NEW YORK CITY DOT

Draft Technical Memorandum

Downtown Brooklyn Surface Transit Circulation Study

Existing & Future Conditions

URS

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EXECUTIVE SUMMARY

Downtown Brooklyn is supported by some of the New York metropolitan region's best transit services. In fact, the Journey to Work (JTW) data from the 2000 U.S. Census shows approximately 65% of residents in the Downtown Brooklyn area use public transit for their daily commute – among the highest levels in the country. Of these, 62% commute via the subway system, most with origins and destinations to and from Downtown Brooklyn.

A total of 17 bus routes serve the Downtown Brooklyn area. During the weekday PM peak hours, more than 13,000 passengers board buses along Fulton Mall and Livingston Street alone, with a majority heading out of the downtown area to other parts of the city For local residents, getting around Downtown Brooklyn has traditionally been accomplished by walking. In fact, only 6% of residents who work in the downtown core area commute by bus (according to 2000 JTW data). Yet no one would deny that bus transit service is a vital component of Downtown Brooklyn's surface transit system.

This report examines Downtown Brooklyn's overall surface transit environment. The results are based on extensive data analysis as well as the nearly 1000 focus group and user/non-user surveys indicating how the surface transit system is perceived by those who live, work, shop and spend time there on a daily basis. The primary focus is on bus transit service efficiency and effectiveness. What are the impacts of existing traffic congestion on quality of bus service within the downtown area? How do current bus riders perceive service in the downtown area? How will Downtown Brooklyn's projected growth and development potentially affect bus service and ridership? Are all areas adequately served by buses? This report documents existing and future conditions that directly or indirectly impact Downtown Brooklyn's surface transit. The goal of this report is to create a framework that can be used to determine the best ways to improve overall surface transit circulation in the Study Area for both the short and long term.

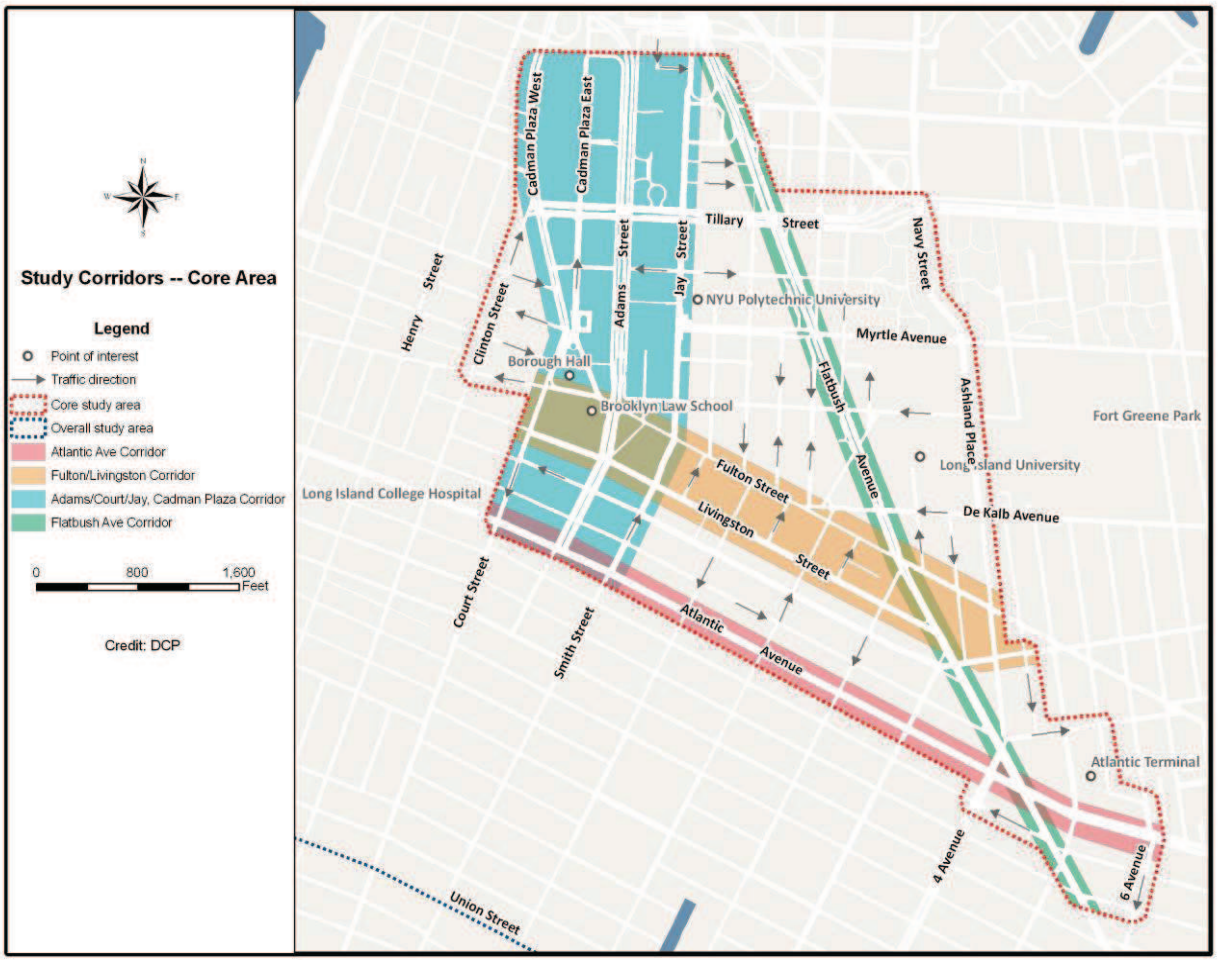
Study Area

The Downtown Brooklyn area is defined in this report as an Overall Study Area and a Downtown Core Study Area. The Core Study Area consists of approximately one-half square mile in the urban core commonly referred to as Downtown Brooklyn. This is further broken into four corridors. These include:

- Atlantic Avenue Corridor
- Flatbush Avenue Corridor
- Jay Street/Adams Street/Cadman Plaza Corridor
- Fulton Street/Livingston Street Corridor

To facilitate analysis, a map depicting these boundaries is shown on the next page.

The overall Study Area consists of a total of nearly four square miles and has been evaluated in terms of its linkages to the Downtown area and whether or not specific neighborhoods and areas are underserved by surface transit. This area is bound by the waterfront to the north and west, Union Street to the south, and Vanderbilt Avenue to the east. It includes all or portions of Fulton Ferry/DUMBO/Vinegar Hill, Brooklyn Navy Yard, Fort Greene, Prospect Heights, Park Slope, Gowanus, and Boerum Hill/Cobble Hill/Carroll Gardens/Columbia.



Review of Previous Studies

Through an extensive review of previous studies conducted over more than 20 years, this report identifies four recurring themes that relate to the study area's surface transit conditions. These focus on the need to manage vehicular congestion; the reality of continuous growth and development in Downtown Brooklyn; the need to enhance existing surface transit service; and finally, a need to improve upon and expand multi-modal opportunities.

Land Use and Demographics

Detailed descriptions of the diverse and varied neighborhoods within the study area were developed, along with key demographic statistics on employment and population densities. Total population in the Core Study Area continues to rise, jumping more than 8% from 2000-2008. Similarly employment density in the Core Study Area continues to increase, and is nearly 200,000 persons per square mile. With high densities of residents and employees, Downtown Brooklyn is an ideal candidate for transit usage. While everyone within the study area has relative proximity to surface transit routes, there is considerable variation in the level of travel options by bus from neighborhood to neighborhood.

Transit Services and Characteristics

The report presents an overview of existing public transit service within the Study Area, including statistics on the 17 bus routes in the Study Area, locations of stops, frequencies, as well as bus ridership and bus stop volumes, and general surface transit service characteristics. During peak hours, buses arrive every 90-100 seconds along Livingston Street and Flatbush Avenue. Travel times on some routes exceed an hour, which contributes to buses having overall difficulty in maintaining schedules.

Traveler Intercept, Bus Rider Surveys, and Focus Group Results

A series of surveys and focus group meetings were conducted to confirm field observations, to gain a better understanding of how existing bus riders and non-users perceive Downtown Brooklyn bus service, and to collect information on travel patterns and origins/destinations within the Study Area. Overall, respondents indicated that while they may use buses to get around Downtown Brooklyn, they do not use them as often as they would due to perceived reliability, on-time performance, and frequency of service issues, especially on weekends. Focus groups confirmed a number of areas perceived as bus "trouble spots" – including the Flatbush Avenue/Atlantic Terminal area, described by some as the worst intersection in Brooklyn.

Problem Identification

The report identities a number of surface transit and corridor-level deficiencies related to downtown circulation. There exists a high level of failing traffic intersections in every corridor identified at some point virtually every day, and while detailed information related to bus on-time performance was generally not available, that which was available shows a relatively low level of service reliability (Level "D").

Through the development of a series of GIS maps focusing on weighted density of the number of bus routes and stops in a given neighborhood, the report evaluates in visual format the level of surface transit service that is available and that is perceived to be available throughout the Study Area. The report also identifies several neighborhoods that are experiencing new development and growth, and while well served by the subway system, could benefit from additional or new surface transit service. These potential growth areas include DUMBO (including the ferry landing), the waterfront and parallel to the new Brooklyn Bridge Park, and Fort Greene.

Future Conditions

The locations, types, and amount of future development projected to occur within the study area are detailed in this report for two analysis years, 2011 and 2015. Data on future developments is extracted from study documents including Downtown Brooklyn Redevelopment FEIS; Atlantic Yards FEIS and Technical Memorandum; 363-365 Bond Street FEIS; A Technical Memorandum for Albee Square; and Brooklyn Bridge Park FEIS.

To identify future transit needs, travel demand forecasts were performed for each of the uses planned for development projects in the study areas. Three peak periods were analyzed, AM (8am to 9am), Mid-day (12pm to 1pm), and PM (5pm to 6pm). Assumptions and methodology are based on City Environmental Quality review (CEWR) Technical Manual, U.S. Census data, and previously approved projects.

The trip generation results indicate that over 6,000 additional daily trips can be expected by bus, and over 75,000 daily trips within the Study Area. Comparing the location of these new developments and trips to existing service, several areas emerge as areas which should be considered for additional transit services.

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1. INTRODUCTION

1.1 PROJECT PURPOSE

Downtown Brooklyn is supported by some of the New York metropolitan region's best transit services.[1] Dozens of bus routes, subway lines, and commuter rail lines as well as ferry service provide excellent transit access to, from, and around Downtown Brooklyn. This immense availability of transit opportunities has led to significant transit usage. Journey to Work data from the 2000 U.S. Census indicates that more than 65% of workers who live within Downtown Brooklyn or its surrounding neighborhoods commute each day via public transit – among the highest levels in the country, though lower than the rate of public transit commuting in Manhattan. The majority of these trips are via subway (62%), primarily to destinations outside of Downtown Brooklyn.

While the Downtown Brooklyn area appears to be well served by public transit alternatives, barely six percent of its residents who work in Downtown Brooklyn use the bus to get to work - less than a half of the proportion who commute via bus within Manhattan or greater Brooklyn. Transportation within the Downtown Brooklyn core has traditionally been accomplished by walking. This culture of walking is exemplified through Census data, which shows 12% of residents walk to work, twice the number of people who take the bus to work. Such a mode split is surprising given that 17 bus routes serve Brooklyn's downtown core, and that during peak hours a bus is scheduled to arrive every 90-100 seconds on principal arterials such as Fulton and Livingston Streets.

Population and employment opportunities continue to increase throughout Downtown Brooklyn. During the past decade, population growth was nearly 10% in Downtown Brooklyn's core area, and employment rose at nearly the same rate – a trend that has made Downtown Brooklyn one of the fastest growing areas in the Borough. Vehicular congestion issues loom larger with this continuous growth, and the challenge to increase surface transit usage becomes ever more important. The challenge for transportation planners is to identify both short and long term solutions for improving surface transit services within Downtown Brooklyn.

The purpose of the Downtown Brooklyn Surface Transit Circulation Study (the DBSTCS) is to analyze intra-Downtown Brooklyn travel patterns and assess the surface transit circulation needs in Downtown Brooklyn. Based on the results of this analysis, a set of sustainable transit strategies and short and long term solutions will be recommended. In addition to meeting Downtown Brooklyn's transportation needs, these strategies are intended to foster economic activity and improve the quality of life for all individuals who use Downtown Brooklyn's transit system.

The first major step in this process, and the focus of this report, is to document the existing surface transit conditions within the study area. This report examines results of previous studies, documents current land use and surface transit travel patterns and ridership levels, assesses existing surface transit performance measures, and identifies through survey and focus group techniques the perceived issues and problems with bus service in the Downtown Brooklyn area.

[1] The Downtown Brooklyn study area is defined as bound by the waterfront to the north and west, Union Street to the south, and Vanderbilt Avenue to the east. More detailed description of the Study Area can be found in Section 1.5.

1.2 PROJECT GOALS AND OBJECTIVES

Goals, objectives, and a set of project "guiding principles" for the project were developed through a series of meetings and discussions with representatives of the New York City Department of Transportation (NYCDOT), the Downtown Brooklyn Partnership, and MTA New York City Transit (NYCT). These goals, objectives, and principles were then shared with the project's Stakeholder Committee for review at a meeting on March 5, 2009. The following is the result of this process.

Overview

While goals outline the priorities of a project, objectives are measurable actions that are necessary to implement the goals. To be useful, objectives must be supported by performance measures that tell citizens, stakeholders, and policymakers how successful the project has been at meeting its goals, and where further refinements are necessary. As a starting point, a set of guiding principles was initially established for the DBSTCS through a series of internal scoping meetings with the project's steering committee. These principles, which were based on the committee's knowledge of the Study Area and issues related to surface transit within the Study Area, were used to refine the project's scope of work and are linked to the project's goals and objectives.

Project Guiding Principles from Scope of Work

A. Identify existing and potential (future) unmet surface transit needs in the Core Study Area using data collection, survey, and focus group techniques outlined in scope.

B. Develop short-term surface transit circulation improvements to existing system within the Study Area that do not involve intensive capital expenditures (Transportation System Management solutions) and that can be implemented upon completion of the study.

C. Explore the need for new circulator routes that complement and expand upon existing bus network.

D. Determine ways to improve circulation, attractiveness, and utility of key transit layover points, key heavily used bus corridors, interconnecting points with other modes, and new development nodes, and improve connectivity between surface transit (bus) and all other transportation modes within the Study Area.

E. Develop consensus with stakeholders on appropriate short-term and long-term solutions for surface transit in Downtown Brooklyn.

Project Goals

Based on the above principles, the following goals and objectives were proposed. Supporting performance measures will be developed following publication of the Existing and Future Conditions report with input from the Steering Committee and presented to stakeholders.

Goal #1: Maximize effectiveness of the Study Area's surface transit network to provide improved access.
(Relates to Guiding Principles A, B, D and E above)

Objective:
Increase quality of transit service options by:

- Reducing travel times and improve schedule reliability for customers using buses;
- Improving inter modal connections between buses and other modes; and
- Making bus service more comfortable and user-friendly.

Goal #2: Provide transit connectivity throughout the Overall Study Area.
(Relates to Guiding Principle C above)

Objective:
Maximize transit connectivity to all significant trip generators throughout the Study Area.

Goal #3:Support the economic health of the Overall Study Area.
(Relates to Guiding Principle E above)

Objective:
Make transit improvements that increase economic attractiveness of commercial- and tourism-based land uses.

This study will accomplish the following goals for the Downtown Brooklyn area: First, this study will recommend short-, mid-, and long-term solutions to enhance the effectiveness of surface transit in Downtown Brooklyn in order to improve accessibility and mobility. Currently, transit mobility is limited by several factors, which will be documented by this study, and alternatives will be developed to solve these problems. Second, this study will provide transit connectivity throughout the Downtown Brooklyn Area. It is the overall goal of this study to identify and support areas which are currently missed or not sufficiently served by transit. Finally, alternatives and recommendations will support the economic health of the area. Downtown Brooklyn has seen exceptional growth in the past, and this is expected to continue. Without an efficient surface transit system, congestion and limited mobility will constrain the growth of the area.

1.3 ORGANIZATION OF THE EXISTING CONDITIONS REPORT

This report documents the results of several previous studies in the area, as well as new data collection efforts, field analysis of existing conditions, and the results of traveler and bus rider surveys. Using these sources, the existing conditions of the area are documented. The results are organized as follows:

- Review of previous studies
- Definition of Study Area
- Description of land uses
- Description of demographics
- Identification of existing transportation services
- Identification of travel patterns
- Identification of surface transit problems

1.4 REVIEW OF PREVIOUS STUDIES

Twenty-three previously completed studies focusing on Downtown Brooklyn and the surrounding area were reviewed, and key findings and recommendations from these studies will be used to inform the DBSTCS. As shown in Table 1, the studies included Environmental Impact Statements, Environmental Assessment Statements, and Land Use and Transportation Studies. Their key findings and recommendations inform the DBSTCS.

Table 1 - Reviewed Previous Studies

Environmental Impact Statements	Date	Sponsoring Agency
363-365 Bond Street DEIS	September 2008	New York City Planning Commission (CPC)
Atlantic Yards Arena and Redevelopment Project FEIS	November 2006	Empire State Development Corporation (ESDC)
Brooklyn Bridge Park Project FEIS	December 2005	ESDC
IKEA Red Hook FEIS	August 2004	CPC
Water Street Rezoning FEIS	August 2004	CPC
Downtown Brooklyn Development FEIS	April 2004	New York City Economic Development Corporation (NYCEDC)
Environmental Assessment Statements	**Date**	**Sponsoring Agency**
Dock Street Rezoning EAS		CPC
85 Jay Street Rezoning EAS	May 2004	CPC
Brooklyn Renaissance Plaza Expansion EAS	March 2003	NYCEDC
Light Bridges at 100 Jay Street Rezoning EAS	September 2001	CPC
Land Use and Transportation Studies	**Date**	**Sponsoring Agency/Organization**
Brooklyn Bridge Park Transportation and Access Study	February 2008	Downtown Brooklyn Waterfront Local Development Corporation
A Bumpy Ride	August 2007	Center for an Urban Future
Transportation Outlook 2006	May 2007	NYMTC
PlaNYC	April 2007	City of New York (Mayor's Office of Long Term Planning & Sustainability)
Interim Coordinated Human Services Public Transit Plan	November 2006	NYMTC
Downtown Brooklyn Residential Parking Permit Study	May 2006	Downtown Brooklyn Council (with NYCDOT and NYCEDC)
Downtown Brooklyn Transportation Blueprint Technical Memo	May 2005	NYCDOT
Subway-Sidewalk Interface	March 2005	NYCDCP and NYCDOT
Downtown Brooklyn Traffic Calming Study	May 2004	NYCDOT
Mobility for the Millennium	September 1999	NYMTC
Downtown Brooklyn Transit Loop Study	October 1994	NYCDCP
Transit Antic Study	February 1985	

Highlighted Studies

Two important studies are the Brooklyn Bridge Park Transportation and Access Study (February 2008) and the Downtown Brooklyn Development Final Environmental Impact Statement (FEIS) (April 2004). These studies are especially relevant to the DBSTCS because of their documentation of transit needs in Downtown Brooklyn. The Brooklyn Bridge Park area is currently underserved by public transit and therefore represents an opportunity to expand existing services. The Downtown Brooklyn Development FEIS paved the way for increased development in Downtown Brooklyn, thereby creating a need for additional and more efficient transit service.

Brooklyn Bridge Park Transportation and Access Study

Following the completion of the FEIS of the Brooklyn Bridge Park Project, measures to enhance public access to the Park without increasing private vehicular traffic were investigated. Some recommendations from this study include extending existing bus routes, improving pedestrian corridors, adding bicycle routes, adding shuttle bus service, expanding waterborne transport for commuting and recreational purposes, and creating a new subway station entrance at the Clark Street station. Figure 1 shows one of the proposed shuttle routes for the area.

Figure 1 - Proposed Shuttle Route between Downtown Brooklyn and Fulton Ferry

The study noted that the majority of its recommendations are short- to medium-term solutions with relatively low capital costs. Despite this, the study determined that such solutions still have the potential to have a substantial impact on increasing public access to the Park.

Downtown Brooklyn Development FEIS

This FEIS examined the effects of development resulting from a rezoning – approved in 2004 – that enables approximately 6.7 million square feet of new development in Downtown Brooklyn. Of this amount, it was estimated that approximately 68.8% would be office space, 14.6% residential space, 12.6% retail space, and 3.9% community facilities (Figure 2). While the land uses anticipated as a result of the rezoning do not stray significantly from existing land uses, the rezoning allows for denser development.

Of the 31 intersections that were analyzed as part of this study, all but two were identified as having the potential to be significantly impacted by new development during one or more peak travel periods. In order to mitigate these adverse impacts, the study recommended physical and operational changes to the street network, modifications to intersection signalization and channelization, and curbside parking regulations. Despite this mitigation, 11 intersections would remain significantly impacted during peak periods.

At the time of the 2004 study, this area was served by eight subway stations and 15 bus routes. The FEIS found that development resulting from the rezoning could result in significant impacts at two stairways at

the Jay Street Borough Hall station. The creation of a new transit plaza and stairway widening by five feet would address these impacts. It is expected that one of the bus routes (B25) would see significant adverse impacts during the PM peak period in one direction. New York City Transit would need to adjust bus service in order to alleviate this impact.

Other transit-oriented mitigation measures advanced in the 2004 FEIS included the widening of sidewalks at two intersections (Willoughby and Jay Streets, and Albee Square West at Willoughby Street) in order to accommodate the new pedestrian demand on sidewalks near this project. Development anticipated as a result of the rezoning was not expected to significantly impact existing bicycle facilities or routes, although there would likely be some increased congestion along streets used by bicyclists.

The rezoning was not expected to have any adverse impacts on the Long Island Rail Road and ferry services that serve the rezoning study area.

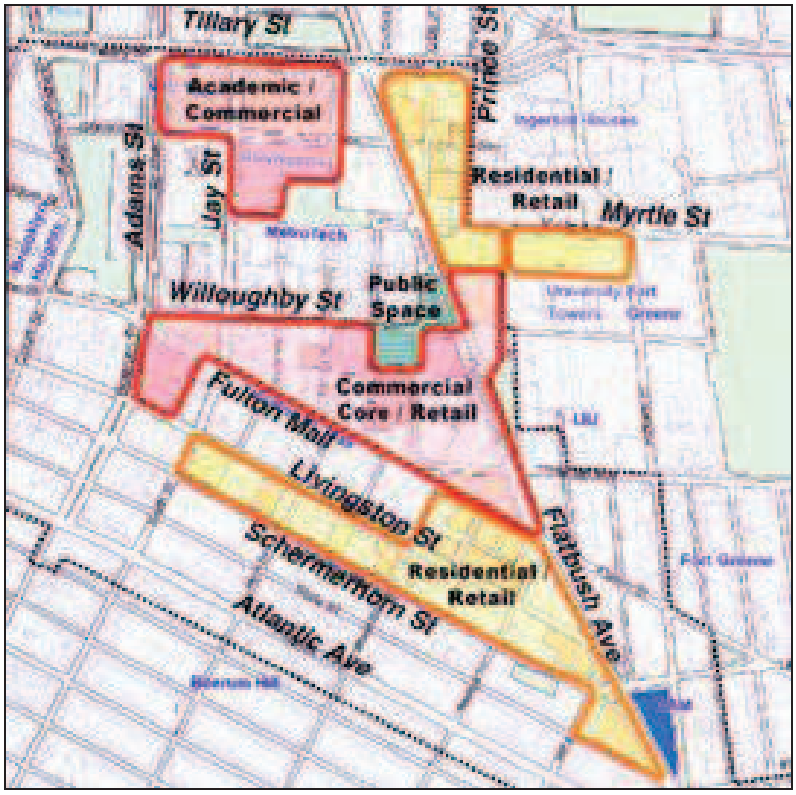


Figure 2 – Downtown Brooklyn Expanded Development Areas

Key Findings of Previous Studies

In addition to the findings of these two major studies, other studies demonstrated four main themes that need to be considered and addressed when developing transportation alternatives within the Downtown Brooklyn area:

1) There is continuous development occurring in Downtown Brooklyn
2) Existing transit services need to be enhanced
3) Congestion must be managed
4) The transit system should promote multi-modal travel

1) There is continuous development occurring in Downtown Brooklyn.

The reviewed Environmental Impact Statements (EIS) and Environmental Assessment Statements (EAS) discuss new developments proposed for Downtown Brooklyn between 2001 and 2008. Although not all of the following projects have been built, it is important that the DBSTCS be framed around this continuous pattern of development proposals in the area.

363-365 Bond Street DEIS, September 2008:

This 602,603 square-foot development (Figure 3) on three acres along the Gowanus Canal would change the existing land use from mostly vacant or underutilized manufacturing uses to a more vibrant mixed-use area. The project includes 447 dwelling units, two parking garages, 2,000 square feet of community facilities, 2,000 square feet of commercial space, and publicly-accessible waterfront open space.

Figure 3 - Rendering of 363-365 Bond Street

Atlantic Yards Arena and Redevelopment Project FEIS, November 2006:

This project as analyzed would redevelop 22 acres in the Atlantic Terminal area of Brooklyn where there are many underutilized industrial buildings. The project as analyzed would include an arena, commercial office and retail space, a hotel, open space, and residential uses. The project also includes nine acres for an improved railyard for the Long Island Rail Road.

Brooklyn Bridge Park Project FEIS, December 2005:

This approved project will create an 85-acre waterfront park along 1.3 miles of the East River between Jay Street and Atlantic Avenue. The park would have both passive and active recreational facilities. The project will also include retail, commercial, residential, restaurant, ancillary office space, parking, and potentially hotel uses.

IKEA Red Hook FEIS, August 2004:

This FEIS analyzed the development of a 346,000 square foot IKEA home furnishing store (Figure 4), a 6.3 acre waterfront esplanade, an additional 69,000 square feet of retail and restaurant uses, and a 1,400-space parking lot on 22 acres in the Red Hook neighborhood of Brooklyn. This project represents a significant change to land use in the predominantly industrial area.

Figure 4 - IKEA Brooklyn (opened in 2009)

Dock Street Rezoning EAS, April 2009:

This EAS studied the rezoning of a block in DUMBO. The rezoning facilitates development of a 323-unit residential building, a 300-seat public middle school and a 465-space public parking garage.

85 Jay Street Rezoning EAS, May 2004:
This EAS analyzed development of an 837,600-square-foot community facility, which was to include residential space, a cafeteria, an assembly hall, office space, and a below-ground parking garage. The project did not move forward and the property is now part of a new MX-2 Special District.

Brooklyn Renaissance Plaza Expansion EAS, March 2003:
This EAS analyzed development of a 194,000-square-foot hotel annex with 282 rooms and 8,000 square feet of retail space, as well as an additional 43,250 square feet of retail space apart from the annex. This project – located between Adams and Pearl Streets – would satisfy the demand for hotel space in response to anticipated development in Downtown Brooklyn.

Light Bridges at 100 Jay Street Rezoning EAS, April 2001:
This EAS assessed a mixed-use development project with 42,500 square feet of retail space, between 34,000 and 92,000 square feet of commercial space, and between 299 and 352 residential units. The building is completed and contains 267 units and ground-floor retail.

2) Existing transit services need to be enhanced.
Previous land use and transportation studies have identified deficiencies in the transit system serving Downtown Brooklyn. Below are some examples of enhancements that have been recommended by previous studies.

A Bumpy Ride, August 2007:
This study examined the Heart of Brooklyn (HOB) Trolley and other New York City trolleys. The study found that the HOB Trolley, which is a rubber-wheeled replica trolley, has had a minimal impact on museum attendance, retail sales, and resident mobility. Some recommendations for making the HOB Trolley more effective include increasing frequency and reliability of service, increasing awareness of service through a marketing campaign, and connecting the HOB Trolley route with other parts of Brooklyn.

Transportation Outlook 2006, May 2007:
This study was a summary of comments from 22 public listening sessions that were held throughout the New York Metropolitan Transportation Council's region. Participants in Brooklyn identified mobility, program development, and infrastructure as areas of the transit system with deficiencies.

Interim Coordinated Human Services Public Transit Plan, November 2006:
This plan provides a framework for developing a Coordinated Human Services-Public Transit Plan in order to be eligible for funding from SAFETEA-LU (Safe, Affordable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users). Recommendations from this study include increasing connections between paratransit systems and generally making transportation access easier for older adults, lower income residents, and people with disabilities.

Transit Antic Study, February 1985:
This study sought to create a transit link between the Long Island Rail Road Terminal, Fulton Landing, and Downtown Brooklyn in order to enhance mobility, accessibility, and development opportunities. The study recommended the addition of light rail transit (LRT) service to link these areas.

3) Congestion must be managed.

Previous land use and transportation studies have identified the immense presence and negative impacts of congestion in Downtown Brooklyn. Below are some examples of recommendations for mitigating congestion.

PlaNYC, April 2007:

PlaNYC represents a comprehensive approach to planning for the future of New York City, and it includes recommendations for land, water, transportation, energy, air quality, and climate change. The transportation section is further divided into several initiatives. One of these initiatives is to improve traffic flow by reducing congestion. Some recommendations for achieving this goal are instituting congestion pricing, managing roads more efficiently, strengthening enforcement of traffic violations, and facilitating freight movements.

Downtown Brooklyn Transportation Blueprint Technical Memo, May 2005:

This study examined land use trends and identified existing and anticipated transportation issues and opportunities in Downtown Brooklyn. The study outlined six goals for overcoming the identified challenges. Some recommendations based on these goals include accommodating travel demand growth that comes from development, developing effective responses that work within physical and fiscal constraints, improving pedestrian safety and infrastructure, and managing congestion in a way that preserves and enhances quality of life for residents and integrity of the system.

Downtown Brooklyn Residential Parking Permit Study, May 2006:

This study examined whether a Residential Permit Parking (RPP) Program would be an effective means of reducing congestion in Downtown Brooklyn. The study found that average weekday on-street parking occupancy is 97%, and more than two-thirds of surveyed parkers searched for at least ten minutes before finding an available spot. This means that drivers searching for parking contribute significantly to the amount of congestion in Downtown Brooklyn. The study outlined four policy options for addressing this parking issue: a traditional RPP Program, a waitlist and multi-space meters, market rate pricing for permits and meters, and no action.

Downtown Brooklyn Traffic Calming Study, May 2004:

This study developed a traffic calming strategy designed to maintain or improve mobility for pedestrians, vehicles, and bicycles without increasing traffic in surrounding areas. Traffic calming measures used in a Pilot Program included widened pedestrian islands, raised intersections, high-visibility on-street bicycling lanes, road closures, and slower signal progression (Figure 5). An Action Plan was then developed for each street based on several themes, including improving pedestrian connectivity, transit operations, and the bicycle network, maintaining a clear truck network, and encouraging through traffic on designated

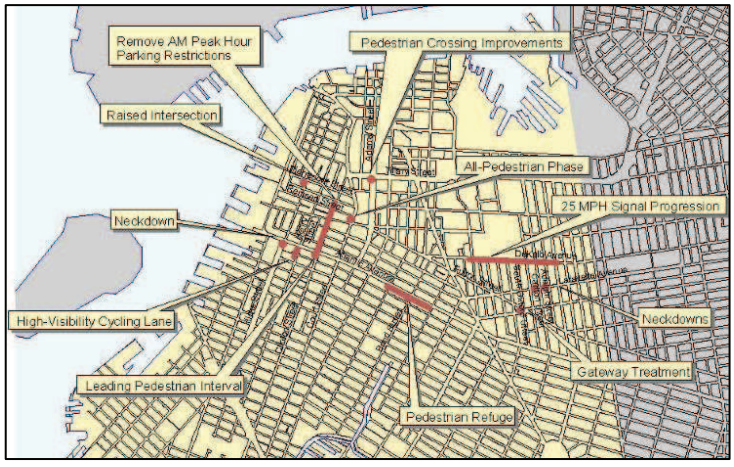


Figure 5 - Pilot Program Traffic Calming Measures

streets while maintaining more limited levels of traffic on other streets.

Downtown Brooklyn Transit Loop Study, October 1994:
This study evaluated the demand for a low-fare or free form of transit within Downtown Brooklyn. The study explained that the addition of a transit loop would provide an alternative option to personal vehicle and taxis, and this would likely reduce traffic in the Downtown area. The study identified possible routes and included a series of recommendations for proceeding with planning for this new service. Recommendations included analyzing existing bus routes for possible streamlining, relieving congestion to make the new loop more efficient, and making physical changes to the street network.

4) The transit system should promote multi-modal travel.
Previous Land Use and Transportation Studies have identified the importance of encouraging multi-modal travel in Downtown Brooklyn. Below are examples of recommendations for system improvements that would promote this type of transit use.

Subway-Sidewalk Interface, March 2005:
This study sought to improve pedestrian and vehicular circulation near subway station entrances in order to encourage mass transit use. The study recommended the use of signage, lighting, signal timing, pavement markings, corner clearances, and curb line changes to meet this goal. The study also addressed the issue of congestion and confusion at intermodal stations. Recognizing the importance of these multi-modal hubs, the study made several recommendations for improving service at such stations. These recommendations include installing bus signage within the stations to direct subway passengers to the correct exits and bus stops, displaying subway, bicycle, and neighborhood maps on bus shelters, implementing bus actuated signals where feasible, and assigning appropriate curb use for taxis and passenger loading.

Mobility for the Millennium, 1999:
This study examined the transportation problems and needs for corridor areas throughout the New York Metropolitan Transportation Council area. In the Northern Brooklyn corridor, congestion from commuters traveling to Manhattan was identified as a problem. In the Central Brooklyn corridor, there were numerous disconnected modes of transportation. In addition to recommending traffic calming measures in Northern Brooklyn, the study highlighted the fact that the Atlantic Terminal is going to be rebuilt so that overcrowding would be reduced and intermodal transfers would be easier for users.

1.5 STUDY AREA
The Downtown Brooklyn area is broken down into an Overall Study Area and a Downtown Core Study Area. The Core Study Area includes several study corridors. Figure 8 shows the Overall Study Area as well as the Downtown Core Study Area and the Study Corridors that were identified in consultation with NYCDOT, Downtown Brooklyn Partnership, and NYCT.

Overall Study Area
The Overall Study Area is bound by the waterfront to the north and west, Union Street to the south and Vanderbilt Avenue to the east. The neighborhoods that make up the Overall Study Area will be discussed in more detail later in this report (Figure 7).

Downtown Core Study Area

The Downtown Core Study Area is generally bounded by High and Tillary Streets to the north, Navy Street and Ashland Place to the east, Prospect, Clinton, and Court Streets to the west, and Atlantic Avenue to the south (Figure 6). It also includes the area surrounding Atlantic Terminal.

The Downtown Core is also broken down into four study corridors. These corridors, which have been identified as areas that this study should focus on, are Jay Street / Adams Street / Cadman Plaza, Atlantic Avenue, Flatbush Avenue, and Fulton Street / Livingston Street. Each corridor will be discussed in detail later in the report.

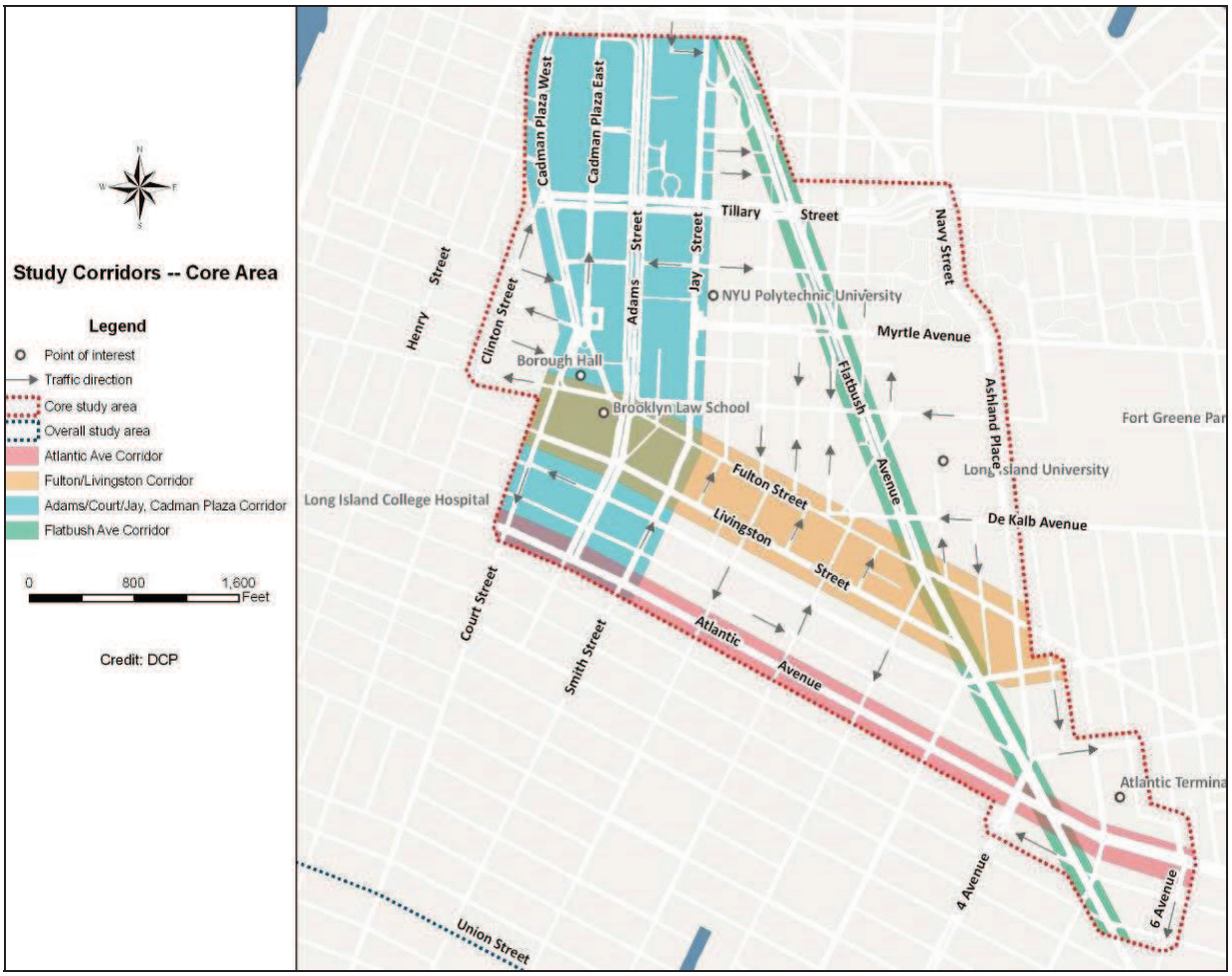


Figure 6- Core Study Area and Study Corridors

2. EXISTING LAND USE / DESCRIPTION OF NEIGHBORHOODS

The following section includes a discussion of the existing land uses in the Downtown Core and Overall Study Areas of the DBSTCS. The Core Study Area encompasses the heart of Downtown Brooklyn, and the Overall Study Area includes a number of discrete neighborhoods, each with their own identity, characteristics, and transit options. The land uses within each of these neighborhoods are inextricably tied to their transportation needs. It is therefore important to understand the land uses within the Study Area because the size, diversity, and locations of its neighborhoods, as well as the built characteristics within each neighborhood, impact the travel demand within the Study Area.

Figure 7 shows the Core Study Area and the nine surrounding neighborhoods that make up the Overall Study Area. The following overview of the Overall Study Area discusses each neighborhood in clockwise order from the north.

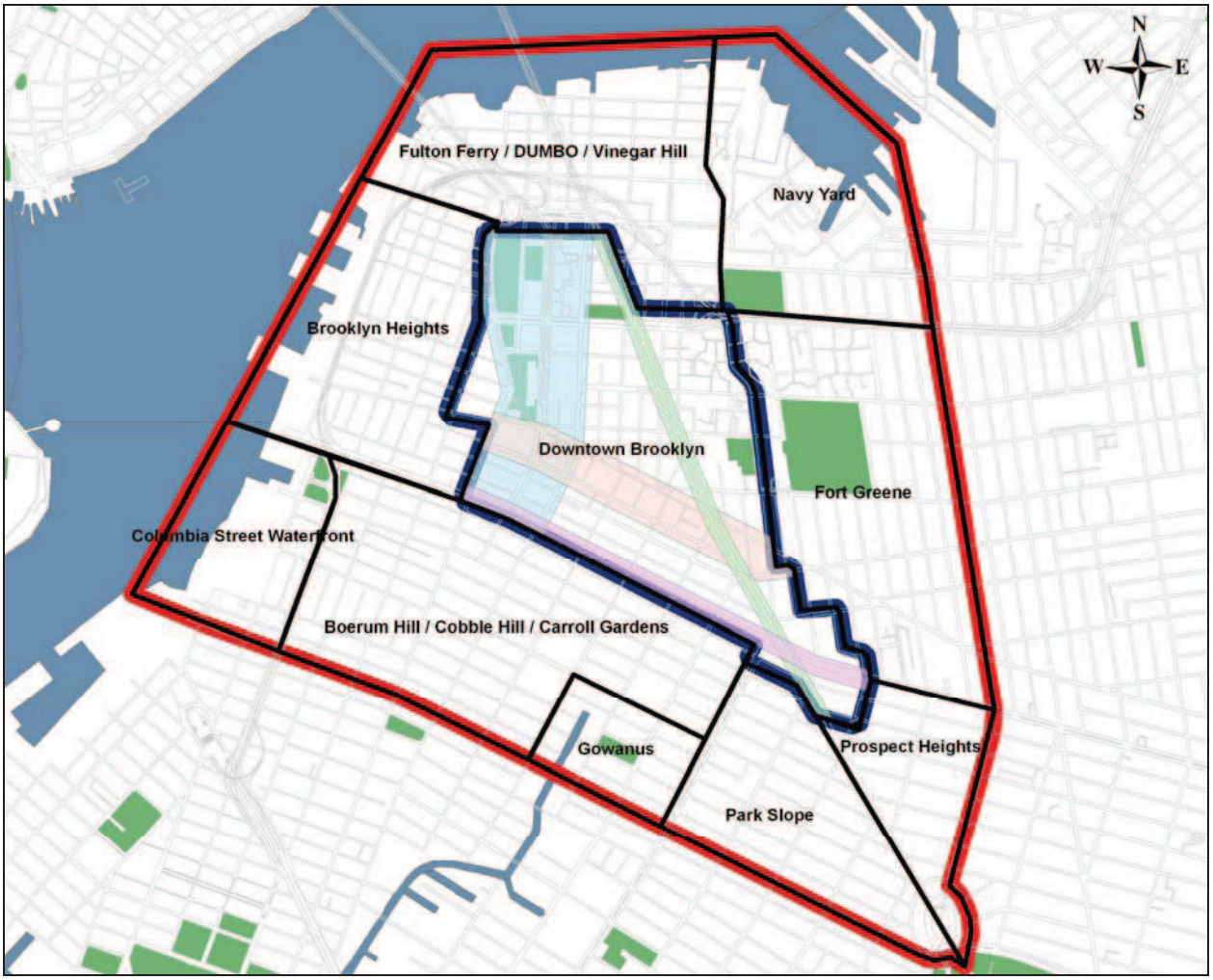
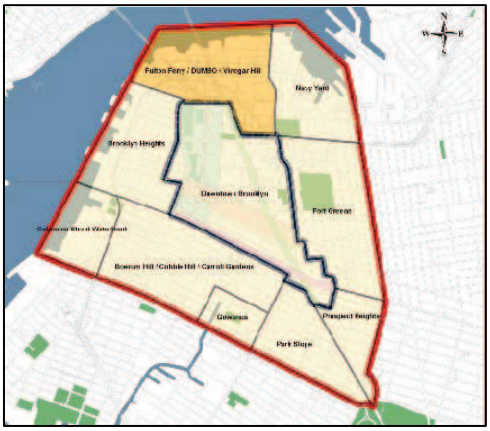


Figure 7 - Overall Study Area and Neighborhoods

2.1 OVERALL STUDY AREA

Fulton Ferry / DUMBO / Vinegar Hill



Fulton Ferry/DUMBO/Vinegar Hill is the area to the north of Downtown Brooklyn generally bounded by the East River to the north, Navy Street to the east, the Brooklyn-Queens Expressway (BQE) and High Street to the south, and the Brooklyn Bridge overpass to the west.

Fulton Ferry (sometimes called Fulton Landing) lies where the foot of Old Fulton Street meets the waterfront. In the shadow of the Brooklyn Bridge, this neighborhood contains a range of land uses, including residential (in converted loft buildings) and commercial (restaurants and local retail) uses; there are also a few vacant lots and vacant former service stations. The 5.5-acre Empire-Fulton Ferry State Park, which includes an esplanade along the East River with excellent views of Manhattan to the north and New York Harbor to the west, is located along Plymouth Street between the overpasses of the Brooklyn and Manhattan Bridges. Fulton Ferry's views of and access to the Brooklyn Bridge, as well as its eateries, retail and overall neighborhood character, make it a strong tourist attraction.

DUMBO, which is short for Down Under the Manhattan Bridge Overpass, is a former industrial area that has seen rapid mixed-use growth and revitalization in the past ten to fifteen years. A number of warehouse and manufacturing buildings in the area have been converted to residential uses, as well as small-scale office uses. There has also been some new construction on formerly underutilized lots. Spurred by these recent developments, restaurants, bars, galleries, grocery stores, and dry cleaners have opened in the area.

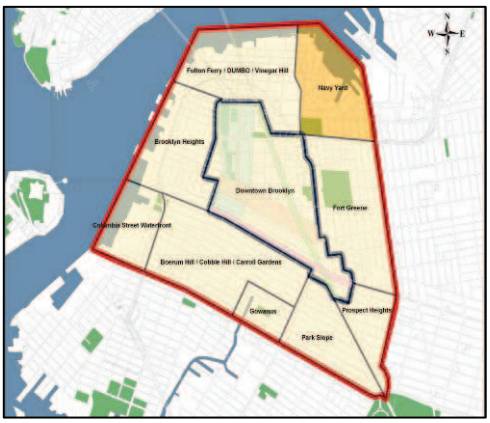
Figure 8 - Vinegar Hill: Corner of Gold and Water Streets

Although predominantly industrial in nature, Vinegar Hill (Figure 8), which lies east of Jay Street, contains many residences, most notably along Front Street and Hudson Avenue. At the southern edge of Vinegar Hill lies the New York City Housing Authority (NYCHA) Farragut Houses, which include three blocks of seven-story buildings with a total of approximately 1,400 residential units. Industrial uses in this area include several brick buildings and a large waterfront parcel of land owned and operated by Con Edison as a transformer field. There are also several surface parking lots in this part of the Study Area, including the full block bounded by York, Front, Bridge, and Jay Streets. Like DUMBO, Vinegar Hill is experiencing residential development through loft conversion and new construction.

Brooklyn Navy Yard

The Brooklyn Navy Yard (Figure 9) is located north of Nassau Street/Flushing Avenue and east of Navy Street in the northeast corner of the Study Area. The Navy Yard, purchased by the federal government in

1801, was used to build warships through 1966, including vessels for the U.S. Civil War, the Spanish-American War, and World Wars I and II. New York City purchased the Navy Yard from the federal government in 1967, and the Navy Yard was reopened as an industrial park in 1971.[2]



Today, the Navy Yard is a 300-acre industrial park containing about forty buildings with more than 200 tenants.[3] New York City has invested $250 million on the Navy Yard in order to upgrade the yard and infrastructure. In response to the decline of industrial space in the City, in Fall 2006, the City announced plans for eight buildings totaling 1.7 million square feet of new industrial space in the Navy Yard.

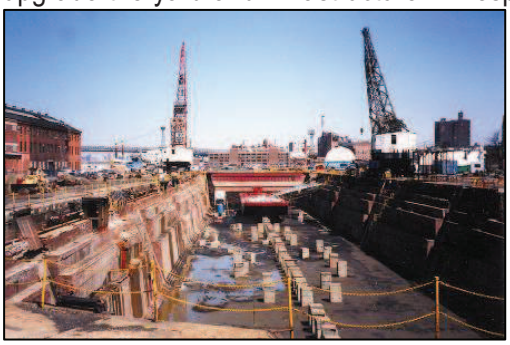
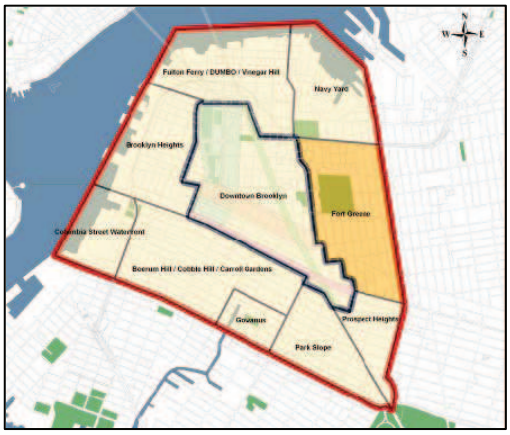


Figure 9 - The Brooklyn Navy Yard

The area south of the Navy Yard and north of the BQE has a mix of residential, industrial, and institutional uses; several properties in the area are vacant. The ten-acre Commodore Barry Park, Brooklyn's oldest park, is located at Navy and Nassau Streets.

Fort Greene

Fort Greene is a residential neighborhood adjacent and east of Downtown Brooklyn. The area is largely characterized by 19th-century brick and brownstones and other assorted two- to four-story residential buildings with some newer, taller buildings. North of Myrtle Avenue, however, residential uses take the form of large-scale NYCHA developments, including the Ingersoll Houses and Walt Whitman Houses.



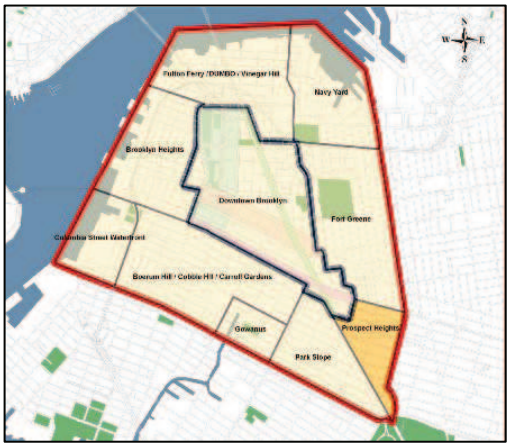
A defining land use in this neighborhood is Fort Greene Park (Figure 10), an approximately thirty-acre park bounded by DeKalb Avenue, St. Edwards Street, Myrtle Avenue, and Washington Park. The park contains open space, playgrounds and athletic courts. Other public open spaces in this subarea include Cuyler Gore Park at Greene Avenue and Fulton Street and the recently-opened South Oxford Park at Atlantic Commons to the north of Atlantic Avenue.

Figure 10 - Fort Greene Park

[2] Lever, Jane L. "Brooklyn Navy Yard, a Roomy Haven for Industry, Once Again is Booming." New York Times. August 29, 2007.
[3] www.brooklynnavyyard.org, accessed April 15, 2009

There are a many institutions and public facilities in Fort Greene. Prominent schools include Brooklyn Technical High School and Bishop Laughlin Memorial High School. The 653-bed Brooklyn Hospital Center is adjacent to Fort Greene Park north of DeKalb Avenue and east of Ashland Place.

Prospect Heights

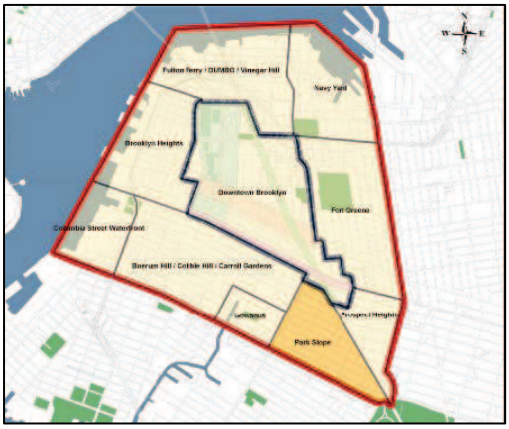


Prospect Heights is located southeast of Downtown Brooklyn and is bounded by Atlantic Avenue to the north and Flatbush Avenue to the west. The neighborhood is characterized by the Vanderbilt Yard to the north and low-rise residential uses to the south. The below-grade Vanderbilt Yard, which services the Long Island Rail Road Atlantic Terminal, runs parallel to Atlantic Avenue from 5th to Vanderbilt Avenues and is bordered by low-density industrial uses such as warehouses, hardware and building suppliers, and smaller factories immediately to the south. Along Dean and Pacific Streets, several former industrial sites have been converted to residential units. South of Bergen Street, this subarea is residential and takes the form of tree-lined streets with three-story rowhouses (Figure 11). Residential buildings are slightly taller (four- to six-stories) closer to the eight-acre Grand Army Plaza. This oval at the main entrance of Prospect Park is New York City's version of Paris' Arc de Triomphe.

Figure 11 - Bergen Street between Vanderbilt and Carlton Avenues

Commercial uses are located primarily along Flatbush and Vanderbilt Avenues. Flatbush Avenue is lined with commercial uses such as restaurants, furniture stores, optical stores, and bicycle shops. Vanderbilt Avenue is home to more neighborhood retail uses. Newer retail establishments, located closer to Grand Army Plaza, include restaurants, bistros, cafes, wine bars, and plant nurseries.

Park Slope



Park Slope is bounded by Downtown Brooklyn to the north, Flatbush Avenue to the east, and 4th Avenue to the west. The area is known as a low-rise residential neighborhood with ground-floor retail uses along Flatbush, 5th, and 7th Avenues. It contains a mix of mansions, brownstone rowhouses, and apartment houses, most of which were built in the late 19th and early 20th centuries. Residential uses in this area are generally found in three- to four-story brownstone buildings, which typically form uninterrupted street walls along east-west streets and 6th Avenue (Figure 12). The taller buildings are found closer to Grand Army Plaza and Prospect Park, on the periphery of the Park Slope neighborhood. There are a number

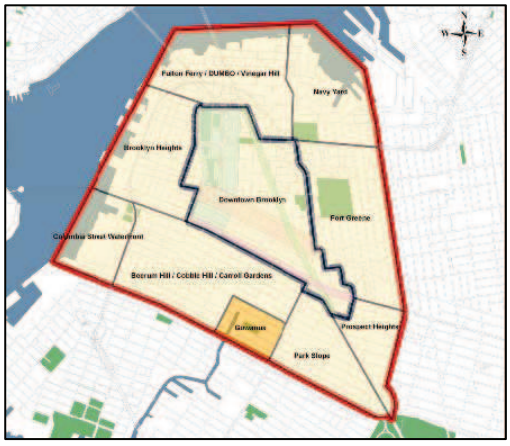
Figure 12 - St. Marks Avenue between 5th and 6th Avenues

of religious institutions in Park Slope, mostly along 6th, 7th, and 8th Avenues.

Flatbush Avenue is the primary commercial corridor in this part of Brooklyn, with establishments such as restaurants, furniture stores, hardware stores, sports clubs and gyms, and bicycle shops located on the lower levels of three- to four-story buildings. Neighborhood commercial uses, generally in the form of ground-floor retail shops in residential buildings, are located primarily along 5th Avenue. A few newer retail uses in this subarea, are interlaced with the older, more-established neighborhood retail. To a lesser extent, commercial uses are also located along 4th Avenue, typically in the form of auto-related establishments. The area along 4th Avenue is in transition. The recent rezoning of this corridor has attracted higher-density development as illustrated by the large number of sites under construction or under redevelopment along 4th Avenue.

Gowanus

Gowanus is adjacent to the Gowanus Canal (Figure 13) and is bounded by Baltic Street to the north, 4th Avenue to the east, and Bond Street to the west. This neighborhood represents the industrial character of the uses along the Gowanus Canal, which was once Brooklyn's industrial center and whose banks were developed with industrial and shipping uses, including coal yards, foundries, paint and ink factories, electroplating shops, and paper mills. Over time, the industrial uses along the Gowanus Canal transformed it into one of the City's most polluted waterways.



The neighborhood still contains a high concentration of manufacturing, industrial, and transportation land uses. Light industrial, warehouse, and vacant uses are located east of Bond Street along the canal waterfront. These uses are primarily located in one- and two-story light-industrial buildings and vacant land used for the storage of vehicles. Parking and vacant buildings are also prevalent throughout the subarea. The closed Bayside Oil Terminal is located along the canal waterfront between Sackett and Union Streets. Other industrial uses include art studios, kennels, printers, and an artistic reproduction company.

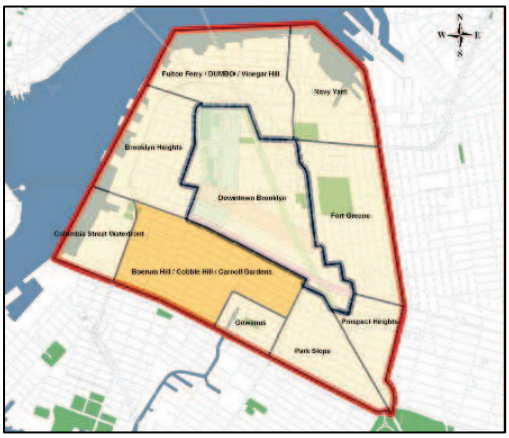
Figure 13 - View from the Union Street Bridge, looking north

Residential uses in this area are limited and are concentrated along 4th Avenue where recent rezoning has attracted higher-density, mixed-use development. In February 2009, the City presented a proposal to rezone a large area along the Gowanus Canal for residential use; if approved, it is anticipated that residential uses would replace existing light industrial uses.

The 2.5-acre Thomas Greene Playground, a public playground and outdoor public pool complex, is located on the full block bounded by 3rd Avenue and DeGraw, Douglass, and Nevins Streets.

Boerum Hill /Cobble Hill/Carroll Gardens

Located south of Downtown Brooklyn and north of Gowanus, Boerum Hill/Cobble Hill/Carroll Gardens is bounded by Atlantic Avenue to the north, 4th Avenue to the east (Bond Street south of Baltic Street), and the BQE to the west.



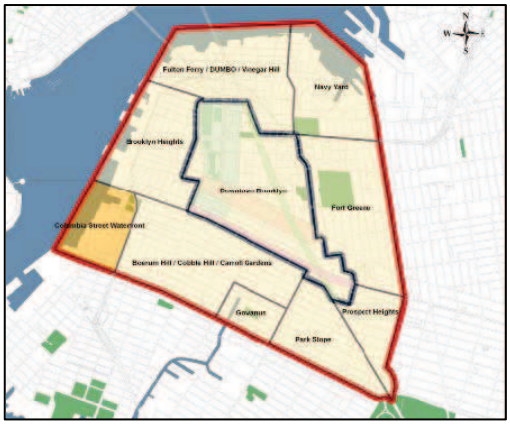
Most of this area is features low-rise residential buildings (Figure 14), some of which contain street-level retail uses along Atlantic Avenue, 4th Avenue, Smith Street, and Court Street. In addition to the three- and four-story rowhouses, there are also mid-rise apartment buildings and large NYCHA complexes adjacent to the industrial areas bordering the Gowanus Canal: Warren Street Houses, Gowanus Houses, and Wyckoff Gardens. The few industrial uses in this area, which include auto-repair shops, construction/building supply companies, and storage/warehouse facilities, are located along Bergen Street between Nevins Street and 4th Avenue and along Baltic Street at the border of the Gowanus subarea.

Figure 14 - St. Marks Place between 4th and 5th Avenues

There are a number of institutions scattered throughout this area, notably the Brooklyn High School of the Arts at Dean Street and 3rd Avenue and the Long Island College Hospital (LICH), which is comprised of a complex of buildings around Hicks and Amity Streets just south of Atlantic Avenue.

Columbia Street Waterfront

Located along the East River and Buttermilk Channel, the Columbia Street Waterfront is west of the BQE and south of Atlantic Avenue. This area contains a mix of residential and light industrial uses with working waterfront activities along its western edge. Vacant lots are scattered throughout this area, some of which are used for surface parking.



The area is undergoing growth, with new restaurants and art galleries, as well as new residential development. Columbia Street, the main thoroughfare in the neighborhood, contains local retail uses that are generally found on the ground floor of

Figure 15 - Sackett & Columbia Streets

three- or four-story residential buildings (Figure 15). The side streets are lined with rowhouses, with some newer residential apartment conversions such as those centered along Tiffany Place. The waterfront includes the Red Hook Container Terminal. Van Voorhees Park, a 5.25-acre public park, is located at Atlantic Avenue and Columbia Street.

Brooklyn Heights

Brooklyn Heights is located west of Downtown Brooklyn and along the East River waterfront. Known as Brooklyn's original residential neighborhood, dating back to the early 19th century, Brooklyn Heights contains a well-established mix of residential, office, retail, and institutional uses along tree-lined streets. Most of Brooklyn Heights was developed as a suburb of Manhattan in the early half of the 19th century and is part of the landmarked Brooklyn Heights Historic District. Several modern buildings, including Clark Cadman Tower and Whitman Close Townhouses, are located on the west side of Cadman Plaza West north of Tillary Street.

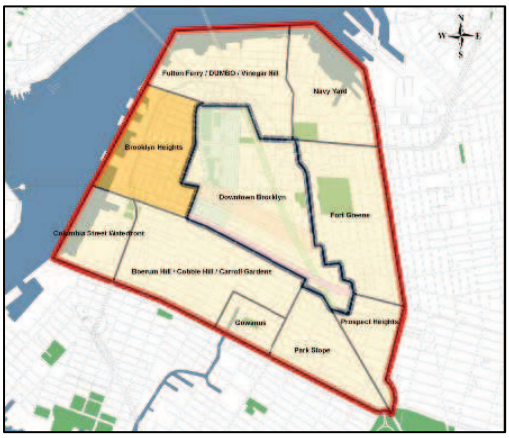


Figure 16 - Brooklyn Heights Promenade, Looking North

A central land use of Brooklyn Heights is the Brooklyn Heights Promenade, a public open space at the western edge of the neighborhood situated on an elevated platform over the BQE and the waterfront uses below (Figure 16). The promenade, which features a walkway, benches, and a small playground, extends from Orange Street south to Remsen Street.

Major retail streets in the area include Montague Street, which is lined with restaurants and shops, and Court Street, which includes restaurants, liquor stores, pharmacies, photo stores, and music stores. Other retail corridors include Atlantic Avenue and a small portion of Henry Street.

2.2 DOWNTOWN CORE STUDY AREA

Downtown Brooklyn, located just across the East River from lower Manhattan, is the economic center of what would constitute America's fourth largest city and what is New York City's third largest central business district (CBD) after Midtown and Downtown Manhattan.

Since the middle of the 20th century, Downtown Brooklyn has been the subject of numerous development and revitalization plans. Between 1950 and 1969, New York City built approximately 700,000 square feet of court and municipal office space in Downtown Brooklyn. The State and Federal governments also added almost 550,000 additional square feet of space, which strengthened the area's role as a government center. Some of the area's educational and cultural institutions also expanded during these two decades.

Existing land uses in Downtown Brooklyn have been greatly influenced by public policy and public subsidies. In the late 1960s, two urban renewal plans for Downtown Brooklyn sought to revitalize the area: the Atlantic Terminal Urban Renewal Plan (ATURP) and the Brooklyn Center Urban Renewal Plan (BCURP). During the 1980s, Borough Hall was renovated, and large office buildings were erected with significant public subsidies at One Pierrepont Plaza and Livingston Plaza. The establishment of the MetroTech Urban Renewal Plan (MTURP) in 1986 led to the development of the most significant office development in Brooklyn: MetroTech Center (Figure 17). Together, these public policy initiatives dramatically changed the character of Downtown Brooklyn, resulting in the construction of significant large-scale commercial and office uses.

Figure 17 - MetroTech Center

Since 2000, Downtown Brooklyn has been the subject of additional planning efforts. In 2001, the City established the Special Downtown Brooklyn District, which was designed to foster development and strengthen the business core, to preserve the historic architectural character, and to establish a transitional contextual buffer between Downtown Brooklyn and the low-rise residential neighborhoods to the south. In 2004, the City's Downtown Brooklyn Development project incorporated land use (zoning) actions with the purpose of creating a vibrant urban environment and encouraged a mix of uses that complement Downtown Brooklyn's commercial core. These uses included new residential development and the creation of a cultural district. As a result, Downtown Brooklyn, though still predominantly commercial and institutional, is now comprised of a mix of land uses, including new residential and hotel uses.

Figure 18 - MetroTech Commons

As noted above, MetroTech – a sixteen-acre corporate and academic complex with more than five million square feet of commercial and municipal office space in twelve buildings ranging in height from eight to thirty-two stories – can be considered the largest single land use in Downtown Brooklyn. MetroTech is roughly bounded by Jay and Willoughby Streets, Flatbush Avenue Extension, and Johnson Street/Tech Plaza. The complex is home to New York

University's Polytechnic University (NYU Polytech) and several government and municipal agencies, including the New York City Fire Department and 911 Emergency Response headquarters. MetroTech's major commercial tenants include KeySpan, JP Morgan Chase, and Verizon. MetroTech Center's public plaza, known as The MetroTech Commons, provides 3.3 acres of passive open space (Figure 18).

In addition to MetroTech, Downtown Brooklyn is defined by its institutions and public facilities. Brooklyn's Civic Center comprises the northwest corner of the Core Study Area and houses a number of City, State, and Federal institutions, including Brooklyn Borough Hall and Municipal Building, Brooklyn Criminal Court, Brooklyn Family Court, the General Post Office, the New York State Supreme Court, the New York City Housing Court, and the U.S. Federal Courthouse at Cadman Plaza East. The New York State Supreme Court and Borough Hall are located within the superblock bounded by Johnson Street/Tech Plaza, Cadman Plaza West/Court Street, Adams Street, and Joralemon Street. Columbus Park, a 4.1-acre park, surrounds these two buildings. Other sizable open spaces in the Civic Center area include the 2.9-acre Walt Whitman Park north of the U.S. Federal Courthouse at Cadman Plaza East and the 10.4-acre S. Parkes Cadman Plaza between Cadman Plaza East and Cadman Plaza West.

There are also several educational institutions in Downtown Brooklyn. In addition to NYU Polytech, these include the New York City College of Technology (City Tech, part of the City University of New York [CUNY]) located at Tillary and Jay Streets, Long Island University's (LIU) Brooklyn campus at Flatbush and DeKalb Avenues, St. Francis College at Remsen and Clinton Streets, and the George Westinghouse Vocational and Technical High School at Tillary Street and Flatbush Avenue. Brooklyn Law School's Main Building is located on Joralemon Street at Boerum Place, and the school's recently-opened dormitory building (Feil Hall) is located three blocks south at State Street and Boerum Place. Two recently-built public schools occupy a former courthouse building at 283 Adams Street: The Urban Assembly School for Law and Justice (grades 9 -12) and the Urban Assembly Institute Of Math And Science For Young Women (grades 6-12).

Cultural institutions are also an important land use in Downtown Brooklyn. The Brooklyn Academy of Music (BAM) is located at Lafayette Avenue and Ashland Place (Figure 19). BAM has been attracting international performing arts and film to Brooklyn since 1861, and its building was constructed in 1906. The Mark Morris Dance Company also has recently been installed in a new building on Lafayette Avenue between Flatbush Avenue and Ashland Place. These institutions are located within the BAM Cultural District, the goal of which is to convert underutilized city-owned properties along Flatbush and Lafayette Avenues from surface parking lots and other uses into affordable performance and rehearsal space, mixed-income housing, and new public open space.

Figure 19 - Brooklyn Academy of Music

In addition to the commercial uses in MetroTech, there are office and retail uses throughout Downtown Brooklyn. One of the most prominent and successful retail areas in Downtown Brooklyn is the Fulton Street Mall, which extends along Fulton Street between Adams Street and Flatbush Avenue. This section contains mostly three- to five-story commercial structures with ground-floor retail uses. Typical ground-floor uses include clothing, furniture, vitamin, and music stores. While the ground-floor uses on Fulton Street are very active, the upper floors of buildings have little activity and include several vacancies. Ground-floor

neighborhood retail uses are also found in a wedge of blocks between Fulton and Willoughby Streets east of Jay Street and along the Montague Street, Court Street, and Atlantic Avenue commercial corridors.

Large-scale retail uses in Downtown Brooklyn include the Atlantic Terminal/Bank of New York Tower, which opened in July 2004 on the northeast corner of Flatbush and Atlantic Avenues and is comprised of a 300-foot-tall office tower atop a four-story retail complex above the Long Island Rail Road Atlantic Terminal, and the Atlantic Center Mall at Atlantic Avenue and Fort Greene Place, which connects the Atlantic Center to the Atlantic Terminal/Bank of New York Tower via a pedestrian bridge over Fort Greene Place. The former retail mall known as The Gallery at Fulton Street (Albee Square) was recently demolished, and a mixed-use building is currently under construction on this site.

Renaissance Plaza, a 32-story office and hotel complex that was constructed in 1999 is located along Adams Street between Johnson and Willoughby Streets (Figure 20). Construction of this complex resulted in Brooklyn's first new major hotel – the Brooklyn Marriott – since the 1920s. The Brooklyn Marriott was expanded in 2006 to provide an additional 280 guest rooms (for a total of 656). Mid-rise office buildings also line Cadman Plaza West north of Joralemon Street.

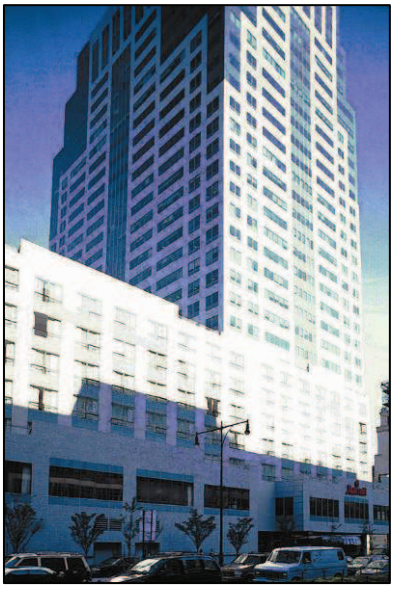


Figure 20 - Renaissance Plaza

Residential uses, while not as prominent as commercial and institutional uses, are becoming more common in Downtown Brooklyn as a result of recent public policy initiatives and – up until recently – Brooklyn's expanding residential real estate market. Long-standing residential uses in the area include Concord Village at Adams and Tillary Streets, University Towers along Willoughby Street east of Flatbush Avenue, and the low-rise brownstones along State Street and Atlantic Avenue. New residential development in the area has taken the form of converted office and loft buildings, including the 27-story Belltel Lofts in the former New York Telephone Company building at Bridge and Willoughby Streets and the 512-foot Williamsburgh Savings Bank Building at One Hanson Place near Flatbush Avenue.

New mid- and high-rise residential buildings, some of which are still under construction, are located along Schermerhorn and Livingston Streets and Flatbush Avenue. These developments, which have replaced several surface parking lots in the southern part of Downtown Brooklyn, include:

- State Renaissance Court: 8 stories, 158 units
- Schermerhorn House: 11 stories, 217 units
- Be@Schermerhorn: Two towers (14 and 25 stories), 226 units.

Taller residential buildings line Flatbush Avenue north of Willoughby Street. These include:

- Toren Building (Flatbush and Myrtle Avenues): 40 stories, 280 units
- Oro Gold (Flatbush Avenue and Gold Street): 40 stories
- Avalon Fort Green (Myrtle Avenue, east of Flatbush Avenue): 42 stories, 650 units

2.3 SURFACE TRANSPORTATION ACCESSIBILITY BY NEIGHBORHOOD

Each neighborhood in the Study Area is distinct in its land use as well as its transportation options. The overall transit system within the Study Area consists of subways and buses. The following analysis focuses only on the availability of surface transit within Study Area neighborhoods.

Using GIS and the bus stop density in the Study Area, each neighborhood is ranked based on the density of bus routes compared to total neighborhood area. Figure 21 shows the relative accessibility to surface transit in the Study Area, where green areas are well served and red areas have weaker surface transit. Table 2 summarizes the rankings.

Table 2 - Surface Transit Accessibility

Rank	Neighborhood	No. of Bus Routes	Transportation Access Score (% max)
1	Downtown Brooklyn	17	416.6 (100.0 %)
2	Prospect Heights	6	174.3 (41.8 %)
3	Fort Greene	9	165.2 (39.7 %)
4	Park Slope	7	147.5 (35.4 %)
5	Columbia Street Waterfront	2	96.7 (23.2 %)
6	Boerum Hill / Cobble Hill / Carroll Gardens	5	95.9 (23.0 %)
7	Gowanus	3	79.8 (19.2 %)
8	Fulton Ferry / DUMBO / Vinegar Hill	7	79.0 (19.0 %)
9	Navy Yard	3	79.0 (19.0 %)
10	Brooklyn Heights	3	62.0 (14.9 %)

Numerous bus services along Livingston Street, Fulton Street, and Cadman Plaza result in Downtown Brooklyn being the most accessible neighborhood in the Study Area. Areas that have very little bus service include the Brooklyn Heights and Fulton Ferry / DUMBO / Vinegar Hill neighborhoods. Brooklyn Heights is not served by bus service and Fulton Ferry / DUMBO / Vinegar Hill has very few bus routes and stops. By using Figure 21 and Table 2, the surface transit issues associated with each neighborhood in the study area can be analyzed. These transportation issues are discussed in more detail in the Problem Identification section.

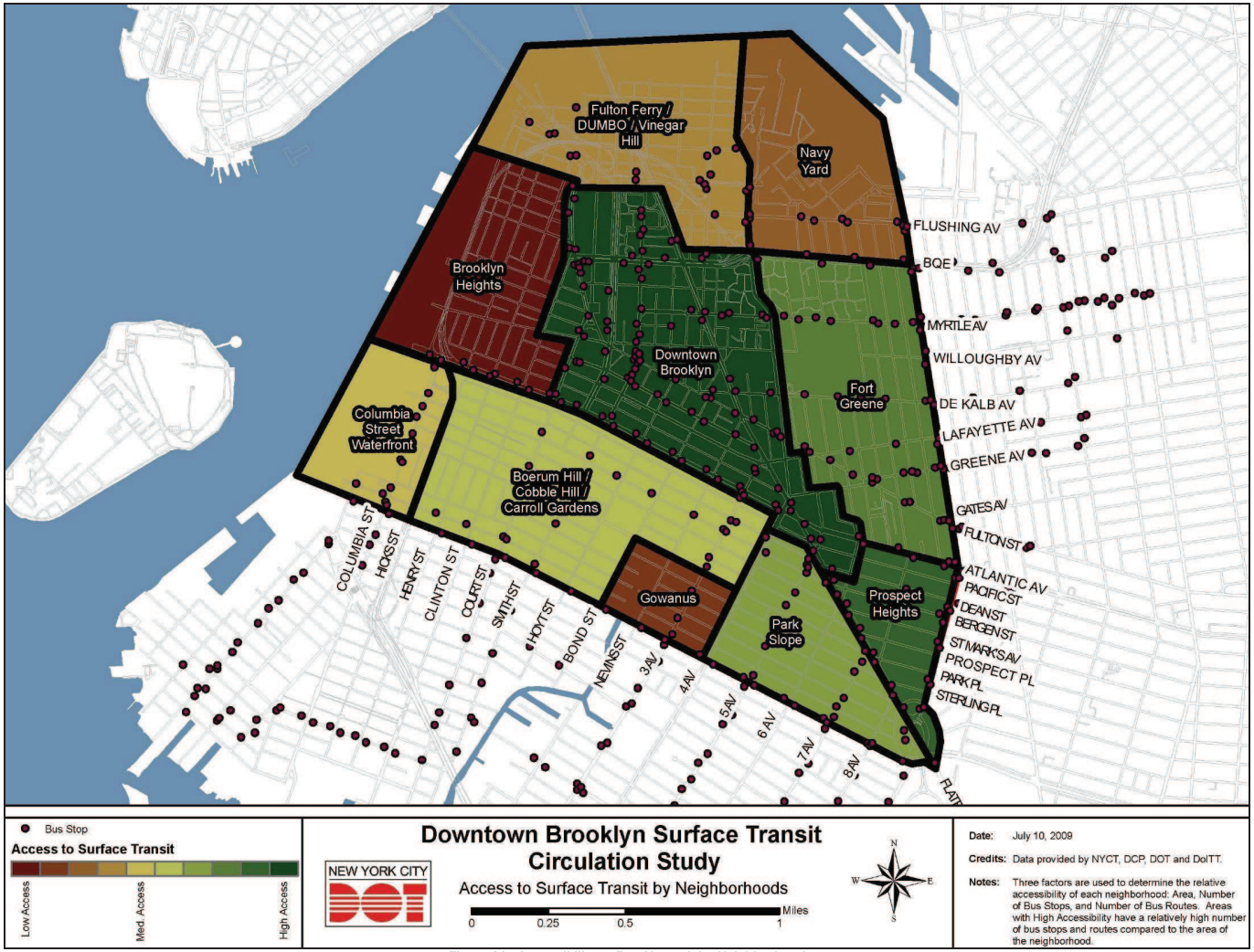


Figure 21 - Accessibility to Bus Network by Neighborhood

2.4 DEMOGRAPHICS

This section describes the existing demographic conditions and trends within the Core and Overall Study Areas of the DBSTCS. Demographic data is from the New York Metropolitan Transportation Council (NYMTC), the United States Census Bureau (US Census), and ESRI, Inc., a private data provider. Data was collected at either the Transportation Analysis Zone (TAZ) or census tract level.

TAZs and census tracts do not always align exactly with the Study Area boundaries. Therefore, TAZs with centroids located in the Study Area are counted in full, and zones with centroids located outside of the Study Area are not counted at all. Census Tracts that include a significant portion of the Study Area are included.

Population

As shown in Table 3, all areas analyzed experienced population growth from 1990-2000, as well as from 2000-2008. According to the U.S. Census, the Core Study Area grew from 20,758 residents in 1990 to 22,918 residents in 2000, a growth rate in excess of ten percent, which was the highest in all of the four areas. The Overall Study Area experienced almost a five percent increase in residents between 1990 and 2000. Over the same period, Brooklyn experienced a 7.2% growth rate, while New York City's overall growth rate (9.4%) more closely matched the growth rate experienced in the Core Study Area.

ESRI's 2008 population estimates indicate that the Core Study Area has maintained the highest growth rate among the four areas since 2000. Between 2000 and 2008, the Core Study Area gained an estimated 1,936 persons for a total of 24,854 residents, or an 8.4% increase since 2000. The other three areas each experienced between three and four percent growth in their residential populations.

Table 3 - Total Population, 1990-2008 (US Census, ESRI)

Area	Total Population			Percent Change	
	1990	2000	2008	1990-2000	2000-2008
Core Study Area	20,758	22,918	24,854	10.4	8.4
Overall Study Area	111,809	117,319	121,464	4.9	3.5
Brooklyn	2,300,664	2,465,326	2,548,982	7.2	3.4
New York City	7,322,564	8,008,278	8,327,026	9.4	4.0

As shown in Table 4, the Core Study Area, with 46,910 people per square mile, is the densest area that was analyzed. While the Overall Study Area is denser than New York City as a whole, its population density is less than that of Brooklyn. Figure 22 shows how the population density in the Study Area relates to the bus routes.

Table 4 - Population Density (NYMTC)

Area	Population (2005)	Area (Square Miles)	Density (2005)
Core Study Area	22,517	0.48	46,910
Overall Study Area	119,144	3.82	31,190
Brooklyn	2,511,408	70.5	35,623
New York City	8,213,839	308.9	26,591

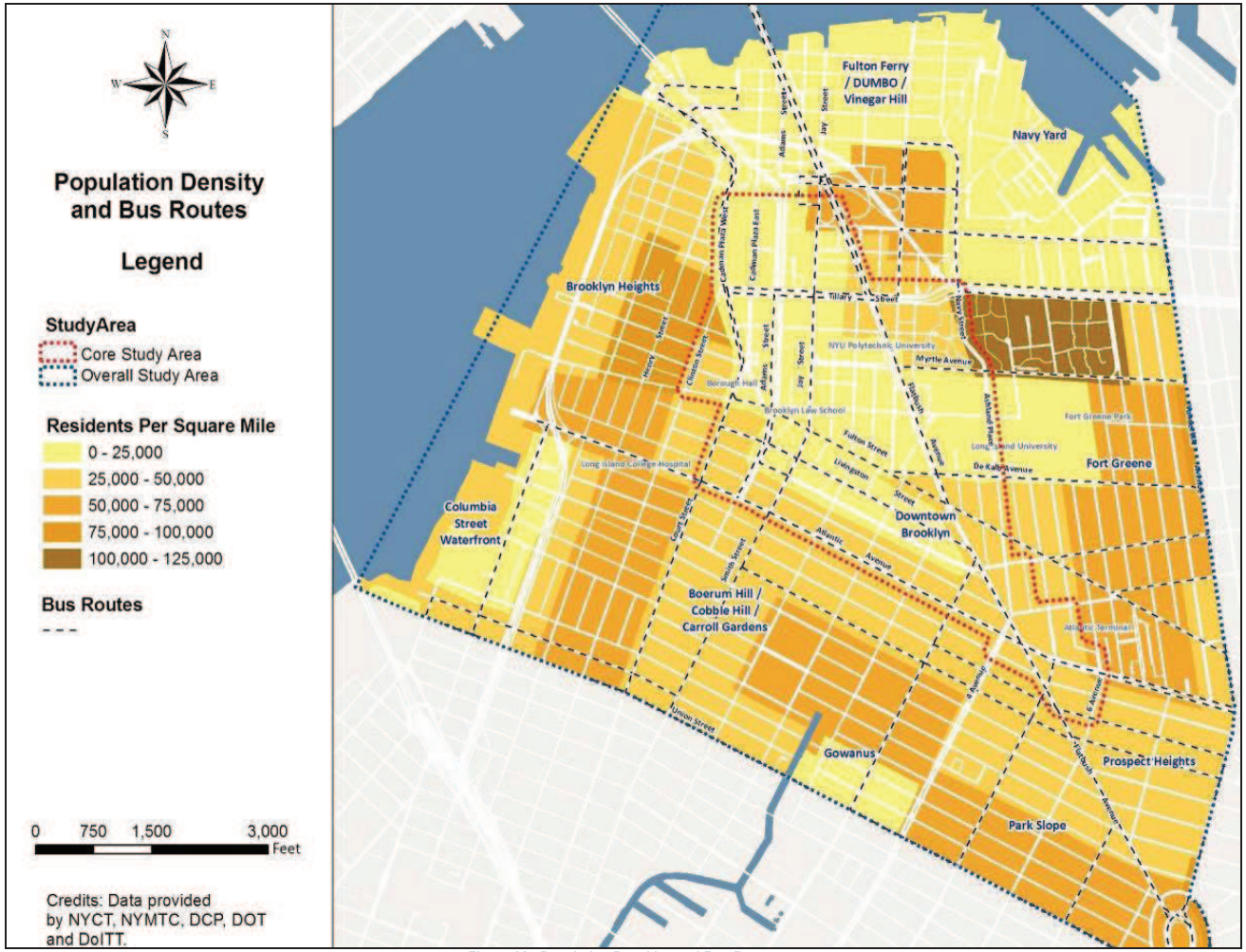


Figure 22 - Population Densities and Bus Routes

Households

Between 1990 and 2000 the average household size in the Core and Overall Study Areas decreased substantially but has stabilized since then based on 2008 demographic estimates (Table 5). The year 2000 average household size in the Core Study Area was 2.01 persons per household, down from 2.11 in 1990. In the Overall Study Area, the average household size decreased from 2.24 to 2.10 persons per household between 1990 and 2000. The average household size in both the Study Areas has consistently been lower than those of Brooklyn and New York City.

Table 5 - Household Size (US Census, ESRI)

Area	Average Household Size		
	1990	2000	2008
Core Study Area	2.11	2.01	2.01
Overall Study Area	2.24	2.10	2.11
Brooklyn	2.74	2.75	2.78
New York City	2.54	2.59	2.61

Employment

Table 6 shows the relative levels of employment density, and Figure 23 demonstrates how employment density in the Study Area relates to bus routes. As is common for metropolitan regions, Downtown Brooklyn is composed of a city center with retail, restaurant, office, and residential space surrounded by a more residential area. Employment density is substantially higher in the Core Study Area compared to the Overall Study Area, with 196,196 and 46,324 employees per square mile, respectively. This demonstrates that the Core Study Area is a commercial center within the Overall Study Area.

Table 6 - Employment Density (NYMTC)

Area	Employment (2005)	Area (Square Miles)	Density (2005)
Core Study Area	94,204	0.48	196,196
Overall Study Area	176,957	3.82	46,324
Brooklyn	453,911	70.5	6,438
New York City	3,491,506	308.9	11,303

Transit is most effective in areas with high densities of both residents and employees, so vehicles are filled with residents leaving in the AM while employees arrive, and vice verse in the PM. Figure 24 presents both the residential and employment densities within the Study Area. As shown in the figure, Downtown Brooklyn is the ideal candidate for transit with high densities of residents and employees.[4] Brooklyn Heights and Smith Street (south of Schermerhorn Street and north of Bergen Street), are also well positioned for two-way transit demand.

[4] High population and employment density is defined as the highest one-third TAZ, whereas low is the lowest one-third.

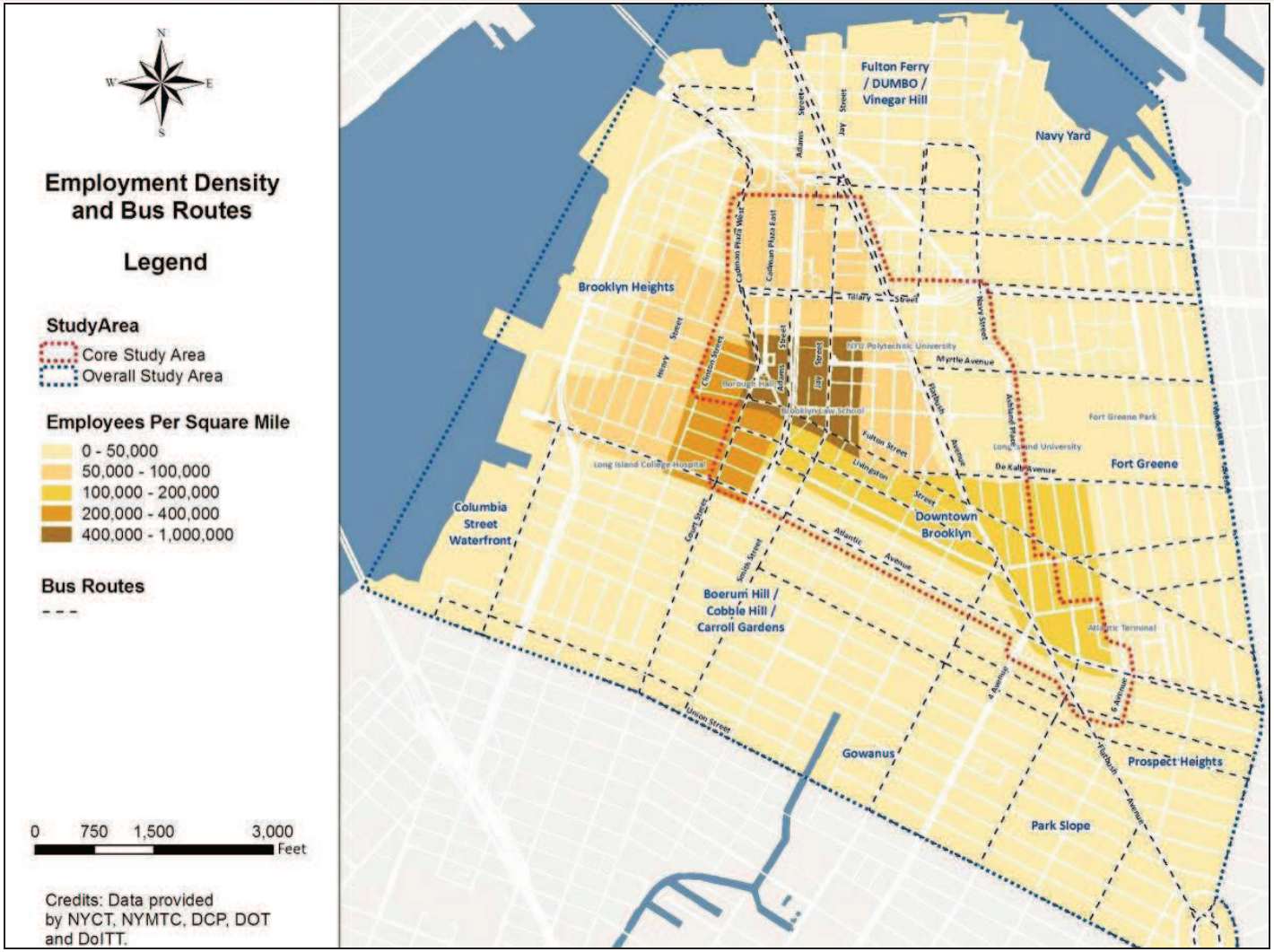


Figure 23 - Employment Densities and Bus Routes

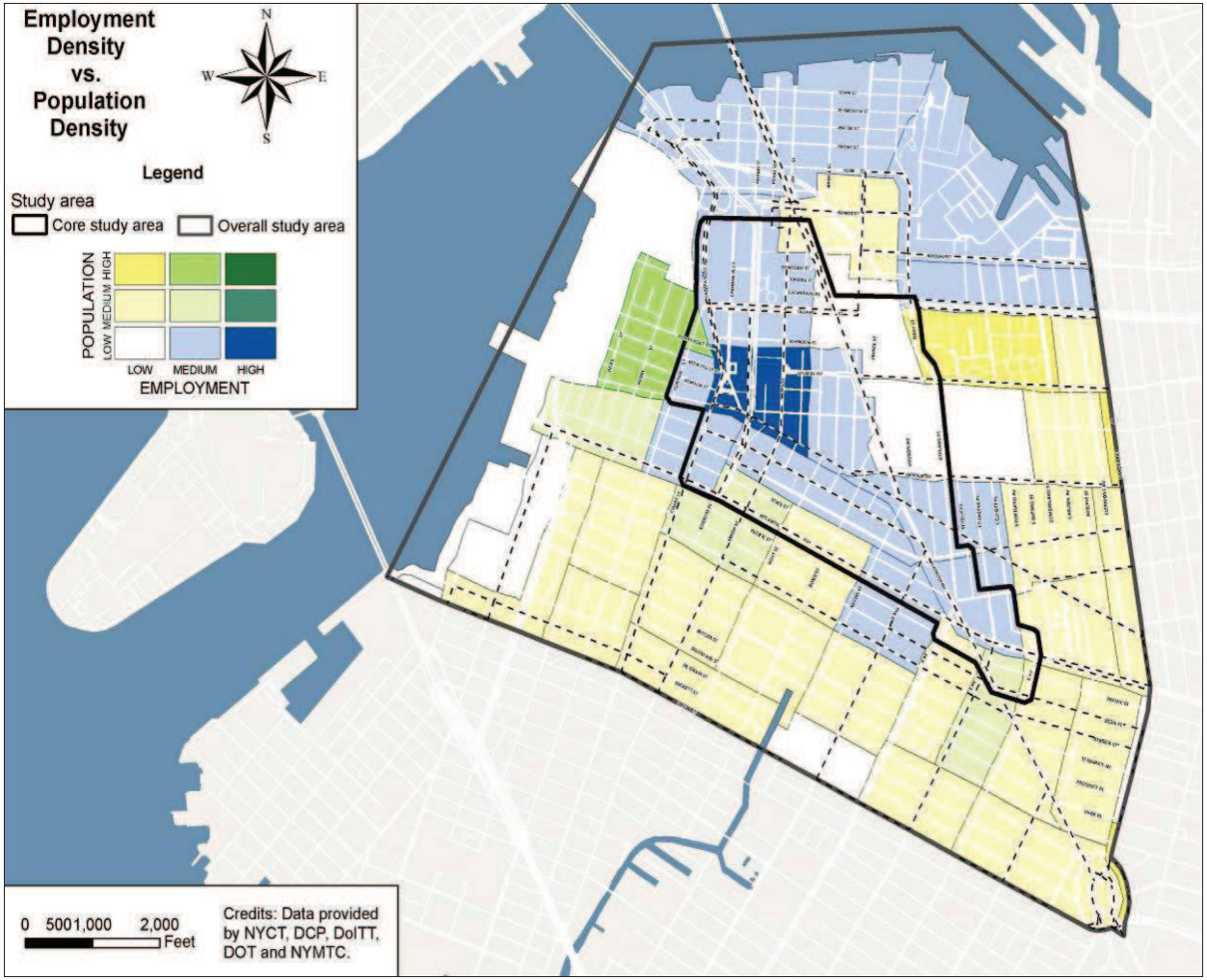


Figure 24 - Population and Employment Densities (NYMTC)

Income

Median household income has continually grown in the Core and Overall Study Areas (Table 7).

Table 7 - Income Characteristics (US Census, ESRI)

Area	Median Household Income (2008 Dollars)					% Below Poverty Level		
	1989	1999	2008	%Δ 1989-1999	%Δ 1999-2008	1989	1999	2008
Core Study Area	$65,433	$67,116	$71,657	2.6	6.8	17.3	19.6	n/a
Overall Study Area	$53,277	$69,531	$72,914	30.5	4.9	20.6	20.6	n/a
Brooklyn	$46,369	$42,807	$43,514	-7.7	1.7	22.7	25.1	n/a
New York City	$53,809	$51,869	$52,423	-3.6	1.1	19.3	21.3	n/a

The Core Study Area median household income increased from $65,433 in 1989 to $67,116 in 1999 (2008 dollars). At the same time, however, the proportion of the population in the Core Study Area living below the poverty level increased from 17.3% to 19.6%. From 1999 to 2008, the median household income increased by 6.8% in the Core Study Area. The Overall Study Area experienced more than a 30% increase in median household income between 1989 and 1999, but only a 4.9% increase from 2000 to 2008. Despite the increases in median household income, the percentage of the population below the poverty level in the Overall Study Area was the same in 1989 and 1999. In contrast, the median household incomes for Brooklyn and New York City decreased between 1989 and 1999, while the percentage of the population living below the poverty level increased. From 1999 to 2008, median income increased slightly in both Brooklyn and New York City, but not as much as it did in the Core and Overall Study Areas.

Housing

In all four areas, the total number of housing units increased between 1990 and 2008, as shown in Table 8. The Core Study Area experienced a slow rate of growth between 1990 and 2000, with an increase of 257 housing units, or 2.7%. In the Overall Study Area, 3,295 housing units were added from 1990 to 2000, an increase of 6.5%. Brooklyn also had a 6.5% increase over the same time period, similar to New York City, where the number of housing units increased by seven percent.

Between 2000 and 2008, the housing stock in the Core Study Area increased while growth rates in other areas declined relative to the pace of development experienced in the 1990s. The Core Study Area had an 11.5% growth rate, while the housing growth in all other areas was between four and six percent. These findings demonstrate that Downtown Brooklyn is an area of continuous growth and development.

Table 8 - Housing Units, 1990-2008 (US Census, ESRI)

Area	Total Housing Units			Percent Change	
	1990	2000	2008	1990-2000	2000-2008
Core Study Area	9,693	9,950	11,090	2.7	11.5
Overall Study Area	50,715	54,010	56,995	6.5	5.5
Brooklyn	873,671	930,866	970,346	6.5	4.2
New York City	2,992,169	3,200,912	3,352,248	7.0	4.7

Vacancy

As shown in Table 9, the number of vacant housing units decreased from 1990 to 2000 in the Core and Overall Study Areas. Vacancy rates were around eight to nine percent in 1990, and dropped to about four to five percent in 2000. In Brooklyn and New York City, vacancy rates were lower than in the two Study Areas in 1990. Between 1990 and 2000, vacancy rates stayed about the same in Brooklyn and New York City, increasing from 5.2% to 5.4% in Brooklyn, and decreasing from 5.8% to 5.6% in New York City.

Between 2000 and 2008 the percentage of vacant units increased in all four areas. The 2008 vacancy rate in the Core and Overall Study Areas was about six percent, slightly lower than in Brooklyn and New York City, which had vacancy rates of about seven percent.

Table 9 - Vacant Housing Units, 1990-2008 (US Census, ESRI)

Area	Vacant Housing Units					
	1990	% of total	2000	% of total	2008	% of total
Core Study Area	909	9.4	488	4.9	709	6.4
Overall Study Area	4,105	8.1	2,378	4.4	3,496	6.1
Brooklyn	45,472	5.2	50,139	5.4	67,178	6.9
New York City	172,768	5.8	179,324	5.6	237,334	7.1

Ownership

As shown in Table 10 and Table 11, home ownership increased between 1990 and 2008. The shift was most pronounced in the Core and Overall Study Areas, with about 23% of the housing stock being owner-occupied in 1990, increasing to about 30% in 2008. Brooklyn and New York City also saw their housing stock become increasingly owner-occupied, though at a slightly lower rate. By 2008, all areas had similar percentages of owner-occupancy housing units, ranging from 28% (Brooklyn) to 31% (New York City).

Table 10 - Owner-Occupied Housing Units, 1990-2008 (US Census, ESRI)

Area	Total Owner-Occupied Housing Units					
	1990	% of total	2000	% of total	2008	% of total
Core Study Area	2,217	22.9	2,710	27.2	3,345	30.2
Overall Study Area	11,795	23.3	14,400	26.7	16,841	29.5
Brooklyn	214,788	24.6	238,367	25.6	270,884	27.9
New York City	807,378	27.0	912,296	28.5	1,032,005	30.8

Table 11 - Renter-Occupied Housing Units, 1990-2008 (US Census, ESRI)

Area	Total Renter-Occupied Housing Units					
	1990	% of total	2000	% of total	2008	% of total
Core Study Area	6,567	67.7	6,752	67.9	7,036	63.4
Overall Study Area	34,815	68.6	37,232	68.9	36,658	64.3
Brooklyn	613,411	70.2	642,360	69.0	632,284	65.2
New York City	2,012,023	67.2	2,109,292	65.9	2,082,909	62.1

3. TRANSIT SERVICES

To provide competitive levels of mobility and access service, transit operations need to perform well on a number of service quality measures. Some of the most important are:

- **Effective Routing –** Connections to key destinations;
- **Effective Stop Placement –** Convenient points of access to service;
- **Service Spans –** When vehicles operate;
- **Service Frequency –** Wait time between buses/trains; and
- **Schedule Reliability –** Particularly during times of lower frequency.

To provide a service-level conditions context for the DBSTCS, the following sections outline these conditions for bus and subway service within the Study Area. Data for bus and subway services were provided by NYCT. Data on commuter van service are also documented, as provided by the Brooklyn Van Industry Association. These conditions are the primary decision-making tools by which riders decide whether to rely on transit services for their travel planning. Together, they tell travelers when and where services are available, how sensitive their trips are to an individual scheduled transit trip (i.e., does their trip hinge on one scheduled bus or is there flexibility), and how reliable that service is to transport them to their destination.

3.1 BUSES

Routing

Seventeen bus routes serve the Study Area. Figure 25 shows a map of these routes. Figure 26 goes a step further and shows the stops of all of the routes that serve the Study Area, and the density of bus stops within the Study Area. A higher level of density implies a higher level of accessibility to bus routes. The map in Figure 28 demonstrates that the majority of the Study Area is serviced by at least one bus route.

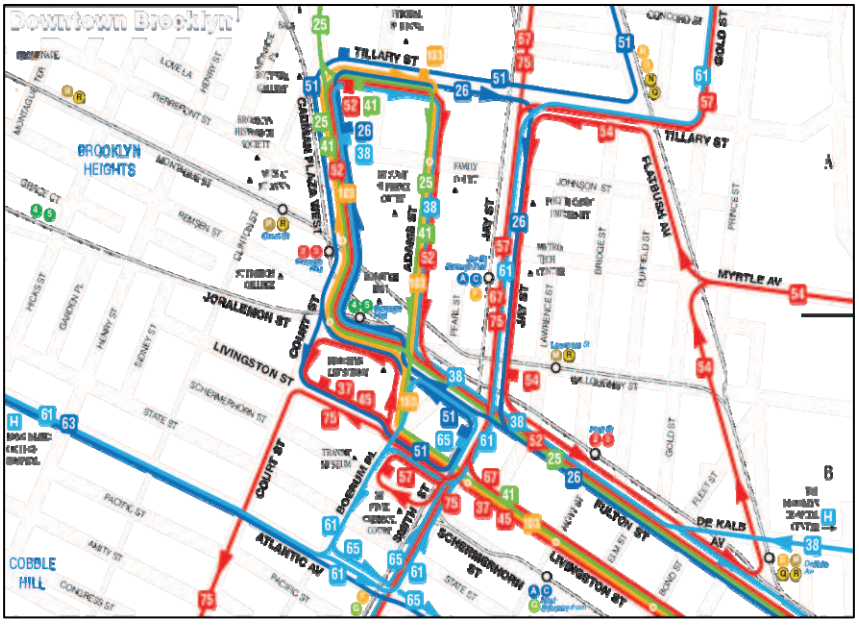


Figure 25 - Downtown Brooklyn NYCT Bus Map

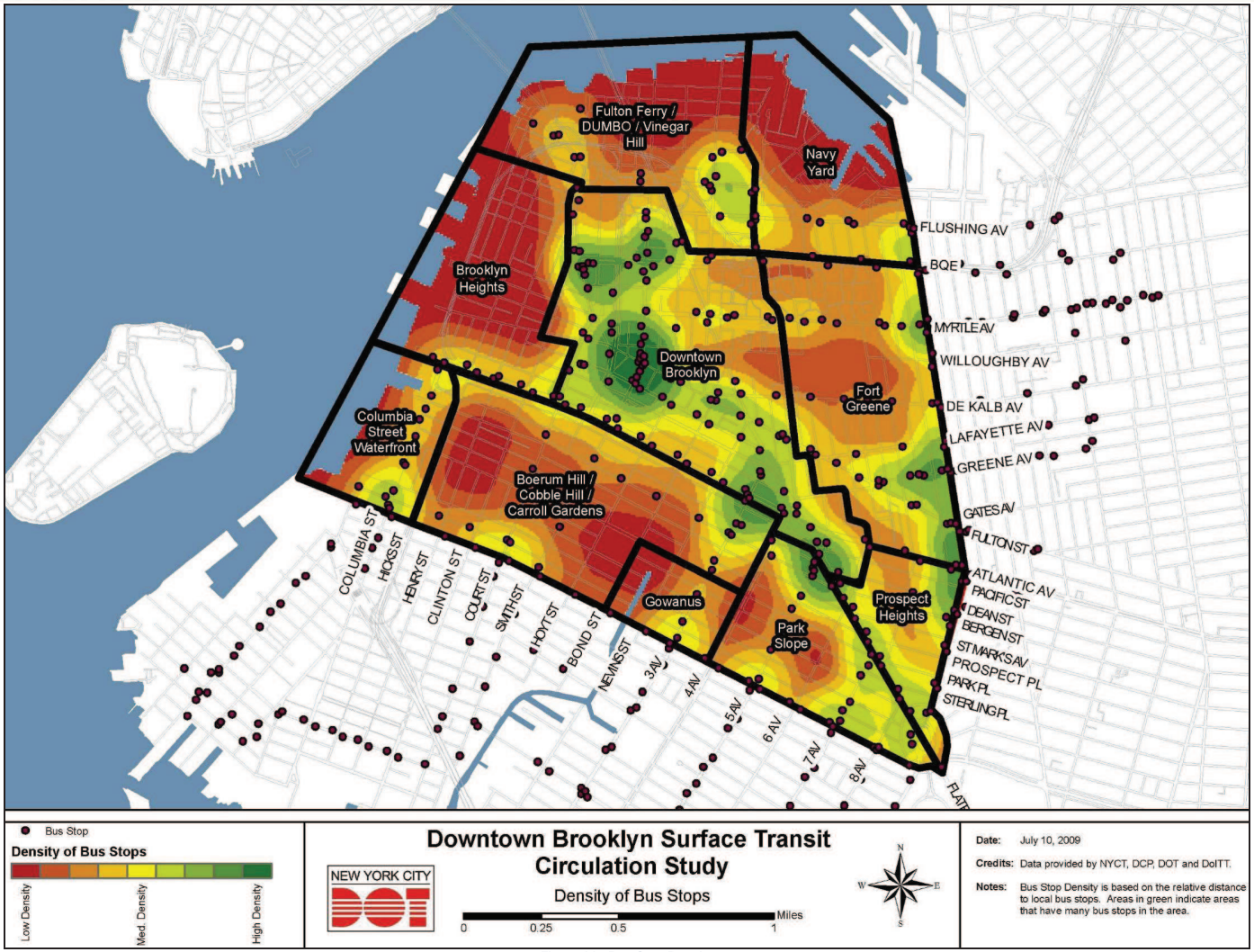


Figure 26 - Bus Stop Density

Bus Route Characteristics

The following is a detailed breakdown of performance measures for the bus routes that service Downtown Brooklyn.

B25	
Stops	
Total	73
In Study Area	35 (48%)
Average Trip Time (Min)[5]	
AM Peak to Downtown	56.1
PM Peak from Downtown	62.4
Buses Per Hour[6]	
AM Peak to Downtown	8
PM Peak from Downtown	8
Average Weekday Ridership	
Total	12,615
Hourly AM Peak	641
Hourly PM Peak	1,056
Peak Hourly Passenger Load	
AM Peak to Downtown	301 ----------
PM Peak from Downtown	390 ----------

Local service between East New York and Fulton Landing, with service to Brownsville, Ocean Hill, and Fort Greene. Key Study Area stops at Fulton Street Mall and Borough Hall. Total revenue miles: 12.21 (westbound: 6.09, eastbound: 6.12)

--- 8am-9am, Fulton St./New York Ave.
--- 3pm-4pm, Fulton St./Albany Ave.

B26	
Stops	
Total	81
In Study Area	24 (30%)
Average Trip Time (Min)	
AM Peak to Downtown	58.7
PM Peak from Downtown	58.0
Buses Per Hour	
AM Peak to Downtown	8
PM Peak from Downtown	7
Average Weekday Ridership	
Total	11,367
Hourly AM Peak	692
Hourly PM Peak	884
Peak Hourly Passenger Load	
AM Peak to Downtown	450 ----------
PM Peak from Downtown	329 ----------

Local service between Ridgewood (Queens) and Downtown Brooklyn, with service to Bushwick, Bedford-Stuyvesant, and Fort Greene. Key Study Area stops at Fulton Street Mall, Metro Tech, and Borough Hall. Total revenue miles: 12.64 (westbound: 6.41, eastbound: 6.23)

--- 7am-8am, Hasley St./Marcy Ave.
--- 3pm-4pm, Hasley St./Nostrand Ave.

[5] Average Trip Time was calculated using NYCT bus timetables (April 2009). This calculation looked at all full-length trips scheduled to begin during the peak period (AM Peak: 6am to 10am, PM Peak: 3pm to 7pm). The scheduled durations of each one-way trip were summed and divided by the number of buses that started their trip during the peak period in question.

[6] Buses per Hour was calculated using NYCT bus timetables (April 2009). First, the number of buses scheduled to begin their trip during the peak period was summed (For buses with short-routes, only full-length trips were considered). That number was then divided by the number of hours in the period (four) to determine the number of buses per hour during the period.

B37	
Stops	
Total	100
In Study Area	22 (22%)
Average Trip Time (Min)	
AM Peak to Downtown	57.9
PM Peak from Downtown	56.4
Buses Per Hour	
AM Peak to Downtown	4
PM Peak from Downtown	3
Average Weekday Ridership	
Total	3,565
Hourly AM Peak	225
Hourly PM Peak	277
Peak Hourly Passenger Load	
AM Peak to Downtown	78 ----------
PM Peak from Downtown	88 ----------

Local service between Fort Hamilton and Downtown Brooklyn, with service to Bay Ridge, Sunset Park, Gowanus, Park Slope, and Boerum Hill. Key Study Area stops at Borough Hall, New York Transit Museum, and Brooklyn Law School. Total revenue miles: 13.78 (northbound: 6.92, southbound: 6.86)

--- 8am-9am, 3rd Ave./60th St.
--- 3pm-4pm, 3rd Ave./Atlantic Ave (Core Study Area)

B38	
Stops	
Total	98
In Study Area	21 (21%)
Average Trip Time (Min)	
AM Peak to Downtown	54.5
PM Peak from Downtown	54.3
Buses Per Hour	
AM Peak to Downtown	16
PM Peak from Downtown	13
Average Weekday Ridership	
Total	23,061
Hourly AM Peak	1,639
Hourly PM Peak	1,703
Peak Hourly Passenger Load	
AM Peak to Downtown	959 ----------
PM Peak from Downtown	716 ----------

Local and Limited-Stop service between Ridgewood (Queens) and Downtown Brooklyn, with service to Bushwick, Bedford-Stuyvesant, and Fort Greene. Short Route service available between Bushwick and Downtown Brooklyn. Key Study Area stops at Fulton Street Mall, Metro Tech, and Brooklyn Supreme Court. Total revenue miles: 11.53 (westbound: 5.39, eastbound: 6.14)

--- 8am-9am, Dekalb Ave./Vanderbilt Ave (Overall Study Area)
--- 4pm-5pm, Lafayette Ave./Carlton Ave. (Overall Study Area)

B41	
Stops	
Total	106
In Study Area	28 (26%)
Average Trip Time (Min)	
AM Peak to Downtown	60.6
PM Peak from Downtown	67.7
Buses Per Hour	
AM Peak to Downtown	21
PM Peak from Downtown	19
Average Weekday Ridership	
Total	39,323
Hourly AM Peak	2,210
Hourly PM Peak	3,187
Peak Hourly Passenger Load	
AM Peak to Downtown	755 ----------
PM Peak from Downtown	1,009 ----------

Local and Limited-Stop service between Bergen Beach or Kings Plaza and Downtown Brooklyn, with service to Flatbush and Prospect Heights. Short Route service available between Midwood and Prospect Park. Key Study Area stops at Fulton Street Mall, Borough Hall, and Cadman Plaza. Total revenue miles: 15.7 (northbound: 7.78, southbound: 7.92)

--- 8am-9am, Flatbush Ave./Empire Blvd.
--- 5pm-6pm, Flatbush Ave./Prospect Pl. (Overall Study Area)

B45	
Stops	
Total	66
In Study Area	19 (29%)
Average Trip Time (Min)	
AM Peak to Downtown	46.7
PM Peak from Downtown	51.6
Buses Per Hour	
AM Peak to Downtown	6
PM Peak from Downtown	7
Average Weekday Ridership	
Total	9,227
AM Peak	437
PM Peak	791
Peak Hourly Passenger Load	
AM Peak to Downtown	232 ----------
PM Peak from Downtown	326 ----------

Local service between Crown Heights and Downtown Brooklyn, with service to Crown Heights and Prospect Heights. Key Study Area stops at Atlantic Terminal, Borough Hall, New York Transit Museum, and Brooklyn Law School. Total revenue miles: 9.42 (westbound: 4.6, eastbound: 4.82)

--- 8am-9am, St. John's Pl./Nostrand Ave.
--- 3pm-4pm, Atlantic Ave./6th Ave. (Overall Study Area)

B51	
Stops	
Total	19
In Study Area	12 (63 %)
Average Trip Time (Min)	
AM Peak to Downtown	17.8
PM Peak from Downtown	25.3
Buses Per Hour	
AM Peak to Downtown	2
PM Peak from Downtown	3
Average Weekday Ridership	
Total	920
AM Peak	66
PM Peak	66
Peak Hourly Passenger Load	
AM Peak to Downtown	26 ----------
PM Peak from Downtown	45 ----------

Local weekday only service between Downtown Brooklyn and Lower Manhattan, with service to DUMBO, the Lower East Side (Manhattan), and Chinatown (Manhattan). Key Study Area stops at Cadman Plaza, Borough Hall, and Brooklyn Law School. Total revenue miles: 9.42 (westbound: 4.6, eastbound: 4.82)

--- 9am-10am, Bowery/Bayard St.
--- 4pm-5pm, Centre St./Chambers St.

B52	
Stops	
Total	71
In Study Area	23 (32%)
Average Trip Time (Min)	
AM Peak to Downtown	56.0
PM Peak from Downtown	55.3
Buses Per Hour	
AM Peak to Downtown	9
PM Peak from Downtown	10
Average Weekday Ridership	
Total	14,821
AM Peak	919
PM Peak	1,188
Peak Hourly Passenger Load	
AM Peak to Downtown	715 ----------
PM Peak from Downtown	517 ----------

Local service between Ridgewood (Queens) and Downtown Brooklyn with service to Bushwick, Bedford-Stuyvesant, and Fort Greene. Key Study Area stops at Cadman Plaza, Borough Hall, and New York State Supreme Court. Total revenue miles: 10.53 (westbound: 5.41, eastbound: 5.12)

--- 8am-9am, Gates Ave./Bedford Ave.
--- 5pm-6pm, Franklin Ave./Greene Ave.

B54	
Stops	
Total	73
In Study Area	18 (25%)
Average Trip Time (Min)	
AM Peak to Downtown	47.0
PM Peak from Downtown	54.7
Buses Per Hour	
AM Peak to Downtown	7
PM Peak from Downtown	9
Average Weekday Ridership	
Total	12,419
AM Peak	799
PM Peak	935
Peak Hourly Passenger Load	
AM Peak to Downtown	440 ----------
PM Peak from Downtown	438 ----------

Local service between Ridgewood (Queens) and Downtown Brooklyn, with service to Bushwick and Bedford-Stuyvesant. Key Study Area stops at New York City College of Technology, Polytechnic University, Metro Tech, and Long Island University. Total revenue miles: 9 (westbound: 4.29, eastbound: 4.71)

--- 8am-9am, Myrtle Ave./Throop Ave.
--- 4pm-5pm, Myrtle Ave./Walworth St.

B57	
Stops	
Total	74
In Study Area	15 (20%)
Average Trip Time (Min)	
AM Peak to Downtown	46.8
PM Peak from Downtown	52.0
Buses Per Hour	
AM Peak to Downtown	4
PM Peak from Downtown	7
Average Weekday Ridership	
Total	5,670
AM Peak	475
PM Peak	430
Peak Hourly Passenger Load	
AM Peak to Downtown	206 ----------
PM Peak from Downtown	170 ----------

Local service between Maspeth (Queens) and Downtown Brooklyn, with service to Clinton Hill and Fort Greene. Key Study Area stops at New York City College of Technology, Polytechnic University, Metro Tech, and New York Transit Museum. Total revenue miles: 11.8 (westbound: 5.57, eastbound: 6.23)

--- 7am-8am, Flushing Ave./Humboldt St.
--- 5pm-6pm, Flushing Ave./Classon Ave.

B61	
Stops	
Total	130
In Study Area	42 (32%)
Average Trip Time (Min)	
AM Peak to Downtown	81.1
PM Peak from Downtown	77.3
Buses Per Hour	
AM Peak to Downtown	8
PM Peak from Downtown	7
Average Weekday Ridership	
Total	18,041
AM Peak	1,359
PM Peak	1,270
Peak Hourly Passenger Load	
AM Peak to Downtown	331 ----------
PM Peak from Downtown	210 ----------

Local service between Red Hook (Brooklyn) and Queens Plaza (Queens), with service to Cobble Hill, Fort Greene, Clinton Hill, Williamsburg, and Greenpoint. Short Route service available between Red Hook and Williamsburg. Key Study Area stops at New York State Criminal Court, New York City College of Technology, Polytechnic University, and Metro Tech. Total revenue miles: 18.93 (northbound: 9.76, southbound: 9.17)

--- 8am-9am, McGuinness Blvd./Freeman St.
--- 4pm-5pm, Atlantic Ave./Clinton St. (Overall Study Area)

B63	
Stops	
Total	110
In Study Area	29 (26%)
Average Trip Time (Min)	
AM Peak to Downtown	78.2
PM Peak from Downtown	81.4
Buses Per Hour	
AM Peak to Downtown	5
PM Peak from Downtown	5
Average Weekday Ridership	
Total	14,315
AM Peak	720
PM Peak	1,216
Peak Hourly Passenger Load	
AM Peak to Downtown	305 ----------
PM Peak from Downtown	468 ----------

Local service between Fort Hamilton and Cobble Hill, with service to Bay Ridge, Sunset Park, Gowanus, and Park Slope. Key Study Area stops at Atlantic Terminal and Long Island College Hospital. Total revenue miles: 15.17 (northbound: 7.67, southbound: 7.5)

--- 7am-8am, 5th Ave./39th St.
--- 3pm-4pm, 5th Ave./26th St.

B65	
Stops	
Total	63
In Study Area	23 (37%)
Average Trip Time (Min)	
AM Peak to Downtown	40.9
PM Peak from Downtown	42.3
Buses Per Hour	
AM Peak to Downtown	5
PM Peak from Downtown	6
Average Weekday Ridership	
Total	4,851
AM Peak	335
PM Peak	383
Peak Hourly Passenger Load	
AM Peak to Downtown	344 ----------
PM Peak from Downtown	289 ----------

Local service between Ocean Hill/Brownsville and Downtown Brooklyn, with service to Crown Heights, Prospect Heights, and Boerum Hill. Key Study Area stops at New York State Criminal Court, New York Transit Museum, and Fulton Street Mall. Total revenue miles: 8.94 (westbound: 4.36, eastbound: 4.58)

--- 8am-9am, Bergen St./Franklin Ave.
--- 4pm-5pm, Dean St./Franklin Ave.

B67	
Stops	
Total	77
In Study Area	33 (43%)
Average Trip Time (Min)	
AM Peak to Downtown	46.2
PM Peak from Downtown	45.1
Buses Per Hour	
AM Peak to Downtown	6
PM Peak from Downtown	6
Average Weekday Ridership	
Total	6,897
AM Peak	515
PM Peak	558
Peak Hourly Passenger Load	
AM Peak to Downtown	320 ----------
PM Peak from Downtown	215 ----------

Local service between Kensington and DUMBO, with service to Windsor Terrace and Park Slope. Key Study Area stops at Fulton Street Mall, New York City College of Technology, Polytechnic University, and Metro Tech. Total revenue miles: 10 (northbound: 5.03, southbound: 4.97)

--- 7am-8am, McDonald Ave./Fort Hamilton Pwky.
--- 3pm-4pm, 7th Ave./3rd St.

B69	
Stops	
Total	67
In Study Area	28 (42%)
Average Trip Time (Min)	
AM Peak to Downtown	42.3
PM Peak from Downtown	35.1
Buses Per Hour	
AM Peak to Downtown	4
PM Peak from Downtown	3
Average Weekday Ridership	
Total	2,302
AM Peak	222
PM Peak	186
Peak Hourly Passenger Load	
AM Peak to Downtown	163 ----------
PM Peak from Downtown	126 ----------

Local service between Windsor Terrace and Downtown Brooklyn, with service to Park Slope, Prospect Heights, Clinton Hill, and Fort Greene. Total revenue miles: 9.63 (northbound: 4.85, southbound: 4.78)

--- 8am-9am, Vanderbilt Ave./Atlantic Ave. (Overall Study Area)
--- 3pm-4pm, Vanderbilt Ave./Fulton St. (Overall Study Area)

B75	
Stops	
Total	62
In Study Area	22 (36%)
Average Trip Time (Min)	
AM Peak to Downtown	37.8
PM Peak from Downtown	43.0
Buses Per Hour	
AM Peak to Downtown	3
PM Peak from Downtown	3
Average Weekday Ridership	
Total	3,528
AM Peak	207
PM Peak	306
Peak Hourly Passenger Load	
AM Peak to Downtown	104 ----------
PM Peak from Downtown	154 ----------

Local service between Park Slope and Downtown Brooklyn, with service to Gowanus and Cobble Hill. Key Study Area stops at New York Transit Museum, Fulton Street Mall, New York City College of Technology, Polytechnic University, and Metro Tech. Total revenue miles: 8.163 (northbound: 3.8, southbound: 4.36)

--- 8am-9am, Smith St./Nelson St.
--- 5pm-6pm, Court St./Warren St. (Overall Study Area)

B103[7]	
Stops	
Total	74
In Study Area	13 (18%)
Average Trip Time (Min)	
AM Peak to Downtown	67.2
PM Peak from Downtown	74.0
Buses Per Hour	
AM Peak to Downtown	11
PM Peak from Downtown	11
Average Weekday Ridership	
Total	4,222
AM Peak	n/a
PM Peak	n/a
Peak Hourly Passenger Load	n/a

Limited-Stop weekday and Saturday service between Canarsie and Downtown Brooklyn, with service to East Flatbush, Kensington, and Boerum Hill. Short Route service available between Flatbush and Canarsie. Key Study Area stops at Borough Hall, the main Post Office, and New York State Supreme Court.

[7] Hourly passenger data is not available for the B103.

Bus Route Performance Measures

With 17 routes,[8] the study area has significant bus coverage. While there are many routes, however, two routes – the B38 and the B41 – account for approximately one-third of the total boardings and ridership across all of the routes (Table 12 and Table 13). With an average of over 1,000 riders boarding every hour during the peak periods (and over 2,000 hourly riders on the B41 outbound during the PM peak hour), these two routes serve as the primary links between Downtown Brooklyn and the surrounding area. Specifically, the B38 gives riders access to Ridgewood (Queens) and Fort Greene, and the B41 connects riders to Bergen Beach and Kings Plaza. Given the high levels of ridership on these routes, improvements to them would benefit the most Study Area riders.

Table 12 - Average Hourly Weekday Peak Boardings[9]

Route	AM Peak		PM Peak	
	to Downtown	from Downtown	to Downtown	from Downtown
B25	441	195	441	732
B26	599	275	441	588
B37	116	103	129	152
B38	1,285	567	925	1,227
B41	1,521	765	1,460	2,018
B45	373	155	327	594
B51	16	57	59	54
B52	805	449	673	884
B54	598	437	510	710
B57	312	227	229	263
B61	852	699	716	698
B63	117	73	489	541
B65	384	160	235	365
B67	458	273	312	390
B69	148	167	117	106
B75	147	119	118	264
TOTAL	8,213	4,676	7,172	9,590

[8] Due to limitations in data, the following tables do not include information for the B103.

[9] Average Hourly Peak Boardings were calculated using on/off counts from NYCT. First, the number of passengers who boarded a route going one direction during a peak period (AM Peak: 6am to 10am, PM Peak: 3pm to 7pm) was summed. That number was divided by the number of hours in the period (four) to determine the average number of people who boarded the route each hour during the peak. This calculation was repeated for each route, in each direction, during each peak period.

Table 13 - Average Hourly Weekday Peak Ridership[10]

Bus Route	AM Peak	PM Peak
B25	641	1,056
B26	692	884
B37	225	277
B38	1,639	1,703
B41	2,210	3,187
B45	437	791
B51	66	66
B52	919	1,188
B54	799	935
B57	475	430
B61	1,359	1,270
B63	720	1,216
B65	335	383
B67	515	558
B69	222	186
B75	207	306
TOTAL	11,461	14,436

Table 14 examines peak load data from the bus routes that serve the Study Area. The hourly load for a route at a given stop is the sum of passengers who were aboard buses for that route as the buses passed the stop during a given hour. The largest of these hourly loads is defined as the peak load. The time period during which this peak load occurred is the Peak Hour, and the stop at which this load occurred is the Peak Location on the route

As shown in Table 14, the peak loads for all of the routes traveling inbound occur at points outside of the Core Study Area (and mostly outside of the Overall Study Area). This indicates that potential riders who may consider boarding a bus within the Study Area may be dissuaded by crowded vehicles. Outbound, the AM peak load points for the B51, B54, and B57 and the PM peak load point for the B37 are within the Core Study Area. This demonstrates high utilization of these routes by individuals who are travelling out of the Study Area, and it could indicate that there is limited space to accommodate additional riders originating in the Study Area.

[10] Average Hourly Peak Ridership was calculated using MetroCard data from NYCT. First, the number of passengers during a peak period (AM Peak: 6am to 10am, PM Peak: 3pm to 7pm) was summed. That number was divided by the number of hours in the period (four) to determine the average number of people who rode the route each hour during the peak. This calculation was repeated for each route, during each peak period. Calculations could not be performed for each direction due to data limitations.

Table 14 - Peak Hourly Passenger Load[11]

Route	AM Peak		PM Peak	
	To Downtown	From Downtown	To Downtown	From Downtown
B25	301 (8am-9am, FULTON ST NEW YORK AV)	118 (8am-9am, FULTON ST UTICA AV)	194 (3pm-4pm, FULTON ST GREENE AV)	390 (3pm-4pm, FULTON ST ALBANY AV)
B26	450 (7am-8am, HALSEY ST MARCY AV)	146 (8am-9am, HALSEY ST STUYVESANT AV)	217 (3pm-4pm, HALSEY ST PATCHEN AV)	329 (3pm-4pm, HALSEY ST NOSTRAND AV)
B37	78 (8am-9am, 3 AV 60 ST)	69 (8am-9am, 3 AV BAY RIDGE AV)	121 (3pm-4pm, 3 AV 86 ST)	88 (3pm-4pm, 3 AV ATLANTIC AV)
B38	959 (8-9am, DE KALB AV VANDERBILT AV)	246 (8-9am, LAFAYETTE AV LEWIS AV)	476 (3-4pm, DE KALB AV CARLTON AV)	716 (4-5pm, LAFAYETTE AV CARLTON AV)
B41	755 (8-9am, FLATBUSH AV EMPIRE BL)	399 (9-10am, FLATBUSH AV CHURCH AV)	579 (3-4pm, FLATBUSH AV E 29TH ST)	1,009 (5-6pm, FLATBUSH AV PROSPECT PA)
B45	232 (8am-9am, ST JOHNS PL NOSTRAND AV)	139 (8am-9am, ST JOHNS PL KINGSTON AV)	181 (3pm-4pm, ST JOHNS PL SCHENECTADY AV)	326 (3pm-4pm, ATLANTIC AV 6 AV)
B51	26 (9am-10am, BOWERY BAYARD ST)	83 (7am-8am, FLATBUSH AV EXT CHAPEL ST)	133 (4pm-5pm, BOWERY BAYARD ST)	45 (4pm-5pm, CENTRE ST CHAMBERS ST)
B52	715 (8am-9am, GATES AV BEDFORD AV)	297 (8am-9am, GATES AV STUYVESANT AV)	390 (3pm-4pm, GATES AV LEWIS AV)	517 (5pm-6pm, FRANKLIN AV GREENE AV)
B54	440 (8am-9am, MYRTLE AV THROOP AV)	304 (8am-9am, MYRTLE AV ASHLAND PL)	264 (4pm-5pm, MYRTLE AV ST EDWARDS ST)	438 (4pm-5pm, MYRTLE AV WALWORTH ST)
B57	206 (7am-8am, FLUSHING AV HUMBOLDT ST)	138 (8am-9am, JAY ST FULTON ST)	136 (4pm-5pm, FLUSHING AV CUMBERLAND ST)	170 (5pm-6pm, FLUSHING AV CLASSON AV)
B61	331 (8am-9am, MC GUINNESS BL FREEMAN ST)	336 (8am-9am, MANHATTAN AV DRIGGS AV)	233 (3pm-4pm, ATLANTIC AV CLINTON ST)	210 (4pm-5pm, ATLANTIC AV CLINTON ST)
B63	305 (7am-8am, 5 AV 39 ST)	160 (8am-9am, 5 AV DOUGLASS ST)	326 (4pm-5pm, 5 AV BAY RIDGE PY)	468 (3pm-4pm, 5 AV 26 ST)
B65	344 (8am-9am, BERGEN ST FRANKLIN AV)	115 (8am-9am, DEAN ST NEW YORK AV)	145 (3pm-4pm, BERGEN ST BROOKLYN AV)	289 (4pm-5pm, DEAN ST FRANKLIN AV)
B67	320 (7am-8am, MC DONALD AV FT HAMILTON PY)	301 (8am-9am, 7 AV UNION ST)	246 (4pm-5pm, 7 AV GARFIELD PL)	215 (3pm-4pm, 7 AV 3 ST)
B69	163 (8am-9am, VANDERBILT AV ATLANTIC AV)	214 (8am-9am, PROSPECT PK W PRESIDENT ST)	152 (3pm-4pm, 8 AV 3 ST)	126 (3pm-4pm, VANDERBILT AV FULTON ST)
B75	104 (8am-9am, SMITH ST NELSON ST)	91 (8am-9am, COURT ST AMITY ST)	86 (3pm-4pm, SMITH ST 5 ST)	154 (5pm-6pm, COURT ST WARREN ST)

Shaded Peak Hourly Passenger Loads indicate that the Peak Location is within the Study Area. Grey represents locations in the Overall Study Area, and red indicates locations within the Core Study Area.

[11] Peak Hourly Passenger Load was determined for each route using on/off counts from NYCT. Hourly load counts were examined, and the largest load within a peak period (AM Peak: 6am to 10am, PM Peak: 3pm to 7pm) was determined to be the Peak Hourly Passenger Load. The time of this load is the Peak Hour for the period, and the stop at which this load occurred is the Peak Location on the route. This analysis was repeated for each route, in each direction, during each peak period.

Typically, MTA –NYCT bus schedule and route information is provided at each bus stop. Figure 27 is an example of the current method for displaying this information.

Figure 27 - NYCT Bus Schedule / Ride Information at Bus Stops

Bus Only Lanes

A limited number of Bus Only lanes are in operation within the Study Area. Fulton Street between Adams Street and Flatbush Avenue has dedicated Bus Only lanes operating 24 hours a day, while Fulton Street between Flatbush Avenue and South Oxford Street (operating during peak hours), and Livingston Street between Adams Street and Flatbush Avenue have dedicated Bus Only lanes on weekdays from 7am-10am and from 4pm-7pm (Figure 28). These dedicated lanes offer buses priority routing and support bus operations over other motorized modes. At the same time, though, bus only lanes do not feature bus priority systems such as signal priority or queue jumpers.

Enforcement agents are dispatched during these periods to further support the operation of the Bus Only lanes. Although enforcement does take place and officers do distribute tickets, parking, driving, and standing in Bus Only lanes remains a serious problem and limits the effectiveness of these lanes. Many cars blocking the Bus Only lanes also have placards, and this makes parking more difficult to enforce.

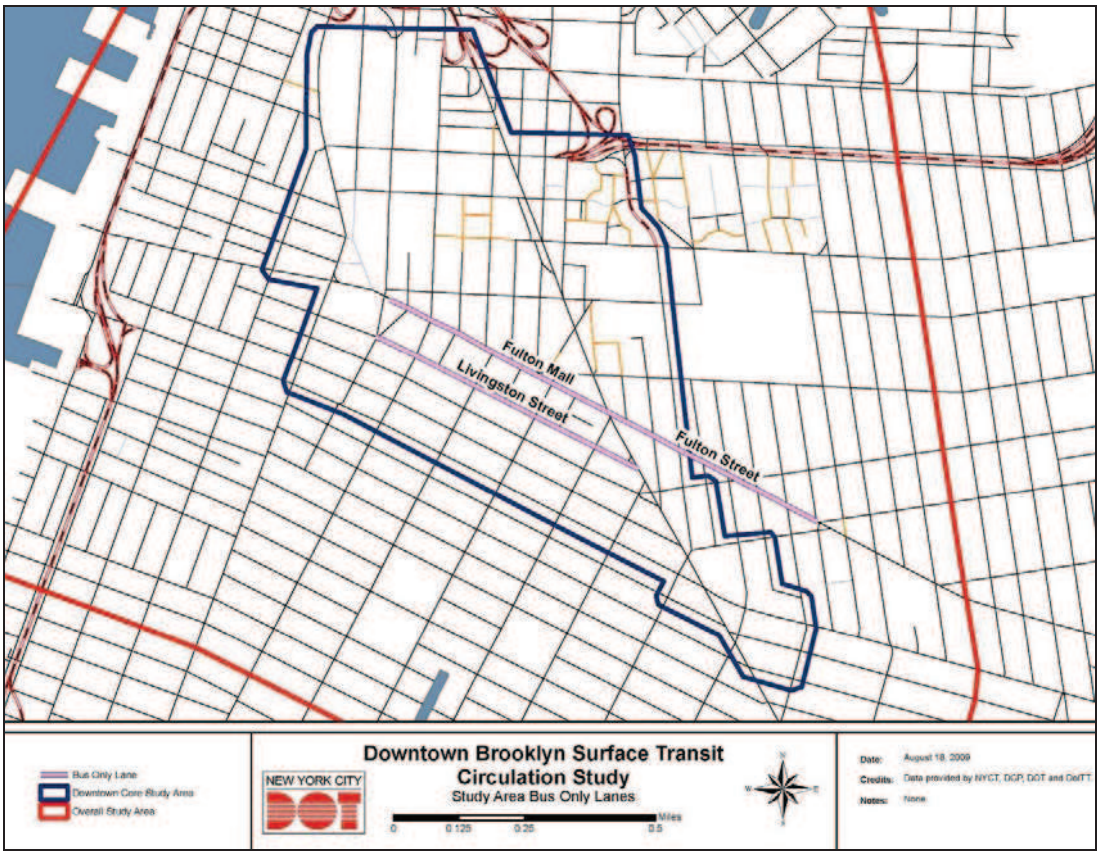
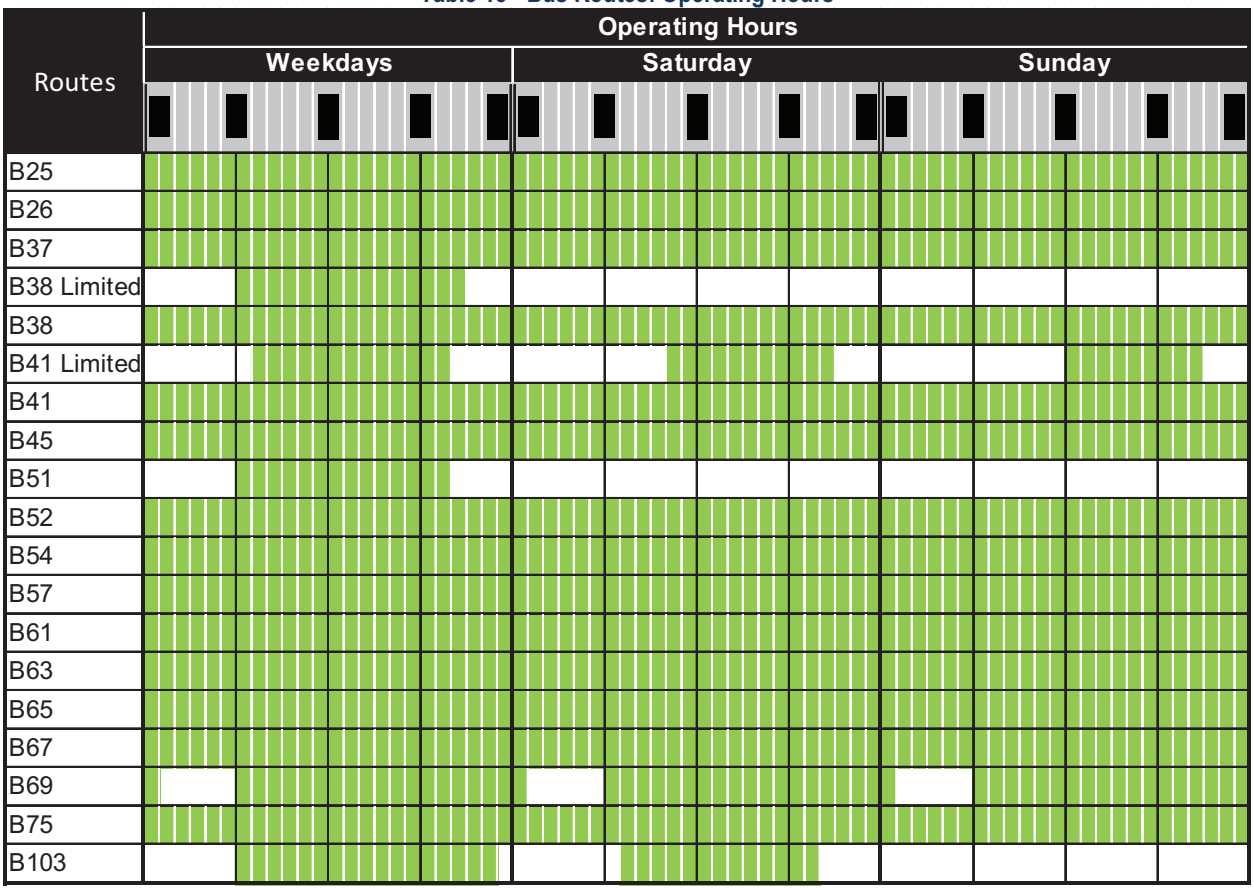


Figure 28 - Location of Study Area Bus Only Lanes

Service Spans

Table 15 provides a summary of the service spans of bus routes serving the Study Area. Service spans are the hours of the day and days of the week during which buses run. As shown in green, the vast majority of buses offer 24-hour/7-day service. Only two routes, the B38 Limited and B51, is limited to weekdays, and just three routes, the B38 Limited, B51, and B103, do not operate on Sundays. This shows that scheduled service spans not only peak hours, but runs consistently throughout each day and week. This scheduling provides the first element of transit service for riders to incorporate into their trip planning.

Table 15 - Bus Routes: Operating Hours



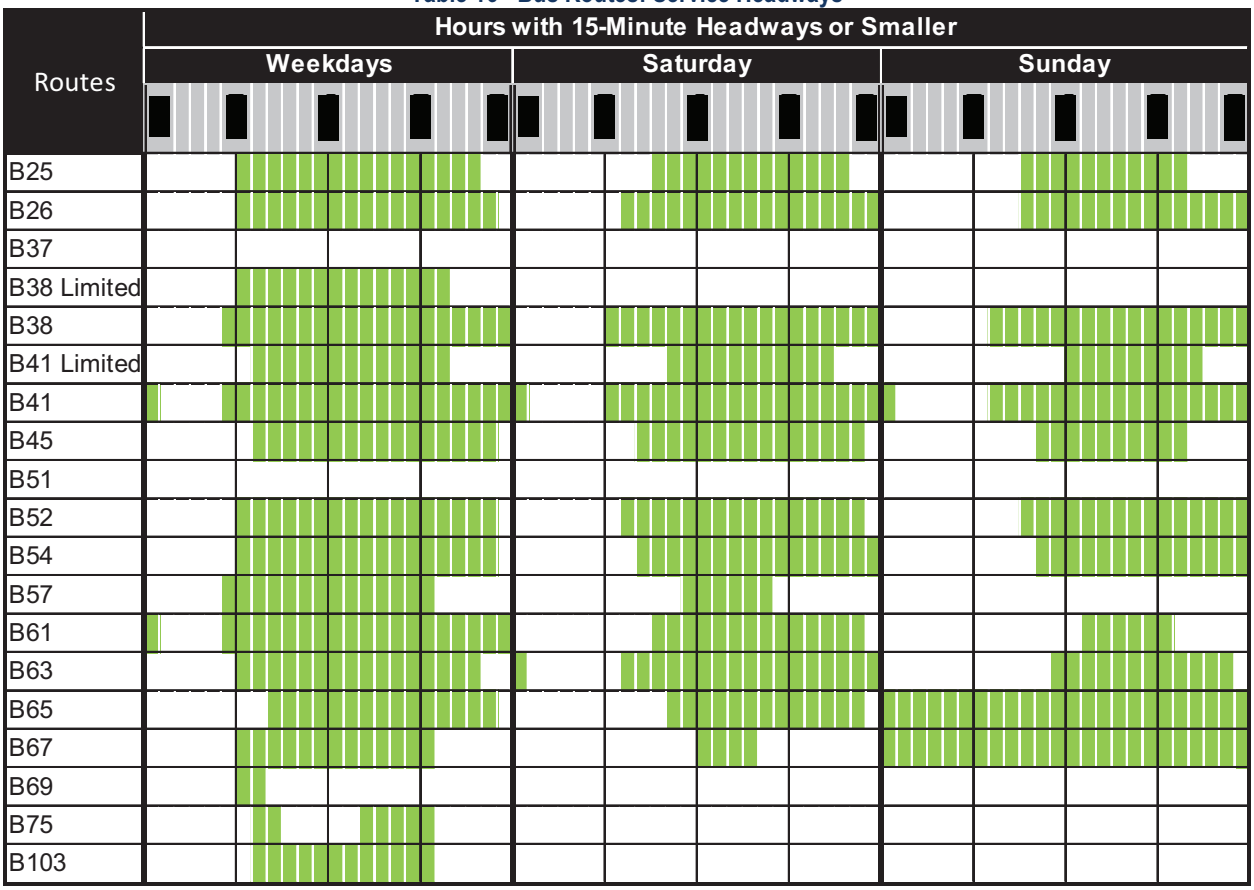
Service Frequencies

Table 16 presents bus route service levels in terms of the scheduled headways between bus runs. The headway is the amount of time elapsed between one bus leaving a station and another bus arriving there. The average amount of time that riders can expect to wait for a bus is equal to half of the headway. A 15-minute headway is a standard target for attempting to attract "choice" or casual riders. These individuals are riders who are prone to avoid service that requires schedule memorization or offers the risk of being "stranded" at a stop in the midst of a long headway. Fifteen minutes is generally considered to represent a high level of operator investment in service levels.

As shown in Table 16, 15-minute or better headways are standard for Study Area service from 6am to at least 7pm, with most routes running at such frequencies for much of the midday period and well into the

evening, even on Sundays. The conclusion drawn from this data set is that service is frequent enough throughout the Study Area to support choice and non-choice riders.

Table 16 - Bus Routes: Service Headways



Schedule Reliability

Table 17 summarizes MTA Wait Assessment surveys results for the B41, B41 Limited, and B63 routes. The table shows the percentage of observed service intervals (headways) that were deemed to be "on-time." A bus is considered to be on-time if it is no more than three minutes over the scheduled interval during peak hours and no more than five minutes over the scheduled interval during off-peak hours. As indicated in the table, roughly 80% of all service intervals observed during the surveys qualified as on-time.

Table 17 - Bus Routes: Sample Wait Assessment

	2007		2008		Average
Route	1st Half	2nd Half	1st Half	2nd Half	
B41	80%	79%	79%	77%	79%
B41 Limited	82%	78%	82%	80%	80%
B63	85%	82%	81%	80%	82%
All					80%

The fact that the B41 Limited service was slightly more reliable than the all-day B41 service indicates that performance of these downtown Brooklyn routes holds up reasonably well during peak hours. This is remarkable given that scheduled headways during these hours are smaller and the negative impact of traffic congestion on bus speeds will be greater than it is during off-peak periods. To perform this well during the peak, the MTA must provide significantly more vehicles to make up for the loss in vehicle speeds and to avoid a total breakdown of on-time performance. For example, the MTA runs three times as many B45 buses (15) between 4:00 and 5:00 PM as it does between 6:00 and 7:00 AM (five).

Bus Ridership and Bus Stop Volumes

Average daily ridership on the bus routes in the Study Area varies greatly. On weekdays, ridership ranges from 920 passengers (B51) to 39,323 (B41 / B41 Limited). Weekend ridership varies from 873 passengers (B61) to 31,627 (B41 / B41 Limited). Table 18 summarizes ridership on all Study Area routes.

Table 18 - Bus Routes: Ridership

Route	Average Daily Ridership		
	Weekday	Saturday	Sunday
B25	12,615	9,417	5,973
B26	11,367	8,882	6,289
B37	3,565	2,021	1,299
B38	23,061	14,455	10,197
B41 and B41 Limited	39,323	31,627	20,503
B45	9,227	7,040	4,744
B51	920	N/A	N/A
B52	14,821	9,804	6,939
B54	12,419	8,136	5,697
B57	5,670	2,805	1,791
B61	18,041	10,408	7,188
B63	14,315	12,993	9,996
B65	4,851	3,055	1,996
B67	6,897	3,348	2,414
B69	2,302	1,058	873
B75	3,528	2,377	1,445
B103	4,222	1,233	N/A

Passenger activity can best be shown by the number of riders boarding (getting on) and alighting (getting off) at each bus stop. As shown in Figure 29, Figure 30, Figure 31, and Figure 32, significant trip demand occurs at the following stops:

- Court Street at Joralemon Street
- Jay Street at Myrtle Avenue and Joralemon Street
- Fulton Street at Pearl Street, Smith Street and Flatbush Avenue
- Livingston Street at Smith Street
- Flatbush Avenue at 4th Avenue (Atlantic Terminal Station)

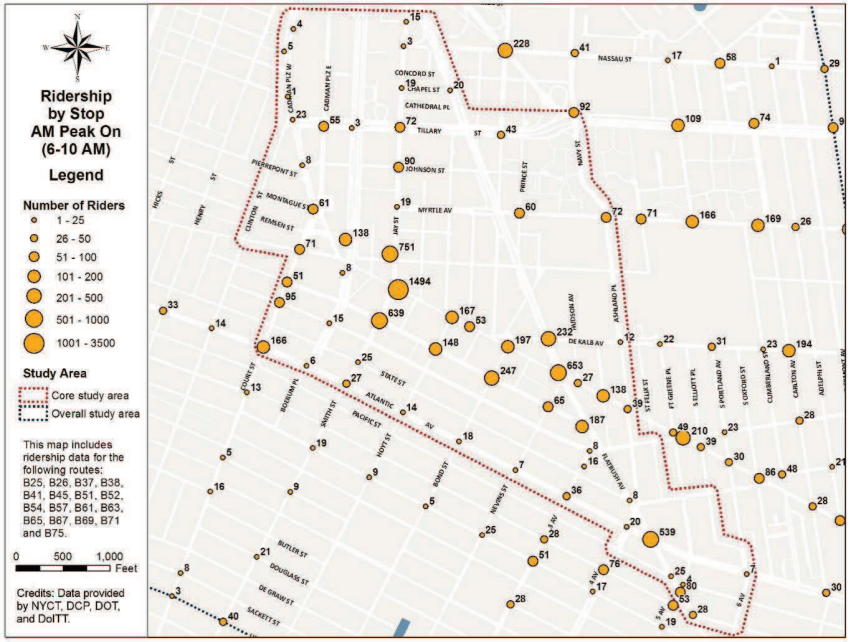


Figure 29- Bus Stop Ridership: Boarding, AM Peak Period

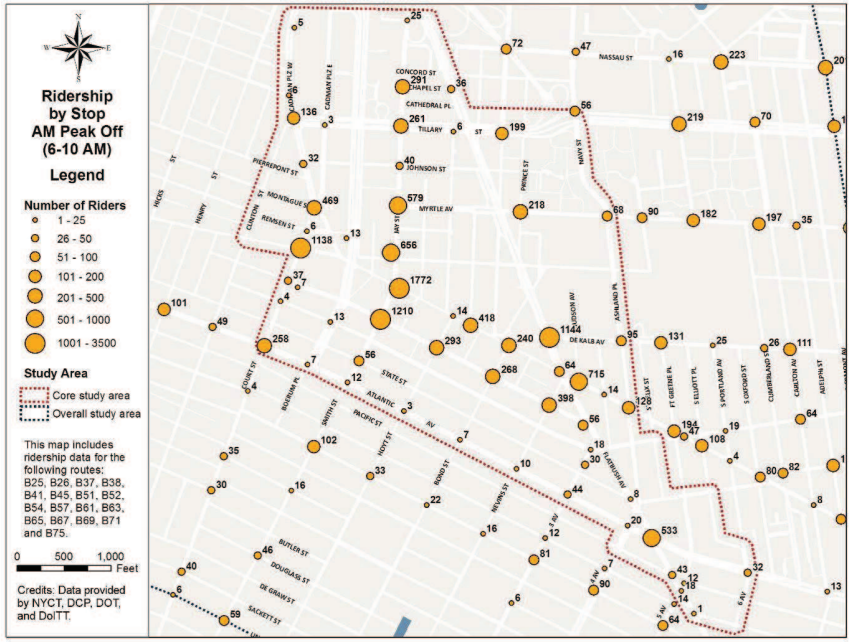


Figure 30- Bus Stop Ridership: Alighting, AM Peak Period

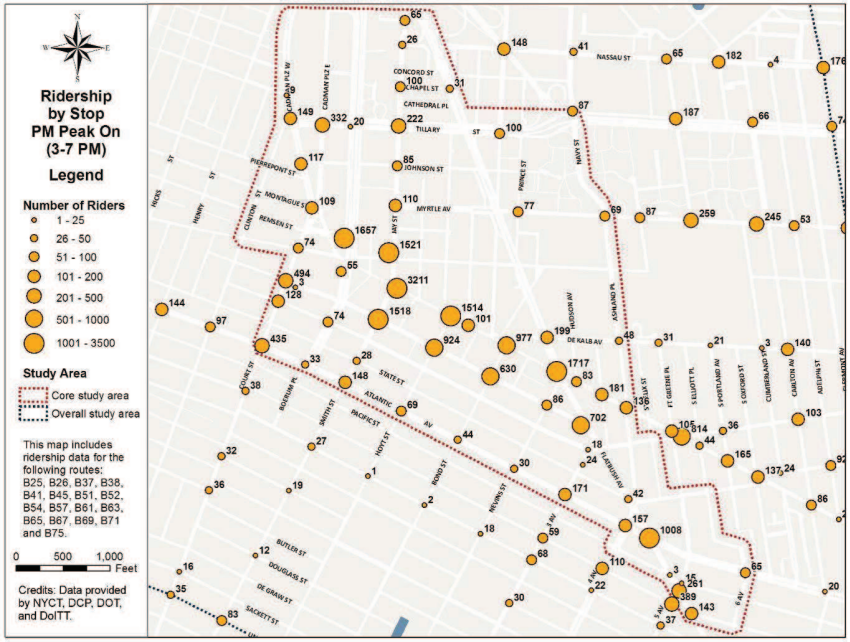


Figure 31 - Bus Stop Ridership: Boarding, PM Peak Period

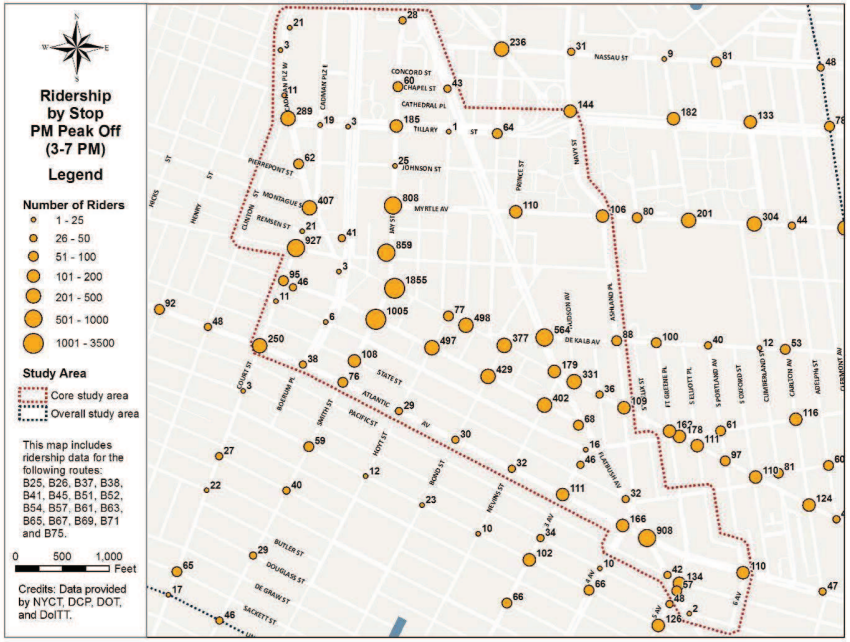


Figure 32 - Bus Stop Ridership: Alighting, PM Peak Period

As evident from comparing the population density patterns in Figure 22 (page 36) and the employment densities in Figure 23 (page 38) with the ridership patterns mapped above, high levels of bus boardings and alightings correlate with clusters of employment and subway access points in the Study Area.

Figure 24 (page 39) reinforces the finding that, even with variation between population-employment density patterns throughout the Study Area, current bus routes are well positioned to serve the area where the most people live and work. The bus stops at Flatbush Avenue / Fulton Street, Jay Street / Fulton Street, Jay Street/Livingston Street, and Court Street/Joralemon Street consistently show the highest boardings and alightings during all periods; these locations also coincide with high employment density. With more than 1,000 passengers boarding buses at these locations during the peak periods, these stops add significant dwell time, as it takes each passenger an average of more than four seconds to pay his or her fare. These locations may become opportunities to implement alternative payment procedures that could result in decreased dwell times and faster overall travel time.

Fulton Mall Reconstruction

Fulton Mall is currently being reconstructed. To accommodate this project, individual blocks will be limited to one lane of traffic while construction occurs on that block. Initially, flagmen have been utilized to route bi-directional bus traffic on those blocks where only one lane is available. With 685 NYCT buses currently operating along Fulton Mall each day, this is a condition that will significantly slow down bus operations, possibly to unacceptable levels. To mitigate this condition, NYCDOT is currently investigating alternative options to accommodate these routes on different streets during reconstruction. The DBSTCS Project Team will provide alternative routing options as a parallel effort to this overall study.

3.2 SUBWAYS

The transit system within the Study Area consists of surface transit as well as subway service. In fact, the Study Area benefits from an exceptionally high level of access to subways. There are eleven stations within the Study Area, and all points within the Study Area are within one half-mile of a subway station. The furthest one can get from a subway station in the Study Area is near the corner of Tillary Street and Navy Street. This location is roughly 0.4 miles from the Lawrence Street Station and within roughly one half-mile of five additional stations. This high density of subway service and the higher level of reliability inherent in a mode with a separated right-of-way (compared to one in mixed traffic) make subways an attractive and convenient option for many trips.

Span and Frequency of Services

As indicated in Table 19 and Table 20, the Study Area benefits from access to 14 subway lines, with over half (eight) offering 24-hour/7-day service. Additionally, the vast majority of routes (11) provide more than twelve consecutive hours of service at fifteen-minute frequencies or better every day.

Table 19 - Subway Routes: Operating Hours By Station

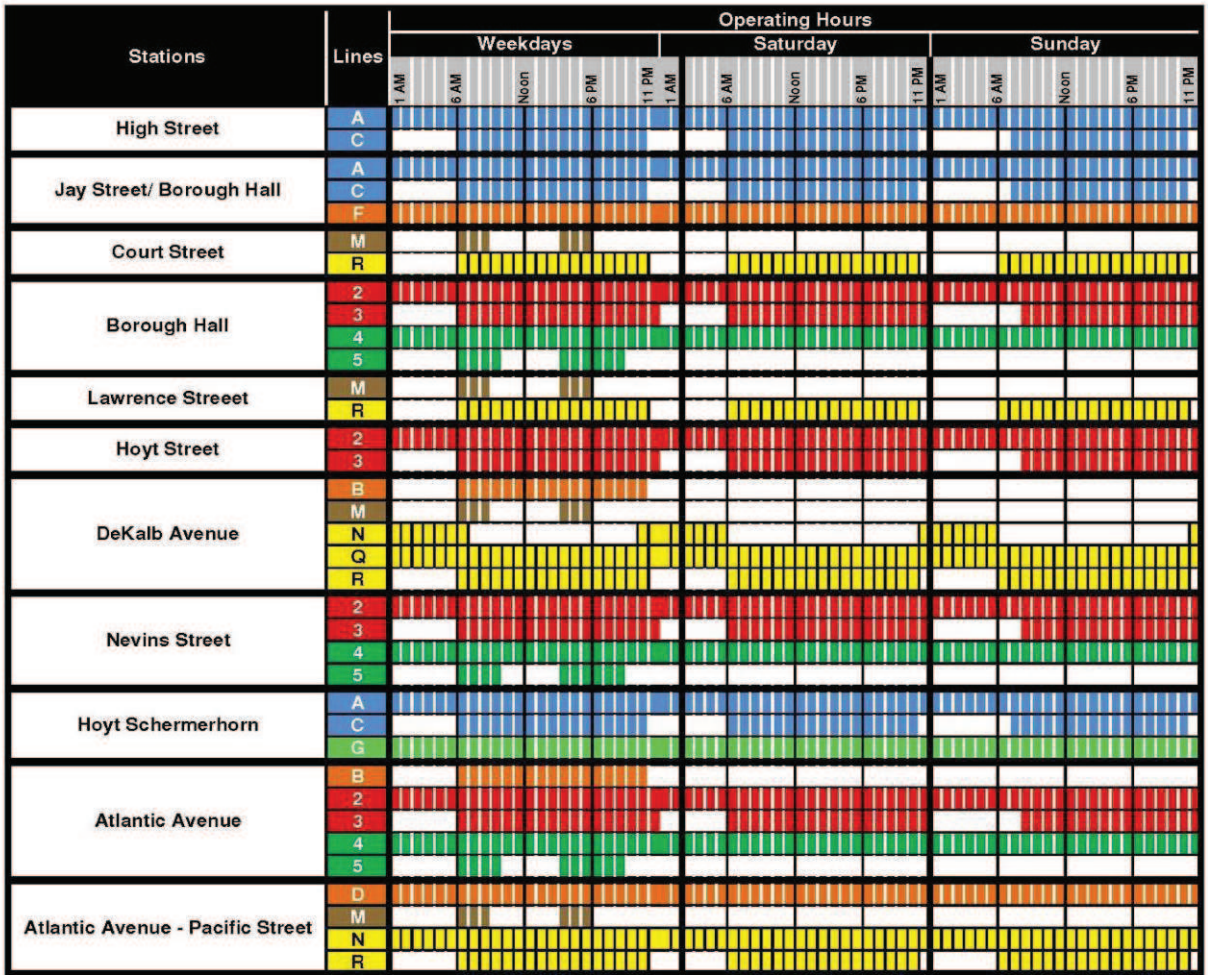
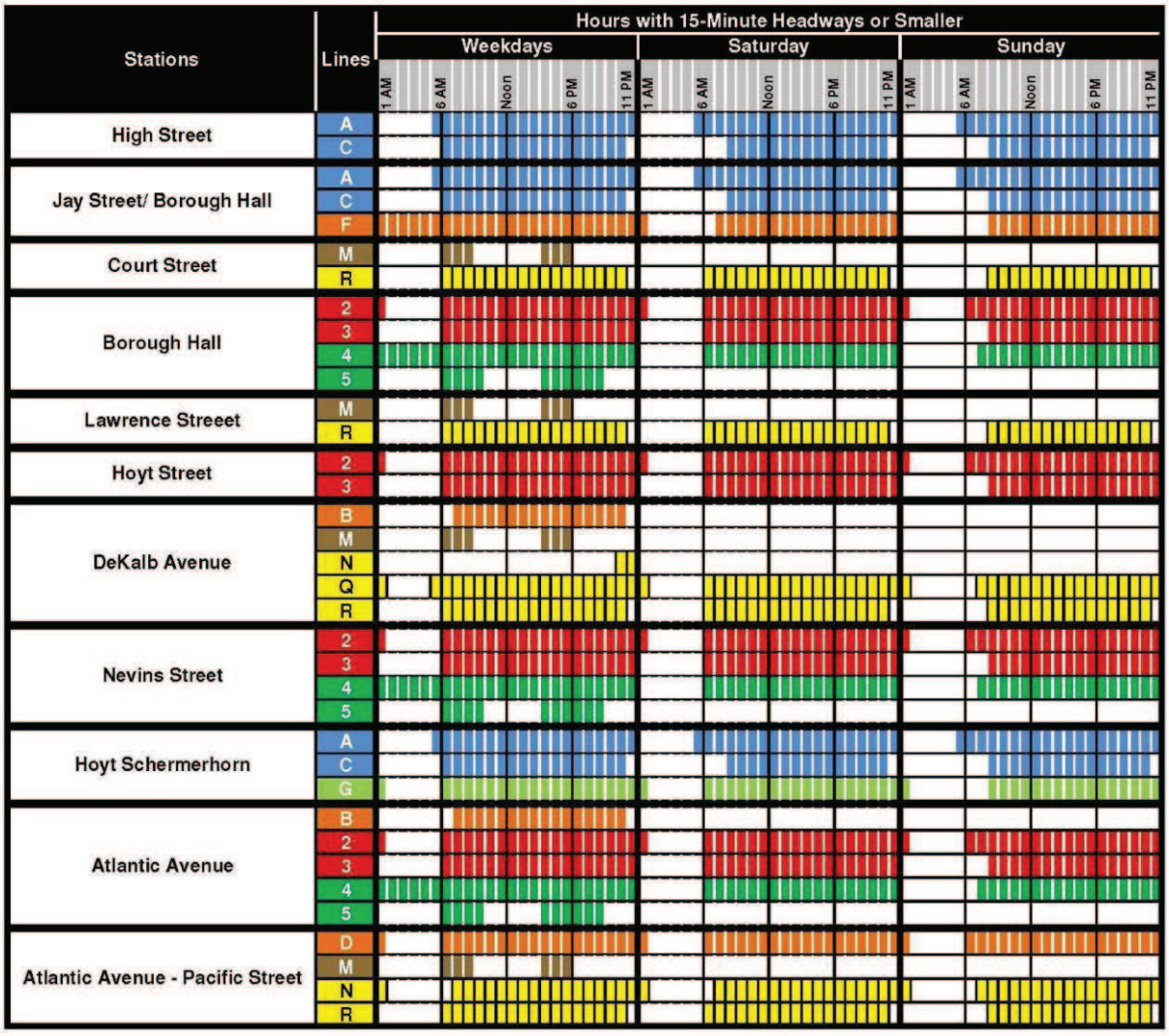


Table 20 - Subway Routes: Short Headway Hours by Station



Schedule Reliability

To assess the performance reliability of the subway lines in the Study Area, on-time performance was obtained from New York City Transit. Based on NYCT methodology, most subways in the study area have between 80 percent and 90 percent on-time performance (Table 21).

Table 21 - Subway Routes: Schedule Reliability

Line	On-Time Performance
A	83%
B	85%
C	87%
D	86%
F	81%
G	89%
M	88%
N	86%
Q	89%
R	87%
2	86%
3	85%
4	78%
5	83%

3.3 LONG ISLAND RAIL ROAD (LIRR) ATLANTIC AVENUE TERMINAL

Downtown Brooklyn is also served by commuter rail, with the LIRR operating out of Atlantic Terminal. Atlantic Terminal is located at Flatbush and Atlantic Avenues, and it consists of three platforms serving six stub-end tracks. As part of a 2004 upgrade to the subway station complex, LIRR ticketing facilities were relocated to a street-level concourse that also provides access to the Atlantic Terminal office and retail development located above the subway station complex. This concourse can be reached via stairs located on each platform.

Direct connections to key Downtown Brooklyn bus routes, including the B41, B45, B63, and B67 buses boarding along Flatbush Avenue, can be made at Atlantic Terminal. Also, the Atlantic Avenue/Pacific Street subway station complex, which incorporates the LIRR terminal, is a direct connection. Stairs connect each LIRR platform to a central connecting corridor that provides access to the Atlantic Avenue IRT, Atlantic Avenue BMT, and Pacific Street BMT subway stations. Direct access is also available to the platform for Manhattan-bound 2 and 3 trains, which is at the same level and adjacent to the LIRR platforms.

From Atlantic Terminal, LIRR trains operate to Jamaica, Queens and points east, with connections available to all LIRR branches except the Port Washington Branch. Based on recent schedules, the greatest number of LIRR trains arriving at Atlantic Terminal during the weekday AM commuter peak period peaks is 10 between 7:30am and 8:30am. During the weekday PM peak commuter period, upwards of nine LIRR trains are scheduled to depart Downtown Brooklyn in a one-hour period. During the weekday midday off-peak periods, trains typically arrive and depart Atlantic Terminal twice per hour.

Overall, the LIRR carries more than 270,000 passengers each weekday (approximately 81 million passengers per year) on ten branches serving 124 stations. An estimated 10 to 12 percent of all Downtown Brooklyn office commuters use the LIRR for their commute. In addition to serving Downtown Brooklyn,

Atlantic Terminal is also a major transfer point between the LIRR and the subway, especially for trips to and from Lower Manhattan.

3.4 COMMUTER VANS

In areas where users deem publicly-operated transit services to be too expensive or rigid, or where these services are far away or unavailable, private alternatives frequently are provided in the form of commuter vans. A function of the market, these privately-owned vehicles – often referred to as "dollar vans" – operate during times and/or in places where the cost and/or service limitations of formal public transportation services result in unmet market demand significant enough to attract consistent, formalized operations with designated routes, stops, and fare structures. Over time, these services have become established neighborhood fixtures.

New York City became responsible for authorizing and regulating commuter vans in 1994. The law defines commuter van service as a "common carrier of passengers… that provides a transportation service through the use of one or more commuter vans on a prearranged basis over non-specified or irregular routes, between a zone in a residential neighborhood and a location which shall be a work-related central location, a shopping center, recreational facility, or airport." Individuals wishing to start a commuter van operation must apply with the Van Licensing Division of the Taxi and Limousine Commission (TLC). Vans used for such services must seat between nine and twenty passengers.

In March 2009, the Project Team held a meeting with representatives from the Brooklyn Van Industry Association (BVIA) to discuss the history and role of commuter van service in Brooklyn. According to participants, commuter vans had the authority to operate in Brooklyn from 1997 to 2002. There were approximately 40 vehicles operating during this time. Since 2002, legal changes have limited licensed commuter van operation.

These legal changes make it so that becoming a licensed commuter van involves significant insurance and licensing fees. Operating a legal commuter van therefore tends not to be a profitable endeavor, especially considering that the 2008 fare increase from $1.50 to $2.00 resulted in a 25% decrease in commuter van ridership.[12] As a result, today more than 80% of commuter vans (approximately 125) are operating illegally, and 25 vans are operating legally.

Other key pieces of information provided by participants include:

- Approximately 80% of van users are from Caribbean cultures;
- There are approximately 20,000 daily van riders in Brooklyn;
- Current fare ($2.00) is less than the current base NYCT base fare ($2.25);
- In 2005, there were 8,000 summonses for van violations – 91% were issued to legal operators[13];
- Key van pick-up and drop-off points within the Study Area are Court Street and Livingston Street;
- 75-80% of all van traffic is on Flatbush Avenue;
- Trip duration is approximately one half-hour from Kings Highway to Downtown Brooklyn; and
- Each van makes an average of twelve to thirteen trips per day.

[12] Brown, Stephen Rex. "For the Dollar Vans, a Gleam in the Eye." *New York Times*. March 8, 2009.
[13] According to BVIA representatives, illegal van operators are more adept at evading summonses.

Based on this information, the Brooklyn commuter vans can be viewed as support services to the bus and subway services provide by NYCT. Since the vans primarily pick-up and drop-off at specific locations within the Study Area and do not generally circulate, the conclusion is that the vans are not indicative of unmet transit demand within the area. Coordination of van and bus pick-up/drop-off locations could improve service quality (in terms of transfers and information) between transit systems.

At the same time, Community Board 2 and local residents have expressed concerns about the operation of commuter vans in Downtown Brooklyn. The vans have been associated with unsafe and aggressive driving, and they often interfere with city buses. This interference occurs when commuter vans pull into bus stops in an attempt to solicit passengers, thereby blocking buses from entering the stops. This especially happens along high-volume bus routes, like the B41. To mitigate this interference with city buses, vans have been banned from Fulton Street Mall. When trying to get the attention of potential riders, commuter vans also have been observed to use a significant, and often excessive, amount of horn honking. Such activities damage the reputation of commuter vans so that they may not be seen as a preferable form of transportation within Downtown Brooklyn.

4. EXISTING SURFACE TRANSIT AND TRAVEL CHARACTERISTICS

4.1 CORRIDOR IDENTIFICATION

To facilitate analysis of the Core Study Area, four study corridors were identified within Downtown Brooklyn that reflect not only distinct areas and characteristics of the urban core, but also differing circulation patterns and travel needs. These four corridors were initially identified through discussion with the project's Steering Committee, comprised of representatives of the Downtown Brooklyn Partnership, New York City Transit, the New York City Department of Transportation, and the URS Study Team. The four corridors identified include the following:

- JayStreet/Adams Street/Cadman Plaza Corridor
- Fulton Street/Livingston Street Corridor
- Atlantic Avenue Corridor
- Flatbush Avenue Corridor

These corridors all feature a significant amount of surface transit service. Table 22 shows the frequency of peak period buses at representative stops within each corridor.[14]

Table 22 - Buses per Hour at Key Stops in Corridors

Corridor	Stop	# of Bus Routes	Average Buses Per Peak Hour			
			AM Peak		PM Peak	
			to Downtown	from Downtown	to Downtown	from Downtown
Jay Street / Adams Street / Cadman Plaza	Joralemon St & Court St	8	63	57	67	67
Fulton Street / Livingston Street	Fulton St & Hoyt St	5	43	39	45	44
Fulton Street / Livingston Street	Livingston St & Hoyt St	5	34	30	37	39
Atlantic Avenue	Atlantic Ave & Flatbush Ave	4	30	28	35	36
Flatbush Avenue	Livingston St & Flatbush Ave	5	34	30	37	39

Jay Street/Adams Street/Cadman Plaza Corridor

The Jay Street/Adams Street/Cadman Plaza corridor generally runs in a north-south orientation and is bounded by Red Cross Place adjacent to the entry ramps to the Brooklyn Bridge on the north, Jay Street on the east, Cadman Plaza West on the west, and Atlantic Avenue on the south.

From a land-use perspective, this corridor is characterized by a predominance of institutional and educational facilities in its northern section and includes major trip generators such as Brooklyn Borough Hall, the U.S. Court House, and N.Y. State Supreme Court buildings adjacent to Cadman Plaza, as well as

[14] Buses per Hour was calculated using information from NYCT bus timetables (April 2009). First, the number of buses scheduled to arrive at each station during the peak period (AM Peak: 6am to 10am, PM Peak: 3pm to 7pm) was summed. That number was then divided by the number of hours in the period (four) to determine the average number of buses arriving per hour

the U.S. Post Office building, Brooklyn Law School, NYCDOT's Brooklyn offices at 16 Court Street, and the Metro Tech complex, which is adjacent to the eastern edge of the corridor and houses NYU Polytechnic University. Land use characteristics of the corridor change south of Joraleman Street/Fulton Street to reflect Downtown Brooklyn's commercial activities, including stores like Trader Joe's and Barnes and Noble bookstore. The corridor ends at Atlantic Avenue, which has its own unique identity and characteristics described later in this report.

The primary focus of this corridor analysis is to document the north-south surface transit characteristics and congestion issues, and to consider impacts of NYCT's bus layover operations at Cadman Plaza. This corridor overlaps with the Fulton/Livingston Street corridor which is also described separately.

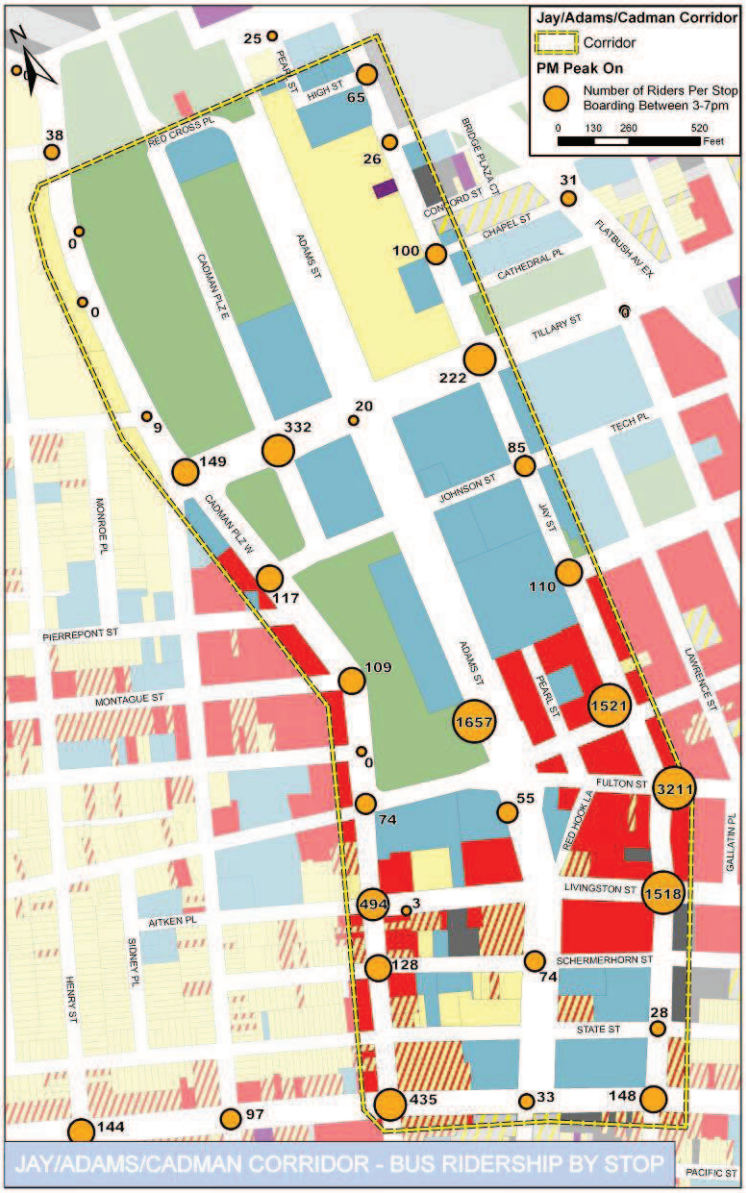


Figure 33 - Bus Ridership by Stop in Jay / Adams / Cadman Corridor

The Jay Street/Adams Street/Cadman corridor is defined by three main urban arterials, which include Court Street, Adams Street, and Jay Street / Smith Street, which all run north/south in the Downtown Core Study Area. In the Study Area, Court Street begins as a bi-directional arterial from Cadman Plaza West and becomes a single-direction southbound arterial at Joralemon Street. Adams Street is a bi-directional divided arterial throughout the entire length of the corridor; south of Fulton Street, Adams Street turns into Boerum Place, remaining bi-directional to Atlantic Avenue. From the north, Jay Street is bi-directional to Fulton Street, becoming Smith Street below this intersection. Smith Street is bi-directional between Fulton Street and Livingston Street, then one-way in a northerly direction from Atlantic Avenue to Schermerhorn Street.

Figure 33 shows bus ridership by stop within the Jay Street / Adams Street / Cadman Plaza corridor during PM peak hours (boarding). The numbers reflect relatively low boardings during the PM peak at the northern end of the corridor along Tillary Street. Boardings during the four-hour PM peak period (3 PM to 7 PM) total only 723 passengers for the four stops on Tillary Street, between Cadman Plaza and Jay Street, for all

bus routes. The busiest single stop in the corridor during the PM peak period is at Jay Street/Fulton Street, where boardings total 3,211. Borough Hall at Joralemon Street is also a prime destination in the evening, with nearly 1,000 alightings during the PM peak.

Heavy boardings also occur at Jay and Willoughby Streets (1,521), at Adams and Willoughby Streets (1,657), and at Jay and Livingston Streets (1,518). These numbers reflect commuter activity generated by the court houses and other institutional employment centers, the heavy inbound and outbound ridership from the Jay Street/Borough Hall subway stop connection, and the considerable commercial activity from the adjacent Fulton Street/Livingston Street corridor. There are very light boardings on Cadman Plaza West, where buses layover. This is attributed to the time saved by walking east across Columbus Park and boarding the same routes on Adams Street, thereby catching buses en route and avoiding layover time.

Cadman Plaza

Cadman Plaza is an urban park located in what was once a central Elevated train and trolley system terminal area known as Sands Street (Figure 34). Most Brooklyn trolley lines traversed the Brooklyn Bridge and terminated in Manhattan. The bus system that eventually replaced trolleys did not terminate in Manhattan, and with no central terminal, these lines terminated in different locations in the area in and around Cadman Plaza West and Tillary Street, thereby forever changing the travel patterns and characteristics of Brooklyn's transit system.

Figure 34 - Construction of Cadman Plaza

Today, Cadman Plaza is the primary layover point for a large percentage of Downtown Brooklyn's buses operated by NYCT (Figure 35). It serves as both a layover point for buses and for bus recovery time for some of NYCT's longer bus routes. Some routes, such as the B41, have trip times in excess of one hour during peak hours. During peak hours, at least one bus per route is in layover for eight to ten minutes along Cadman Plaza West and Tillary Street, and as many as two buses layover for routes with both Limited and regular service. A total of 12 bus routes stop or layover at Cadman Plaza. Bus turning conflicts can be observed daily at the corner of Tillary Street and Adams Street due to tight clearance and turning radius issues shortly after buses re-start their return route from Cadman Plaza West.

Figure 35 - Cadman Plaza Bus Layover Area

Fulton Street/Livingston Street Corridor

The Fulton Street/Livingston Street Corridor runs in an east-west orientation and is bounded by Court Street to the west, Atlantic Avenue Terminal to the east, and Livingston Street and Fulton Mall to the south and north, respectively.

This corridor is the heart of Downtown Brooklyn's commercial area, as indicated in Figure 36, where land uses highlighted in dark red represent commercial and office buildings. The corridor is a combination of

significant portions of the Court Livingston Schermerhorn Business Improvement District (BID) and the Fulton Street BID. This is also the only corridor within the Study Area with bus only lane operations, as described in the previous section.

Figure 36 shows ridership by stop along Fulton and Livingston Streets for PM peak hour boardings (3 PM to 7 PM). During this peak period, a total of 13,322 passengers board buses on these two streets - the highest levels of any corridor in the Study Area.

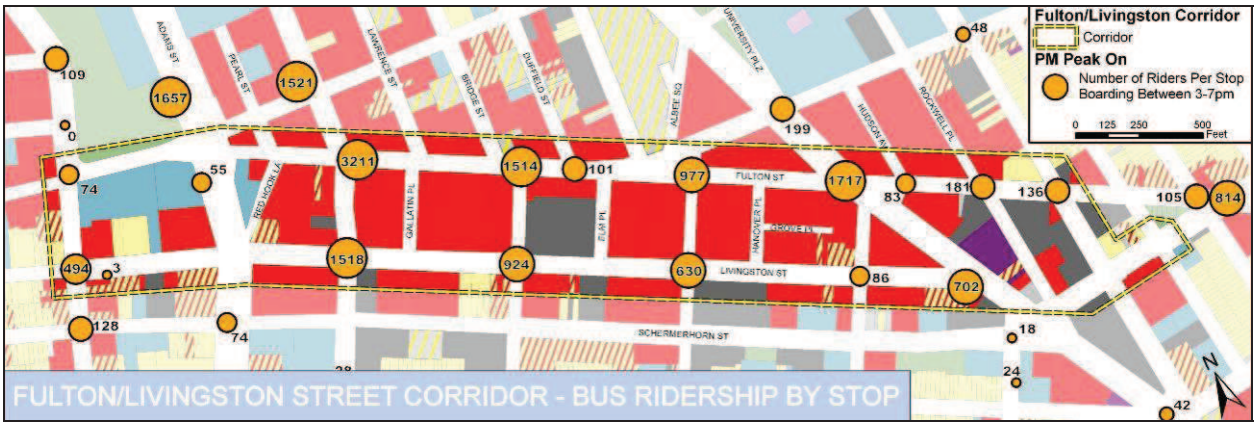


Figure 36 - Bus Ridership by Stop in Fulton / Livingston Corridor

The Fulton Street/Livingston Street Corridor is the focus of a separate report, the Fulton Streetscape Project, which is currently in preparation.

Atlantic Avenue Corridor

Atlantic Avenue is one of the oldest streets in Brooklyn, dating back to the 1700s. Today, the street retains some of its historical identity, offering a mix of ethnic restaurants, specialty food shops, antique, furniture and other boutiques. Atlantic Avenue is a bi-directional, four-lane urban arterial, with separate parking lanes on each side. The eastbound parking lane between Boerum Place and 4th Avenue serves as a travel lane from Monday to Friday between 4PM and 7PM. Despite this additional lane of capacity, traffic is extremely heavy between 3rd Avenue and 4th Avenue during the PM Peak.

Key bus routes serving Atlantic Avenue include the B61, B63, and B65. Bus ridership during the PM peak period is relatively light compared to the Fulton Street/Livingston Street corridor (Figure 37). Between Court Street to 4th Avenue, a total of 1,087 passengers boarded during the four-hour PM peak period.

Figure 37 - Bus Ridership by Stop in Atlantic Avenue Corridor

Flatbush Avenue Corridor

Flatbush Avenue is considered the "arterial gateway" to Brooklyn and is one of the busiest arterials in the Study Area. It provides a six-lane, bi-directional link to the Brooklyn Bridge and is the principal connector to the rest of Brooklyn. Land use along Flatbush Avenue reveals rapid development of new residential housing units, which will be discussed in more detail in the Future Conditions report. North of the Atlantic Avenue Terminal and the Fulton Mall area, there is relatively little bus service along Flatbush Avenue within the Core Study Area. The B51 route provides stops near Tillary at Flatbush Avenue/Chapel Street at the northern end of the Core Study Area, In addition, the B54 route provides stops at Flatbush Avenue/DeKalb Street and at Flatbush Avenue/Myrtle Avenue. The lack of bus service along this section of Flatbush Avenue is evident when looking at the PM Peak ridership within the corridor, as only 31 passengers board at Chapel Street/Flatbush Avenue during this 4-hour period (Figure 38). Significant bus service operates along Flatbush Avenue south of Livingston Street. Improving bus service within the Study Area may require addressing operational issues in this area as well.

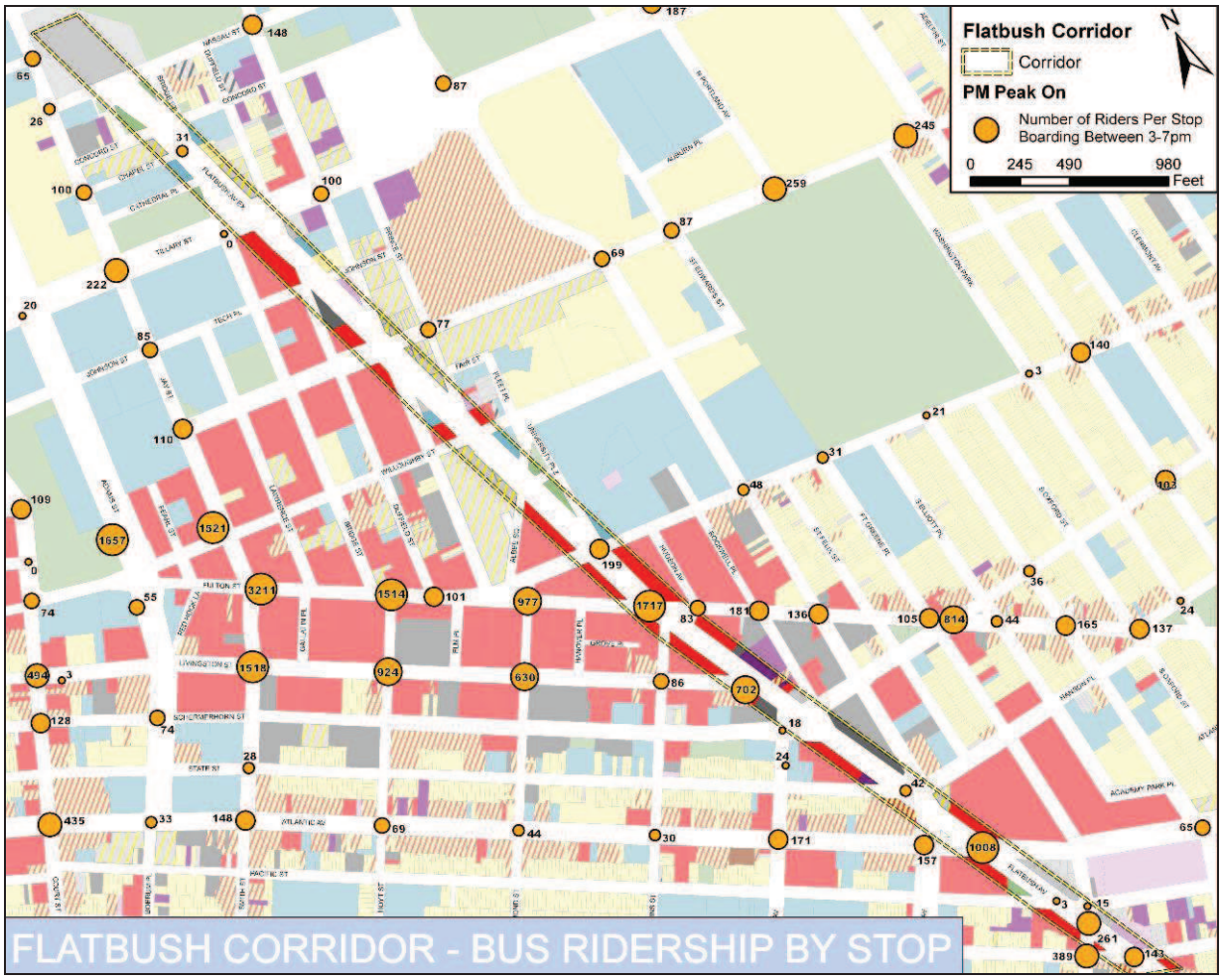


Figure 38 - Bus Ridership by Stop in Flatbush Avenue Corridor

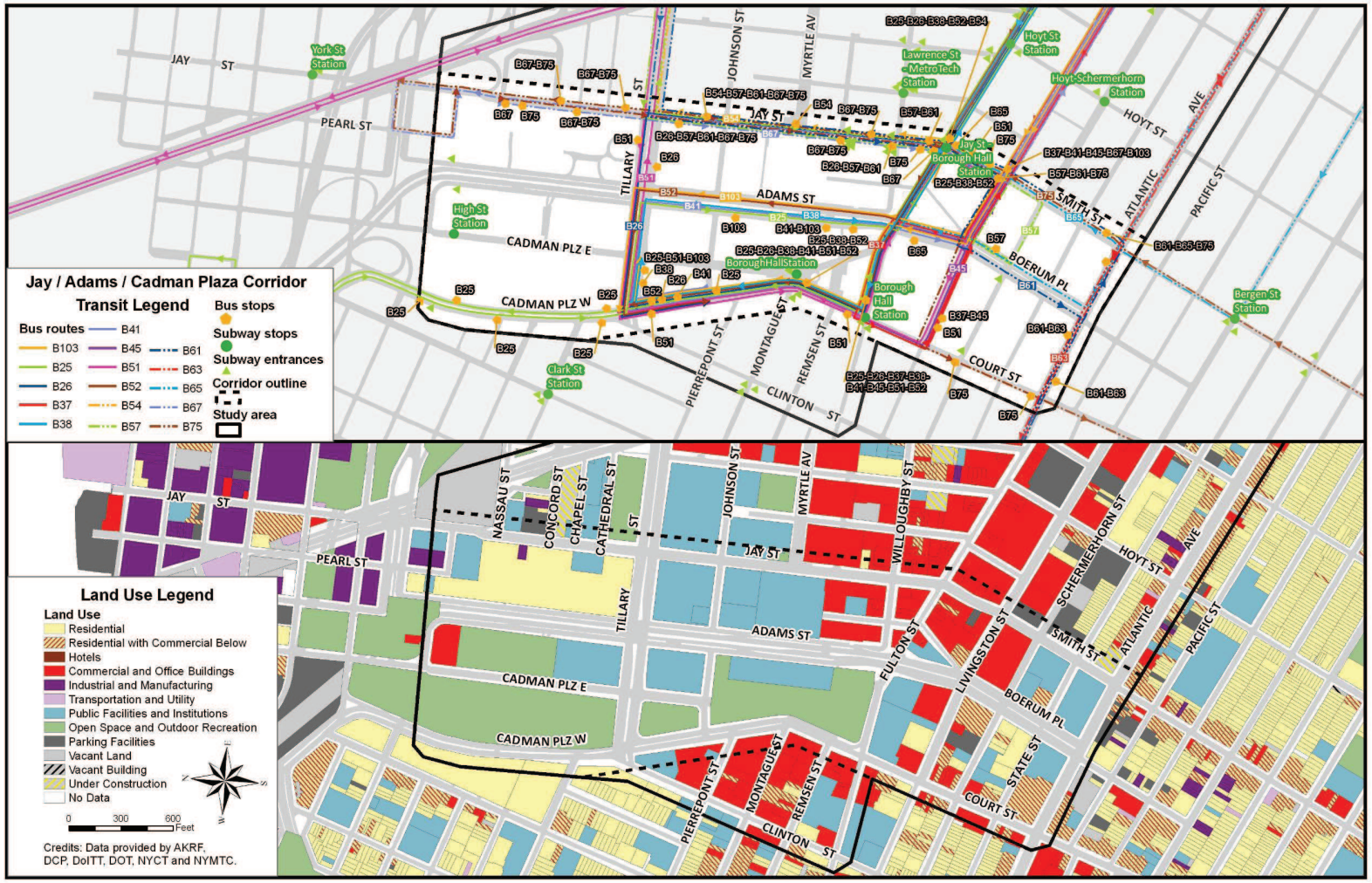


Figure 39 - Jay / Adams / Cadman Plaza Corridor

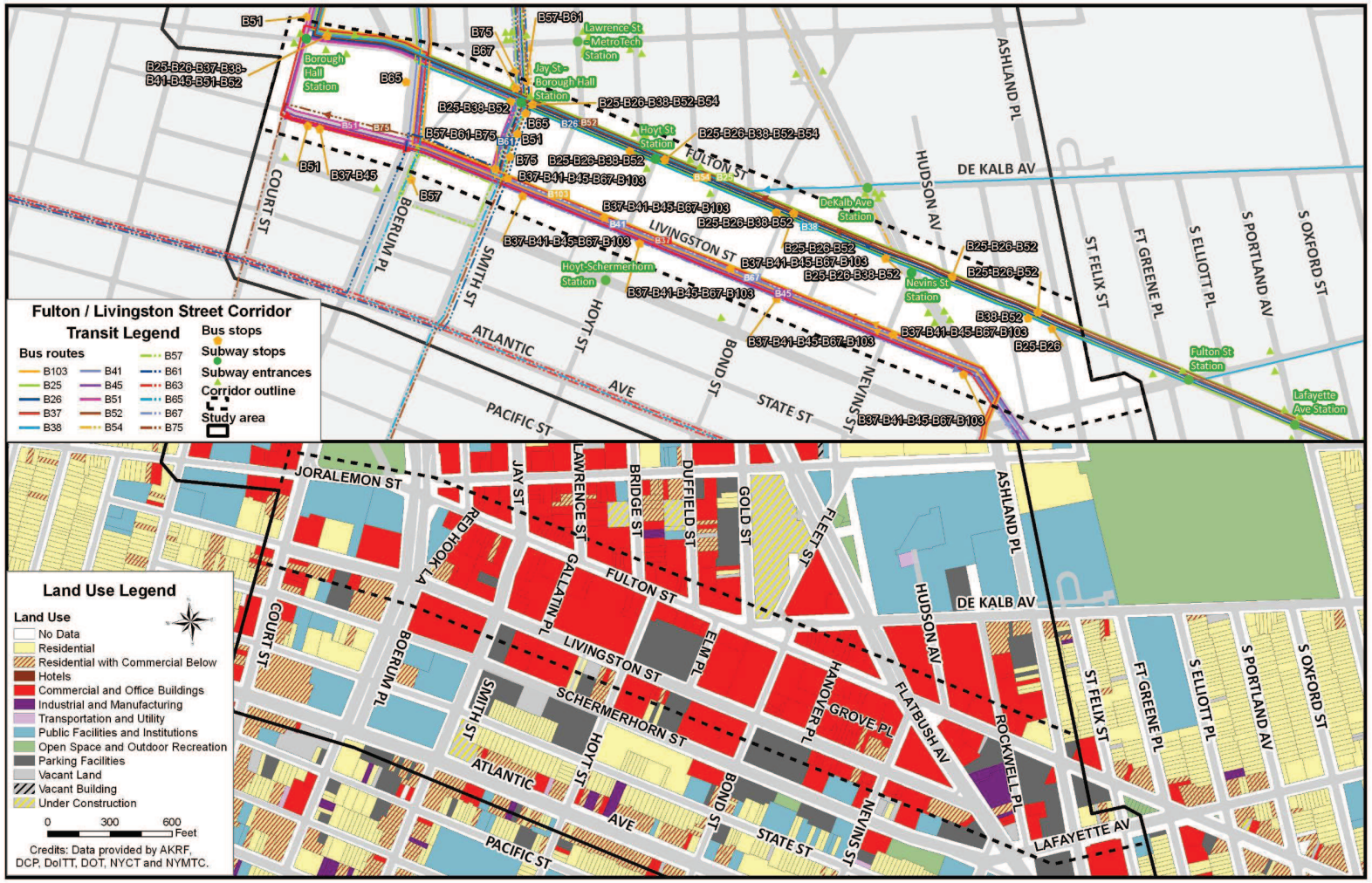


Figure 40 - Fulton / Livingston Street Corridor

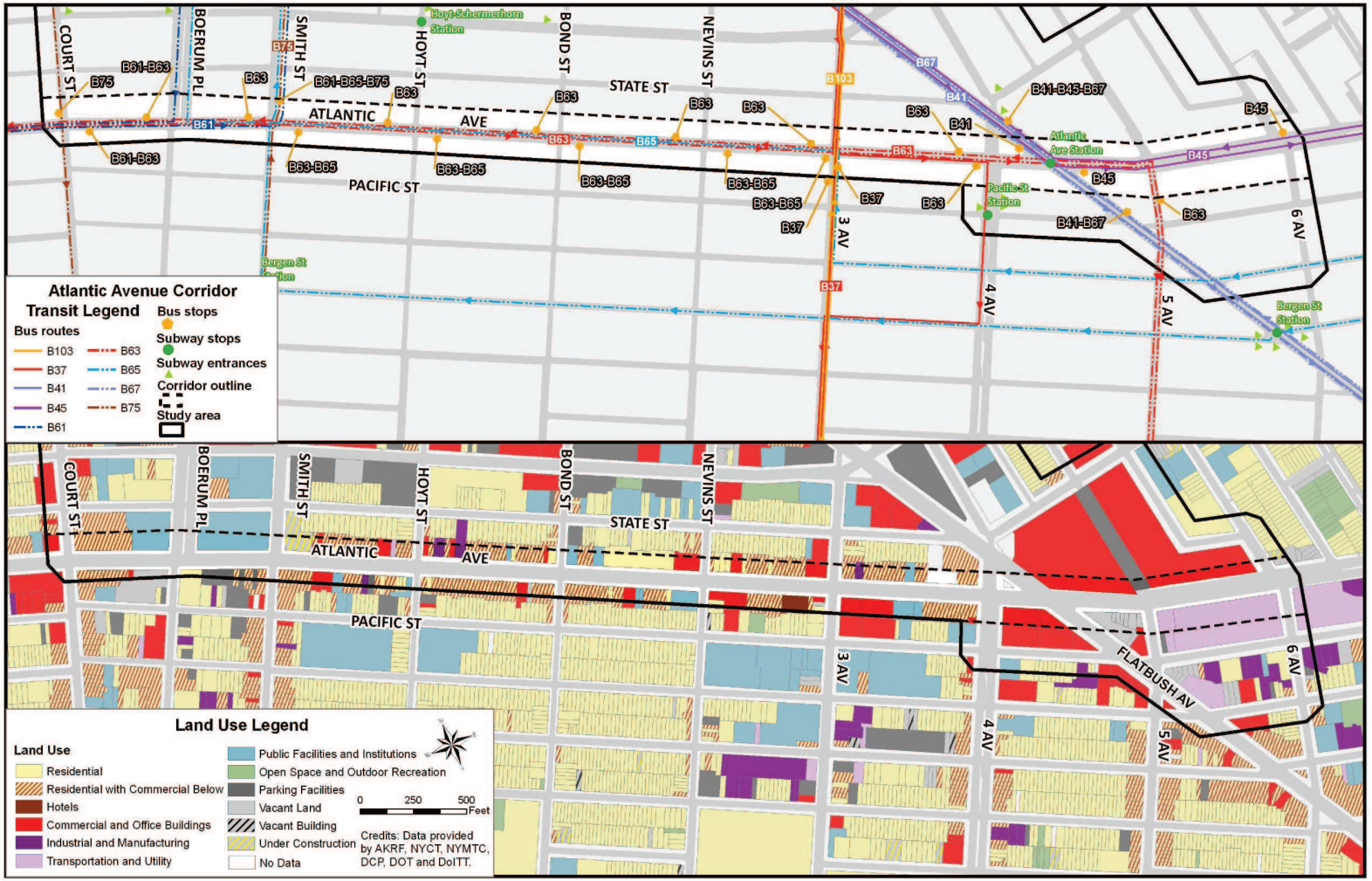


Figure 41 - Atlantic Avenue Corridor

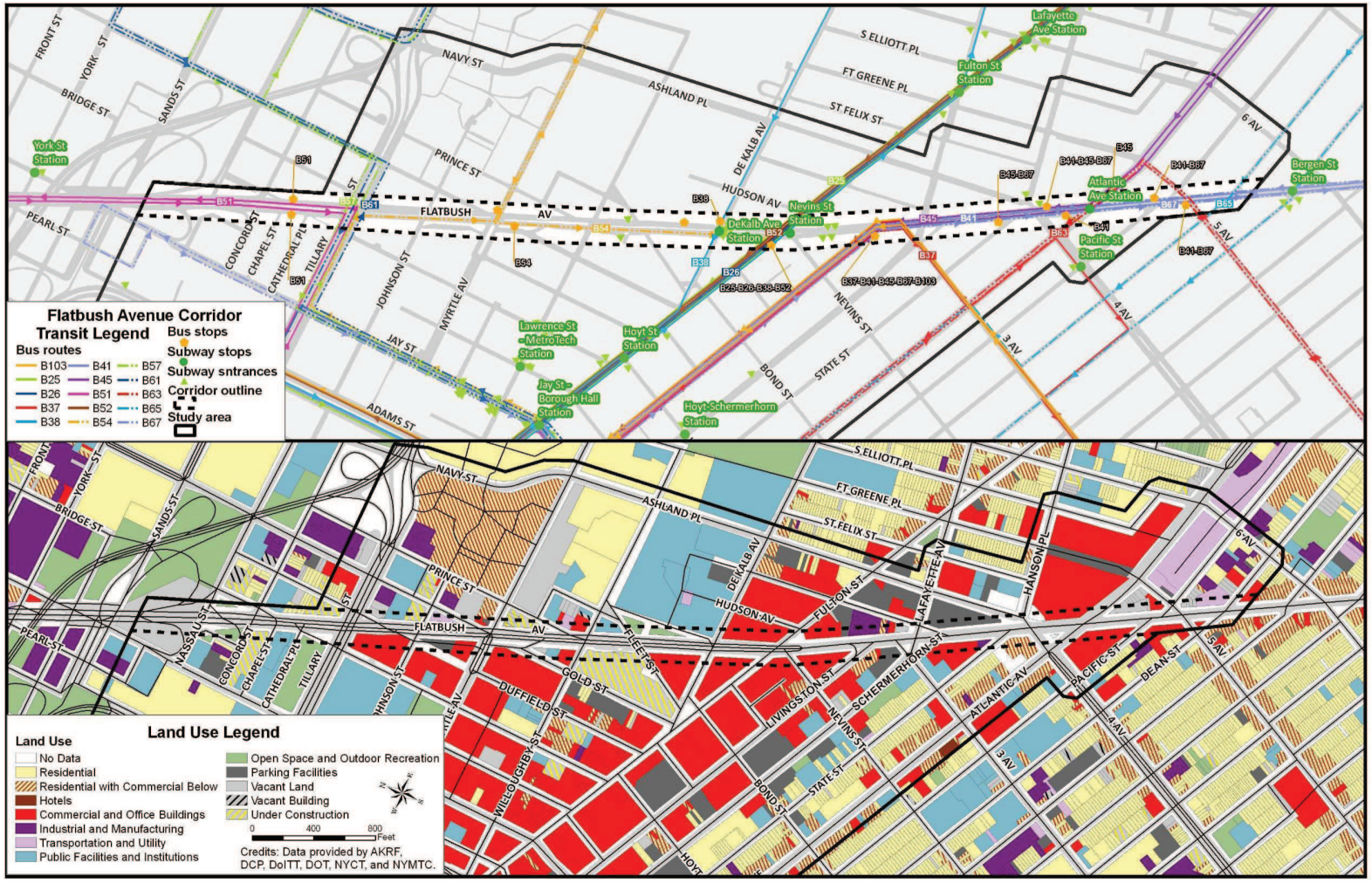


Figure 42 - Flatbush Avenue Corridor

4.2 JOURNEY TO WORK

The percentage of Study Area residents who use transit to get to work is significant (Table 23). The majority of Core Study Area residents (63%) take the subway to get to work. An additional 13% of residents walk to work, and another 12% drive. At the same time, only 2% of residents who live in the Core Study Area take the bus to work. The modal distribution of the Core Study Area is similar to that of the Overall Study Area.

Table 23 - Journey to Work Modal Split (2000 US Census)

Area	% Car	% Bus	% Streetcar/ Trolley	% Subway	% Rail	% Ferry	% Taxi	% Bike	% Walk	% Other	% Work at home
Core Study Area	12.0	2.0	0.3	62.6	1.6	0.1	1.4	1.4	12.7	0.5	5.5
Overall Study Area	13.2	3.2	0.2	63.1	1.1	0.0	0.8	1.0	11.0	0.5	5.9
Brooklyn	30.4	10.4	0.2	44.8	1.4	0.0	0.7	0.5	8.8	0.5	2.3
New York City	32.9	11.4	0.2	37.6	1.6	0.4	1.7	0.5	10.4	0.5	2.9

Although the percentage of people using public transit in Study Area is high, there are still areas with unmet transportation demand. Figure 43 identifies areas where the use of public transit is lower than other areas in the Overall Study Area. In these areas, improving the surface transportation system could encourage more people to choose the bus as their mode of transportation to work.

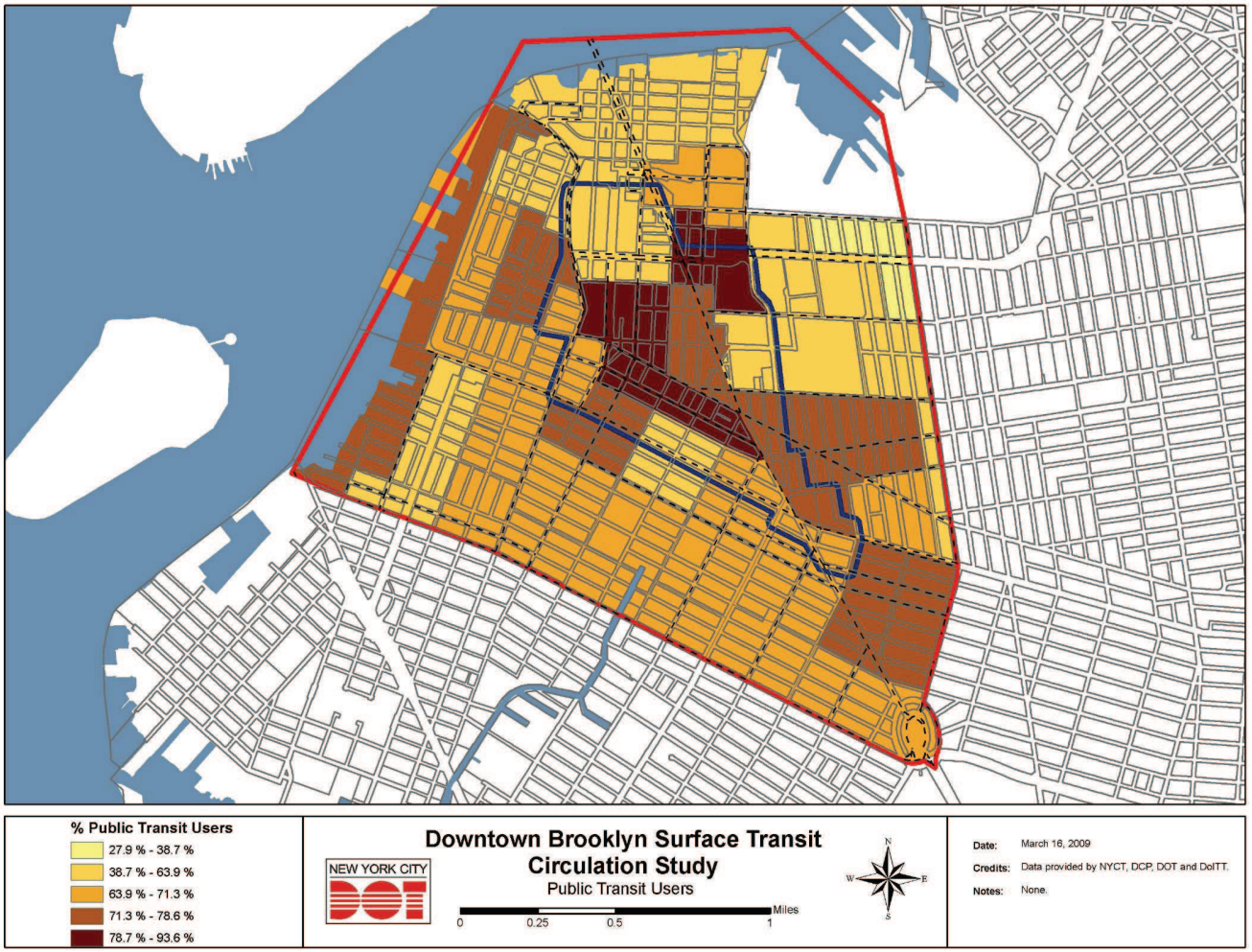


Figure 43 - Journey to Work, Percent Using Public Transit (US Census)

While the above analysis looks at the mode choices of people living within the Study Area, it also important to understand the travel patterns of individuals who work in Downtown Brooklyn.[15] Table 24 and Table 25 complement the data displayed in Figure 44. Of the people who work in Downtown Brooklyn, approximately 74% of them work within the Core Study Area. The origins of workers going to both the Overall and Core Study Areas are similar. The majority of workers live in Brooklyn, but of these individuals, most do not live within the Overall Study Area. The next most common residence of workers in Downtown Brooklyn is Queens. Relatively few workers commute from Manhattan, Staten Island, and the Bronx.

Table 24 - Residences of Employees in the Study Area

Residence of Employee	Overall Study Area		Core Study Area	
	Number of Employees	Percent	Number of Employees	Percent
Bronx	6,280	4.9%	5,303	5.6%
Brooklyn	84,138	65.5%	60,218	63.2%
Overall Study Area	*11,539*	*9.0%*	*5,369*	*5.6%*
Other	*72,599*	*56.5%*	*54,849*	*57.5%*
Manhattan	8,432	6.6%	6,079	6.4%
Queens	22,550	17.6%	18,056	18.9%
Staten Island	6,982	5.4%	5,674	6.0%
Total	128,382	100%	95,330	100%

Overall, 18.6% of workers who commute to the Core Study Area do so by bus (Table 25 and Figure 44). Bus travel is most common among residents of Brooklyn, who take the bus 12.7% of the time. Bus commuting is more common between other parts of Brooklyn and the Core Study Area (13.1%), but 8.5% of people who live in the Overall Study Area and work in the Core Study Area still use the bus to get to work. This compares with only 3.2% of all workers who live in the Overall Study Area who commute to work by bus. A significant percentage of workers from Staten Island also commute to the Core Study Area by bus. Relatively few commuters take the bus from the Bronx, Queens, and Manhattan, likely because most people choose to use the subway for long distance travel.

Table 25 - Bus Ridership of Employees in the Study Area

Residence of Employee	Overall Study Area			Core Study Area		
	# Total Employees	# Employees who Take the Bus	% Employees who Take the Bus	# Total Employees	# Employees who Take the Bus	% Employees who Take the Bus
Bronx	6,280	471	7.5%	5,303	389	7.3%
Brooklyn	84,138	10,141	12.1%	60,218	7,621	12.7%
Overall Study Area	*11,539*	*668*	*5.8%*	*5,369*	*457*	*8.5%*
Other	*72,599*	*9,473*	*13.0%*	*54,849*	*7,164*	*13.1%*
Manhattan	8,432	419	5.0%	6,079	328	5.4%
Queens	22,550	1,484	6.6%	18,056	1,080	6.0%
Staten Island	6,982	880	12.6%	5,674	671	11.8%
Total	128,382	23,536	12.1%	95,330	17,710	18.6%

[15] The data does not include information about workers who live outside of New York City (e.g. New Jersey or Long Island).

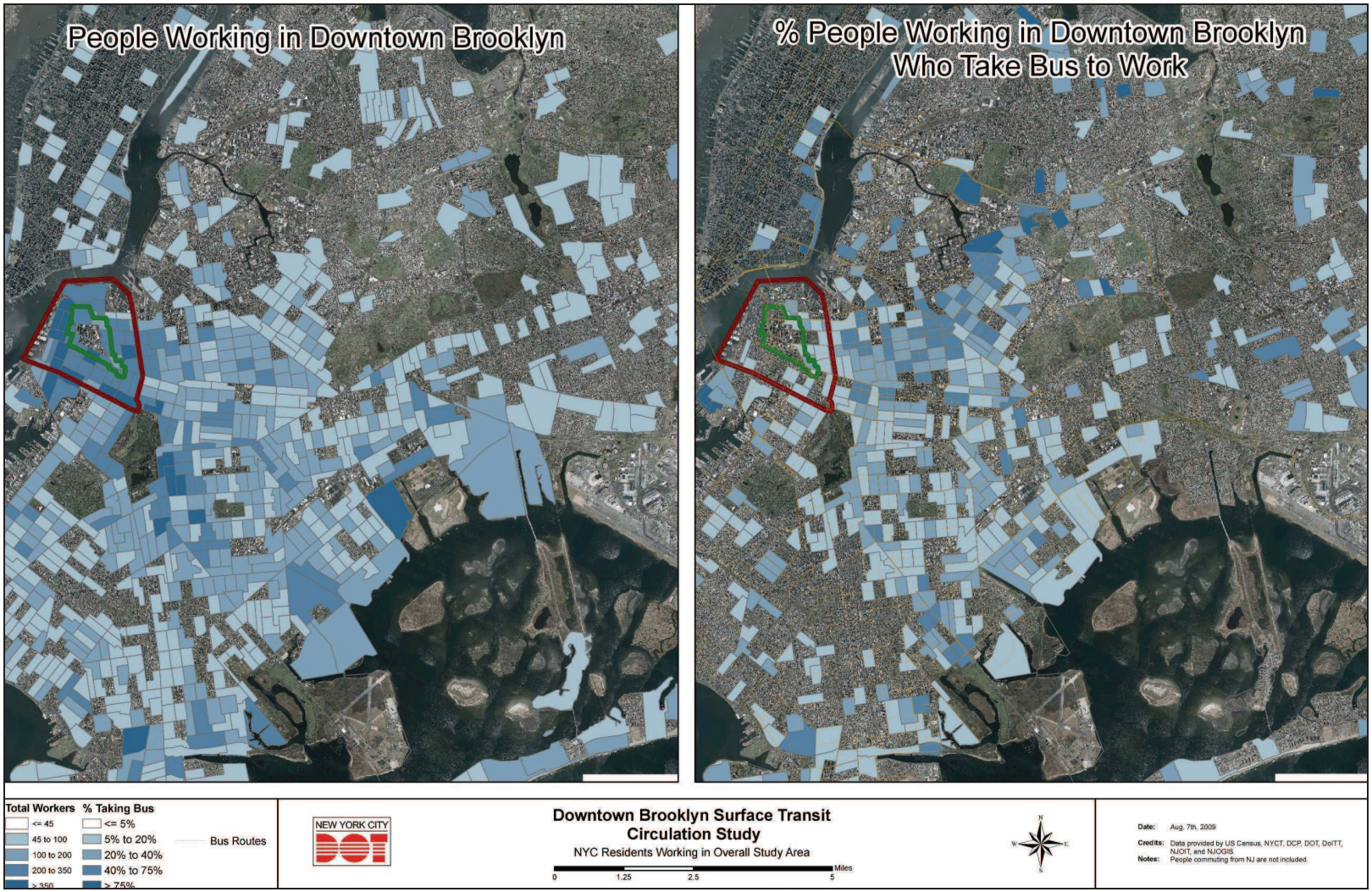


Figure 44 - New York City Residents Working in the Overall Study Area

4.3 FIELD OBSERVATIONS

A number of site investigations were conducted within the Study Area between February and June, 2009. This included developing a database of project photos, including a number presented in this report. Observations were made at a number of key intersections, including Flatbush/Atlantic Avenue, Smith and Livingston, Adams/Tillary, Cadman Plaza West/Johnson Street, Atlantic Ave/Hicks, Jay/Fulton, Flatbush/Fulton, Borough Hall, and Jay Street, to name a few. Several key intersections or series of intersections were then focused on and are presented in the section related to problematic intersections. A sample list of these observations is presented on the following pages.

Tillary/Adams

This location has frequent turning conflicts, as buses have difficulty negotiating the tight turning radius. Frequent bus/pedestrian/vehicle conflicts due to roadway geometry and frequency of buses. During peak hours, conflicts can occur every eight to ten minutes.

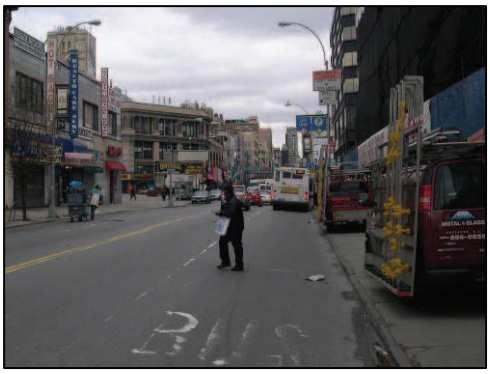
Adams/Fulton

Nearly 700 buses currently travel along Fulton Mall each day, making these blocks critical to the bus operations serving the Study Area. During peak periods, high volumes of buses create congestion that appear to slow down overall operations. In addition, while private vehicle use of this street are officially limited to deliveries and short stretches where north/south streets "jog" so drivers are allowed to use Fulton Street, Fulton Mall's bus only lanes were observed to be frequently violated by automobiles which significantly reduced bus operating reliability. The weave section where buses are required to cross traffic to turn left onto Fulton Mall was also identified as a problem.

Livingston Street and Multiple Cross Streets

Although on-time performance and reliability information was not available for most of this corridor, Livingston Street vehicular congestion was observed to be constant during peak hours. Heavy auto congestion and multiple, overlapping bus routes contribute to problem of slow moving traffic.

Bus only lanes were observed to be frequently violated by automobiles and construction at new developments led to single lane operations in one direction.



Bus only lane pavement markings on Livingston Street do not meet current NYCDOT standards; much of the pavement markings are worn and not very visible to motorists.

Vehicles parked illegally at several bus stops causing buses to stop away from curb lane to let passengers on and off.

Jay Street heading south toward Livingston Street

Vehicular/bike/bus conflicts. Buses need to cross bike lane to pull in and out of bus stops – safety issue.

Flatbush/Atlantic Avenue

During peak periods, buses pull in already at capacity, causing large numbers of passengers to wait at this stop to leave downtown area during PM Peak period.

Generally, street crossings in the Flatbush/Atlantic area are unfriendly to pedestrians.

4.4 TRAVELER INTERCEPT AND BUS RIDER SURVEYS

Journey to Work data (Section 4.2) was used to develop an overview of travel patterns in Downtown Brooklyn. While this data provided insight into mode choice, analysis of new data was needed to:

- Confirm field observations;
- Gain a better understanding of perceptions of existing Downtown Brooklyn bus service; and
- Identify travel patterns by collecting information on origin and destinations in the Study Area.

In order to collect the above information, two fields surveys, a traveler intercept and a bus rider survey, were conducted during April and May 2009. Sample survey forms are included in Appendix A. While the survey were not designed to provide statistical data, their purpose was to elicit qualitative responses, and to provide information on passengers' experiences and impressions of existing surface transit operations as well as quality of service within the Study Area

On April 18, April 30, May 28, and May 31, surveyors from SIMCO Engineering and URS Corporation stationed at several locations in Downtown Brooklyn conducted intercept surveys with people waiting for the bus and people walking on the sidewalk. The surveyors asked people their trip origins and destinations, and which mode(s) they typically use to travel to and from Downtown Brooklyn or will use to arrive at their destination, and preferences for potential bus service improvements. Bus riders were asked to rate service on the line they were waiting for and to pick their top choice from a list of bus stop improvements. The following section analyzes responses to the traveler intercept and bus rider surveys.

A high percentage of responses to several of the questions fell into the "other" category. In order to achieve the most accurate analysis possible, if people marked "other" but the reason fit into a category,

responses were re-coded. For example, if someone responding to the origin or destination question said "other" and the surveyor wrote in "Church," that response was coded under Social/Church/Personal. "Other" responses to questions about bus service improvements and stop amenities were harder to categorize since they elicited qualitative responses. Wherever possible, however, remarks listed in "other" have been interpreted to fit into a response. For example, if the surveyor wrote "more benches" to the question "What one improvement to this bus stop environment would you like to see most," the response was placed in the "waiting area comfort" category.

Following are the primary findings gathered from the surveys:

- To increase bus ridership around Downtown Brooklyn, service must be more reliable in terms of on-time performance and frequency of service, especially on the weekend. The B41, B61, and B63 routes are priority candidates for reliability improvements.

- In terms of bus stops, waiting area comfort was the top request by passengers. The need for seating was the highest priority. Providing shelters at all bus stops was also highly rated. A few passengers also requested that bus shelters be placed farther away from the curb.

Summary of Survey Results

A total of 825 surveys were collected – 260 bus surveys and 565 sidewalk intercept surveys. The number of surveys collected at each site was close to equal, except for at Atlantic Center (Table 26). The bulk of surveys were distributed during the midday period and on weekdays (Table 27).

Table 26 - All Surveys by Location

Location	Number	Percent
Atlantic Terminal	167	20%
Livingston & Smith	162	20%
LICH	161	20%
DUMBO	146	18%
LIU	136	16%
Atlantic Center	53	6%
Total	**825**	**100%**

Table 27 - All Surveys by Time and Day

Day	Number	Percent
Thursday	491	60%
Saturday	147	18%
Wednesday	143	17%
Sunday	44	5%
Total	**825**	**100%**
Time	**Number**	**Percent**
Midday	406	49%
PM	234	28%
AM	185	22%
Total	**825**	**100%**

Bus Riders

The following is a summary of survey responses by bus riders. Surveyors collected 260 questionnaires from people waiting for the bus at five Downtown Brooklyn locations see (Table 28).

Table 28 - Bus Surveys by Location

Location	Number	Percent
Livingston & Smith	91	35%
LICH	67	26%
Atlantic Center	53	20%
Atlantic Terminal	36	14%
LIU	13	5%
TOTAL	**260**	**100%**

Nearly half of the surveys were collected during the midday period, and just fewer than 68% were distributed on a weekday. As shown in Figure 45, bus riders were primarily traveling between work and home – these destinations represent just over 60% of origins and 58% of destinations. Of the responses with clear origins and destinations, 67% were traveling within Brooklyn.

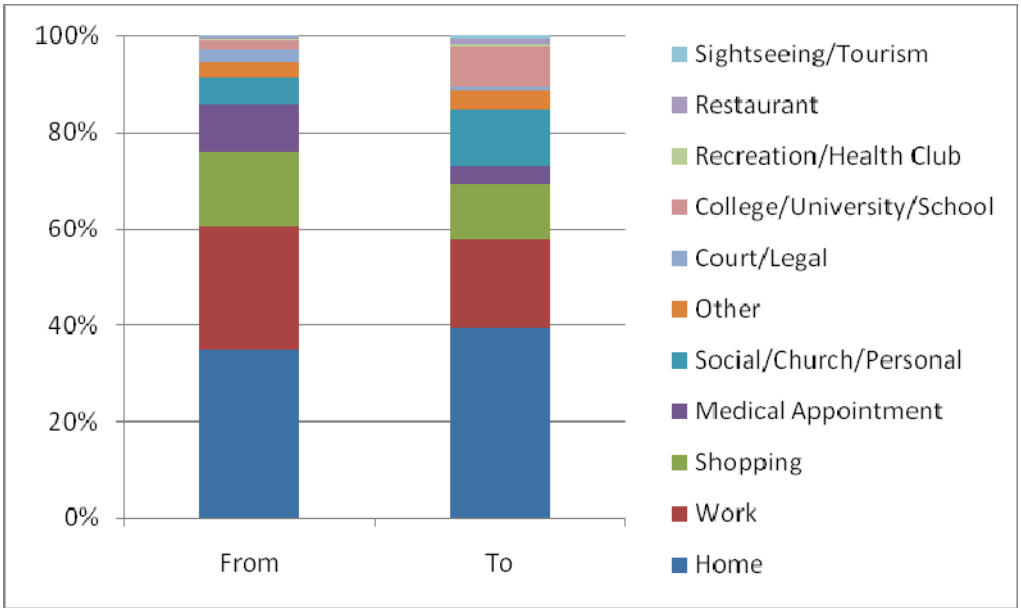


Figure 45 - Origin and Destination: Bus Riders

More than one-third of bus riders walked to reach their bus stop from their origin, while another third transferred from another route. Very few or zero respondents said they used a taxi, bicycle, or commuter van to reach their bus stop. Passengers connecting to their destination bus route from another bus route primarily came from the B61 (27 respondents) with several transferring from the B41, B63, B45, and B75 routes. Of the 31 people who responded "Other," 22 transferred to a bus from the Long Island Rail Road. Table 29 shows the complete mode choice of riders accessing their bus stop.

Table 29 - Mode Used to Access Bus Stop

Mode	Number	Percent
Walk	98	37%
Another Bus	80	30%
Subway Line	50	19%
Other	31	12%
Car	4	2%
Commuter Van	1	0%
Taxi	1	0%
Total	**265**	**100%**

The next question asked people to rate their satisfaction with the bus route that served their stop. Nearly two-thirds of responses fell in the "Fair" or "Good" categories (Figure 46).

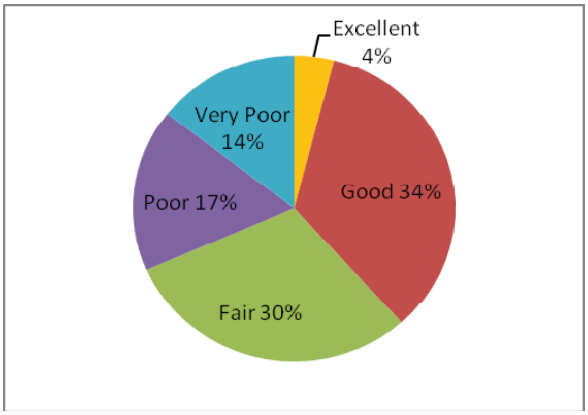


Figure 46 - Satisfaction with Bus Service Used on Day of Survey

Bus customers were asked which improvements they would most like to see. According to their responses, bus riders clearly want more frequent service (Figure 47). Frequency of bus service is often not an issue of how often a bus is scheduled to operate, but how reliable a bus is to arrive on-time. As shown in Table 16 (page 55), 15-minute or better headways are standard for Study Area service from 6am to at least 7pm. The conclusion drawn from comparing the feedback to the data is not an issue of scheduled service frequency, but of actual service performance of buses to arrive on-time and at reliable headways.

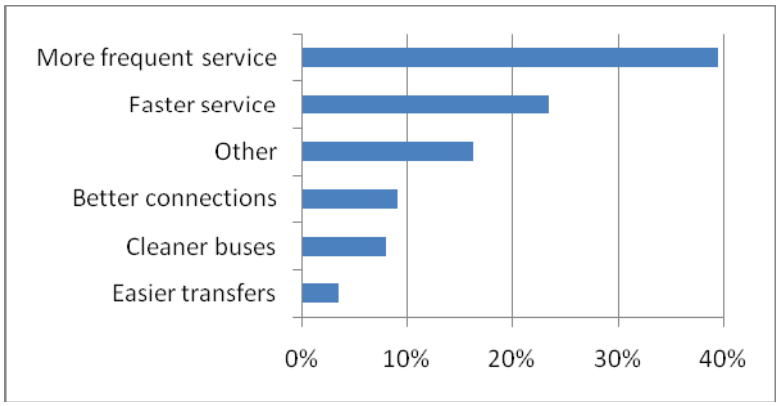


Figure 47 - Requested Improvements to Bus Routes: Bus Riders

From the 52 people who checked "Other," some of the most popular requests were:

- Buses running on schedule – no bunching;
- Friendlier, more courteous drivers;
- Less crowded buses;
- Better weekend service;
- Get buses around vehicle congestion; and
- Lower fares.

Of the 89 bus riders who requested "more frequent service" or "faster service", 29% cited that they rode the B61, with 15% each citing the B63 and B41 (Table 30). Since these routes operate with headways of no less than every 15 minutes for most the week, these responses are interpreted as requests for improved reliability of the already-frequent scheduled service.

Table 30 - Routes of Bus Riders Requesting More Frequent or Faster Service

More Frequent Service or Faster Service	
Bus Route	**Total**
B61	26
B63	13
B41	13
B45	7
B38	5
B75	4
B57	4
B52	4
B103	44
B44	2
B67	2
B68	2
B26	1
B8	1
B35	1
B43	1
Total	**89**

Next, respondents were asked what type of bus stop improvements they would like to see. "Waiting area comfort" and "Shelter" were the most popular response (Figure 48), and many people wrote in that they wanted seating. At stops with benches, many people requested longer benches to accommodate everyone. Most of the people who checked "Other" wrote that the bus stops are fine as they are.

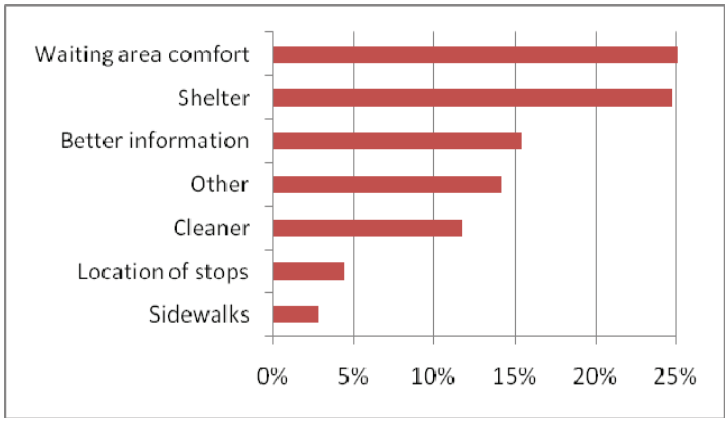


Figure 48 - Requested Improvements to Bus Stops

The final survey question asked if the respondent knew of locations in and around Downtown Brooklyn requiring new or additional bus service. The majority of respondents said "Don't Know" as shown in Table 31. A large number of respondents selected "Other." In terms of additional service, respondents primarily referred to the bus routes they used to arrive at the bus stop as needing more frequent service. The most frequent places that survey respondents believed need new or additional bus service included Red Hook, Borough Hall, Myrtle Avenue, and Carroll Gardens.

Table 31 - Locations in Need of New/Additional Bus Service

Place	Number	Percent
Don't Know	124	52%
Other	74	31%
Brooklyn Heights/Cobble Hill	19	8%
Flatbush at "X"	10	4%
DUMBO	8	3%
Fulton Ferry Landing	3	1%
Total	**238**	**100%**

Sidewalk Intercepts

The following is a summary of responses gathered from sidewalk intercept surveys. A total of 565 pedestrians filled out surveys at five locations (Table 32). Just over 80% of surveys were completed during on a weekday (Wednesday or Thursday). Nearly half of the surveys were distributed around the midday.

Table 32 - Sidewalk Surveys by Location

Location	Number	Percent
DUMBO	146	26%
Atlantic Terminal	131	23%
Long Island University	123	22%
Long Island College Hospital	94	17%
Livingston Street & Smith Street	71	13%
Total	**565**	**100%**

Similarly to individuals traveling by bus, pedestrians were mostly traveling between work and home, as shown in Figure 49. The percentage of respondents traveling from home – 50% – was much higher than the percentage for bus riders. Similar to results from bus rider surveys, shopping was the third highest reason for travel. Of the 353 responses with origins coded by borough, 60% were traveling within Brooklyn.

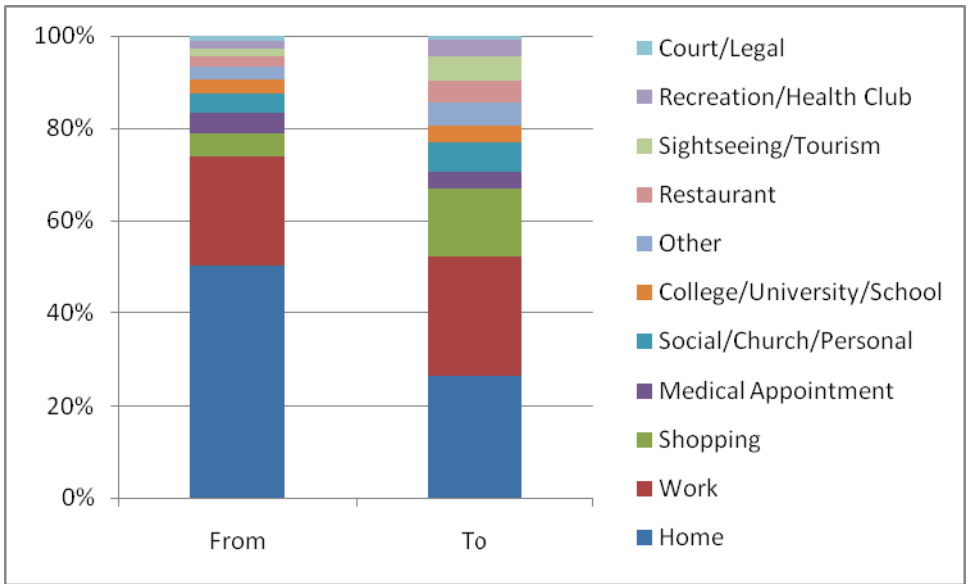


Figure 49 - Origin and Destination: Pedestrians

Pedestrians mostly responded that they would take the subway to get to their final destination (Table 33). Of those pedestrian respondents who identified a specific bus route they would subsequently take, individuals commonly mentioned the B41, B63, B61, B25, and B45. In terms of what mode respondents typically use within Downtown Brooklyn, responses were nearly the same, except that bus use slightly edged out walking. Bus routes identified as typically being used by surveyed pedestrians include the B41, B63, B61, B38, B25, B44, and B45.

Table 33 - Mode Choice: Sidewalk Surveys

	What mode will you use today?		What mode do you typically use?	
Mode	Number	Percent	Number	Percent
Subway Line	223	36%	248	39%
Walk	182	29%	113	18%
Bus	125	20%	139	22%
Car	68	11%	79	12%
Other	16	3%	23	4%
Bike	6	1%	15	2%
Taxi	4	1%	16	3%
Commuter Van	3	0%	4	1%
Total	627	100%	637	100%

When asked what factored into their mode choice on the day of the survey, people primarily cited speed and convenience (Figure 50).

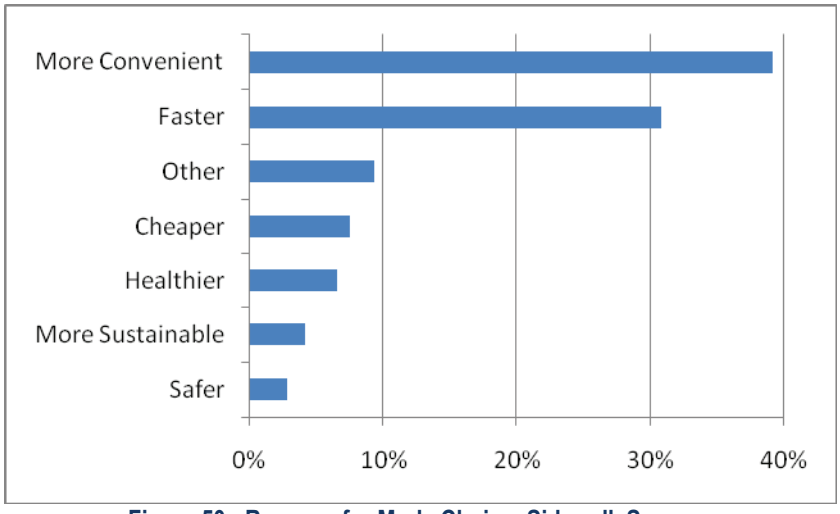


Figure 50 - Reasons for Mode Choice: Sidewalk Surveys

When people were asked why they don't take the bus, the most common complaint was that service is too slow and infrequent (Figure 51). The second most common response was that routes do not go where people want to go. Fixing this problem will be a primary goal of this study. The cost of riding the bus was not cited as a factor, nor was any preference to drive. 15% of respondents stated that they preferred walking over driving or taking transit.

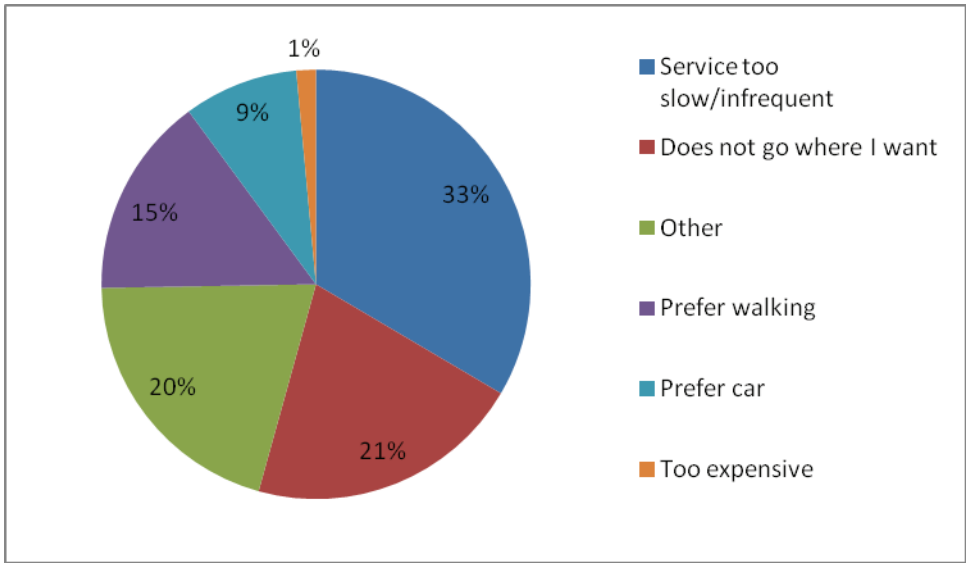


Figure 51 - Reasons Why People Do Not Take the Bus: Sidewalk Surveys

Similar to bus riders, pedestrians cited the need for more frequent and faster service as the main improvements they would like to see (Figure 52).

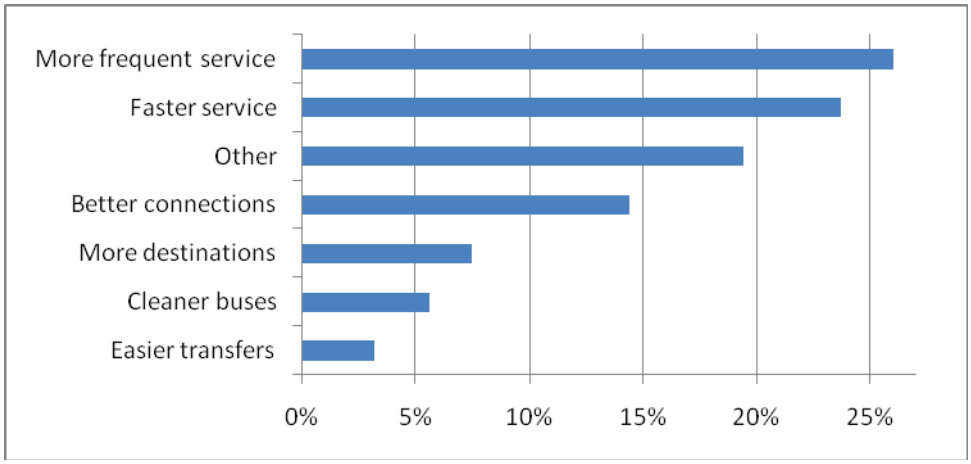


Figure 52 - Requested Improvement to Bus Routes: Sidewalk Surveys

A total of 170 respondents (30.1%) requested more frequent bus service, of which 57 said they would use the bus to get to their final destination and 37 identified specific bus routes they were going to use. The second most frequent response, "faster service" was cited by 155 people (27.4%). Of those people, 50 said they were going to use the bus to get to their final destination, and 22 gave the actual route they were going to use.

Table 34 shows the routes that pedestrians who requested more frequent or faster service used on the day of the survey. These respondents most frequently rode the B41. Since this route already operates with headways of no less than 15 minutes for the majority of the week, these responses are interpreted as requests for improved reliability of the scheduled service.

Table 34 - Routes of Pedestrians Requesting More Frequent or Faster Service

More Frequent or Faster Service		
Bus Route	Responses per Route	Total Responses
B41	18	18
B45, B61, B63	6	18
B46, B103	4	8
B25, B52, B67	3	9
B20, B26, B37, B49, B83	2	10
B23, B38, B44, B54, B65	1	5
	Total	**68**

In the "other" category, some common responses were:

- Unfamiliar with how to use the bus system;
- Unfamiliar with where bus routes run;
- Buses are too crowded;
- Prefer taking subway, train is easier; and
- Not convenient.

In response to the survey question asking which locations in Brooklyn that require new or additional service, most pedestrians responded "Don't Know." The location cited as most requiring bus connections was DUMBO (Table 35). Several Downtown Brooklyn bus routes were cited as requiring additional service.

Table 35 - Places Requiring New/Additional Bus Service: Sidewalk Surveys

Place	Number	Percent
Don't Know	297	52%
DUMBO	88	16%
Other	85	15%
Brooklyn Heights/Cobble Hill	45	8%
Fulton Ferry Landing	35	6%
Flatbush at	16	3%
Total	566	100%

4.5 FOCUS GROUP RESULTS

Public involvement is a key component of the DBSTCS. While quantitative data is valuable for determining travel patterns, qualitative input helps determine why travelers are making their mode choices. One of the elements of the study's public involvement plan was to facilitate focus groups representing Study Area stakeholders. These stakeholders were organized into two groups: residents and community groups, and employees and business owners/managers. The following presents summaries of the feedback received from the focus groups. A map produced by is also included (Figure 53).

The focus group meetings allowed stakeholders who live and work in the area to identify and profile their distinct travel experiences, perceptions, expectations, and preferences. The Team collected direct feedback from each group on a number of travel issues, including:

- Levels and patterns of transit use and assessment of services;
- Key origins and destinations within the Study Area;
- Locations served, underserved, and unserved by transit;
- Span of service and service frequencies of transit services;
- Walking conditions along routes to transit stops and at transit stops; and
- Walking conditions along routes unserved by transit.

Stakeholders most frequently travel to the following locations within the area:

- Stores at Livingston Street at Hoyt Street, along Flatbush Avenue, and along Atlantic Avenue;
- Post office at Atlantic Avenue;
- Banking along Montague Street and Court Street;
- Metrotech Center;
- Borough Hall and the Green Market;
- Brooklyn Academy of Music; and
- Long Island Rail Road Terminal/Atlantic Terminal Mall.

The following locations were also mentioned as areas underserved by current bus service:

- Montague Street;
- Red Hook – IKEA, Fairway;

- Fulton Ferry/DUMBO area (especially in the evenings);
- Piers below Brooklyn Heights; and
- Future Brooklyn Bridge Park.

While there is significant bus service operating east and west along Fulton and Livingston Streets, there is limited service that runs north and south. Stakeholders requested implementing a Downtown Loop that would take people from offices to the shopping along Smith and Livingston Streets.

Pedestrian improvements were also requested to help people travel between the bus and their origin or destination. The following locations were noted as being unfriendly to pedestrians:

- The intersection of Atlantic, Flatbush and 4th Avenues;
- The length of Atlantic Avenue, especially at Court Street;
- The length of Adams Street, especially at Tillary Street;
- Livingston Street and Bond/Hanover: The parking facility creates an unsafe and uncomfortable situation with short pedestrian timings;
- Metrotech Center is dead space; and
- Livingston Street is very dark after sunset and feels unsafe.

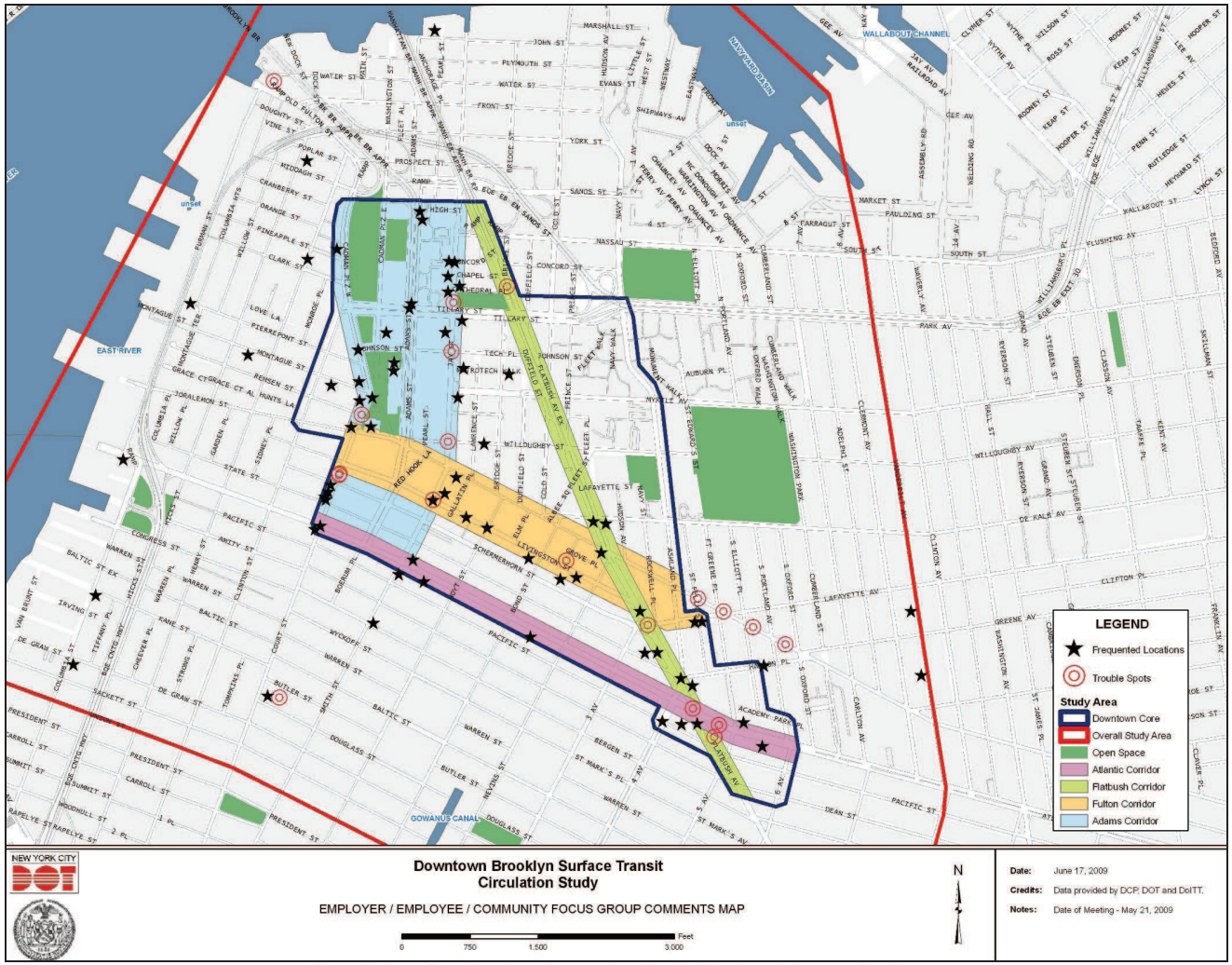


Figure 53 - Focus Group Map: Areas Frequented and Troubled Bus Areas in Downtown Brooklyn

5. PROBLEM IDENTIFICATION

5.1 OVERVIEW

Based on the study's principles, goals, and objectives, as well as the quantitative data and qualitative input documented above, the deficiencies in the current surface transit network can be summarized into six primary categories: bus operations/reliability, areas underserved by service transit, overlapping bus routes, passenger experience, fare collection, and problematic intersections. Each issue is described below.

5.2 BUS OPERATIONS/RELIABILITY

Significant bus service operates in the Study Area, with many routes running on frequent headways. Operations are hindered by heavy traffic volumes and conflicting curbside demands, which degrade service reliability. As shown above, schedules for three primary routes achieve an 80% on-time rate, for a Level of Service of "D". Focus group attendees and survey respondents confirmed that without bus service that reliably takes the same amount of time each trip, they will not use buses as their primary mode (reflecting U.S. Census Journey to Work data that shows only 3% of residents in the Study Area commute by bus). Key routes that were identified as unreliable include the B61 and B41. Intersections noted for significant delays include Flatbush Avenue / Atlantic Avenue / 4th Avenue and Flatbush Avenue / Livingston Street.

5.3 UNDERSERVED AREAS

While bus accessibility is generally available throughout the study area, there are some areas that could be considered underserved. Focus groups, field surveys, and GIS analysis identified several of these areas. This assessment does not take into account the availability of subway service within these areas. The focus is on the strength of the surface transit system rather than on the strength of the system as a whole.

Figure 54 shows the weighted density of bus stops in the Study Area. Green areas indicate locations with a higher density of bus stops. This map assigns a higher weight to bus stops that have more than one route. This means that if there are four bus routes at a given stop, then that stop is counted as four stops instead of just one. This weighting system more accurately represents the availability of service because a stop that is used by four bus routes gives riders more service options and therefore affords them more mobility than a stop that is only used by one bus route. In addition, the number of bus routes at a particular stop is an indication of the frequency that buses arrive at the station. This map indicates that DUMBO (including the ferry landing), the waterfront and parallel to the new Brooklyn Bridge Park, and Fort Greene are potentially underserved by surface transit. DUMBO and the waterfront are both areas that have been identified in focus group sessions and traveler surveys as areas that need additional service.

5.4 OVERLAPPING SERVICE

While the 17 bus routes that serve Downtown Brooklyn are important and necessary because they serve a variety of neighborhoods throughout Brooklyn, problems arise when they converge in Downtown. Figure 55 shows the bus route density within the Study Area. Green portions of the map have a higher density of bus routes, while red portions are farther from current bus routes. This map clearly indicates that there is a concentration of bus lines along Flatbush Avenue, Fulton Street, and Livingston Street, and around Cadman Plaza, which is indicative of overlapping routes in certain stretches of Downtown. Overlapping service is an issue for surface transportation as a high density of bus routes competing with each other and other modes for lane space often leads to bus congestion and unreliable service.

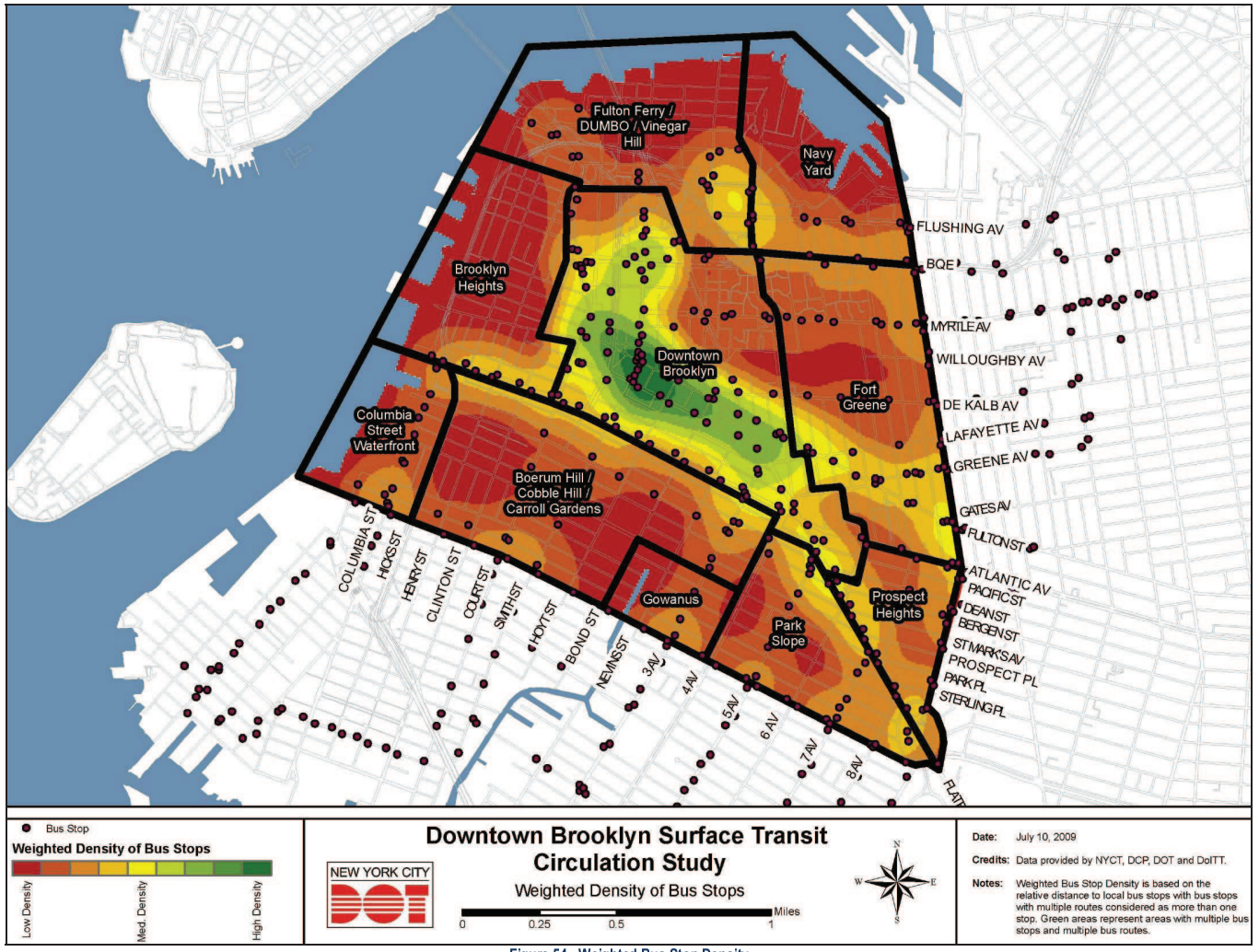


Figure 54 - Weighted Bus Stop Density

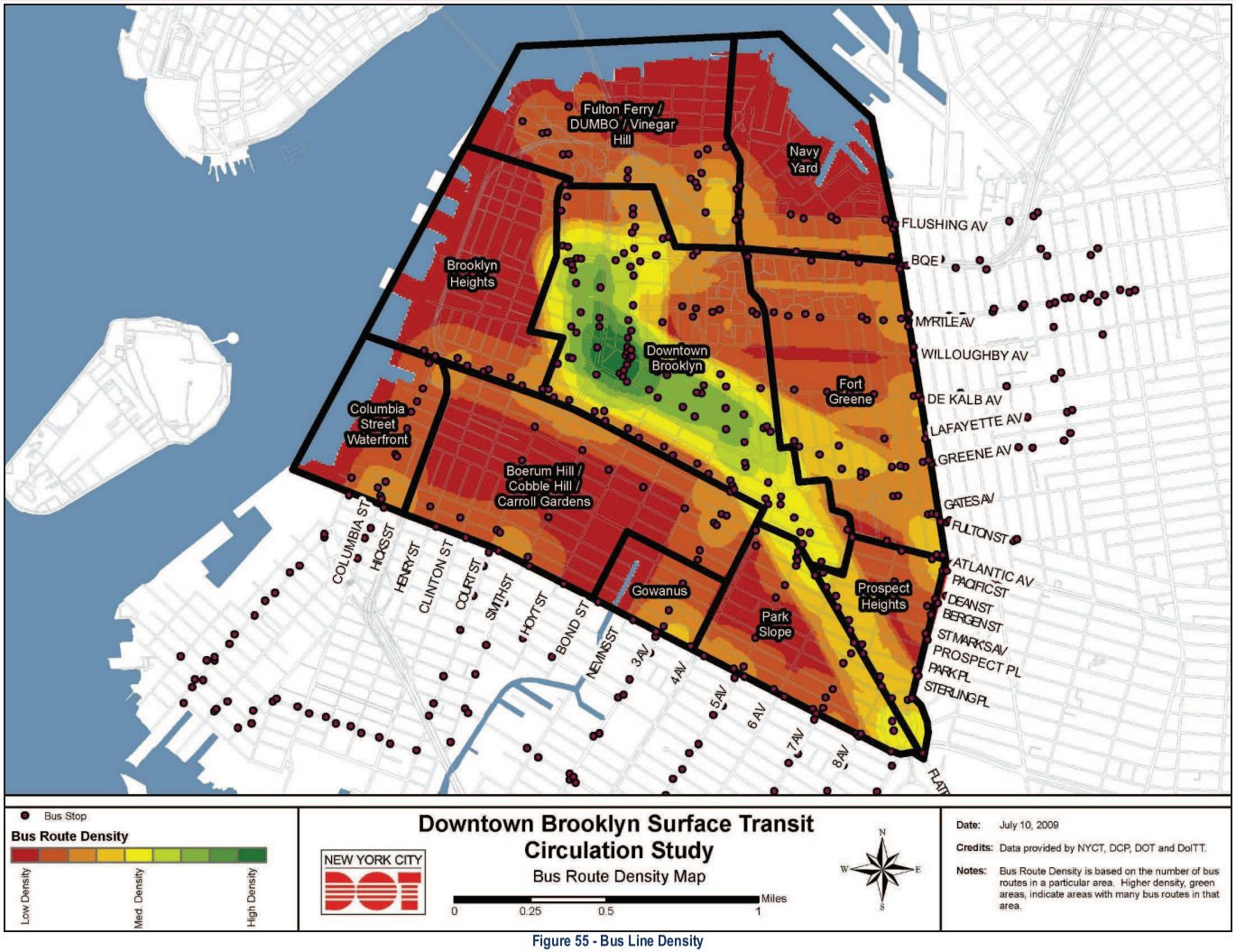


Figure 55 - Bus Line Density

5.5 PASSENGER EXPERIENCE

According to Census data, the Study Area's resident population is aging. This was confirmed at the focus groups, where residents told the Project Team that aging residents are more comfortable riding the bus than many other modes (subway, bike, and frequently walking). Memories of pleasant bus trips, comfortably sitting while watching the neighborhood pass by the window were recounted. However, the bus is currently perceived by many of these potential riders as overcrowded, unreliable, and confusing. Additionally, waiting conditions at bus stops were reported to be uncomfortable as many stops do not include shelters or benches (Figure 56). Uncertainty about whether the posted schedule is still in effect was also noted.

Figure 56 - Flatbush Avenue / Atlantic Avenue Bus Stop

5.6 FARE COLLECTION

During field observations and focus groups sessions, several issues arose with the method of fare collection for the surface transit system. Transaction time using the MetroCard aboard the buses cause higher dwell times at high traffic bus stops. The *Transit Capacity and Quality of Service Manual* suggests that passenger service time for dipping the MetroCard is about 4.2 seconds per passenger.[16] High volume and high dwell times have been identified at several bus stops, including those along Livingston Street, specifically at Smith Street, and Flatbush Avenue at Atlantic Avenue. In addition to high dwell times the placement of Ticket Vending Machines (TVM) has also been identified as a problem. TVM are only located in subway stations, below street levels. Surface transit users are unable to buy new MetroCards, refill MetroCards, or check their MetroCard balance. As a result, potential bus users are discouraged from using the system.

5.7 PROBLEMATIC INTERSECTIONS

Vehicular Congestion and Level of Service Issues

One of the key issues raised at focus group, stakeholder, and public meetings is the level of vehicular congestion at multiple intersections within the Study Area. Based on data collected from previous studies,[17] there are a number of congested intersections within each of the four corridors in the Core Study Area. At these intersections, the measure of vehicular congestion in terms of service delay, or Level of Service (LOS), is E or F. In general, LOS A, B, and C is considered "highly favorable to fair levels of traffic" while LOS E is considered at "the limit of acceptable delay" and LOS F is an "unacceptable" delay. Table 36 defines LOS delay according to the Transportation Research Board's *Highway Capacity Manual, 2000*.

[16] Transit Capacity and Quality of Service Manual, 2nd Edition, 2004.

[17] n particular the *Atlantic Yards Arena and Redevelopment Project EIS Final Environmental Impact Statement, Chapter 12: Traffic and Parking* prepared for Empire State Development corporation and published in November, 2006, and the *Adams Street High School EIS*, prepared by AKRF and published in 2006,

Table 36 - LOS Criteria for Signalized Intersections

LOS	Delay (seconds)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	>80.0

This report defines LOS E and F as "congested." Based on this definition, the primary **congested** areas in the four corridors for which data was previously published include those listed on the following pages.

Jay Street/Adams Street/Cadman Plaza Corridor (Figure 57)

Congested Signalized Intersections:

- Adams Street/Tillary Street intersection LOS F (AM and PM peak)
- Livingston Street/Boerum Place LOS E/F (PM Peak 5-6pm)
- Atlantic Avenue/Court Street LOS E/F (Saturday 4-5pm)
- Atlantic Avenue/Boerum Place LOS E/F (Weekdays 12-1pm, Saturday 4-5pm)
- Atlantic Avenue/Smith Street LOS E/F (Weekdays 8am-1pm and 5-6pm, Saturday 4-5pm)

Congested Lanes:

- Tillary Street/Adams Street Eastbound Left Lane LOS F (AM Peak) and LOS E (PM Peak)
- Tillary Street/Adams Street Westbound Through Lane LOS E (AM and PM Peak)
- Tillary Street/Jay Street Eastbound Left Lane LOS E (AM Peak)
- Tillary Street/Jay Street Westbound Left Lane LOS E (AM Peak)
- Willoughby Street/Jay Street Westbound Left, Through and Right Lanes LOS F (AM and PM Peak)
- Fulton Street/Adams Street Northbound Left Lane LOS E (PM Peak)

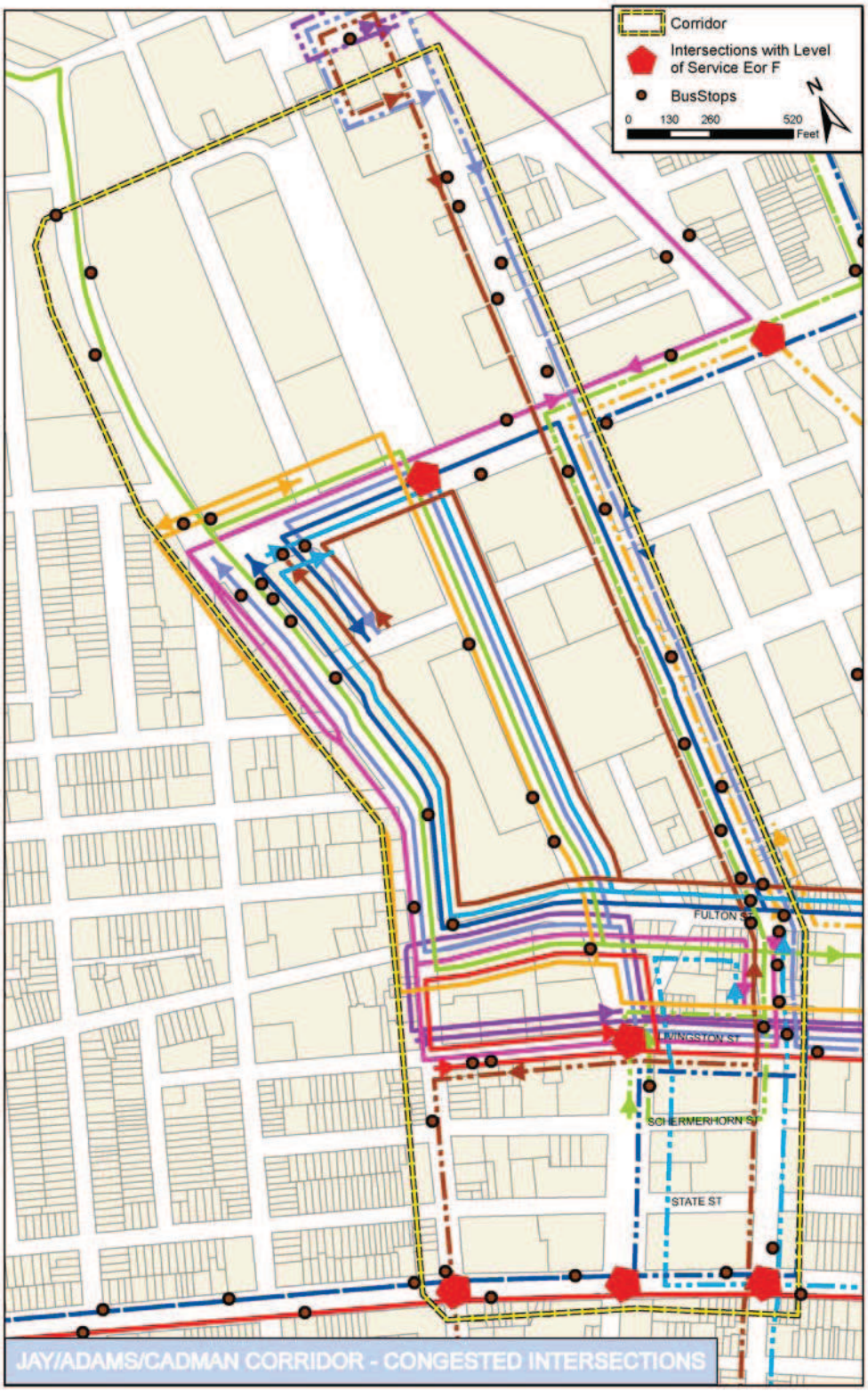


Figure 57 - Jay Street / Adams Street / Cadman Plaza Corridor - Critical Intersection LOS

Fulton Street/Livingston Street Corridor

Only a limited amount of existing data was available for the Livingston/Fulton corridor. This data is currently being collected as part of a separate task. When completed, it will be included with this information.

Atlantic Avenue Corridor (Figure 58)

Congested Signalized Intersections:

- Atlantic Avenue/Hoyt Street LOS E/F (Weekdays 5-6PM, Saturday 4-5pm)
- Atlantic Avenue/Bond Street LOS E/F (Weekdays 8am-6pm, Saturday 4-5pm)
- Atlantic Avenue/Nevins Street LOS E/F (Weekdays 8-9am and 5-6pm, Saturday 1-5pm)
- Atlantic Avenue/3rd Avenue LOS E/F (Weekdays 8-9am, Saturday 1-5pm)
- Atlantic Avenue/4th Avenue LOS E/F (Weekdays 8-9am and 5-8pm, Saturday 1-5pm)
- Atlantic Avenue /5th Avenue LOS E/F (Weekdays 8-9am and 5-8pm, Saturday 1-2pm)
- Atlantic Avenue/S. Portland LOS E/F (Weekdays 5-8pm, Saturday 1-5pm)

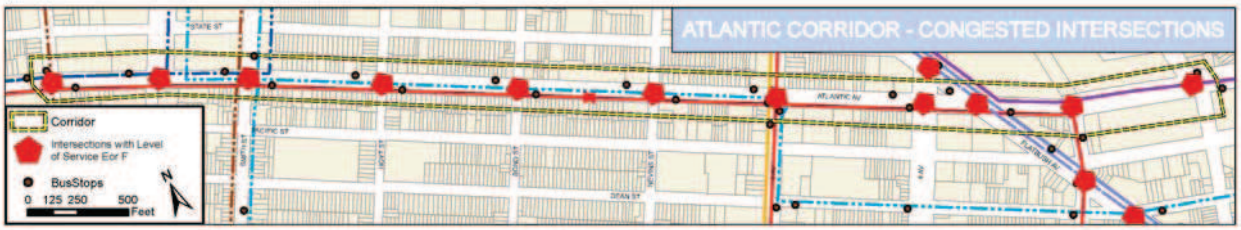


Figure 58 - Atlantic Avenue Corridor - Critical Intersection LOS

Flatbush Avenue Corridor (Figure 59)

Congested Signalized Intersections:

- Flatbush Avenue/Tillary Street LOS F (Weekdays 8am-8pm, Saturday 1-5pm)
- Flatbush Avenue /Myrtle Street LOS E/F (Weekdays 8am-11pm, Saturday 1-5pm)
- Flatbush Avenue/Willoughby Street LOS E/F (Weekdays 8am-8pm, Saturday 1-5pm)
- Flatbush Avenue/DeKalb Avenue LOS E/F (Weekdays 8am-8pm, Saturday 1-5pm)
- Flatbush Avenue/Fulton Street LOS E/F (Weekdays 8-9am and 5-11pm, Saturday 4-5pm)
- Flatbush Avenue/Livingston Street LOS E/F (Weekdays 8-9am and 5-6pm)
- Flatbush Avenue/Lafayette Avenue LOS E/F (Weekdays 8-9am and 5-8pm, Saturday 4-5pm)
- Flatbush Avenue/4th Avenue LOS E/F (Weekdays 5-6pm)
- Flatbush Avenue/Atlantic Avenue LOS E/F (Weekdays 8-9am)
- Flatbush Avenue/5th Avenue LOS E/F (Weekdays 8-9am and 7-11pm, Saturday 1-2pm)
- Flatbush Avenue/Dean Street LOS E/F (Weekdays 7-8pm and Saturday 1-5pm)

Congested Lanes:

- Flatbush Avenue /Tillary Street Eastbound Left Lane LOS F (AM and PM Peak)
- Flatbush Avenue /Tillary Street Eastbound Through and Right Lane LOS E (AM Peak)
- Flatbush Avenue /Tillary Street Northbound Left Lane LOS F (AM and PM Peak)
- Flatbush Avenue/Tillary Street Southbound Left Lane LOS F (AM Peak) and E (PM Peak)
- Flatbush Avenue /Willoughby Street Eastbound Left Lane LOS F (AM and PM Peak)
- Flatbush Avenue /Willoughby Street Northbound Left Lane LOS F (AM and PM Peak)

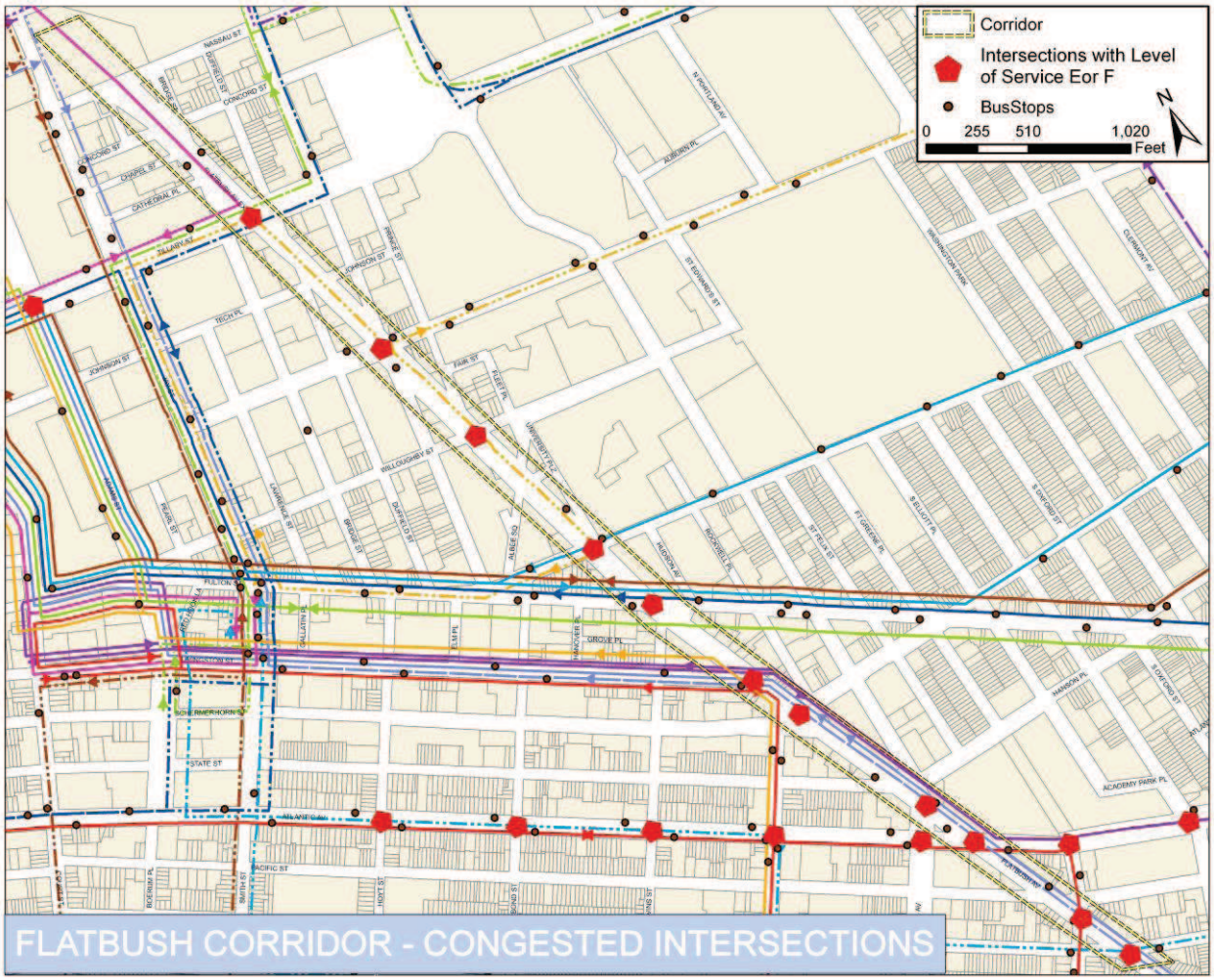


Figure 59 - Flatbush Avenue Corridor - Critical Intersection LOS

Pedestrian Safety

Three intersections in the Study Area have been identified as problematic to pedestrians, with potential bus riders stating they cannot reach bus stops at these locations due to safety concerns. These areas have been identified from both field observation and results from focus group sessions. Each area is detailed in the following pages.

The first area is the intersection around Atlantic Avenue / Flatbush Avenue / 4th Avenue. The geometry of this intersection is complicated with both Atlantic Avenue and Flatbush Avenue heavily travelled streets with lengthy pedestrian crossings with limited pedestrian refuge.

Figure 60 shows a satellite photograph with transit services in the area. The crossing distance for pedestrians across Flatbush Avenue can be as much as 115 feet and the pedestrian crossing distance across Atlantic Avenue can be as much as 130 feet. Atlantic Terminal draws a significant number of pedestrians and the B41 bus stop in the middle of the intersection is one of the busiest bus stops in the area during both the morning and evening peak periods.

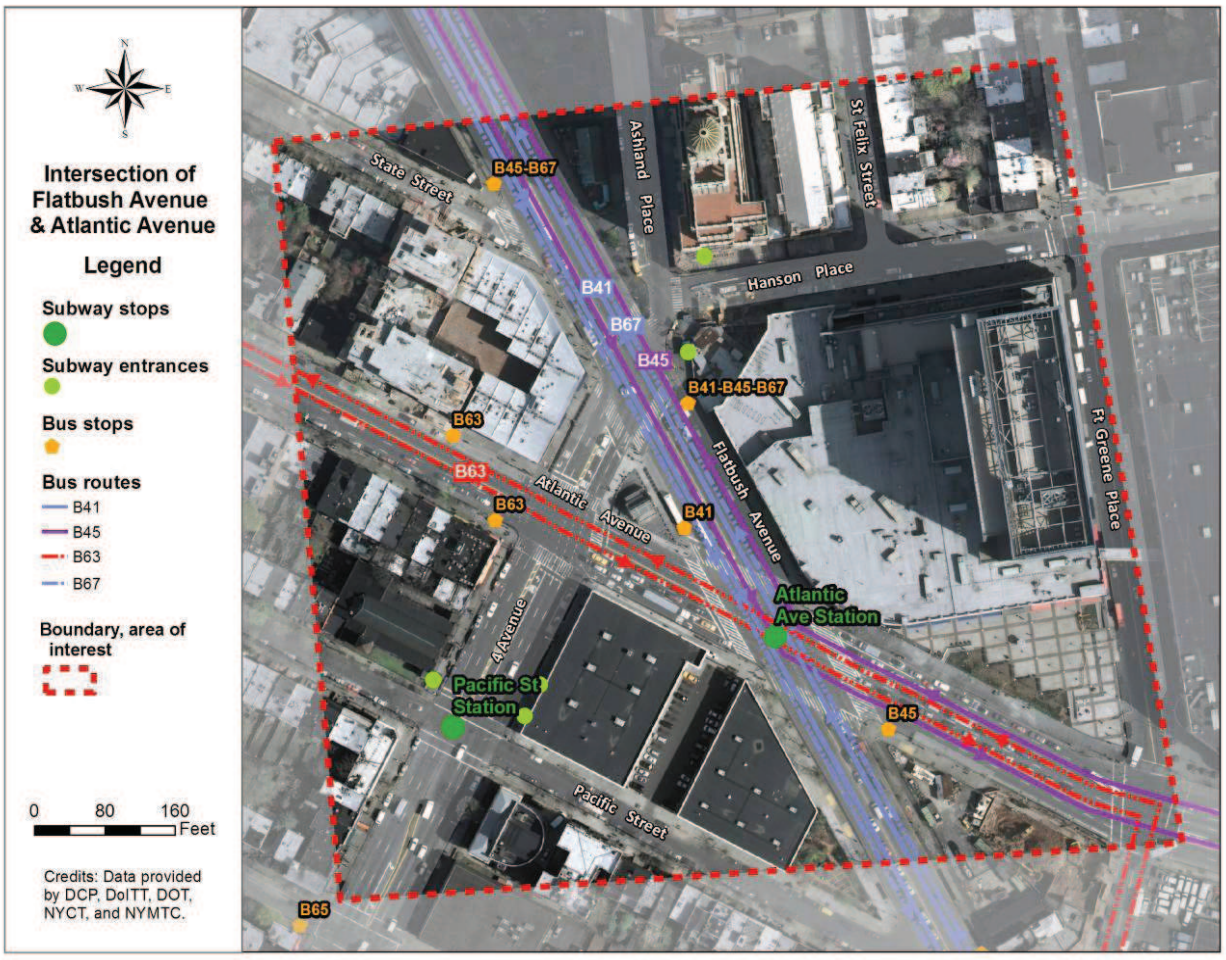


Figure 60 - Flatbush Avenue / Atlantic Avenue

The second area identified as a problematic intersection with pedestrian safety concerns is the system of intersections around Fulton Street / Smith Street / Jay Street; Fulton Street / Boerum Place; Livingston Street / Smith Street; and Livingston Street / Boerum Place.

Figure 61 shows a satellite photograph of the area and its 15 bus routes. Bus boardings and alightings in this area are the highest in the entire Study Area in both the morning and evening peak periods. In addition traffic congestion along Livingston Street creates difficult crossings for pedestrians. The 15 different bus routes that travel the area cause bus congestion and potential bus delays.

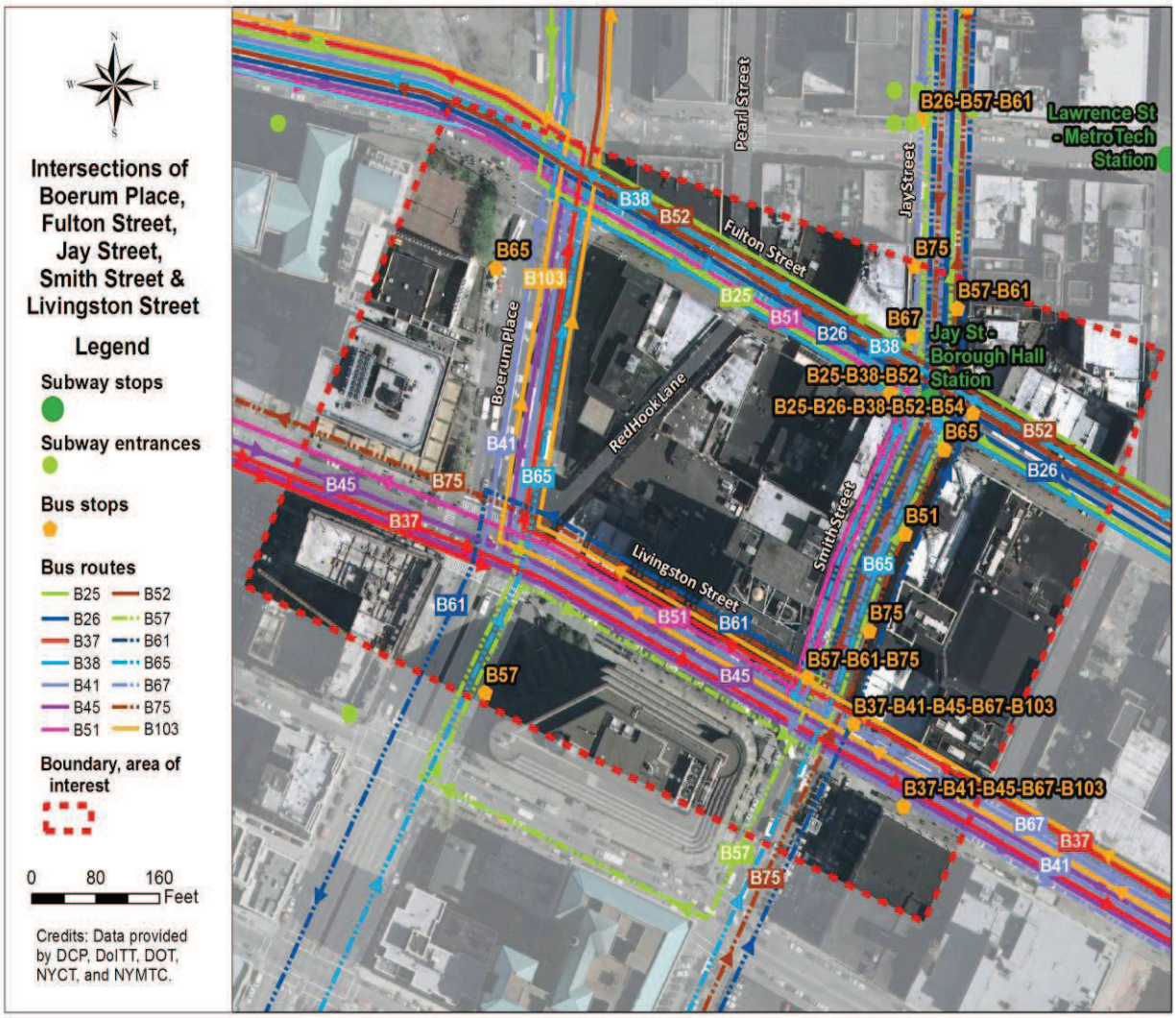


Figure 61 - Boerum Place / Fulton Street / Jay Street / Livingston Street / Smith Street

The area around Cadman Plaza is the third area identified as a problematic intersection with pedestrian concerns.

Figure 62 shows the satellite photographs of this area. Cadman Plaza is the layover point for most bus routes that terminate in the Downtown Brooklyn Study Area. As a result, numerous buses park along Cadman Plaza West causing potential traffic interference and additional bus / pedestrian conflicts.

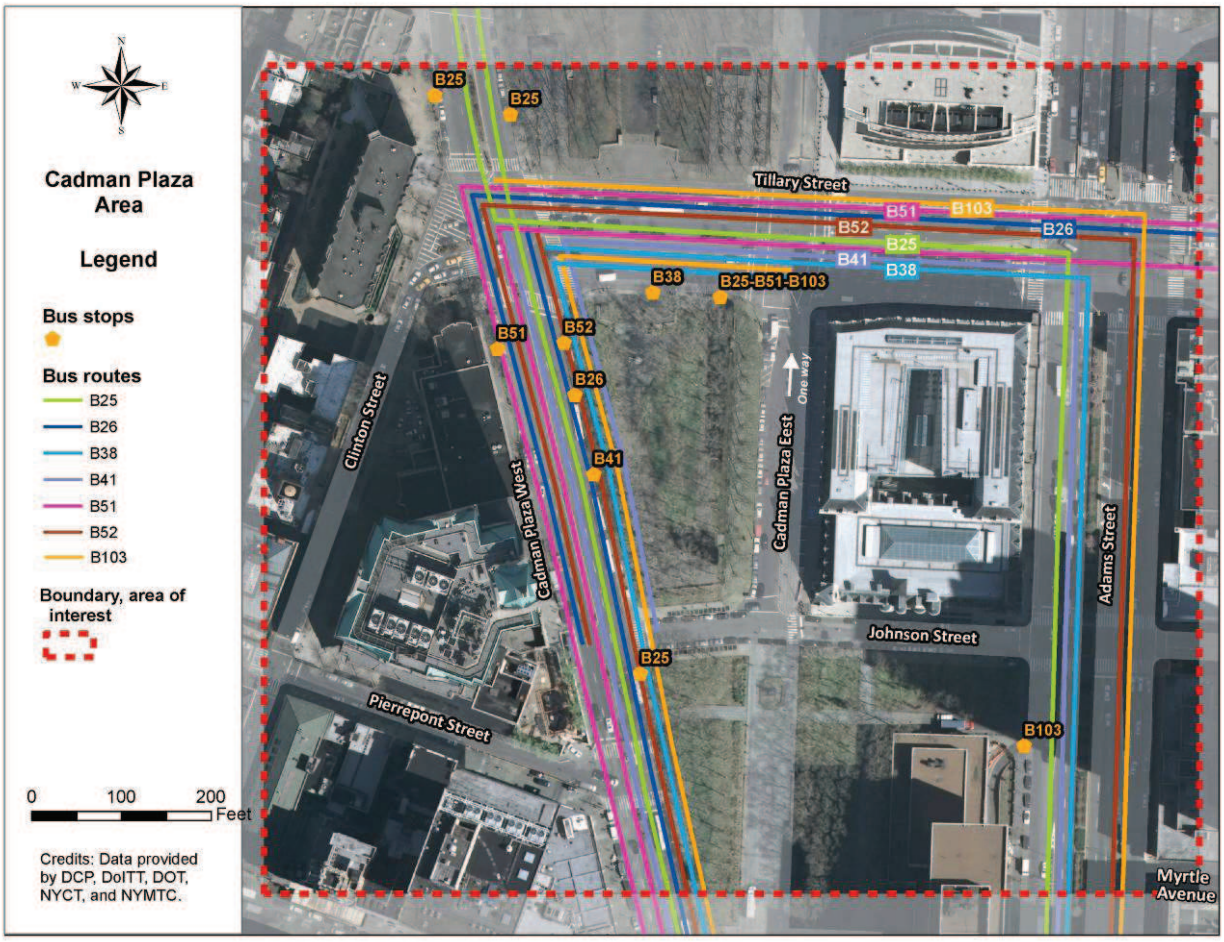


Figure 62 - Cadman Plaza

6. CONCLUSION

This report provides a framework for developing a series of alternatives to improve surface transit circulation in Downtown Brooklyn. The initial findings support the observation that short term and long term solutions are needed to improve the surface transit system. Issues that need to be addressed include level of service, safety, reliability and congestion issues at intersections and along corridors in the short run, as well as to identify longer term solutions that reduce the overlap of bus routes within, improve efficiency and lead to a more integrated and sustainable transit system.

The report identifies a number of surface transit and corridor-level deficiencies related to Downtown Brooklyn surface transit service. The findings indicate that while the level of service is high in the Core Study Area, problems exist with overlapping bus routes, service reliability, vehicular congestion issues, turning conflicts, and passenger comfort. As neighborhoods around downtown continue to develop and grow, particularly the Fulton Ferry/DUMBO/Vinegar Hill neighborhood and the area around Brooklyn Bridge Park, new surface transit service is needed to address their current lack of transit options. The report provides evidence that while bus routes extend into most neighborhoods, surface transit options diminish considerably away from the Core Study Area.

The next step in this process is to develop feasible short and long-term solutions to the key problems identified in the report and to work with NYCDOT and the public to build consensus on the most viable alternatives.

A. INTRODUCTION

Previous sections of the Downtown Brooklyn Surface Transit Circulation Study (DBSTCS) have documented existing conditions that directly or indirectly impact Downtown Brooklyn's surface transit. The surface transit challenges—created in large part by the rapid growth in commercial and residential development that has occurred within the study area—are likely to be compounded in the future as numerous planned projects will attract more residents, workers, and visitors to the area. Formation of sustainable transit strategies and solutions therefore requires evaluation of these future conditions and potential development.

This section of the DBSTCS describes the locations, types, and amounts of future development that is projected to occur within the downtown core and overall study areas, and estimates the incremental transit demand that will be generated by residents and workers of the projected development. In order to provide short- and long-term solutions to the problems identified in this report, the analysis estimates incremental transit demand generated by projects expected to be completed by 2011 and 2015.

Following this introduction, the future conditions assessment is organized as follows:

- **Section B** presents the methodological approach and data sources for the future conditions analysis;
- **Section C** describes the locations and nature of planned development projects, focusing on development projects within, or in close proximity to, the four study area corridors;
- **Section D** presents trip generation estimates for users of new development projects that are expected to be operating by 2011;
- **Section E** presents the trip generation estimates for users of new development projects that are expected to be operating by 2015 (including those operating by 2011); and
- **Section F** summarizes the findings of the future conditions analysis.

B. METHODOLOGY

The future conditions assessment required three core elements:

1. the identification of planned projects in the study area (detailed under "Data Sources," below);
2. a mechanism for estimating the transit demand generated by the planned projects (detailed under "Trip Generation Estimates," below); and
3. future analysis years to characterize the rate of growth in transit demand over time (detailed under "Analysis Years," below).

DATA SOURCES

The list of planned development projects within the Downtown Brooklyn Surface Transit Circulation Study Area was compiled from a variety of sources. Data on most of the projects identified were from Environmental Assessment Statements (EASs) or Environmental Impact Statements (EISs) for proposed rezoning and for specific development projects. These environmental review documents require the identification of future planned projects and future neighborhood conditions in order to forecast the environmental consequences of a proposed action. The studies reviewed included all of those referenced in Section 1.4 "Review of Previous Studies." Much of the data on planned development projects were gathered from the following documents:

- Downtown Brooklyn Redevelopment FEIS
- Atlantic Yards FEIS and Technical Memorandum
- 363-365 Bond Street FEIS
- A Technical Memorandum for Albee Square
- Brooklyn Bridge Park FEIS

In addition to EAS and EIS reports, the New York City Department of Buildings database was used to identify upcoming projects that were recently approved or that are in the permitting process. The Downtown Brooklyn Partnership website and the Department of City Planning website were also used to find upcoming projects in the Study Area. In addition, the blogs *Curbed* and *Brownstoner* often report progress on upcoming projects in the Brooklyn area; these sources were searched to find additional projects in the Study Area, and to update data on planned projects identified in EASs and EISs. The projects found on these websites were checked against the Department of Buildings database to confirm they have been approved. When project information was available from multiple sources, the program data from the most recent report was used.

A draft list of planned development projects was then reviewed by NYCDOT, the Department of City Planning, and the Downtown Brooklyn Partnership to confirm the program information and status of the identified planned projects.

TRIP GENERATION ESTIMATES

Travel demand forecasts were performed for each of uses planned as part of development projects in the study areas. Travel demand forecasts for different uses estimate person trips by modes of transportation

during typical weekday peak hours: 8 AM to 9 AM, 12 PM to 1 PM, and 5 PM to 6 PM. As shown in **Table 1**, trip rates and travel demand assumptions are based on *City Environmental Quality Review (CEQR) Technical Manual* (2001), U.S. Census data (2000), and previously approved projects including *the Downtown Brooklyn Development FEIS* (2004), *Brooklyn Bridge Park FEIS* (2005), and *Atlantic Yards Arena and Redevelopment Project FEIS* (2006).

Retail uses generate a wide variation in travel demand depending upon the type of retail and its target consumer base. As shown in **Table 1**, local retail uses, which offer primarily neighborhood convenience goods and services, tend to generate a higher overall person-trip-rate per square foot of retail as compared to destination retail, but a much lower proportion of those trips are made by bus and subway (an estimated 70 percent of trips are made by walking, as compared to 26 percent for destination retail). For trip generation purposes, developments which include fewer than 50,000 square feet of retail space were analyzed as local retail uses. For retail space between 50,000 square feet and 100,000 square feet in size, it was assumed that 30,000 square feet will be local retail uses and the remaining will be destination retail. For retail space in excess of 100,000 square feet, 50,000 square feet of retail space was assumed to be local retail use and the remaining assumed to be destination retail.

Table 1: Travel Demand Assumptions

Use	Person Trip Rate	Peak Hour			Modal Split							Source
		Temporal	In	Out	Auto	Taxi	Subway	Bus	Railroad	Walk	Total	
Residential	8.075 Trips/Dwelling Unit	AM 9.1%	20.0%	80.0%	14%	1%	67%	4%	1%	13%	100%	a, b, c, d.
		MD 4.7%	51.0%	49.0%	14%	1%	67%	4%	1%	13%	100%	
		PM 10.7%	65.0%	35.0%	14%	1%	67%	4%	1%	13%	100%	
Commercial Office	18.0 Trips/1,000 gsf	AM 11.8%	96.0%	4.0%	37%	1%	39%	11%	6%	6%	100%	a, c, e, f.
		MD 14.5%	39.0%	61.0%	2%	1%	7%	7%	0%	83%	100%	
		PM 13.7%	5.0%	95.0%	37%	1%	39%	11%	6%	6%	100%	
Local Retail	153.75 Trips/1,000 gsf	AM 3.1%	50.0%	50.0%	2%	3%	20%	5%	0%	70%	100%	a, c, d, g.
		MD 19.0%	50.0%	50.0%	2%	3%	20%	5%	0%	70%	100%	
		PM 9.6%	50.0%	50.0%	2%	3%	20%	5%	0%	70%	100%	
Destination Retail	71.8 Trips/1,000 gsf	AM 2.4%	61.0%	39.0%	20%	2%	22%	30%	0%	26%	100%	c, h, i.
		MD 8.7%	55.0%	45.0%	20%	2%	22%	30%	0%	26%	100%	
		PM 8.9%	47.0%	53.0%	20%	2%	22%	30%	0%	26%	100%	
Community Facility	48.0 Trips/1,000 gsf	AM 7.1%	61.0%	39.0%	5%	1%	3%	6%	0%	85%	100%	j.
		MD 10.0%	55.0%	45.0%	5%	1%	3%	6%	0%	85%	100%	
		PM 7.2%	29.0%	71.0%	5%	1%	3%	6%	0%	85%	100%	
Hotel	9.4 Trips/Hotel Room	AM 7.5%	41.0%	59.0%	30%	12%	19%	6%	0%	33%	100%	a, d, f.
		MD 14.4%	68.0%	32.0%	30%	12%	19%	6%	0%	33%	100%	
		PM 12.8%	59.0%	41.0%	30%	12%	19%	6%	0%	33%	100%	
Academic-University	26.6 Trips/1,000 gsf	AM 7.2%	94.0%	6.0%	12%	1%	71%	6%	0%	10%	100%	a, c.
		MD 7.1%	45.0%	55.0%	12%	1%	71%	6%	0%	10%	100%	
		PM 8.3%	42.0%	58.0%	12%	1%	71%	6%	0%	10%	100%	
Open Space	139.0 Trips/Acre	AM 7.0%	55.0%	45.0%	20%	1%	12%	11%	0%	56%	100%	a, f.
		MD 17.0%	50.0%	50.0%	20%	1%	12%	11%	0%	56%	100%	
		PM 14.0%	45.0%	55.0%	20%	1%	12%	11%	0%	56%	100%	

Source:
a. City Environmental Quality Review (CEQR(Technical Manual
b. 2000 Census journey to work data
c. Downtown Brooklyn Development FEIS (2004)
d. Atlantic Yards Arena and Redevelopment Project FEIS (2006)
e. 2000 Census reverse journey to work data
f. Brooklyn Bridge Park FEIS (2005)
g. with 25% linked trip credits
h. ITE Trip Generation 8th Edition. Shopping Center Land Use Code 820.
i. For retail space less than 50,000 sf, local retail use was assumed; for retail space between 50,000 and 100,000 sf, 30,000 sf of retail space were assumed to be local retail use and the remaining was assumed to be destination retail use; for retail space over 100,000 sf, 50,000 sf of retail space were assumed to be local retail use and the remaining was assumed to be destination retail.
j. The Jamaica Plan FEIS (2007)

ANALYSIS YEARS

Incremental trip generation was estimated for two future analysis years: 2011 and 2015.[1] These analysis years provide the short- and longer-term forecasts of future transit demand that are necessary to plan for and implement transit improvement measures recommended by this study. The methodological assumptions used for the two analysis years are provided below.

2011 Analysis Year - The 2011 analysis year accounts for major new development projects that are expected to be open and operating by year-end 2011. The incremental trip volumes estimated for the 2011 analysis year are the product of all major development projects in the study areas for which construction is already underway (as of July 2009). While there are additional projects nearing construction that could be operating by year-end 2011, given the current economic climate it is reasonable to assume that the analysis captures a vast majority of the major development initiatives expected to be completed by 2011.

[1] The 2011 and 2015 analysis years for DBSTCS were established in consultation with NYCDOT, the Department of City Planning, and the Downtown Brooklyn Partnership.

2015 Analysis Year – The 2015 analysis year accounts for major new development projects that are expected to be open and operating by year-end 2015 (including those projects expected to be completed by 2011). Given the longer time horizon associated with this analysis year and the variability in real estate markets created by the economic recession, two potential development scenarios are considered for the 2015 analysis year:

2015 Scenario A – Scenario A assumes that all planned projects that are projected to be developed by 2015 (based on public documents) will be built and operating by 2015. This is an aggressive growth assumption in that many of the projects planned for development by 2015 were conceived and advanced before the economic recession, which began in December 2007.
Under Scenario A, the studies areas by 2015 are projected to receive an estimated 12,689 new residential dwelling units, 1.47 million square feet of commercial office space, 1.10 million square feet of retail uses, 204,410 square feet of community facility space, and 1,787 additional hotel rooms by 2015.

2015 Scenario B – Scenario B discounts Scenario A's residential growth projection, recognizing that not all of the planned residential projects slated for development by 2015 will actually be built and operating by 2015. Scenario B applies a residential growth rate consistent with that experienced from 2004 to 2007. Under Scenario B, the study area is projected to receive approximately 7,474 new residential dwelling units by 2015, which is approximately 59 percent of the housing stock projected under Scenario A (12,689 units). As it would be highly speculative to identify specific projects that would be delayed beyond 2015, the planned number of dwelling units was proportionately reduced across all development projects that are not already in construction.

C. PLANNED DEVELOPMENT PROJECTS IN STUDY AREA

Table 2 and **Figure 1** identify the locations, types, and amounts of future development that is projected to occur within the downtown core and overall study areas. This information forms the basis for the 2011 and 2015 incremental trip generation analysis (described in Section D and E, below). The following describes planned development projects within the context of the four study area corridors.

ADAMS/COURT/JAY/CADMAN PLAZA CORRIDOR

See **Figure 2**

In the existing condition, this corridor is defined by a dense concentration of institutional and educational facilities. Brooklyn Borough Hall, the Brooklyn Criminal Court, the General Post Office, and the U.S. Federal Courthouse occupy much of the area to the north of Joralemon Street between Adams Street and Cadman Plaza West. The New York City College of Technology (City Tech) South Campus and the Polytechnic Institute of New York University (Polytech) are located along both sides of Jay Street between Tillary Street and Myrtle Avenue. Residential land uses are more prevalent to the south of Livingston Street and north of Tillary Street. The seven projects that will be developed by the 2015 analysis year will not alter the current land use pattern. These projects will result in institutional land uses in the northern portion of the corridor and additional residential land uses in the southern portion.

In the northern portion of the corridor, City Tech will develop a new academic building and install new infrastructure to support existing buildings as part of the City University of New York's 2008-2012 Master Plan. The first project would result in the construction of a new approximately 150-foot-tall, 350,000-square-foot academic building at 105 Tech Place and the demolition of the existing Klitgord Building, which is located on the eastern blockface of Jay Street between Tech Place and Tillary. The new building, with frontages along both Jay and Tillary Streets, would include classrooms, laboratory space, a CUNY Express information facility, administrative space, and a below-grade garage with 29 accessory parking spaces. The building would also include a gymnasium and an auditorium to replace these facilities in the former Klitgord Building. Second, City Tech plans to construct a new central mechanical plant on the Main Complex, which is located between Tillary Street, Jay Street, Johnson Street, and Adams Street. This mechanical plant would serve City Tech's South Campus with an updated heating, ventilation, and air conditioning (HVAC) system. Additionally, the work will convert the current student activities center in the Main Complex into swing space for other functions.

Four projects will be developed in the southern portion of the corridor. Three of these projects are primarily concentrated in the area around the intersection of Atlantic Avenue and Boerum Place. The 252 Atlantic Avenue and 236 Atlantic Avenue projects will be developed on each side of the intersection and will add residential uses and ground floor retail. The 252 Atlantic Avenue project is already under construction and will include 65 residential units and 16,000 square feet of ground floor retail. The 236 Atlantic Avenue project will include 55 residential units, ground floor retail, and medical offices. Across Atlantic Avenue from

these two projects, the Brooklyn House of Detention will be reopened and its size increased by 40,000 square feet; however, the status of the expansion is unknown at this time. One block to the north, an approximately 100-unit residential building (Hoyt-Schermerhorn II) will be constructed on the east side of Smith Street, between State and Schermerhorn Streets.

FLATBUSH AVENUE CORRIDOR

See **Figure 3**

Flatbush Avenue is one of the main transportation arteries through Brooklyn. Overall, Flatbush Avenue—officially known as Flatbush Avenue Extension north of Fulton Street—runs from the Manhattan Bridge to the northern end to the Marine Parkway Bridge, which connects Brooklyn with the Rockaway Peninsula. Within the Study Area, Flatbush Avenue extends southward from the Manhattan Bridge to Dean Street, dividing Fort Greene from Downtown Brooklyn and, south of Atlantic Avenue, Prospect Heights from Park Slope. Commercial and institutional uses line both sides of Flatbush Avenue, but this wide street currently does not exhibit a distinct and cohesive land use character. Instead, Flatbush Avenue serves primarily as a vehicle thoroughfare, particularly north of Atlantic Avenue.

Flatbush Avenue has begun to transition toward higher density mixed-use development. This trend is expected to continue through the 2015 analysis year, particularly at the northern end of the corridor between Myrtle Avenue and Tillary Street, where a number of development project are planned. Three of these projects—Toren (at 245 Flatbush Avenue), Avalon Fort Greene (at 159 Myrtle Avenue), and 218 Myrtle Avenue—are already under construction at the intersection of Myrtle and Flatbush Avenues. While these projects differ in density, height, and land use from the existing land uses, they support the development trends occurring in Downtown Brooklyn as a result of its rezoning. The 41-story Avalon Fort Greene development fronts Flatbush Avenue and will include approximately 650 residential units and ground-floor retail. The 38-story Toren is located directly south of Avalon Fort Greene and will include 280 residential units and ground-floor retail. Finally, the 218 Myrtle Avenue project is located directly east of Toren. This large project will occupy the entire south side of Myrtle Avenue between Prince Street and Ashland Place, and will include 660 residential units and 22,000 square feet of ground-floor retail.

Continuing north on Flatbush Avenue, several primarily residential projects will be constructed in the area near the intersection of Tillary and Duffield Streets. At the intersection of Flatbush Avenue Extension and Tillary Street, the 21-story Flatbush Flatiron building will include 108 residential units. Less than a block north, the 55 Flatbush Avenue site will be occupied by an 80-unit Best Western hotel, while directly across from the Flatbush Flatiron a small residential conversion will be constructed at 49 Duffield Street. A 377-unit residential building is under construction at 235 Gold Street, and plans to open in Fall 2009. Another residential building planned for 277 Gold Street will include approximately 133 units. Further north and east the Flatbush Avenue Corridor, an 89-unit residential building is under construction at 168 Nassau Street.

Toward the southern end of the corridor, the City Point project will redefine the intersection of Willoughby Street and Flatbush Avenue. This mixed-use tower will be located on the site of the former Albee Square

Mall, which occupied the entire block bounded by Willoughby Street to the north, Flatbush Avenue to the east, Fulton Street to the south, and Gold Street to the west. The project, which will commence construction of its initial phase in 2010, will include in total approximately 650 residential units, 360,000 square feet of office space, 520,000 square feet of retail space, and 404 underground parking spaces. Willoughby Square Park will be constructed directly east of City Point. This 1.25-acre park will be constructed above a 700-space parking garage. One block to the south and east, a 34-story residential building at 80 Dekalb Avenue is under construction and will include 272 residential units, of which 20 percent will be available to low-to moderate-income residents through an affordable housing program.

In addition to these projects along the Flatbush Avenue corridor, four projects—two hotels and two residential buildings with street-level retail—are located in the portion of Downtown Brooklyn that is situated between Flatbush Avenue corridor, the Fulton Street/Livingston Street corridor, and the Adams/Court/Jay/Cadman Plaza corridor. While these projects are not located directly in a transportation corridor, they are described below due to their proximity to many corridors, their significant size, and because they further represent the significant transformation occurring within Downtown Brooklyn. The Hotel Indigo will be developed at 237 Duffield Street, directly south of the Willoughby Square Park. This 21-story building will include approximately 180 hotel rooms. The 25-story Sheraton Aloft hotel is under construction at 222 Duffield Street, on the west side of Duffield Street and across from the Hotel Indigo, and will include approximately 501 rooms. Within the same area, a 51-story, 491-unit residential building is under construction at 111 Lawrence Street, and a 49-story, 360-unit residential building with 20,000 square feet of retail space is planned at 388 Bridge Street.

FULTON/LIVINGSTON STREET CORRIDOR

See **Figure 4**

The Fulton Street/Livingston Street corridor, which includes the areas along Fulton and Livingston Streets and extends the entire width of the study area, intersecting with the Flatbush Avenue corridor on the east to the Adams/Court/Jay/Cadman Plaza corridor on the west. Additionally, this corridor is situated to the south of the MetroTech. This corridor is defined by the density of retail uses along Fulton Street, which is a distinct retail spine within Downtown Brooklyn, and the institutional uses that located on its eastern and western edges.

The projects planned for this corridor are similar in terms of use and scale to the projects that are the result of the Downtown Brooklyn rezoning: high-density mixed-use buildings. Projects to be constructed in the portion of the corridor to the west of Flatbush will include a hotel and three residential buildings. The 12-story, 69-room hotel will be constructed at 46 Nevins Street at the intersection with Schermerhorn Street. Two of the residential buildings will be constructed on Livingston Street, an area that is currently transitioning away from surface parking lots and low density uses towards high-density mixed-use buildings. At 254 Livingston Street, a 186-unit building with 21,000 square feet of office space is planned. On the same block, at 230 Livingston Street, a 21-story 271-unit residential building with 18,000 square feet

of office space is in construction. Finally, a 544-unit residential building with 50,000 square feet of retail is in construction at 505 Fulton Street.

Plans for development east of the Avenue include two projects which are part of the Brooklyn Academy of Music (BAM) Cultural District. The BAM Local Development Corporation (LDC) North and South projects will be located along Fulton Street between Rockwell Place and St. Felix Street. These projects are part of the Downtown Brooklyn Partnership (DBP) plan to create much-needed affordable performance and rehearsal space, mixed-income housing, and new public open space anchored by BAM and the other cultural institutions in the immediate area. BAM LDC South will include 250 residential units, approximately 25,000 square feet of retail space, 48,500 square feet of community facility space, and 466 parking spaces. The BAM LDC North project will include a 30,000 square foot, 299-seat theater with offices, rehearsal space, and 39,000 square feet of arts space. The building will also include 4,000 square feet of retail space and 187 residential units. A third project—29 Flatbush Avenue—will not be a part of the BAM Cultural District but will include 333 residential units.

ATLANTIC AVENUE CORRIDOR

See **Figure 5**

The Atlantic Avenue corridor runs east-west between Court Street to the west and South Portland Avenue to the east. While this corridor is mixed-use in nature, residential buildings with street-level retail uses are the predominant land use type along much of the corridor. To the east, this corridor is anchored by local and regional shopping destinations.

There are numerous development projects expected to be complete in the Atlantic Avenue corridor by the 2015 analysis year. In the western portion of the corridor, a six-floor residential building with 55 dwelling units will be constructed at 236 Atlantic Avenue. Moving east along Atlantic Avenue, a residential building is in construction at 252 Atlantic Avenue/97 Boerum Place; it will contain 65 dwelling units and approximately 16,000 square feet of ground floor commercial use, as well as on-site parking. Another residential building in construction at 307 Atlantic Avenue will include 26 dwelling units, and 348 Atlantic Avenue will be renovated with approximately 2,000 square feet of ground floor retail and six residential units.

The Atlantic Yards project at 630 Atlantic Avenue is a large scale, mixed-use development expected to include (by 2015): 2,110 dwelling units; 336,000 square feet of office/commercial space; 91,000 square feet of retail; 180 hotel rooms; 2,346 parking spaces; 1 acre of open space; and an 850,000-square-foot sports arena. This project is expected to be built out in a number of phases over the next 10 years; additional development would be completed subsequent to the 2015 analysis year.

The Atlantic Terrace development at 699 Atlantic Avenue will be an 8-story residential building with 80 units, 87 parking spaces, and approximately 12,000 square feet of retail. This development is currently under construction and is expected to be complete by 2010.

There are several residential development projects just outside of the Atlantic Avenue corridor to the south; including two on the western edge of the corridor and two towards the eastern edge. 210 Pacific Street and 216 Pacific Street are both located between Court Street and Boerum Place. 210 Pacific Street is expected to contain 10 dwelling units and 216 Pacific Street—which will entail the conversion of an existing building—will contain 3 dwelling units. 345 Bergen Street and 357 Dean Street are both between Third and Fourth Avenues. 345 Bergen Street is expected to contain 15 dwelling units, and 357 Dean Street is expected to contain 3 dwelling units.

D. 2011 ANALYSIS YEAR

Fourteen planned development projects (labeled as "In Construction" in **Table 2** and **Figure 1**) were considered for estimating future trip-making in Downtown Brooklyn by 2011. As summarized in **Table 3**, cumulatively these projects include nearly 3,400 residential dwelling units, 18,000 square feet of commercial office use, 160,000 square feet of retail space, and 500 hotel rooms.

Table 3: Cumulative Program Data: Planned Projects in Operation by 2011

Area	Residential Units	Retail (sf)	Commercial Office (sf)	Community Facility/ Institutional (sf)	Hotel Rooms	Parking Spaces	Open Space (acres)
Downtown Core Study Area	2,934	148,000	-	-	501	709	-
Overall Study Area	440	12,100	18,000	-	-	87	-
Total	**3,374**	**160,100**	**18,000**	**-**	**501**	**796**	**-**

As shown in **Figure 6**, all 14 projects that are expected to be operating by year-end 2011 (i.e., all projects that are currently in construction) are located within or immediately adjacent to Downtown Brooklyn's core study area. Six of the 14 projects are located within the Flatbush Avenue corridor; those projects would add an estimated 1,861 residential units and 82,000 square feet or retail. Four other projects are located north of Fulton Street between Adams and Duffield Streets: the 544-unit Conway Building at 505 Fulton Street; a 491-unit building at 111 Lawrence Street; a 36-unit residential expansion at 345 Adams Street; and a 501-room Sheraton/Aloft Hotel at 222-228 Duffield Street.

INCREMENTAL TRAVEL DEMAND ESTIMATES

Table 4 summarizes the project-generated person-trips by development use and by mode of transportation. In total, the planned developments for the 2011 future condition are projected to generate a total of 15,220 person trips daily: 3,546; 6,006; and 5,067 person trips during the weekday AM, midday, and PM peak hours, respectively. Of the total person trips, 6,175 (40.6 percent) are projected to occur via subway, while 817 (5.4 percent) are bus trips. An estimated 741 bus trips (90.7 percent of the increment) will be generated by uses in the downtown core study area, while the remaining 76 bus trips will be generated by uses in the overall study area. Most of the incremental bus trips will occur during the midday and PM peak hours.

Table 4: Trip Generation Summary, 2011

Use	Study Area	AM Peak Hour							Midday Peak Hour							PM Peak Hour						
		Auto	Taxi	Subway	Bus	Railroad	Walk	Total	Auto	Taxi	Subway	Bus	Railroad	Walk	Total	Auto	Taxi	Subway	Bus	Railroad	Walk	Total
Residential	Core	301	22	1,444	88	22	280	**2,157**	159	12	744	45	12	146	**1,118**	357	25	1,698	100	25	330	**2,535**
	Overall	46	3	218	13	3	43	**326**	22	2	112	8	2	22	**168**	52	3	254	15	3	49	**376**
	Total	**347**	**25**	**1,662**	**101**	**25**	**323**	**2,483**	**181**	**14**	**856**	**53**	**14**	**168**	**1,286**	**409**	**28**	**1,952**	**115**	**28**	**379**	**2,911**
Commercial Office	Core	0	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**
	Overall	15	0	15	4	2	2	**38**	1	0	3	3	0	39	**46**	17	0	17	5	3	3	**45**
	Total	**15**	**0**	**15**	**4**	**2**	**2**	**38**	**1**	**0**	**3**	**3**	**0**	**39**	**46**	**17**	**0**	**17**	**5**	**3**	**3**	**45**
Retail	Core	20	19	123	45	0	407	**614**	108	108	732	230	0	2,463	**3,641**	70	58	390	143	0	1,269	**1,930**
	Overall	2	2	12	2	0	40	**58**	8	10	70	18	0	248	**354**	4	6	36	8	0	126	**180**
	Total	**22**	**21**	**135**	**47**	**0**	**447**	**672**	**116**	**118**	**802**	**248**	**0**	**2,711**	**3,995**	**74**	**64**	**426**	**151**	**0**	**1,395**	**2,110**
Hotel	Core	107	44	66	19	0	117	**353**	204	84	128	37	0	226	**679**	181	74	113	34	0	200	**602**
	Overall	0	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**
	Total	**107**	**44**	**66**	**19**	**0**	**117**	**353**	**204**	**84**	**128**	**37**	**0**	**226**	**679**	**181**	**74**	**113**	**34**	**0**	**200**	**602**
Total	Core	428	85	1,633	152	22	804	**3,124**	471	204	1,604	312	12	2,835	**5,438**	608	157	2,201	277	25	1,799	**5,067**
	Overall	63	5	245	19	5	85	**422**	31	12	185	29	2	309	**568**	73	9	307	28	6	178	**601**
	Total	**491**	**90**	**1,878**	**171**	**27**	**889**	**3,546**	**502**	**216**	**1,789**	**341**	**14**	**3,144**	**6,006**	**681**	**166**	**2,508**	**305**	**31**	**1,977**	**5,668**

E. 2015 ANALYSIS YEAR

The 2015 analysis year considers 88 planned development projects that are expected to open and operating by 2015 (see **Figure 1**). As compared to the 2011 analysis year, projects anticipated to be complete by 2015 cover a broader geography within Downtown Brooklyn, including: substantial development throughout the Fulton Ferry/DUMBO/Vinegar Hill neighborhoods; a broad mix of uses (including over 1,200 residential units) as part of the Brooklyn Bridge Park project in Brooklyn Heights; numerous development projects in the Boerum Hill /Cobble Hill/Carroll Gardens neighborhoods; the first phase of the Atlantic Yards/Brooklyn Arena project (which will include an approximately 850,000-square-foot arena); and substantial additional development within the downtown core.

As described in Section B, "Methodology," the future conditions assessment considers two scenarios for the 2015 analysis year: Scenario A and Scenario B. Scenario A assumes complete build-out of all development projects that, according to public documents, would be open and operating by 2015. Scenario B recognizes the possibility of less aggressive residential growth in the study area, and proportionately discounts the number of residential units for each planned project. The estimated travel demands for both scenarios are presented below.

INCREMENTAL TRAVEL DEMAND ESTIMATES: SCENARIO A

As summarized in **Table 5**, under Scenario A the 88 planned development projects would bring online a total of 12,687 residential dwelling units, 1.47 million square feet of commercial office use, 1.10 million square feet of retail space, 204,410 square feet of community facility uses, 571,500 square feet of academic uses, and 1,787 hotel rooms.

Table 5: Cumulative Program Data: Planned Projects in Operation by 2015 Scenario A

Area	Residential Units	Retail (sf)	Commercial Office (sf)	Community Facility/ Institutional (sf)	Hotel Rooms	Parking Spaces	Open Space (acres)
Downtown Core Study Area	6,489	746,095	381,000	157,500	1,068	2,421	1.3
Overall Study Area	6,198	356,900	1,086,551	46,910	719	5,807	24.0
Total	**12,687**	**1,102,995**	**1,467,551**	**204,410**	**1,787**	**8,228**	**25.3**

Table 6 summarizes the project-generated person-trips by development use and by mode of transportation. In total, the planned uses for the 2015 Scenario A future condition are projected to generate a total of 80,229 person trips daily: 19,142; 29,856; and 31,231 person trips during the weekday AM, midday, and PM peak hours, respectively. Of the total person trips, 30,741 (38.3 percent) are projected to occur via subway, while 6,888 (8.6 percent) are bus trips. An estimated 4,013 bus trips (58.3 percent of the increment) will be generated by uses in the downtown core study area, while the remaining 2,875 bus trips will be generated by uses in the overall study area. As compared to the 2011 analysis year, a higher proportion of the incremental bus trips will be generated by uses in the overall study area by 2015 (in 2011

less than 10 percent of incremental bus trips will generated by new uses in the overall study area). Most of the incremental bus trips will continue to occur during the midday and PM peak hours.

Table 6: Trip Generation Summary: 2015 Scenario A

Use	Study Area	AM Peak Hour							Midday Peak Hour							PM Peak Hour						
		Auto	Taxi	Subway	Bus	Railroad	Walk	Total	Auto	Taxi	Subway	Bus	Railroad	Walk	Total	Auto	Taxi	Subway	Bus	Railroad	Walk	Total
Residential	Core	664	45	3,192	190	45	619	**4,755**	349	22	1,645	96	22	320	**2,454**	788	55	3,757	221	55	728	**5,604**
	Overall	635	43	3,051	181	43	590	**4,543**	325	22	1,575	90	22	301	**2,335**	744	51	3,586	211	51	691	**5,334**
	Total	**1,299**	**88**	**6,243**	**371**	**88**	**1,209**	**9,298**	**674**	**44**	**3,220**	**186**	**44**	**621**	**4,789**	**1,532**	**106**	**7,343**	**432**	**106**	**1,419**	**10,938**
Commercial Office	Core	300	7	316	89	49	49	**810**	19	10	69	69	0	826	**993**	347	8	366	103	57	57	**938**
	Overall	855	22	899	254	138	138	**2,306**	57	27	198	198	0	2,353	**2,833**	992	26	1,043	295	159	159	**2,674**
	Total	**1,155**	**29**	**1,215**	**343**	**187**	**187**	**3,116**	**76**	**37**	**267**	**267**	**0**	**3,179**	**3,826**	**1,339**	**34**	**1,409**	**398**	**216**	**216**	**3,612**
Retail	Core	192	53	426	316	0	1,045	**2,032**	771	280	2,126	1,299	0	5,845	**10,321**	708	174	1,431	1,137	0	3,372	**6,822**
	Overall	84	27	217	145	0	569	**1,042**	355	151	1,127	609	0	3,245	**5,487**	314	90	719	517	0	1,822	**3,462**
	Total	**276**	**80**	**643**	**461**	**0**	**1,614**	**3,074**	**1,126**	**431**	**3,253**	**1,908**	**0**	**9,090**	**15,808**	**1,022**	**264**	**2,150**	**1,654**	**0**	**5,194**	**10,284**
Community Facility	Core	27	6	16	33	0	457	**539**	36	7	22	45	0	643	**753**	26	5	16	32	0	462	**541**
	Overall	6	0	2	9	0	137	**154**	12	1	3	14	0	193	**223**	8	1	3	8	0	138	**158**
	Total	**33**	**6**	**18**	**42**	**0**	**594**	**693**	**48**	**8**	**25**	**59**	**0**	**836**	**976**	**34**	**6**	**19**	**40**	**0**	**600**	**699**
Hotel	Core	228	93	141	41	0	249	**752**	434	178	272	79	0	482	**1,445**	387	158	242	72	0	428	**1,287**
	Overall	153	63	95	28	0	169	**508**	291	120	184	54	0	325	**974**	259	108	161	48	0	288	**864**
	Total	**381**	**156**	**236**	**69**	**0**	**418**	**1,260**	**725**	**298**	**456**	**133**	**0**	**807**	**2,419**	**646**	**266**	**403**	**120**	**0**	**716**	**2,151**
Academic-University	Core	117	9	690	58	0	97	**971**	116	10	680	58	0	95	**959**	134	10	794	67	0	112	**1,117**
	Overall	15	1	89	7	0	13	**125**	15	0	86	7	0	13	**121**	17	1	102	8	0	14	**142**
	Total	**132**	**10**	**779**	**65**	**0**	**110**	**1,096**	**131**	**10**	**766**	**65**	**0**	**108**	**1,080**	**151**	**11**	**896**	**75**	**0**	**126**	**1,259**
Open Space	Core	2	0	2	2	0	7	**13**	6	0	4	4	0	16	**30**	5	0	3	2	0	13	**23**
	Overall	47	2	29	26	0	130	**234**	112	6	68	62	0	318	**566**	93	4	56	51	0	262	**466**
	Total	**49**	**2**	**31**	**28**	**0**	**137**	**247**	**118**	**6**	**72**	**66**	**0**	**334**	**596**	**98**	**4**	**59**	**53**	**0**	**275**	**489**
Arena	Core	0	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**
	Overall	125	10	179	7	28	9	**358**	128	11	173	8	32	10	**362**	629	54	886	38	144	48	**1,799**
	Total	**125**	**10**	**179**	**7**	**28**	**9**	**358**	**128**	**11**	**173**	**8**	**32**	**10**	**362**	**629**	**54**	**886**	**38**	**144**	**48**	**1,799**
Total	Core	1,530	213	4,783	729	94	2,523	**9,872**	1,731	507	4,818	1,650	22	8,227	**16,955**	2,395	410	6,609	1,634	112	5,172	**16,332**
	Overall	1,920	168	4,561	657	209	1,755	**9,270**	1,295	338	3,414	1,042	54	6,758	**12,901**	3,056	335	6,556	1,176	354	3,422	**14,899**
	Total	**3,450**	**381**	**9,344**	**1,386**	**303**	**4,278**	**19,142**	**3,026**	**845**	**8,232**	**2,692**	**76**	**14,985**	**29,856**	**5,451**	**745**	**13,165**	**2,810**	**466**	**8,594**	**31,231**

INCREMENTAL TRAVEL DEMAND ESTIMATES: SCENARIO B

As summarized in **Table 7**, under Scenario B the 88 planned development projects total 7,474 residential dwelling units, 1.47 million square feet of commercial office use, 1.10 million square feet of retail space, 204,410 square feet of community facility uses, 571,500 square feet of academic uses, and 1,787 hotel rooms.

Table 7: Cumulative Program Data: Planned Projects in Operation by 2015 Scenario B

Area	Residential Units	Retail (sf)	Commercial Office (sf)	Community Facility/ Institutional (sf)	Hotel Rooms	Parking Spaces	Open Space (acres)
Downtown Core Study Area	5,222	746,095	381,000	157,500	1,068	2,421	1.3
Overall Study Area	2,252	356,900	1,086,551	46,910	719	5,807	24.0
Total	**7,474**	**1,102,995**	**1,467,551**	**204,410**	**1,787**	**8,228**	**25.3**

Table 8 summarizes the project-generated person-trips by development use and by mode of transportation. In total, the planned uses for the 2015 Scenario B future condition are projected to generate a total of 69,989 person trips daily: 15,336; 27,903; and 26,750 person trips during the weekday AM, midday, and PM peak hours, respectively. Of the total person trips, 23,842 (34.1 percent) are projected to occur via subway, while 6,490 (9.3 percent) will be bus trips. An estimated 3,919 bus trips (60.4 percent of the increment) would be generated by uses in the downtown core study area, while the remaining 2,571 bus

trips will be generated by uses in the overall study area. As compared to the 2011 analysis year, a higher proportion of the incremental bus trips will be generated by uses in the overall study area by 2015 (in 2011 less than 10 percent of incremental bus trips will generated by new uses in the overall study area). Most of the incremental bus trips will continue to occur during the midday and PM peak hours.

Table 8: Trip Generation Summary: 2015 Scenario B

Use	Study Area	AM Peak Hour							Midday Peak Hour							PM Peak Hour						
		Auto	Taxi	Subway	Bus	Railroad	Walk	Total	Auto	Taxi	Subway	Bus	Railroad	Walk	Total	Auto	Taxi	Subway	Bus	Railroad	Walk	Total
Residential	Core	537	39	2,571	154	39	499	**3,839**	278	20	1,328	79	20	257	**1,982**	632	45	3,023	180	45	586	**4,511**
	Overall	231	16	1,109	66	16	215	**1,653**	120	8	573	34	8	111	**854**	272	20	1,303	78	20	253	**1,946**
	Total	**768**	**55**	**3,680**	**220**	**55**	**714**	**5,492**	**398**	**28**	**1,901**	**113**	**28**	**368**	**2,836**	**904**	**65**	**4,326**	**258**	**65**	**839**	**6,457**
Commercial Office	Core	300	7	316	89	49	49	**810**	19	10	69	69	0	826	**993**	347	8	366	103	57	57	**938**
	Overall	855	22	899	254	138	138	**2,306**	57	27	198	198	0	2,353	**2,833**	992	26	1,043	295	159	159	**2,674**
	Total	**1,155**	**29**	**1,215**	**343**	**187**	**187**	**3,116**	**76**	**37**	**267**	**267**	**0**	**3,179**	**3,826**	**1,339**	**34**	**1,409**	**398**	**216**	**216**	**3,612**
Retail	Core	192	53	426	316	0	1,045	**2,032**	771	280	2,126	1,299	0	5,845	**10,321**	708	174	1,431	1,137	0	3,372	**6,822**
	Overall	84	27	217	145	0	569	**1,042**	355	151	1,127	609	0	3,245	**5,487**	314	90	719	517	0	1,822	**3,462**
	Total	**276**	**80**	**643**	**461**	**0**	**1,614**	**3,074**	**1,126**	**431**	**3,253**	**1,908**	**0**	**9,090**	**15,808**	**1,022**	**264**	**2,150**	**1,654**	**0**	**5,194**	**10,284**
Community Facility	Core	27	6	16	33	0	457	**539**	36	7	22	45	0	643	**753**	26	5	16	32	0	462	**541**
	Overall	6	0	2	9	0	137	**154**	12	1	3	14	0	193	**223**	8	1	3	8	0	138	**158**
	Total	**33**	**6**	**18**	**42**	**0**	**594**	**693**	**48**	**8**	**25**	**59**	**0**	**836**	**976**	**34**	**6**	**19**	**40**	**0**	**600**	**699**
Hotel	Core	228	93	141	41	0	249	**752**	434	178	272	79	0	482	**1,445**	387	158	242	72	0	428	**1,287**
	Overall	153	63	95	28	0	169	**508**	291	120	184	54	0	325	**974**	259	108	161	48	0	288	**864**
	Total	**381**	**156**	**236**	**69**	**0**	**418**	**1,260**	**725**	**298**	**456**	**133**	**0**	**807**	**2,419**	**646**	**266**	**403**	**120**	**0**	**716**	**2,151**
Academic-University	Core	117	9	690	58	0	97	**971**	116	10	680	58	0	95	**959**	134	10	794	67	0	112	**1,117**
	Overall	15	1	89	7	0	13	**125**	15	0	86	7	0	13	**121**	17	1	102	8	0	14	**142**
	Total	**132**	**10**	**779**	**65**	**0**	**110**	**1,096**	**131**	**10**	**766**	**65**	**0**	**108**	**1,080**	**151**	**11**	**896**	**75**	**0**	**126**	**1,259**
Open Space	Core	2	0	2	2	0	7	**13**	6	0	4	4	0	16	**30**	5	0	3	2	0	13	**23**
	Overall	47	2	29	26	0	130	**234**	112	6	68	62	0	318	**566**	93	4	56	51	0	262	**466**
	Total	**49**	**2**	**31**	**28**	**0**	**137**	**247**	**118**	**6**	**72**	**66**	**0**	**334**	**596**	**98**	**4**	**59**	**53**	**0**	**275**	**489**
Arena	Core	0	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**
	Overall	125	10	179	7	28	9	**358**	128	11	173	8	32	10	**362**	629	54	886	38	144	48	**1,799**
	Total	**125**	**10**	**179**	**7**	**28**	**9**	**358**	**128**	**11**	**173**	**8**	**32**	**10**	**362**	**629**	**54**	**886**	**38**	**144**	**48**	**1,799**
Total	Core	1,403	207	4,162	693	88	2,403	**8,956**	1,660	505	4,501	1,633	20	8,164	**16,483**	2,239	400	5,875	1,593	102	5,030	**15,239**
	Overall	1,516	141	2,619	542	182	1,380	**6,380**	1,090	324	2,412	986	40	6,568	**11,420**	2,584	304	4,273	1,043	323	2,984	**11,511**
	Total	**2,919**	**348**	**6,781**	**1,235**	**270**	**3,783**	**15,336**	**2,750**	**829**	**6,913**	**2,619**	**60**	**14,732**	**27,903**	**4,823**	**704**	**10,148**	**2,636**	**425**	**8,014**	**26,750**

F. CONCLUSION

Downtown Brooklyn has experienced rapid growth in commercial and residential projects, and numerous planned projects will attract more residents, workers, and visitors to the area. As shown in **Table 9**, by 2015 Downtown Brooklyn could receive over 12,000 residential units, over 1.1 million square feet of retail, almost 1.5 million square feet of commercial office space, over 204,000 square feet of community facility/institutional uses, nearly 1,800 hotel rooms, and over 25 acres of publicly accessible open space.

Table 9: Cumulative Program Data: Planned Projects in DBSTCS

Area	Residential Units	Retail (sf)	Commercial Office (sf)	Community Facility/ Institutional (sf)	Hotel Rooms	Parking Spaces	Open Space (acres)
2011 Analysis Year							
Downtown Core Study Area	2,934	148,000	-	-	501	709	-
Overall Study Area	440	12,100	18,000	-	-	87	-
2011 Total	**3,374**	**160,100**	**18,000**	**-**	**501**	**796**	**-**
2015 Analysis Year							
Downtown Core Study Area	5,222 - 6,489	746,095	381,000	157,500	1,068	2,421	1.3
Overall Study Area	2,252 - 6,198	356,900	1,086,551	46,910	719	5,807	24.0
2015 Total	**7,474 - 12,687**	**1,102,995**	**1,467,551**	**204,410**	**1,787**	**8,228**	**25.3**

Travel demand estimates predict that by 2015 these new uses will generate up to 1,386 bus trips in the AM peak hour, 2,692 bus trips in the midday peak hour, and 2,810 bus trips in the PM peak hour. While much of this growth and its associated travel demands will occur in areas of the downtown core that are relatively well-served by surface transit, growth is also projected for neighborhoods with fewer surface transit options, as obtained from focus groups, traveler surveys, and GIS analysis. These areas include:

Within Downtown Core Study Area:

- Flatbush Avenue north of DeKalb Avenue. Five developments are currently in construction along Flatbush Avenue, with eight more currently planned. Surface transit options on Flatbush Avenue, north of DeKalb Avenue, only include the B54 bus service, servicing areas east of the study area along Myrtle Avenue.

Within Overall Study Area

- DUMBO (particularly the area bounded by Jay Street to the west, Gold Street to the east, Plymouth Street to the north, and York Street to the south). DUMBO contains several planned developments with no surface transit options. Transit options are limited to the F train located at York Avenue. Surface transit in DUMBO is limited to the B25, which services the area just around the Brooklyn Bridge.

- Columbia Street Waterfront. The currently planned Brooklyn Bridge Park has no surface transit accessibility and limited subway service providing almost no transit accessibility and is limited to walking trips.
- Boerum Hill /Cobble Hill/Carroll Gardens. This area, in the southern part of the overall study area, contains several planned developments. Current bus service is limited to north/south travel only, along Court Street, Smith Street, and 3rd Avenue, with one bus travelling east/west along Bergen Street.
- Brooklyn Heights has several developments, with several subways services in the vicinity, but with no surface transit options.

Table 2

Planned Development Projects in DBSTCS Study Areas

Map Number	Project Name	Address	Block(s)	Lot(s)	Primary or Secondary Study Area?	Primary Use	Development Program							Status
							Residential Units	Retail (sf)	Office/ Commercial (sf)	Community Facility/ Institutional (sf)	Hotel Rooms	Parking Spaces	Open Space (acres)	
1	100 Gold Street	100 Gold Street	55	32	Secondary	Residential	10	-	-	-	-	-	-	Planned
2	103 Kane Street	103 Kane Street	309	42	Secondary	Residential	7	-	-	2,023	-	-		Planned
3	City University Site B	105 Tech Place	131	1	Primary	Public Facility	-	-	-	350,000	-	-	-	Planned
4	107 Union Street	107 Union Street	335	42	Secondary	Residential	1	-	-	2,929	-	6		Planned
5	109 Gold Street	109 Gold Street	56	2,34,35	Secondary	Residential	33	-	-	-	-	-	-	Planned
6	111 Lawrence Street	111 Lawrence Street	148	1	Primary	Residential	491	-	-	-	-	-	-	In Construction
7	Sleepy's Apartments	116 Montague Street	248	32	Secondary	Residential	6	2,000	-	-	-	-	-	Planned
8	Navy Green	130 Flushing Avenue	2033	1	Secondary	Residential	455	6,000	-	6,000	-	-	-	Planned
9	131 6th Avenue	131 6th Avenue	942	3	Secondary	Residential	2	-	-	5,458	-	-	-	Planned
10	137 5th Avenue	137 5th Avenue	944	1	Secondary	Residential	4	1,600	-	-	-	-	-	Planned
11	150 4th Avenue	150 4th Avenue	413	37	Secondary	Residential	95	-	-	-	-	-	-	Planned
12	Avalon Fort Greene	159 Myrtle Avenue	2049	1,2,28-35	Primary	Residential	650	-	-	-	-	252		In Construction
13	177 Concord Street	177 Concord Street	109	25	Primary	Residential	23	-	-	-	-	-	-	Planned
14	181 3rd Avenue	181 3rd Avenue	413	2	Secondary	Hotel	-	-	-	-	130	-	-	Planned
15	DumboSpace	192 Water Street	41	11	Secondary	Residential	10	-	-	5,250	-	-	-	Planned
16	210 Pacific Street	210 Pacific Street	279	24	Primary	Residential	10	-	-	-	-	-	-	Planned
17	216 Pacific Street	216 Pacific Street	279	28,30	Primary	Residential	3	-	-	-	-	-	-	Planned
18	Castimatidis Red Apple Project	218 Myrtle Avenue	2061	1	Primary	Residential	100	22,000	-	-	-	-	-	In Construction
19	Sheraton/Aloft Hotels	222-228 Duffield Street	145	26, 32	Primary	Hotel	-	-	-	-	501	-	-	In Construction
20	235 Gold Street	235 Gold Street	122	13	Primary	Residential	377	-	-	-	-	-	-	In Construction
21	236 Atlantic Avenue	236 Atlantic Avenue	278	33	Primary	Residential	55	-	-	-	-	-	-	Planned
22	230 Livingston Street	230 Livingston Street	165	17,18,19,58	Secondary	Residential	271	-	18,000	-	-	-	-	In Construction
23	Hotel Indigo	237 Duffield Street	146	7	Primary	Hotel	-	-	-	-	180	-	-	Planned
24	Toren	245 Flatbush Ave Ext	2060	22-27, 32, 122	Primary	Residential	280	60,000	-	-	-	457	-	In Construction
25	252 Atlantic Avenue/97 Boerum Place	252 Atlantic Avenue/97 Boerum Place	181	1	Primary	Residential	65	16,000	-	-	-	-	-	In Construction
26	254 Livingston Street	254 Livingston Street	165	29	Primary	Residential	186	-	21,000	-	-	-	-	Planned
27	264 Bond Street	264 Bond Street	416	42	Secondary	Residential	2	-	-	-	-	-	-	Planned
28	Brooklyn House of Detention	275 Atlantic Avenue	175	1	Primary	Institutional	-	-	-	40,000	-	-	-	Planned
29	277 Gold Street	277 Gold Street	122	5, 9	Primary	Residential	133	-	-	-	-	-	-	Planned
30	29 Flatbush Avenue	29 Flatbush Avenue	2106	19, 40	Primary	Residential	333	-	-	-	-	-	-	Planned
31	290 Sackett Street	290 Sackett Street	339	19	Secondary	Residential	32	-	-	-	-	-		Planned
32	Degraw Street Firehouse	299 Degraw Street	414	61	Secondary	Community Facility	-	-	-	4,250	-	-		Planned
33	City University Site A	300 Jay Street	128		Primary	Public Faciility	-	-	-	350,000	-	-		Planned
34	Holiday Inn	300 Schermerhorn Street	172	24	Primary	Hotel	-	-	-	-	247	-		Planned
35	306 Bond Street	306 Bond Street	430	3	Secondary	Residential	11	-	-	-	-	-		Planned
36	307 Atlantic Avenue	307 Atlantic Avenue	176	50, 49	Primary	Residential	26	-	-	-	-	-		In Construction
37	BAM LDC South	31 Lafayette Avenue	2110		Primary	Residential	250	-	-	48,500	-	466		Planned
38	31 North Elliot Place	31 North Elliot Place	2027	11	Secondary	Residential	5	-	-	-	-	-		Planned
39	Oro II	311 Gold Street	134	1,5,30,36,38,41	Primary		-	-	-	-	-	-		Planned
40	316 Bergen Street	316 Bergen Street	389	10	Secondary	Residential	39	-	-	-	-	-		Planned
41	345 Bergen Street	345 Bergen Street	198	46	Primary	Residential	15	-	-	-	-	-		Planned
42	348 Atlantic Avenue	348 Atlantic Avenue	183	7	Primary	Residential	6	2,000	-	-	-	-		Planned
43	348 Sackett Avenue	348 Sackett Avenue	428	26	Secondary	Residential	5	-	-	-	-	-		Planned
44	357 Dean Street	357 Dean Street	192	47	Primary	Residential	45	-	-	-	-	-		Planned
45	37 Bridge Street	37 Bridge Street	32	4	Secondary	Residential	2	-	-	-	-	-		Planned
46	388 Bridge Street	388 Bridge Street	152	37, 118	Primary	Residential	360	20,095	-	-	-	142		Planned
47	414 Hicks Street	414 Hicks Street	304	18	Secondary	Residential	149	-	-	-	-	-		Planned
48	45 North Oxford Street	45 North Oxford Street	2029	1	Secondary	Residential	3	-	-	-	-	-		Planned
49	46 Nevins Street	46 Nevins Street	166	40	Secondary	Hotel	-	-	-	-	69	-		Planned
50	462 Baltic Street	462 Baltic Street	405	16	Secondary	Office	-	-	35,551	-	-	61		Planned
51	49 Duffield Street	49 Duffield Street	121	12	Primary	Residential	7	-	-	-	-	-		Planned
52	491 Henry Street	491 Henry Street	323	1	Secondary	Residential	3	-	-	-	-	-		Planned
53	505 Fulton Street (Conway Building)	505 Fulton Street	145	3, 35	Primary	Commercial	544	50,000	-	-	-	-		In Construction
54	56 Strong Place	56 Strong Place	323	59	Secondary	Residential	3	-	-	-	-	-		Planned
55	611 DeGraw Street	611 DeGraw Street	420	52	Secondary	Hotel	-	-	-	-	25	-		Planned
56	Atlantic Yards - residential mixed use	630 Atlantic Avenue			Secondary	Mixed	2,110	91,000	336,000	-	180	2,346	1.0	Planned
57	Atlantic Terrace	669 Atlantic Avenue	2004	1,2,78,79,80,81,82,	Secondary	Residential	80	12,100	-	-	-	87		In Construction
58	675 Sackett Street	675 Sackett Street			Secondary	Residential	38	-	-	-	-	-		Planned
59	72 Poplar	72 Poplar	211	15	Secondary	Residential	24	-	-	-	-	-		Planned
60	75 Columbia Street	75 Columbia Street	299	1	Secondary	Hotel	-	-	-	-	10	-		Planned
61	Flatiron Building	75 Flatbush Avenue Extension	120	13, 45	Primary	Residential	108	-	-	-	-	-		Planned
62	80 Dekalb Avenue	80 Dekalb Avenue	2094	1	Primary	Residential	365	-	-	-	-	-		In Construction
63	85 Jay Street and Rezoning	85 Jay Street			Secondary	Residential	1,000	-	2,600	-	-	1,100		Planned
64	86 Congress Street	86 Congress Street	299	16	Secondary	Residential	48	-	-	-	-	-		Planned
65	97 Douglass Street	97 Douglass Street	409	50	Secondary	Residential	6	-	-	-	-	-		Planned
66	470 Vanderbilt	Block btw Fulton, Atlantic, Clermont, Vanderbilt	2009	1,6,19,20,23,26,31-	Secondary	Mixed		83,000	530,000	-	-	400		Planned
67	BAM LDC North	Block btw Fulton, rockwell, lafayette, ashland	2107	1,2,15,24,30,36,40,	Primary	Residential	187	4,000	-	69,000	-	-		Planned
68	Brooklyn Bridge Park	Brooklyn side of East River south of Brookl Bridge			Secondary	Open Space	1,210	151,200	164,400	21,000	225	1,283	23.0	Planned
69	Dock Street Rezoning	Dock Street btw Water and Front Street			Secondary	Residential	301	10,000	-	45,000	-	465		Planned
70	City Point	Flatbush Avenue at Albee Square West	149	1, 49	Primary	Residential	650	520,000	360,000	-	-	404		Planned
71	Grand Army Plaza Redesign	Grand Army Plaza			Secondary		-	-	-	-	-	-		Planned
72	Pier 7	Pier 7, Brooklyn	281	1	Secondary	Industrial	-	-	-	-	-	-		Planned
73	Pier 9a	Pier 9a, Brooklyn	281	1	Secondary	Industrial	-	-	-	-	-	-		Planned
74	Pier 9b	Pier 9b, Brooklyn	281	1	Secondary	Industrial	-	-	-	-	-	-		Planned
75	Hoyt-Schmererhorn I	Schermerhorn and Hoyt Streets			Primary	Residential	100	-	-	-	-	-		Planned
76	Hoyt-Schermerhorn II	Schermerhorn and Smith Streets			Primary	Residential	100	-	-	-	-	-		Planned
77	Willoughby Square Park	Willoughby St between Gold and Duffield Streets	146	16,17,18,23,29,34, 35,36,37,41, 42	Primary	Open Space	-	-	-	-	-	700	1.3	Planned
78	PS8 Addition	Hicks Street between Poplar and Middagh Streets	211	1	Secondary	School			-	19,500				Planned
79	220 Water Street	Bridge Street between Water and Front Streets	41	17	Secondary	Residential	135		-			59		Planned
80	168 Nassau Street	168 Nassau Street			Secondary	Residential	89		-					In Construction
81	V3 Hotel	229 - 231 Duffield Street	146	13, 14	Primary	Hotel			-					Planned
82	9 Townhomes (Phase III)	State Street			Secondary	Residential	9		-					Planned
83	Hampton Inn	125 Flatbush Avenue Extension			Primary	Hotel			-		140			Planned
84	Best Western Manhattan Bridge	55 Flatbush Avenue			Secondary	Hotel			-		80			Planned
85	321 Schermerhorn	321 Schermerhorn Street			Primary	Residential	64	7,000	-					Planned
86	State Street Mews and Cathedral Townhomes	311-319 State Street & 345-349 State Street			Primary	Residential	45		-					Planned
87	Avalon Bay Willoughby	Willoughby Street			Primary	Residential	875	20,000	-					Planned
87	2 Floors in 345 Adams	345 Adams			Primary	Residential	36	-	-	-	-	-	-	Planned
						TOTAL	**12,687**	**1,077,995**	**1,467,551**	**968,910**	**1,787**	**8,228**	**25.3**	

FIGURE 1

PLANNED DEVELOPMENT PROJECTS IN DBSTCS

Secondary Study Area
Primary Study Area
Planned Projects
In Construction

Study Corridors

Adam/Court/Jay/Cadman Plaza
Atlantic Avenue
Flatbush Avenue
Fulton/Livingston

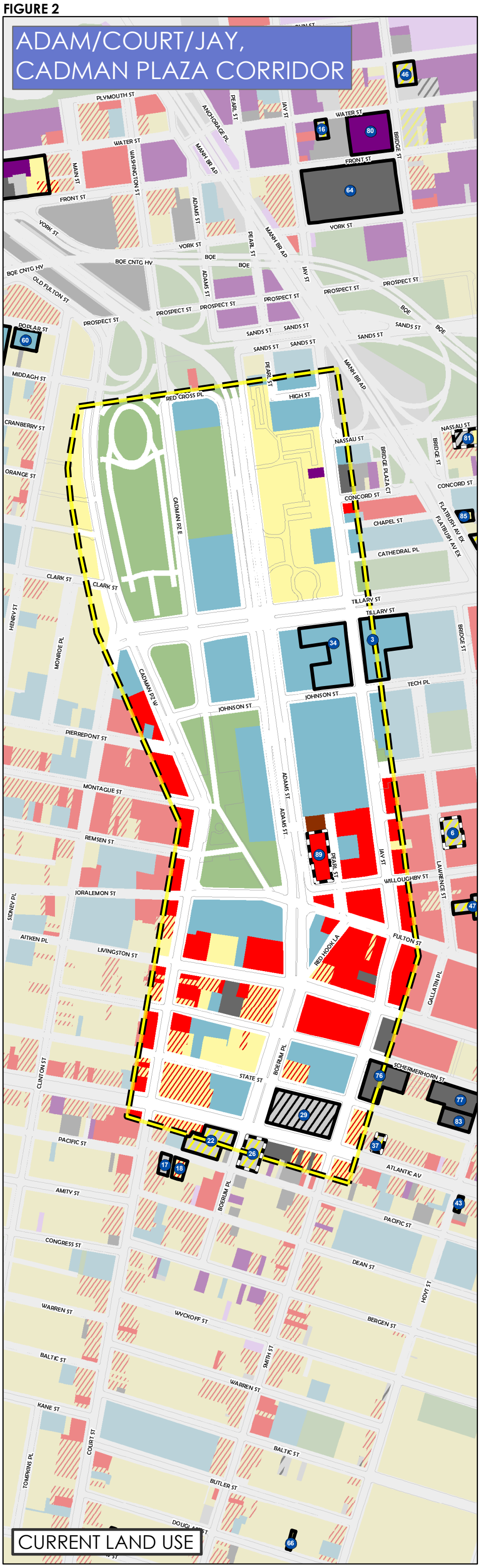
0 0.25 Miles

N

FIGURE 2

8.13.09 AKRF

ADAM/COURT/JAY, CADMAN PLAZA CORRIDOR



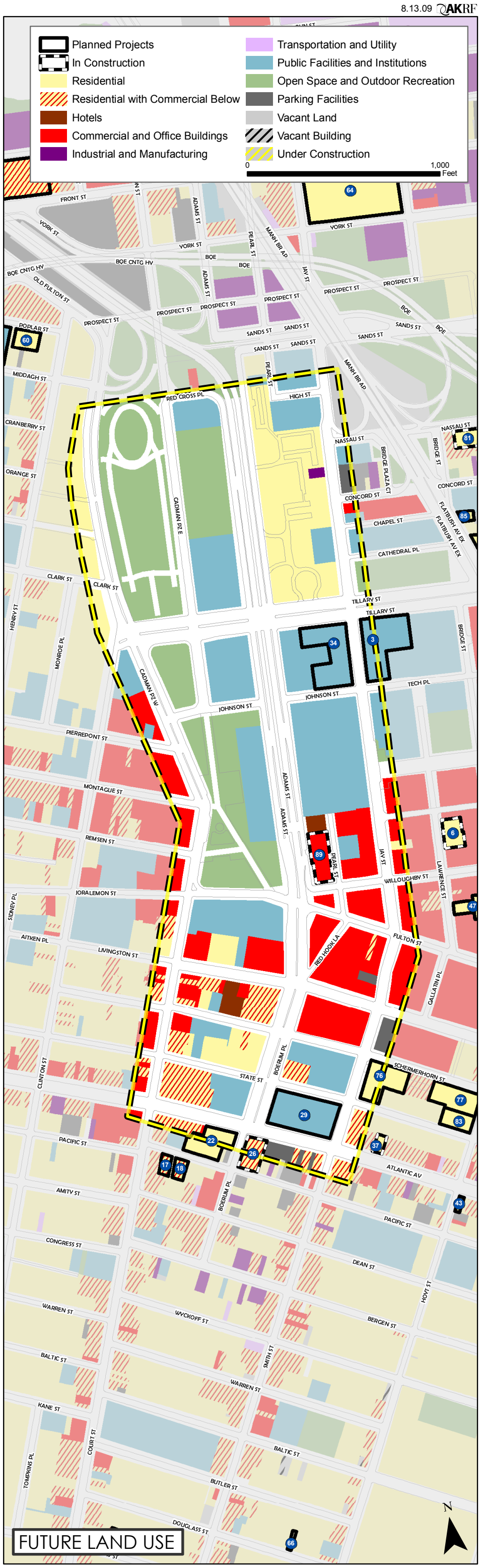
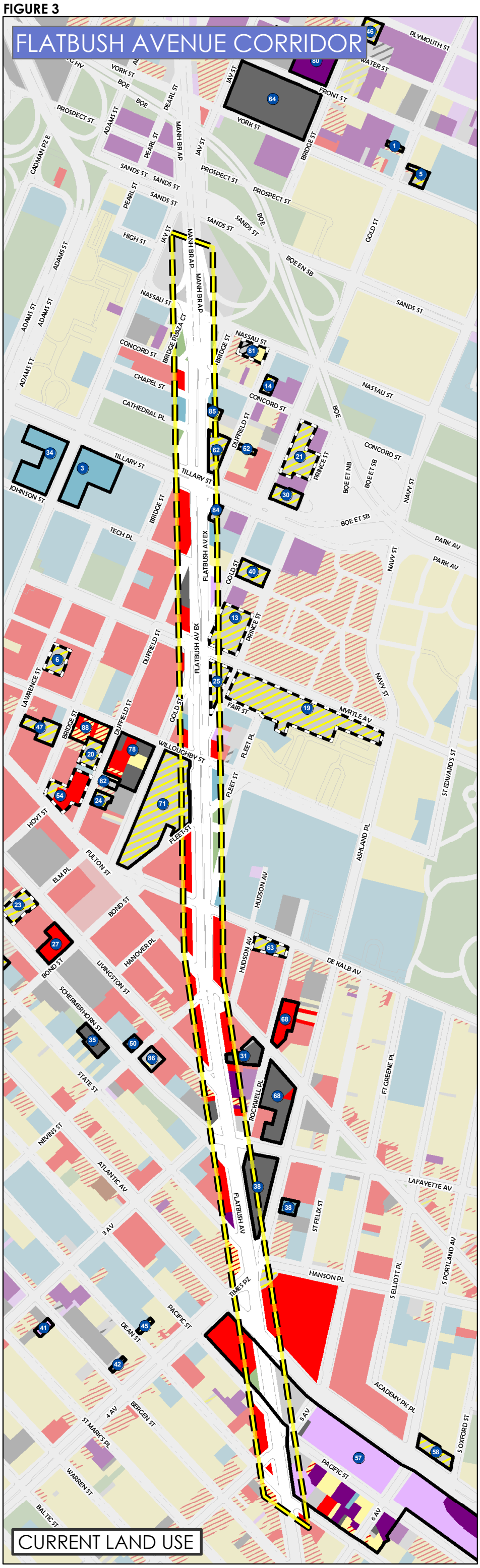


FIGURE 3

8.13.09 AKRF

FLATBUSH AVENUE CORRIDOR



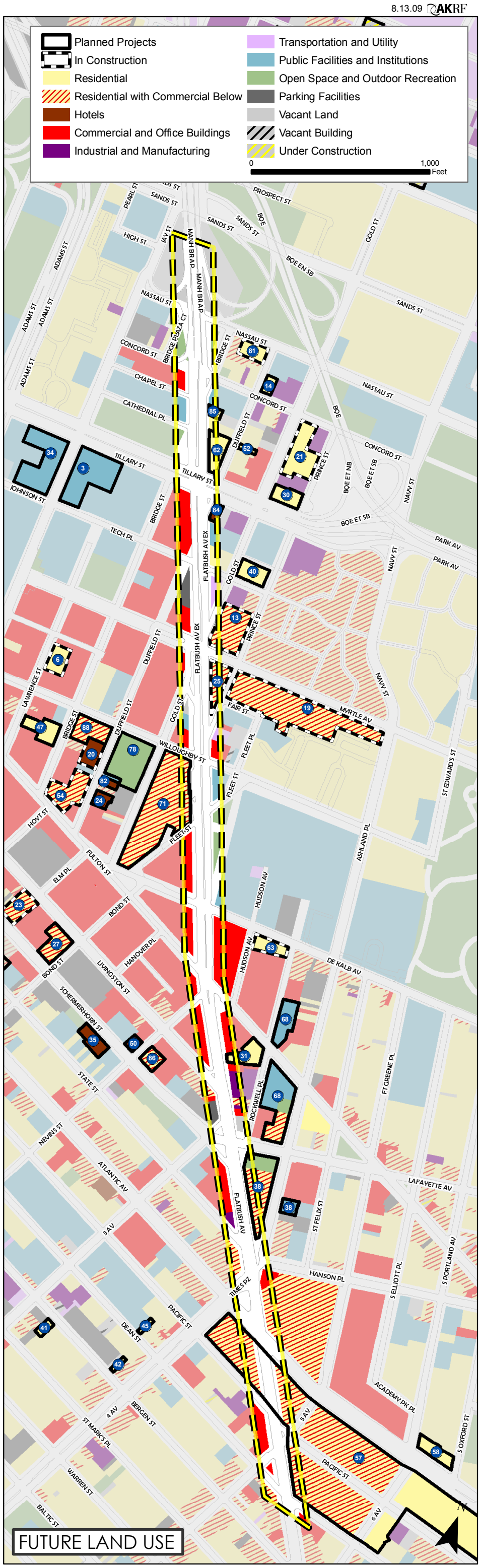
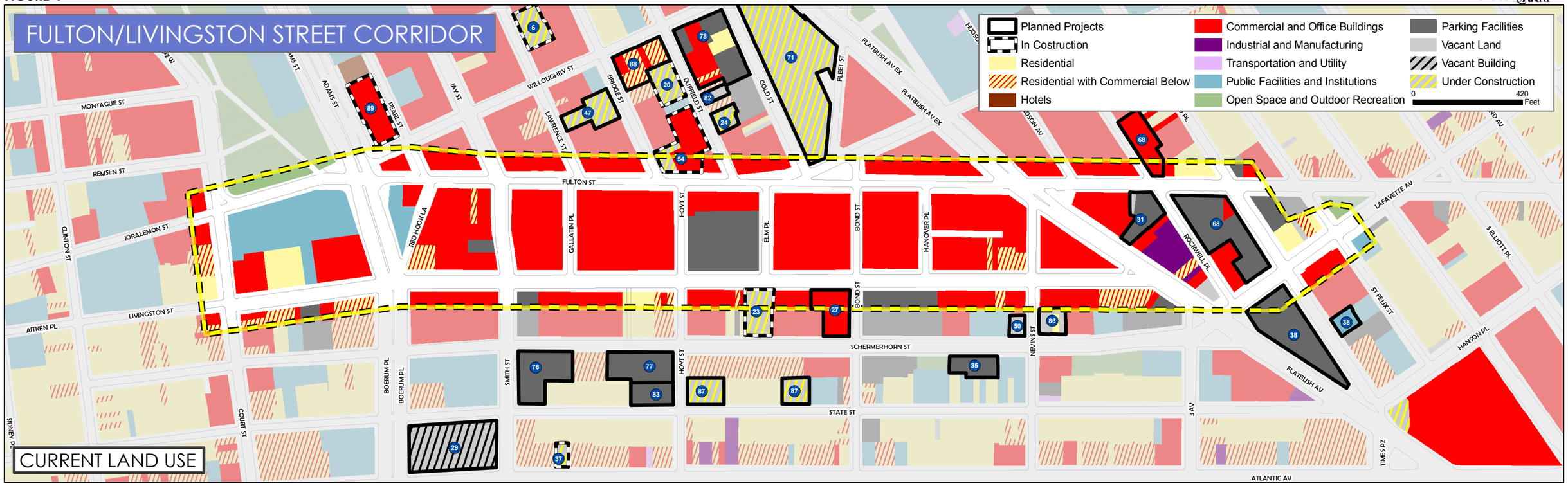


FIGURE 4

8.13.09 AKRF

FULTON/LIVINGSTON STREET CORRIDOR

CURRENT LAND USE



FUTURE LAND USE

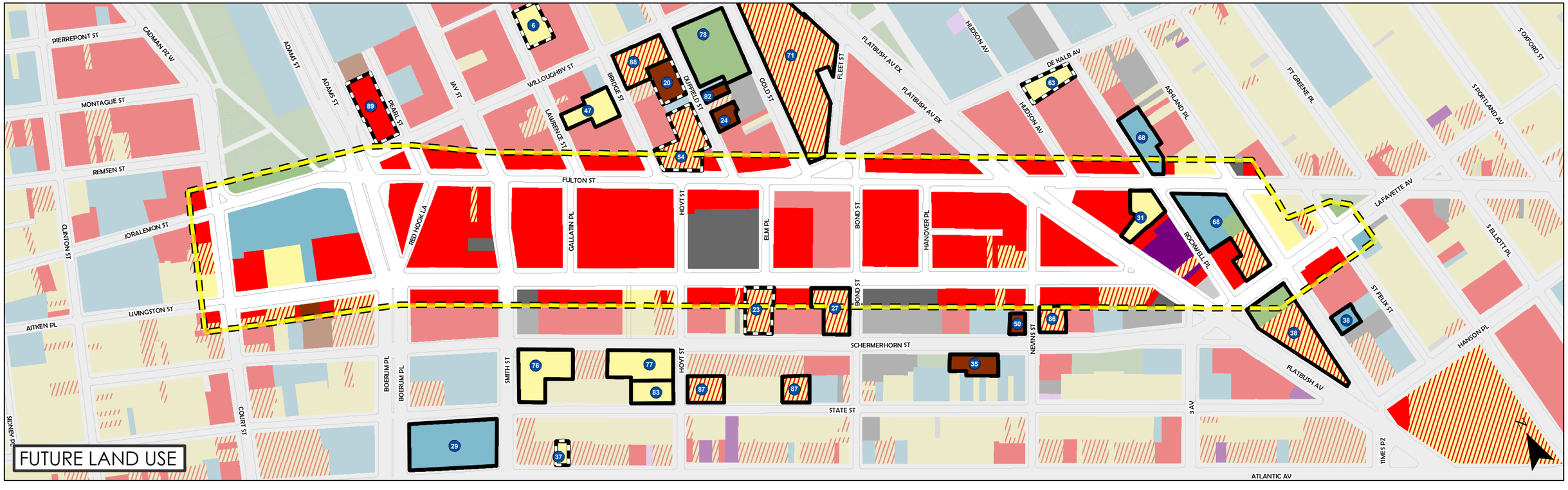
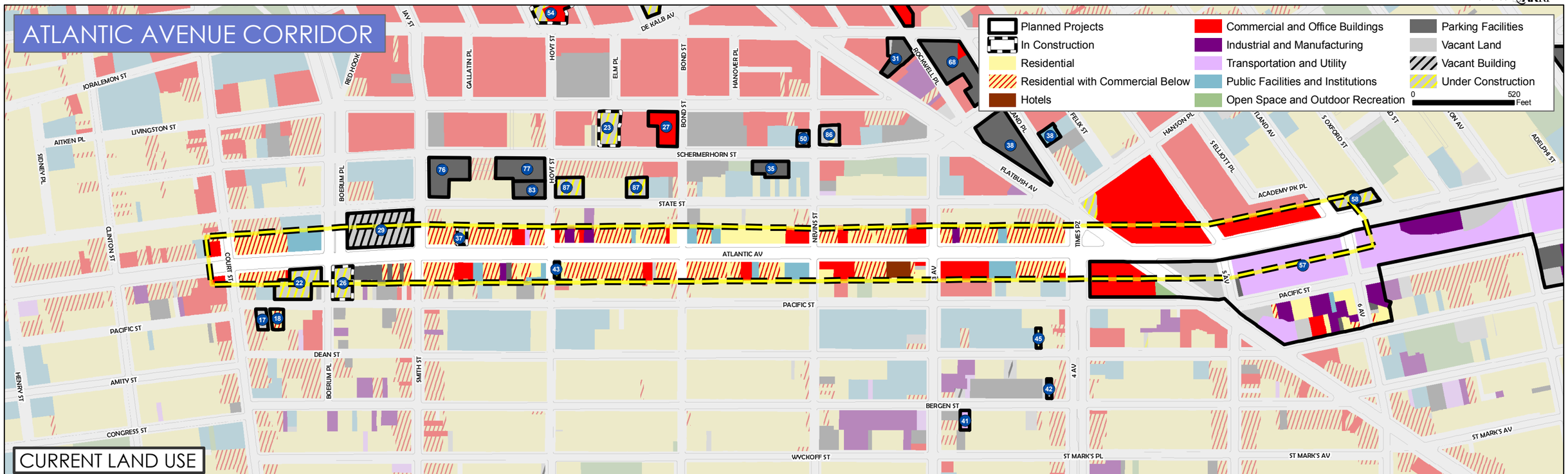


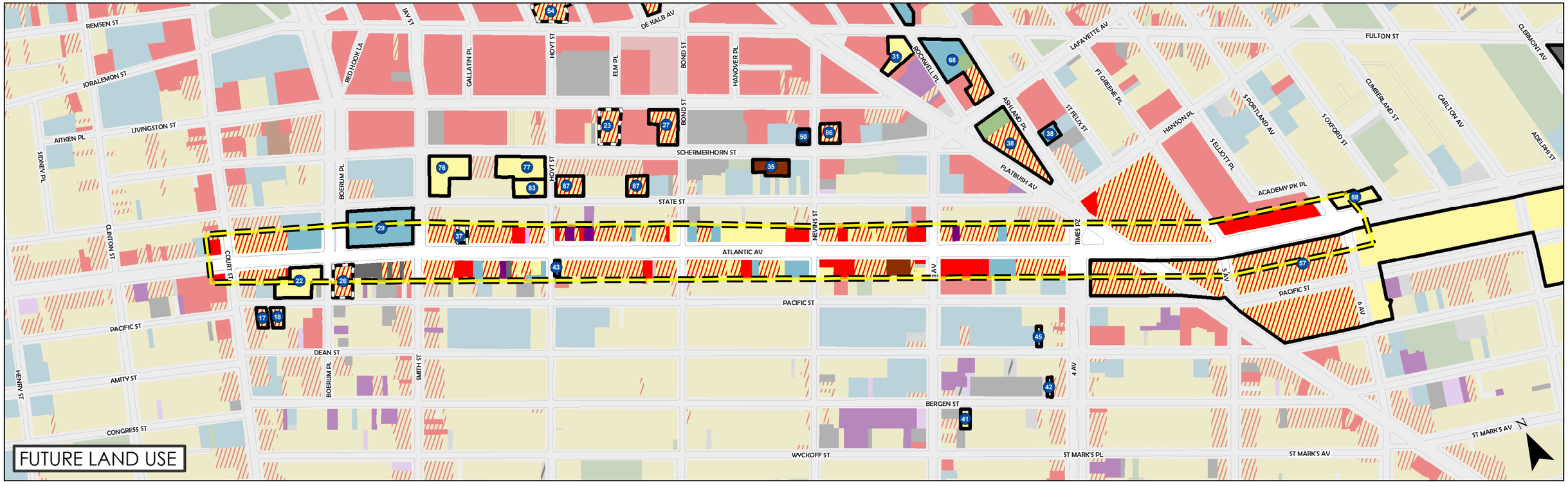
FIGURE 5

8.13.09 AKRF

ATLANTIC AVENUE CORRIDOR



CURRENT LAND USE



FUTURE LAND USE

FIGURE 6

PLANNED DEVELOPMENT PROJECTS IN DBSTCS - 2011 ANALYSIS YEAR