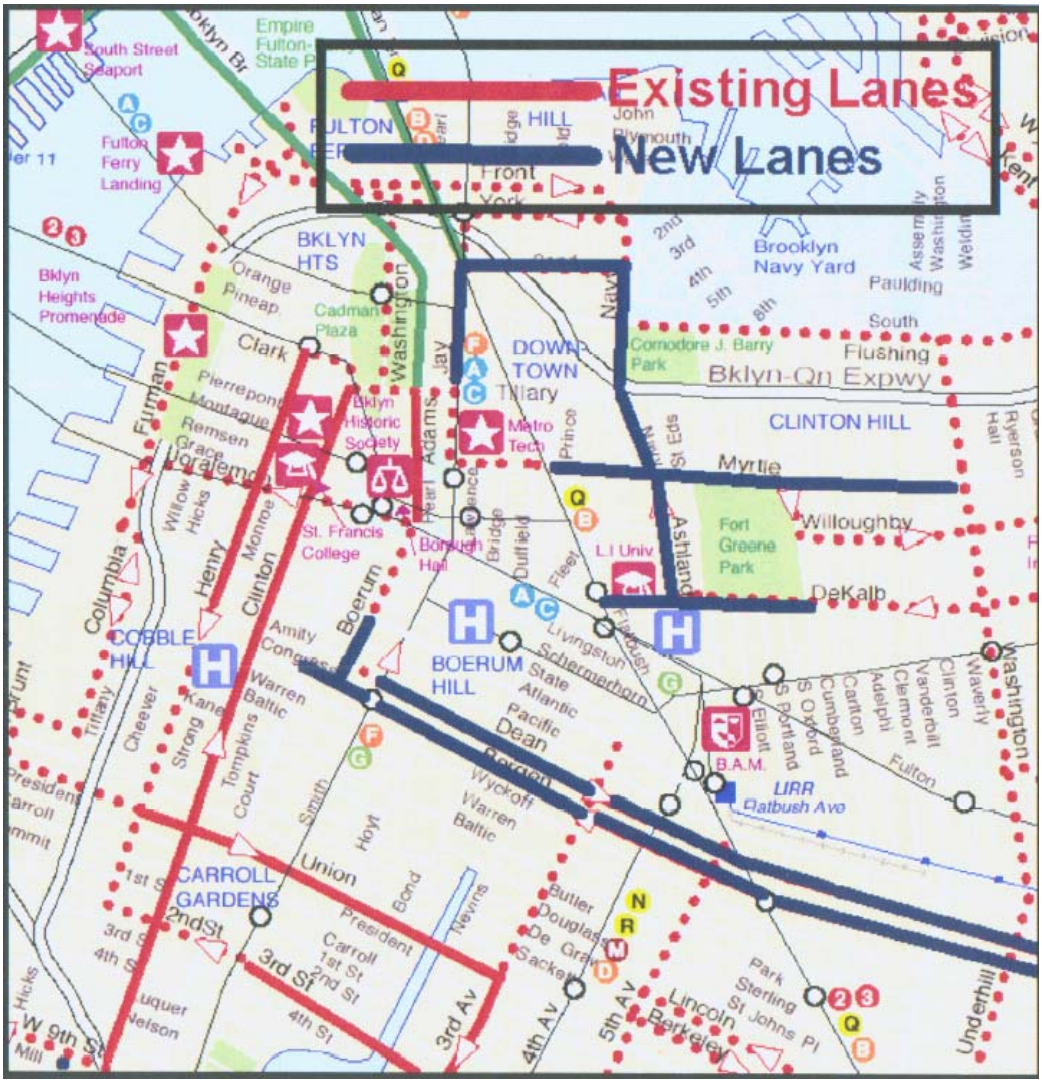
2.2.3 Street Management for Competing Uses

The Downtown Brooklyn Traffic Calming Project, begun in the late 1990s, yielded a street management strategy that reversed historical practices in the area which focused on improvements to vehicle capacity. Instead, capacity reductions have been selectively implemented in order to gain other benefits such as discouraging the use of local streets for cut-through purposes, increasing pedestrian safety and comfort, improving local access/parking opportunities, reducing bus delays and providing a cycling network in the area. Measures used to date include changing street geometry and direction to favor pedestrians over motorists, slowing traffic signal progression, providing exclusive crossing times for pedestrians at intersections, eliminating peak period and all day parking restrictions, and replacing vehicle travel lanes with bicycle lanes and bus lanes. Streets in the study area that have been subject to notable changes include Clinton Street, Court Street, Smith Street, Boerum Place, Dean Street, Bergen Street, Fulton Street and Ashland Place/Navy Street. Capital elements of this project, primarily the widening of sidewalks at intersections will be implemented with $5 million of funding available in the FY 2006 budget.

2.2.4 Implementation of a Bicycle Facility Network

Significant improvements have been made to encourage and accommodate bicycling in Downtown Brooklyn. Building off of the citywide Bicycle Master Plan of 1997, the Downtown Brooklyn Traffic Calming Project developed detailed recommendations for a network of bicycle lanes in the greater downtown area. By 2004, most of this network had been implemented. In addition, the first bicycle only path across the East River was opened on the Manhattan Bridge in 2004 along with a set of bicycle lanes leading to and from the path. Since 2001, the total bicycle lane mileage added to the greater Downtown Brooklyn area has exceeded 10 miles (see Figure 4 for Bicycle Network). In addition, a number of the traffic calming strategies mentioned in section 2.2.3 above have served to make corridors in the area more comfortable for cyclists.

Figure 4: Greater Downtown Brooklyn Bicycle Network

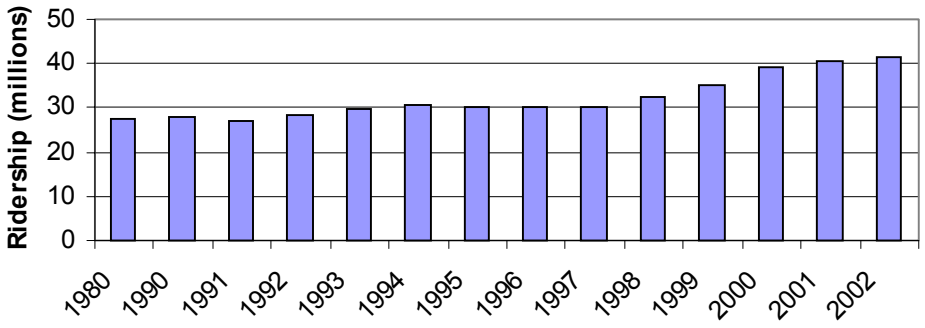


Source: NYCDOT

2.3 Significant Growth in Transit and Other Alternative Mode Usage

The growth of Downtown Brooklyn in the last 20 years is reflected in the surge in transit ridership and increased use of other alternative modes, such as walking and bicycling. As Figure 5 shows, subway ridership at stations within the Study Area increased dramatically, particularly in the period from 1997 to 2002 during which ridership grew by 50%. This increase is primarily a result of the rehabilitation efforts and fare policies described in section 2.2.2 and the overall revitalization and job growth in downtown.

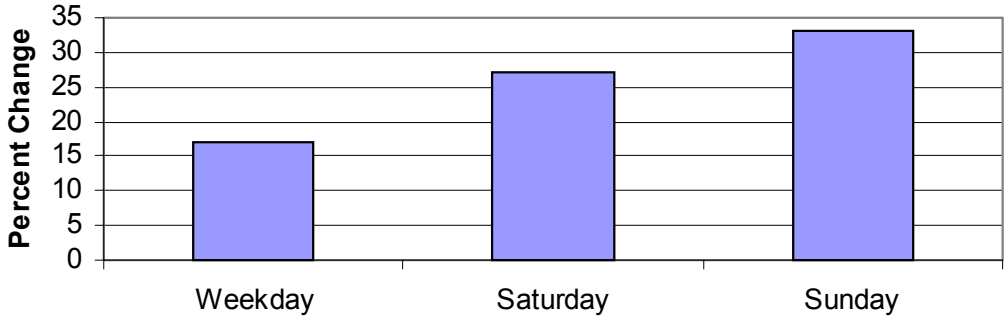
Figure 5: Annual Subway Ridership at Major Downtown Brooklyn Stations



Source: MTA Subway and Bus Ridership Report (2000)

Ridership growth on weekends in recent years has outpaced growth on weekdays (see Figure 6), reflecting the convenience of unlimited ride fare cards and the growth in cultural attractions downtown.

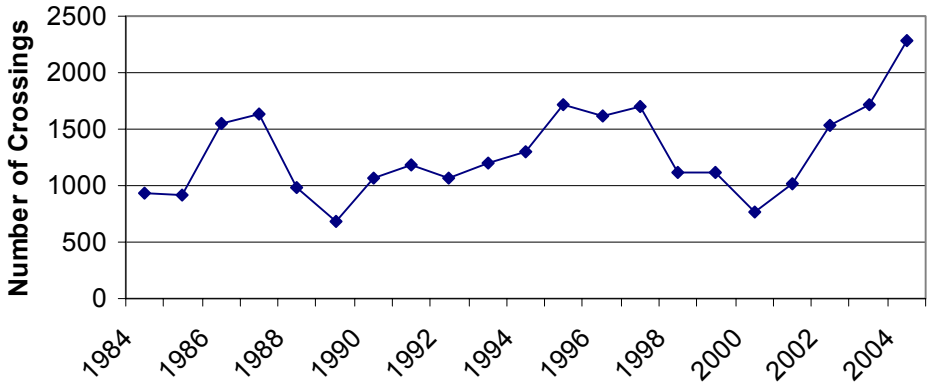
Figure 6: Change in Ridership at Major Downtown Brooklyn Stations from 1998 - 2002 (by day of the week)



Source: 2000 and 2002 New York City Transit Subway & Bus Ridership Reports

Bicycle use in the downtown area has also shown significant signs of growth. Figure 7 shows a one day count (7 AM–7 PM) of cyclists using either the Brooklyn or Manhattan Bridges since 1984. The count of 2,278 cyclists in 2004 is 33% greater than the previous recorded high of 1,715 in 1995. On the north-south bike route pair of Clinton and Henry Street, a nine-hour count showed that usage increased by 72% in one year - growing from 326 users in 2002 561 users in 2003.

Figure 7: Downtown Brooklyn Bicycle Crossings (Daily)



Source: NYCDOT

While use of alternative modes has grown significantly in the area, the percentage of commuters who drive alone to work in the downtown core appears to have grown since 1980. Based on census data, over 21% of commuters in 1980 drove alone to work. Preliminary 2000 census data indicates that the percentage of single-occupant vehicle (SOV) commuting trips increased to 28% in that time. Indeed, in comparison to the two Manhattan central business districts (CBDs), driving alone captures a much higher share of the commuter travel market, as can be seen in Table 2.1.

Table 2.1: Mode Share of Journey-to-Work by Central Business District

	Drive Alone	Transit
Lower Manhattan	11%	82%
Midtown	10%	78%
Downtown Brooklyn	28%	59%

Sources: US Census 2000, Census Transportation Planning Package

Generally, the choice of commute mode is primarily influenced by the availability of transit, levels of congestion and directs costs such as tolls and parking. Transit service in Downtown Brooklyn compares favorably to the Manhattan CBDs. However, conditions for motorists are different in downtown than in these areas: congestion levels are lower than in Manhattan; motorists are less likely to need to pay tolls; parking prices are lower; and many of downtown's large number of government related employees are able to park at no charge.

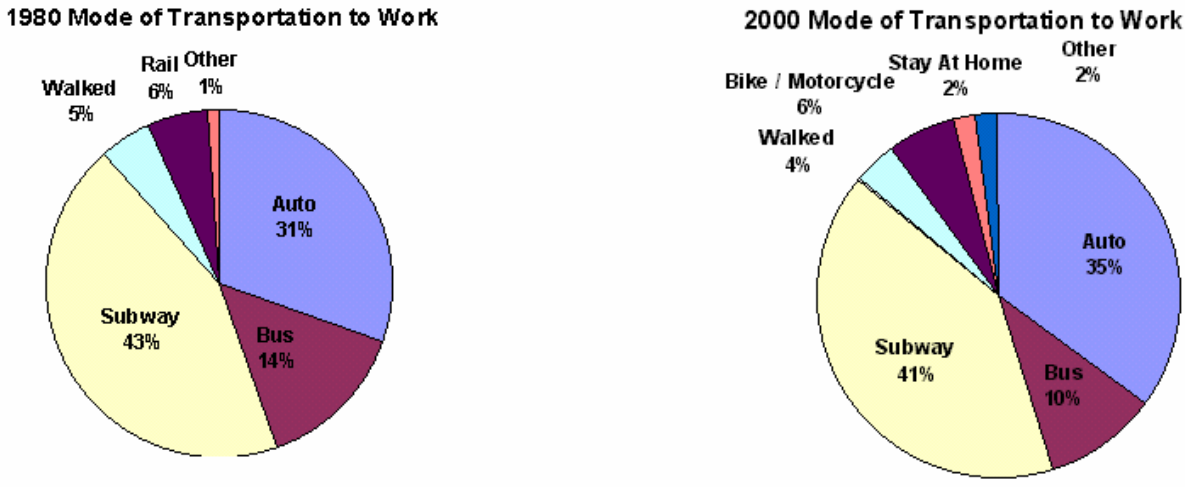
Nevertheless, transit still captures a large share commute trips in Downtown Brooklyn. Table 2.2 shows that its 59% transit share exceeds the transit share in several other major downtowns in the country. Oakland, which serves as a secondary business district to San Francisco, like Brooklyn does to Manhattan, has only 24% of its commuters arriving by transit. The table also illustrates that from 1980 to 2000, transit shares in a number of other downtowns fell at a faster rate than in Brooklyn.

Table 2.2: Percentage of Commute Trips by Transit at Selected Downtowns

	1980	2000	Percent Change in Share
Downtown Brooklyn	63	59	-7%
Chicago	73	62	-15%
San Francisco	51	49	-5%
Philadelphia	59	45	-23%
Seattle	44	37	-16%
Oakland	26	24	-7%
Baltimore	32	19	-41%

Sources
Downtown Brooklyn Transportation Factbook, January 1984
US Census 2000, Census Transportation Planning Package
FHWA, CTPP Status Report, Commuting to Downtown Study, April 2004
DVRPC 1980-2000 Journey to Work Trends for Philadelphia

Figure 8: Mode Split in Downtown Brooklyn



Source: 2000 US Census Transportation Planning Package / 1984 Downtown Brooklyn Transportation Factbook

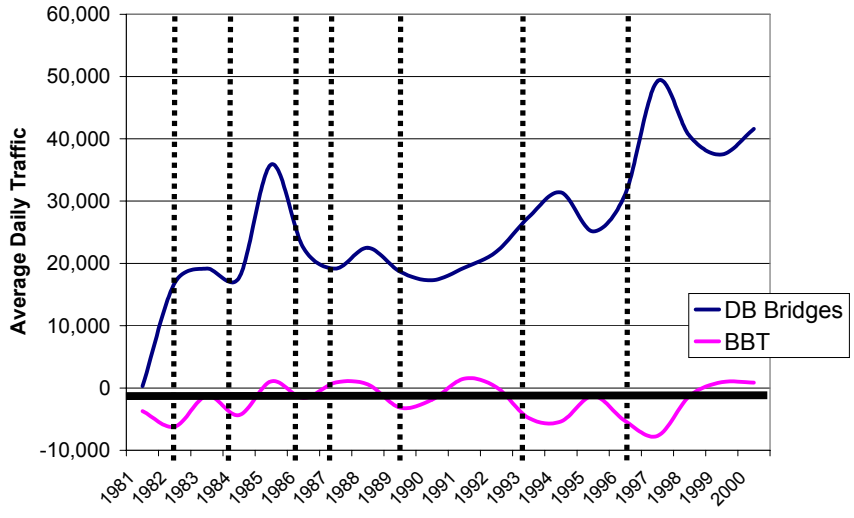
2.4 Modest Growth in Overall Vehicle Volumes

The vehicular gateways of Downtown Brooklyn have experienced a lower rate of growth, as compared to transit and other alternative modes. Between 1980 and 2000, based on daily volumes, the three river crossings between Downtown Brooklyn and Manhattan experienced a combined 17% increase in volume, an equivalent of 0.8% per year. Some roadways have recently seen a decline in volume. In the morning rush, NYDOT has implemented measures encouraging through traffic to use the BQE rather than parallel local routes. As a result, the four local roads of Columbia Street, Hicks Street, Clinton Street and Smith Street exhibited a 24% decline in morning peak period volume from 1999 to 2004. However, vehicle volumes on Flatbush Avenue and Atlantic Avenue, two corridors that carry high volumes, have increased by 28% and 14%, respectively, in the last 20 years.

2.5 Increased Preference for Brooklyn and Manhattan Bridges over the Brooklyn Battery Tunnel

Through traffic between Downtown Brooklyn and Manhattan showed a marked preference for the Brooklyn and Manhattan Bridges rather than the Brooklyn Battery Tunnel, a tolled facility. This is notable because traffic using the bridges impacts the downtown street network whether or not it is destined for downtown, while the Brooklyn Battery Tunnel traffic generally does not use downtown streets. Annual vehicular traffic on the Brooklyn Bridge has grown steadily since 1980 while annual vehicular traffic on the Manhattan Bridge and in the BBT has essentially remained the same. As Figure 9 shows, in 2000, 41,000 more vehicles per day used the two bridges than in 1980, an increase of 34%. By comparison, daily traffic at the BBT was a mere 1,000 more vehicles in 2000 than in 1980, a negligible increase. Correspondingly, Brooklyn Battery Tunnel now carries only 20% of combined Downtown Brooklyn-Manhattan crossings in 2000 as compared to 25% in 1980. The most logical and likely explanation for this preference for the bridges rather than the BBT is that the Brooklyn battery is a toll facility, with tolls paid in both directions. The current one-way toll at the BBT is $4.50 when paid in cash and $4.00 with E-ZPass, as compared to $1.00 in 1980.

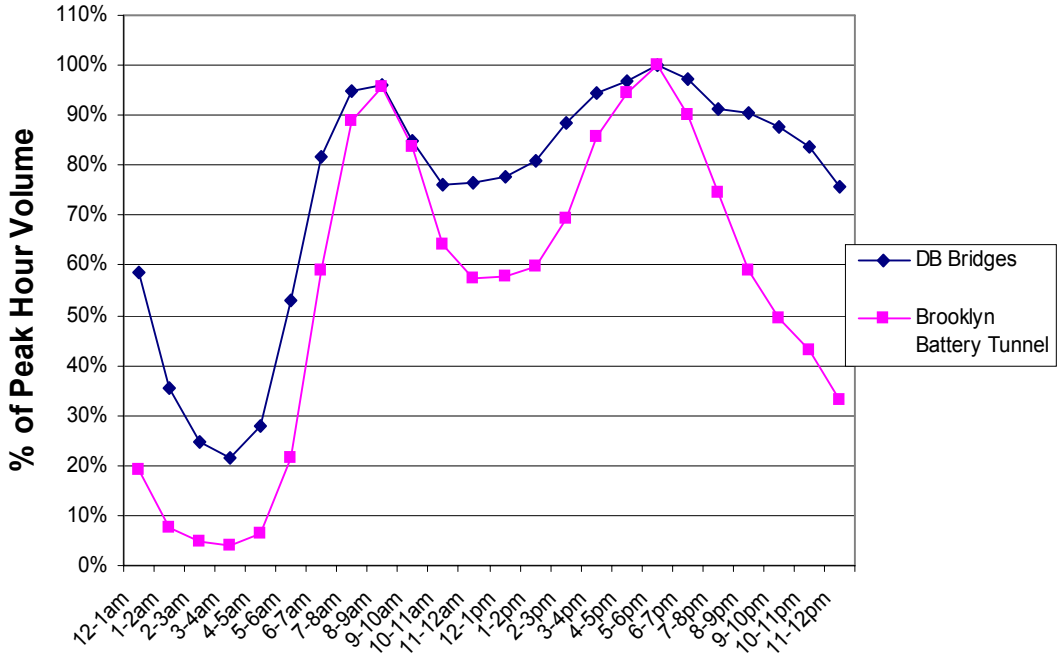
Figure 9: Annual Traffic at Downtown Brooklyn Crossings
(Annual Volume in Relation to 1980 Volume)



Source: 2003 New York City DOT Bridge Traffic Volumes Report

This preference is seen particularly outside the traditional peak hours of 8-9 AM and 5-6 PM. As shown in Figure 10, volumes on the two bridges do not significantly drop off outside of the peak hour when compared to the BBT. For example, from 9-10 PM, the bridges carry volume that is 87% of the volume in the PM peak hour, while the tunnel only carries 49% of its PM peak hour volume at that time. Basically, choosing the BBT for an East River crossing loses its appeal outside of the AM and PM peak hours when congestion is most pronounced.

Figure 10: Hourly Downtown Brooklyn Crossings as Percentage of Peak Hour Volume, 2003



Source: 2003 New York City DOT Bridge Traffic Volumes Report

2.6 Persistent Congestion and Spillover Traffic in Peak Periods

Downtown Brooklyn has for many years experienced recurring congestion. The 1984 *Downtown Brooklyn Transportation Factbook* (NYCDOT) and other planning studies identified corridors and areas that then experienced congestion and spillover traffic. Most, if not all, of these problems continue to face Downtown Brooklyn today, and many of them are exacerbated. According to the Downtown Brooklyn Development Plan Final Environmental Impact Statement, 20 of the 29 signalized intersections analyzed in the downtown area, or almost 70%, had at least one congested movement (defined as level of service E or worse) in one or more peak hours in the 2002 baseline condition.

The Flatbush Avenue corridor, one of Downtown Brooklyn's main north-south arterials, experiences recurring traffic congestion, particularly at its intersection with Atlantic Avenue/4th Avenue, and at the intersection with Tillary Street, the gateway intersection for the Manhattan Bridge. There are only a limited number of east-west through roadways such as Schermerhorn and Livingston Streets and Atlantic Avenue. Fulton Street, one of the few east-west through streets, is closed to all but transit and pedestrians.

The BQE, the only limited access facility in Downtown Brooklyn, suffers from chronic congestion during most of the daytime hours. The attractiveness of the BQE as a commuter and commercial corridor stems from its role as the primary north-south expressway in western/southern Brooklyn and as the major link to other major expressways outside the Study Area, such as the Gowanus Exrpressway and Belt Parkway. Motorists, trying to avoid the congestion on the BQE, use local north-south streets, such as Furman Street, Hicks Street, Clinton Street, Court Street, and Smith Street as alternates to the BQE. In particular, Hicks and Clinton Streets experience spillover effects in the AM peak traffic period from inbound traffic avoiding the BQE, while Henry and Court streets experience spillover from outbound traffic in the PM peak period. Additional corridors in the study area that suffer from spillover traffic include Sate, Pacific, Dean, Bergen and Fulton Streets as alternates to Atlantic Avenue; Carlton Avenue as an alternate to Flatbush Avenue; and Myrtle and DeKalb Avenues as alternates to the BQE.

2.7 Improvements in Pedestrian, Bicycle and Vehicular Safety

Reflecting the high vehicle and pedestrian volumes along major corridors, there are intersections and corridors with high numbers of crashes and injuries in the downtown area relative to other places in Brooklyn. These include the intersection of Flatbush Avenue and Tillary Street, where 126 vehicle occupants were killed or injured in 445 total accidents in the 3-year period, 2000-2002. Similarly, the intersections of Adams Street and Tillary Street and Flatbush Avenue and Willoughby Street also experienced a relatively high number of accidents during that time.

However, the greater downtown area experiences fewer traffic injuries and fatalities on a *per resident* basis than the average for all of Brooklyn. There were 6.0 traffic injuries per 1,000 residents in greater downtown (NYPD precincts 84, 78, 88, 76) in 2004 compared to 6.8 injuries per 1,000 residents borough-wide. From 2002-2004, traffic fatalities numbered 5.3 per 100,000 residents in greater downtown, 20% fewer than the 6.7 borough-wide. Traffic injuries adjusted for population are shown in Tables 2.3 and 2.4 below.

The number of pedestrian and bicycle injuries in the greater downtown area decreased to 317 injuries in 2004 from a high of 670 in 2000, a reduction of 52%. In the core Downtown Brooklyn area, pedestrian and bicycle injuries showed a similar trend in decline, decreasing from 160 injuries in 2001 to 120 in 2004, a reduction of 33% (see Figures 11 and 12).

Table 2.3: Traffic Injuries as a Rate per 1,000 Residents, 2004

Downtown Core	8.0
Greater Downtown	6.0
All Brooklyn	6.8

Source: NYPD and US Census

Table 2.4: Traffic Injuries as a Rate per 1,000 Residents and Workers, 2004

Downtown Core	1.9
Greater Downtown	2.8
All Brooklyn	4.8

Source: NYPD and US Census

Figure 11: All Traffic Injuries

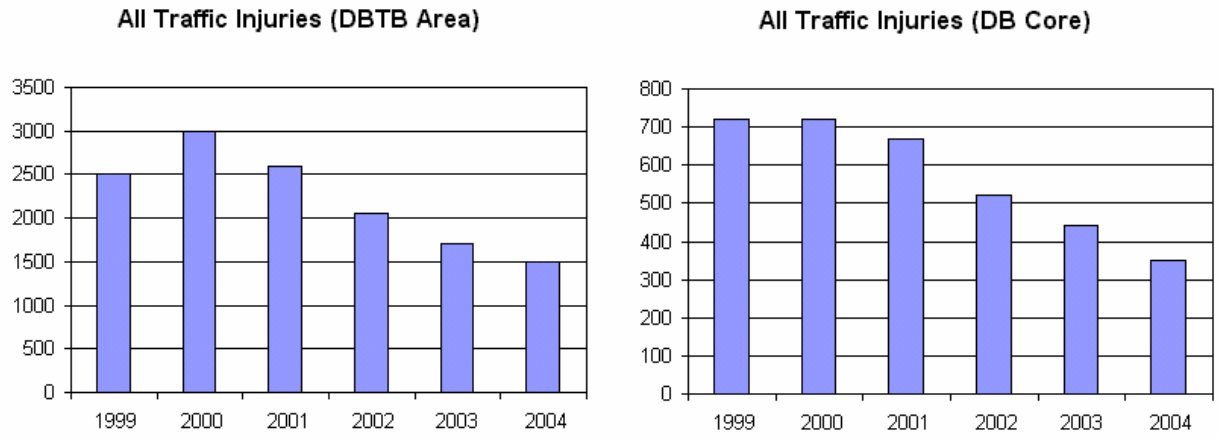
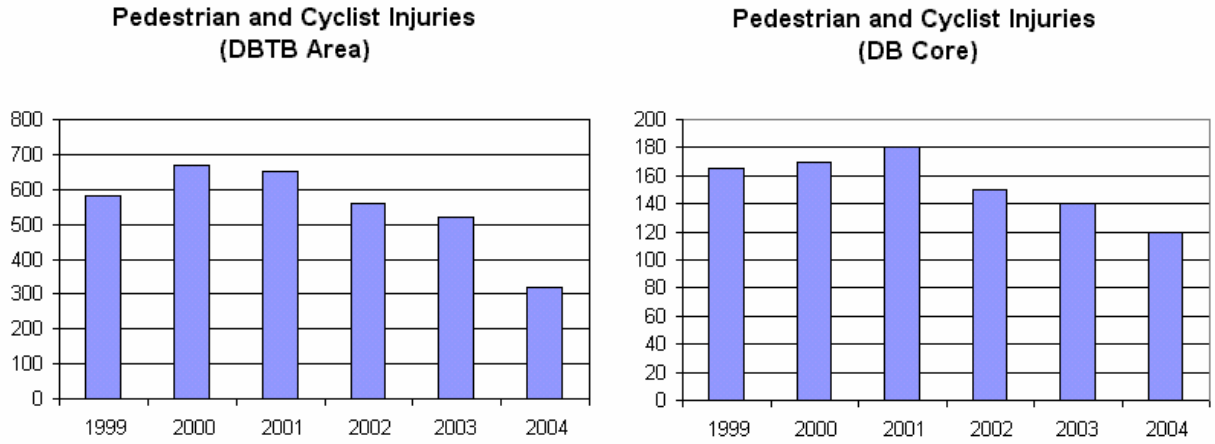


Figure 12: Pedestrian and Cyclist Injuries



Source: New York City Police Department