NORTH WILLIAMSBURG TRANSPORTATION STUDY

FINAL REPORT
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North Williamsburg Transportation Study

This study was produced by the New York City Department of Transportation. The Department expresses its appreciation to Council Member Stephen Levin for providing funding for this project. The support and input of Council Member Levin, elected officials, Community Board and Technical Advisory Committee members was invaluable throughout. The study team expresses its appreciation to the Williamsburg community who attended meetings and provided critical input and helped make the study a success.

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S EXECUTIVE SUMMARY

S.1 Introduction

The North Williamsburg Transportation Study is being conducted in response to growing congestion resulting from new development, the varied and often conflicting demands of the different travel modes (pedestrian, bicycle, personal vehicle, trucks) as well as requests from community members and elected officials to address congestion in the North Williamsburg area. The study aims to relieve congestion, expand travel choices and enhance safety for all road users. The study area, located in Brooklyn just north of the Williamsburg Bridge, is bounded by the Newtown Creek in the north and east, Broadway and Flushing Avenue in the south and the East River in the West. It is traversed by the BQE which provides access to the Williamsburg Bridge.

S.2 Demographics

The study area 2015 population was 140,689 with an average household size of 2.3 and $57,457 median household income. Population within the study area has increased dramatically in the last ten years and is expected to continue growing due to several planned new large scale residential developments. Population increased by 12% from 2010 to 2015 and is projected to grow an additional 9% by 2020 to 152,835 residents.

The study area has low vehicle ownership and high transit journey to work mode share in part due to its proximity to the Manhattan CBD. In the study area 34% of the households own at least one vehicle while Brooklyn averages 44%. 12% of the study area work force use auto for journey to work compared to 23% in Brooklyn and 27% in NYC. The dominant mode was subway (63%) which was much higher than Brooklyn (50%) and NYC (43%).

S.3 Zoning and Land Use

There have been four rezonings in the study area since 2006 resulting in large scale residential developments along the waterfront and much of the population increase described in the demographics analysis. A review of the existing land use and zoning districts in the study area reveals that the area is approximately 50% residential and 45% manufacturing uses with two industrial business zones including the North Brooklyn IBZ which makes up the eastern third of the study area. Residential uses vary from high density waterfront towers to 3-4 story row houses and apartment complexes. Commercial overlays providing ground floor retail exist along Franklin Street, Manhattan Avenue, Greenpoint Avenue, Nassau Avenue, Bedford Avenue, Metropolitan Avenue, Grand Street, Union Avenue, Graham Avenue and Bushwick Avenue.

Major developments expected to come online by 2025 include the Domino Sugar residential development (2,800+ dwelling units) and the Greenpoint Landing development (5,500+ dwelling units).

S.4 Traffic and Transportation

Major east-west corridors in the study area Broadway, Flushing Avenue, Greenpoint Avenue, Metropolitan Avenue and Grand Street. Major north-south corridors are Kent Avenue/Franklin Avenue, Manhattan Avenue, McGuinness Boulevard, Bushwick Avenue and Morgan Avenue. The Brooklyn/Queens Expressway , a major through truck route, extends through the study area with entrance/exit ramps at Metropolitan Avenue, McGuinness Boulevard and Vandervoort Avenue and Meeker Avenue East and West operating as the service roads. The Williamsburg Bridge, located just south of the study area, provides a major connection between Brooklyn and Manhattan while connections to Queens are limited by the Newtown Creek via the Pulaski Bridge, Greenpoint Avenue Bridge, Kosciusko Bridge and Metropolitan Avenue Bridge. Congestion occurs along all major corridors during the AM and PM peak period

particularly near the BQE ramps and at the convergence of major corridors near the bridge crossings.

The 2016 traffic data was collected at 65 intersections and analyzed using the Highway Capacity Software (HCS). There are 40 intersections in the AM and 47 in the PM experiencing delay with LOS E or worse on one or more approach. Many of these intersections were along Metropolitan Avenue and Grand Street. Average corridor travel speeds on all major corridors averaged 10 mph during the AM and 9 mph during the PM with the slowest speeds on Greenpoint Avenue eastbound with 4.5 mph and Meeker Avenue East with 4.1 mph during the PM peak hour.

S.5 Public Transportation

An examination of the public transportation system in the study area shows that there are five subway routes (J, Z, M, L, G), fourteen subway stations and eleven bus lines in the study area. While the southern and western portions of the study area are well served by subway, bus and ferry, the industrial areas in the east and northern neighborhoods in Greenpoint have less transit service. The B46 is the 3rd busiest bus of 238 local lines in the MTA system while no other routes are in the top 50. The Williamsburg Bridge Bus Terminal at Broadway and Havemeyer Street serves six bus routes. The Bedford Avenue L train station is the busiest in the area with 27,486 and 49,479 trips on the average weekday and weekend day respectively. The East River Ferry has two stops in the area at India Street and North 5th Street with another stop just south of the study area at the South 10th Street pier.

S.6 Parking

There is high demand for on street parking throughout the area at different periods of the day. The on-street parking analysis focused on three separate parking areas with differing primary land uses (mixed commercial/residential, industrial, commercial). Total capacity within the three areas was 9,716 spaces with AM/MD/PM utilization of 82%, 86% and 70% respectively.

The industrial focus area had the highest AM (89%) and MD (89%) utilization while all three areas had approximately 70% utilization in the PM peak period. The commercial area had approximately 700 metered parking spaces with AM and MD utilization of 61% and 84% respectively.

There are 20 off-street parking facilities generally located north of the BQE, along major commercial corridors, near large residential developments, commercial centers and recreation areas. Average size of the facilities was 145 spaces with average hourly/daily cost of $5.30 and $18.10 respectively.

S.7 Pedestrians and Bicycles

Thirty five locations were selected for pedestrian analysis based on field reconnaissance, proximity to intense pedestrian activity such as transit stations and recreation areas and commercial activity as well as community input. The highest pedestrian volumes were observed near transit facilities at Bedford Avenue and N 7th Street and Greenpoint Avenue at Manhattan Avenue and at the main entrance to McCarren Park at Bedford Avenue/Lorimer Street and Nassau Avenue. Of the locations analyzed the pedestrian level of service (LOS) was B or better at every crosswalk except the west crosswalk at Bedford Avenue and N 7th Street with LOS C and D in the AM and PM peak respectively. Future projected pedestrian volumes had little effect on the LOS. While intersection level of service was acceptable during the AM and PM peak periods there are several weekly/monthly/annual events and activities in the study area that attract high pedestrian traffic.

Bike facilities cover much of the west half of the study area with bicycle lanes on most of the major corridors and a two way protected bike lane on Kent Avenue. The eastern half of the study area has less coverage with more industrial uses and heavier truck traffic. There are

protected bike lanes across the Williamsburg Bridge and Pulaski Bridge and bike lanes across the Greenpoint Avenue Bridge and Metropolitan Ave Bridge.

S.8 Crash/Safety

The detailed crash analysis (2014 to 2016) focused on intersections with 23 or more vehicle crashes or 5 or more pedestrian/bike crashes in one year. Three intersections were identified as a high crash locations; Flushing Avenue/Bushwick Avenue, Union Avenue/Grand Street and McGuiness Boulevard/Nassau Avenue. There were 33 fatalities between 2012 and 2018 in the study area with 8 motorists, 19 pedestrians and 6 cyclists. There were five fatalities on three of the corridors; Broadway, Grand Street and Metropolitan Avenue.

The NYCDOT Borough Pedestrian Safety Action Plan, as part of the Vision Zero initiative, identified corridors and intersections with the highest pedestrian KSI in each borough. Priority corridors include Graham Avenue, Bushwick Avenue, Broadway and Flushing Avenue. Bushwick Avenue and Metropolitan Avenue was a Vision Zero priority intersection.

S.9 Goods Movement

The existence of two Industrial Business Zones (IBZ) and the proximity to the BQE, Williamsburg Bridge and Maspeth IBZ creates and attracts high volume of trucks into the area. The study area is traversed by many local truck routes which facilitate deliveries and access to the BQE, a major through truck route and regional corridor. Kent Avenue, McGuinness Boulevard Union Avenue, Morgan Avenue and Vandervoort are the major North-South local truck routes. Greenpoint Avenue, Metropolitan Avenue, Grand Street, Broadway and Flushing Avenue are the major East-West local truck routes. Meeker Avenue acts as the service road to the BQE with entrance/exit ramps located at Metropolitan Avenue, McGuinness Boulevard and Vandervoort Avenue. Truck volumes are highest in the AM peak hour along McGuinness Boulevard and along Metropolitan Avenue, Grand Street and Vandervoort Avenue as they approach the Metropolitan Avenue Bridge.

S.10 Public Outreach and Community Input

The following instances reflect the public participation during the course of the study that undertook an existing and future conditions analysis and the development of recommendations. The resulting input and comments informed and aided in the development of the identification of issues and development of recommendations/proposals.

- A Technical Advisory Committee (TAC) meeting and two Public Kick Off meetings (Summer 2016)
- Go Green Festival booth presence (Summer 2016)
- TAC and public meeting to present existing conditions analysis (Mar 2017)
- Online Web Portal which collected more than 350 user comments (throughout study life cycle)
- CM Levin public comment email campaign resulting in approximately 75 comments. (Winter 2017)
- Two meetings with city council members to present proposed recommendations (Feb 2018)
- Presentation of summary of recommendations and potential 2018 SIP projects to Community Board 1 (April 2018)
- CB1 Transportation Committee Meeting to present potential 2018 SIP projects (May 2018)
- Public Meeting to present full recommendations (June 2018)

S.11 Issues and Recommendations

Based upon the analysis and community input, recommendations were developed to improve traffic operations and pedestrian safety. Recommendations involve street geometric changes and street direction changes.

Geometric Changes

- Bedford Avenue/Nassau Avenue/Lorimer Street – Combination of street direction changes and geometric changes to improve pedestrian safety
- Franklin Street/Banker Street –Street calming markings to slow turns from Franklin St onto Banker St
- Manhattan Avenue and Eckford Street – Street direction change of Eckford St to one way NB between Manhattan Avenue and Driggs Avenue with curb extension at Manhattan Avenue
- North Henry Street from Richardson Street to Meeker Avenue – Street direction change of North Henry Street to one way NB between Richardson Street and Meeker Avenue with curb extension at North Henry Street and Meeker Avenue
- North Henry Street from Nassau Avenue to Greenpoint Avenue – Street direction change on North Henry Street to SB between Greenpoint Avenue and Nassau Avenue
- Maspeth Avenue/Woodpoint Road – Proposed stop control with curb extensions
- Broadway and Union Avenue/Boerum Street – Curb extensions/slip closure around elevated subway columns and realignment of parking along Boerum Street
- Broadway and Debevoise Street - Curb extensions/slip closure around elevated subway column to bring crosswalk closer to intersection and in front of bus stop

- Flushing Avenue from Humboldt Street to Bushwick Avenue – Curb extensions to reduce pedestrian crossing distances and enhance visibility

- Flushing Avenue/Varick Avenue/Irving Avenue – Street directional conversion on Varick Avenue between Johnson Avenue and Flushing Avenue from two-way to one-way SB and expansion of pedestrian refuge and crosswalks at Flushing Avenue and Varick Avenue.

1 INTRODUCTION

1.1 Background

The North Williamsburg Transportation Study is being conducted to address congestion resulting from increased development density as well as to enhance safety and mobility. The 2005 Greenpoint Williamsburg rezoning that facilitated increased development led to community concerns as travel demand by various modes (pedestrian, bicycle, automobile, trucks) compete for the fixed and limited roadway capacity.

The transportation network is unique in that the BQE, a major regional corridor, provides access to the Williamsburg Bridge, a significant portal to Lower Manhattan CBD. It passes through the middle of the study area with on and off ramps in close proximity to each other. Truck traffic in the area is very high due to the presence of the Williamsburg Bridge, which accommodates truck traffic, and the large Industrial Business Zone (IBZ) located in the eastern half of the study area. Because of the area's travel needs resulting from the various land uses, the study adopts a multimodal approach (transit, trucks, auto, bikes and pedestrians) in search of solutions. Peak period congestion on the BQE on/off ramps and the connecting local streets is very high.

The study provides input to the regional planning effort in the area and was coordinated with NYCDCP's North Brooklyn Industry and Innovation Study which focuses on the IBZ and other NYCDOT initiatives and projects in the study area.

1.2 Study Area

The study area, is bounded by Newtown Creak to the north and east, Broadway and Flushing Avenue to the south and the East River to the west (Figure 1-1). The study area lies north of the Williamsburg Bridge and its approach, and entirely in Brooklyn Community District #1.

Figure 1-1: Study Area Boundaries

1.3 Goals and Objectives

The goal of the study is to evaluate traffic/travel conditions in the study area and develop recommendations to relieve congestion, enhance mobility, safety and the quality of life for residents and all road users.

The study's main objectives are:

1. To analyze and document existing travel characteristics and traffic conditions
2. To assess existing and future travel demand and traffic conditions taking account of demographics, land use, socio-economic factors, and transportation infrastructure.
3. To develop improvement measures for traffic operations and safety for all road users.

4. To coordinate and build upon other initiatives in the area such as the Broadway Congested Corridor Study

1.4 Project Organization and Methodology

The study was organized as a series of tasks as follows:

Task 1: Project Organization and Management – Create a detailed work program which includes project scope, tasks, subtasks, and deliverables.

Task 2: Literature Search – Conduct a literature search and review of relevant studies and Environmental Impact Statement (EIS) from DOT and other agency libraries (NYCEDC, NYCDCP, NYSDOT and NYMTC)

Task 3: Public Outreach - Establish a Technical Advisory Committee (TAC) involving main stakeholders, community board members and elected officials and host TAC meetings; Conduct public meetings to facilitate public participation and community input. Document community issues and problems from TAC and public meetings

Task 4 – Data Collection and Analysis – Collect and analyze population, land use, vehicular traffic, parking, pedestrians, bikes, transit, accidents/safety and goods movement data. Create an inventory of all data which along with other information and community input would facilitate the identification of issues and potential improvements.

Task 5 – Issue Identification and Problem Definition – Identify and prioritize issues arising from the analysis of existing conditions and future 2026 conditions and community and stakeholder input

Task 6 – Present Findings and Recommendations to Stakeholders and community members

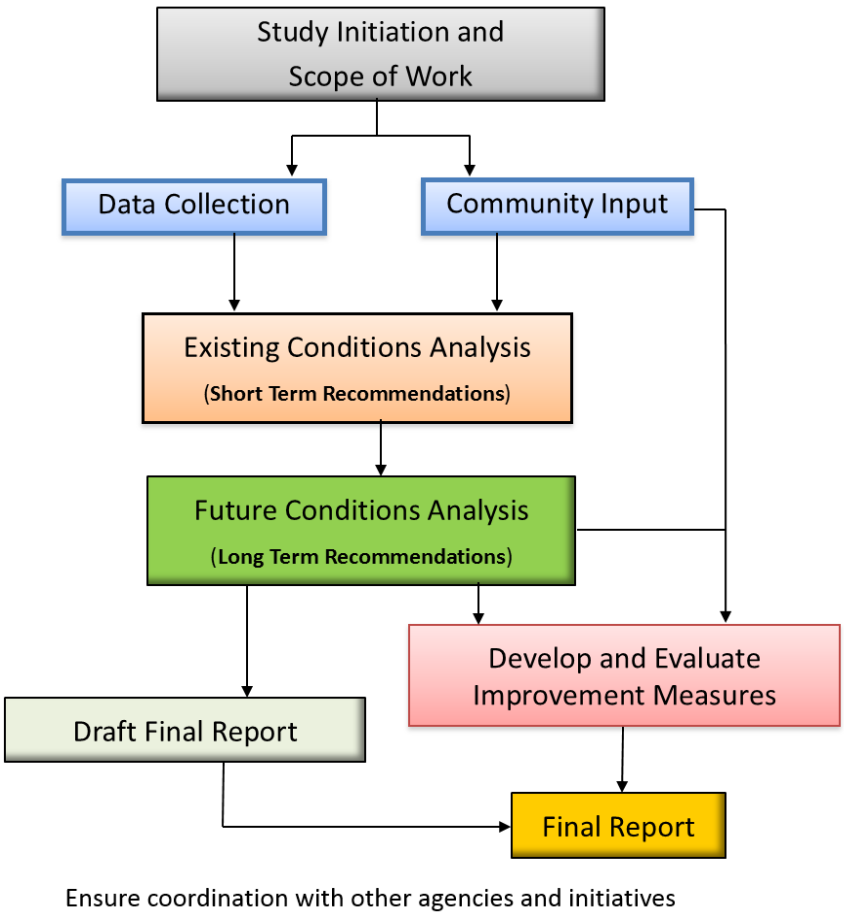
Task 7 – Develop and Evaluate Improvement Package – Develop improvement alternatives and evaluate same for effectiveness, community support, costs and consistency with the study's goals and objectives.

Task 8 – Draft Report – Prepare draft report with short- and long-term recommendations including preliminary sketch designs for improvement projects and other treatments.

Task 9 – Develop Implementation Plan – Prepare detailed design drawings for project implementation after internal review and presentation to the community

See figure 1-2 for Study Process.

Figure 1-2: Transportation Study Process



2 DEMOGRAPHICS

2.1 Introduction

The demographic analysis of the study area examines population changes and socioeconomic characteristics such as household size, income, car ownership and journey to work by mode to help identify trends and determine future travel needs. The analysis relies on data from New York Metropolitan Transportation Council (NYMTC), New York City Department of City Planning (NYCDCP) and data compiled by the United States Department of Commerce – Bureau of Census. Data was collected and analyzed for 2000, 2010 and 2015 while projections were made for 2020 and 2025. To better assess the population dynamics of the study area, comparisons were made with the Borough of Brooklyn and New York City, where applicable.

The study area consists of twenty eight 2010 Census Tracts. Table 2-1 shows the population by census tract for each analysis year. Figure 2-1 shows the census tracts and their population change from 2000 to 2010 while figure 2-2 shows projected census tract population change from 2010 to 2020.

2.2 Population Trends

The study area population was 125,592 in 2010 and 140,689 in 2015. After showing modest growth (+3%) between 2000 and 2010, population grew by 12% in the last five years adding nearly 15,000 residents. As shown in figure 2-1, nine tracts experienced significant population decline between 2000 and 2010, mainly in the northern part of the study area. The largest population loss occurred in tract 593 which decreased by 2,060. Population growth mainly occurred in the lower half of the study area. No census tract is projected to lose population between 2010 and 2020. See Figure 2-2.

Table 2-1: Census Tract Population 2000 - 2025

2010 Census Tract	Population				
	2000	2010	2015	2020*	2025*
453	1,616	2,017	2,002	2,002	2,032
449	3,100	2,932	2,958	3,364	3,529
477	2,276	3,318	3,671	3,814	3,836
481	2,772	2,778	2,912	2,994	3,010
485	1,613	2,510	2,505	2,545	2,625
489	4,020	4,039	4,040	4,040	4,066
491	5,453	6,418	6,549	6,571	6,703
493	7,681	7,625	7,986	8,049	8,208
495	2,727	2,603	2,725	2,801	2,830
497	2,228	2,645	2,890	2,974	3,025
499	1,649	1,753	1,859	2,006	2,203
501	2,646	2,786	2,912	2,952	3,036
503	2,735	2,582	2,677	2,675	2,695
505	4,211	4,163	4,494	4,563	4,629
511	3,730	3,933	4,473	4,577	4,638
513	4,362	4,332	4,934	5,130	5,331
515	877	1,372	2,316	2,561	2,775
517	1,514	1,735	2,573	2,676	2,888
519	3,043	3,564	4,754	5,266	5,799
523	5,729	5,469	5,604	5,625	5,731
525	3,537	3,499	3,551	3,672	3,756
527	7,277	6,629	6,924	7,067	7,115
549	1,508	3,122	4,614	5,006	6,070
551	4,333	4,597	4,950	6,767	6,701
553	2,583	2,596	2,970	3,015	3,088
555	888	1,959	6,258	6,777	7,370
557	1,171	1,655	2,076	2,096	2,284
561	3,784	3,295	3,338	4,306	5,539
563	4,327	4,360	4,828	9,389	9,864
565	3,550	3,255	3,360	4,253	4,820
569	1,664	1,630	1,681	1,696	1,761
571	5,083	4,400	4,548	4,561	4,586
573	2,787	2,608	2,688	2,712	2,726
575	5,006	4,249	4,703	4,865	4,920
579	1,362	1,117	1,191	1,261	1,333
589	1,774	1,904	1,913	1,909	1,917
591	4,277	3,920	4,013	4,020	4,048
593	2,488	2,228	2,249	2,278	2,287
Population	**121,381**	**125,597**	**140,689**	**152,835**	**159,774**
Change		**4,216**	**15,092**	**12,146**	**6,939**
Change (%)		**3%**	**12%**	**9%**	**5%**

***projected**

Source: U.S. Census Bureau

Figure 2-1: Census Tract Population Change 2000-2010

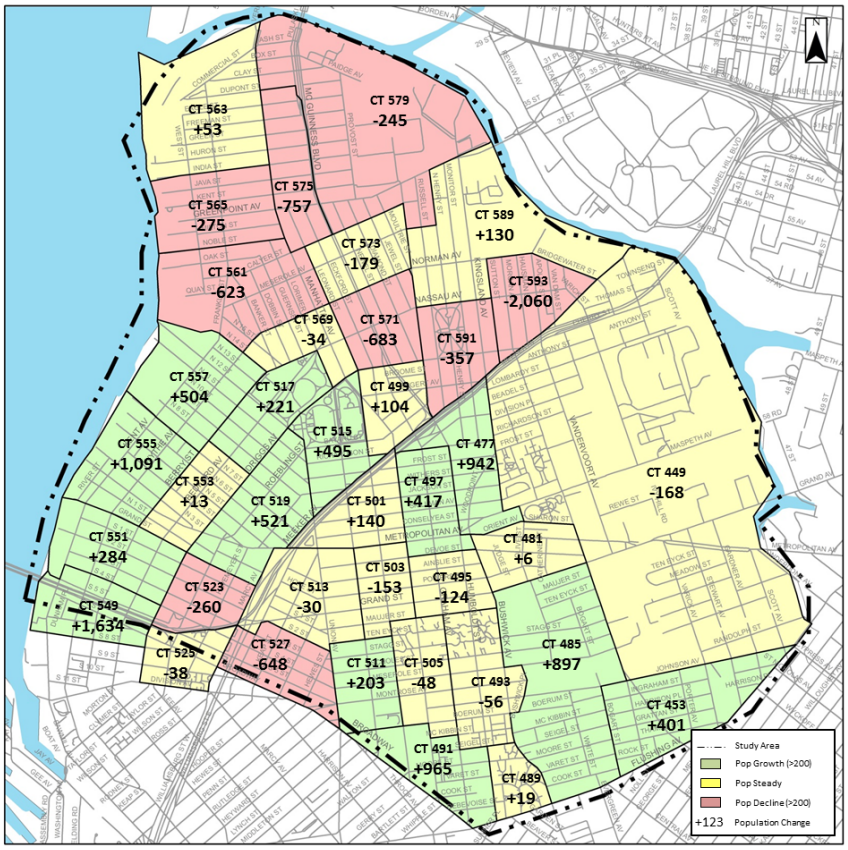
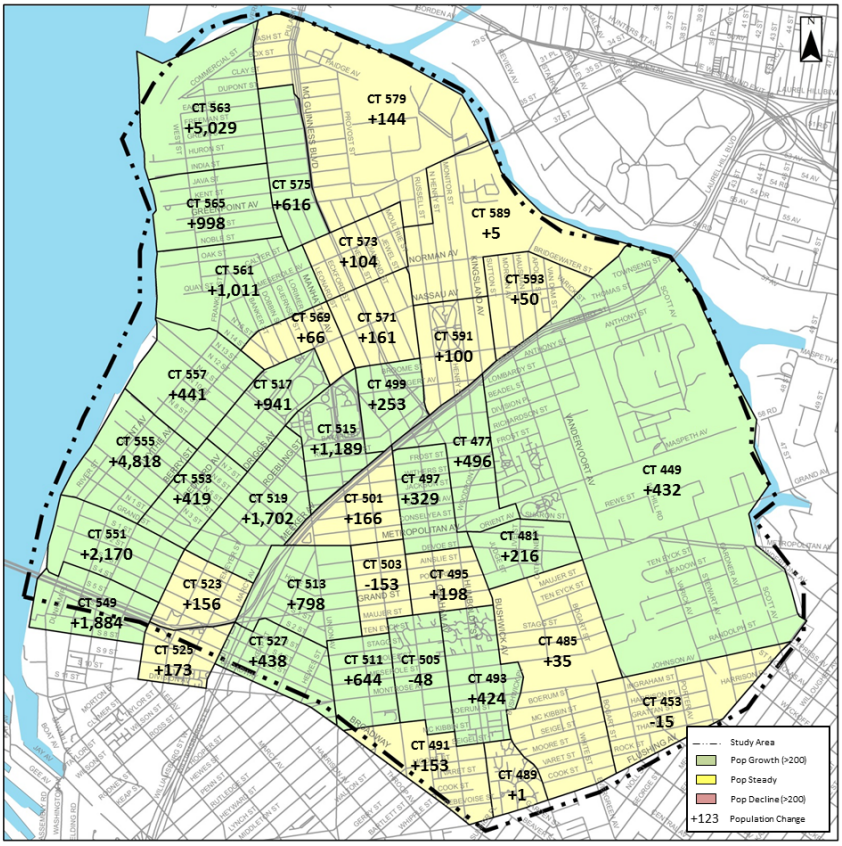


Figure 2-2: Census Tract Population Change 2010-2020 (Projected)



The area 2015 population density (33,657 persons/sq. mi) is similar to Brooklyn's (37,450 persons/sq. mi). However, the area population grew 12% between 2010 and 2015; much faster than the population increase of Brooklyn (2%) and NYC (2%). Study area population growth over the next 10 years is projected to be 13%. See Table 2-2.

Table 2-2: Population Change

Characteristic	Year	Study Area		Brooklyn		NYC	
		Total	% Change	Total	% Change	Total	% Change
Population	*2000*	121,381		2,465,300		8,008,278	
	2010	125,597	3%	2,552,911	4%	8,242,624	3%
	2015	140,689	12%	2,602,800	2%	8,397,100	2%
	**2020*	152,092	8%	2,648,452	2%	8,550,972	2%
	**2025*	159,774	5%	2,706,246	2%	8,699,966	2%

***projected**
Source: U.S. Census Bureau

2.3 Socio-Economic Trends

Household Size and Income

In 2015 there were approximately 60,324 households in the study area with 2.31 average household size and $57,457 median household income. The median household size is lower than Brooklyn (2.69) and NYC (2.57). Household size decreased from 2.6 to 2.3 between 2000 and 2010 but remained largely unchanged through 2015. The area's median household income is compares favorably to that of Brooklyn and NYC (see table 2-4) and increased faster (27%) than Brooklyn (20%) and NYC (17%) between 2010 and 2015.

Table 2-3: Household Size

Characteristic	Year	Study Area		Brooklyn		NYC	
		Total	% Change	Total	% Change	Total	% Change
Household Size	*2000*	2.59		2.75		2.59	
	2010	2.30	-11%	2.74	0%	2.57	-1%
	2015	2.31	1%	2.69	-2%	2.57	0%
	**2020*	2.29	-1%	2.69	0%	2.57	0%
	**2025*	2.30	0%	2.69	0%	2.57	0%

***projected**
Source: U.S. Census Bureau

Table 2-4: Median Household Income

Characteristic	Year	Study Area		Brooklyn		NYC	
		Total	% Change	Total	% Change	Total	% Change
Median Household Income	*2000*	$ 28,952		$ 32,135		$ 38,293	
	2010	$ 45,365	57%	$ 44,593	39%	$ 51,270	34%
	2015	$ 57,457	27%	$ 53,289	20%	$ 59,986	17%
	**2020*	$ 68,948	20%	$ 62,348	17%	$ 70,184	17%
	**2025*	$ 80,670	17%	$ 72,947	17%	$ 82,115	17%

***projected**
Source: U.S. Census Burea

Vehicle Ownership

In 2015, 66% of the households owned no vehicle, 26% owned 1 vehicle, while 7% owned two vehicles and .6% owned 3 or more vehicles. Between 2010 and 2015, the number of households with no vehicle available decreased from 70% to 66%. Conversely the percentage of households with one vehicle increased from 30% to 34%. Vehicle ownership in the study area is very low compared to both Brooklyn and NYC. See table 2-5.

Table 2-5: Household Vehicles

Area	Year	No Vehicle	1 Vehicle	2 Vehicles	3+ Vehicles
Study Area	**2000**	67.9%	27.1%	4.0%	1.0%
	2010	70.0%	24.5%	4.7%	0.8%
	2015	66.4%	26.2%	6.8%	0.6%
	***2020**	65.0%	27.0%	7.0%	1.0%
	***2025**	64.0%	28.0%	7.0%	1.0%
Brooklyn	**2000**	57.0%	33.1%	8.2%	1.8%
	2010	57.1%	32.6%	8.5%	1.8%
	2015	56.7%	33.1%	8.7%	1.6%
	***2020**	56.5%	33.2%	8.8%	1.5%
	***2025**	56.3%	33.0%	8.9%	1.8%
NYC	**2000**	55.7%	31.6%	10.1%	2.6%
	2010	55.1%	31.3%	10.7%	3.0%
	2015	55.4%	31.2%	10.6%	2.8%
	***2020**	55.2%	31.1%	10.8%	2.9%
	***2025**	55.0%	31.0%	11.0%	3.0%

***projected**
Source: U.S. Census Bureau

Journey to Work by Mode

Public transportation was the most prevalent journey to work mode in 2015 accounting for 68% (Subway 63%, compared to 50% and 43% for Brooklyn and NYC respectively). While subway mode share is higher than Brooklyn and NYC bus trips are 4% compared to 10% and 12% in Brooklyn and NYC. Auto trips are 12% in the area compared to 23% in Brooklyn and 27% in NYC. Low auto mode share can be partially attributed to the close proximity to the Manhattan CBD and the comparatively low vehicle ownership. Worked at home accounts for 7% and bike trips are 3%. See Table 2-6 and figure 2-3.

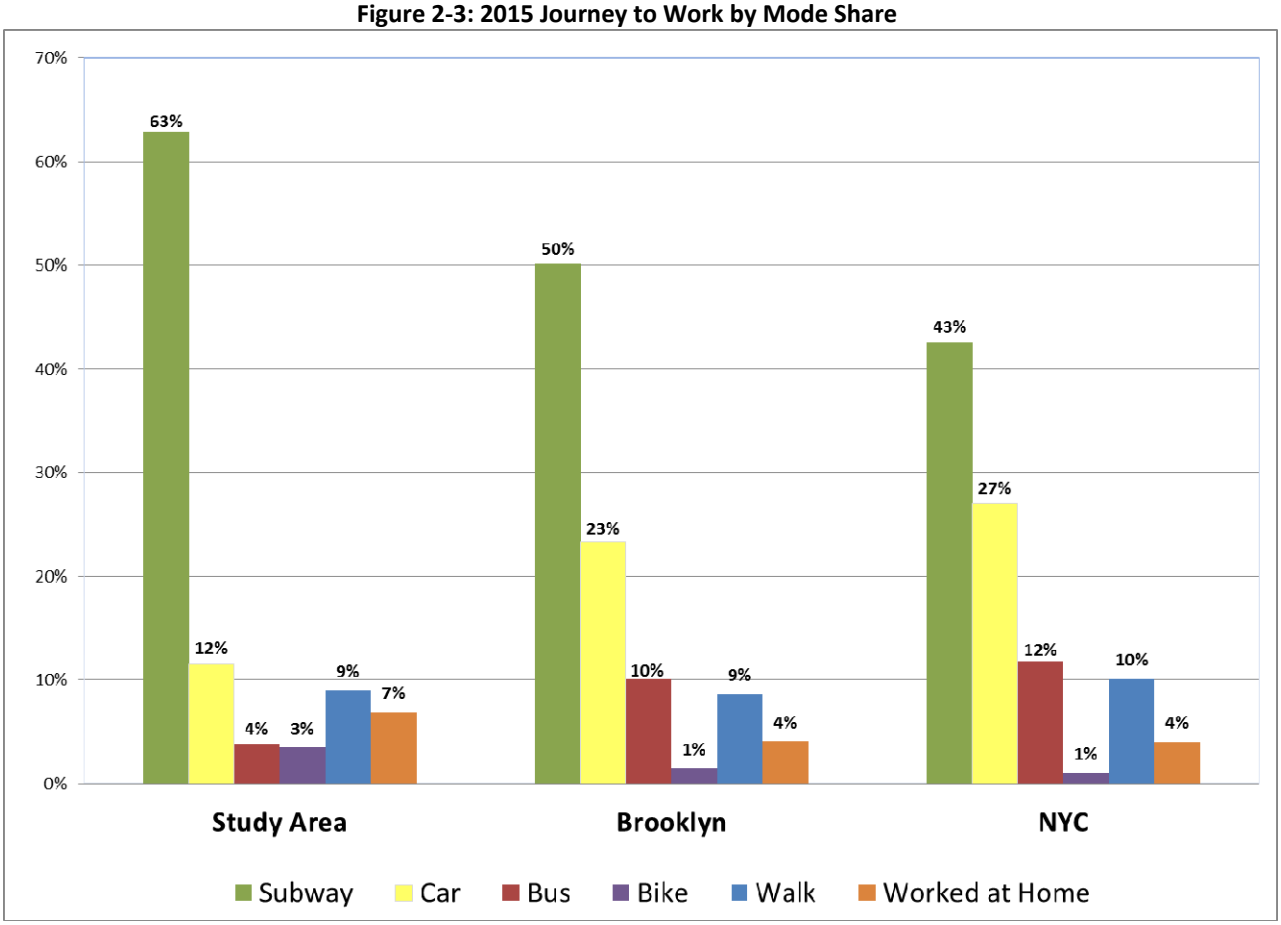
Table 2-6: Journey to Work by Mode

Travel Mode	Study Area				
	2000	2010	2015	*2020	*2025
Car	20.7%	13.1%	11.5%	10.7%	10.0%
Drove Alone	14.2%	10.0%	9.7%	9.5%	8.9%
Carpool	6.4%	3.1%	1.8%	1.2%	1.1%
Public Transportation	61.8%	66.0%	68.0%	69.0%	69.5%
Bus	7.2%	4.5%	3.8%	4.0%	4.3%
Subway	53.4%	60.8%	62.9%	63.5%	64.4%
Railroad	0.7%	0.8%	0.6%	0.5%	0.5%
Taxi	0.5%	0.5%	0.3%	0.5%	0.5%
Motorcycle	0.1%	0.3%	0.4%	0.4%	0.5%
Bike	1.2%	2.7%	3.5%	3.8%	3.9%
Walk	12.7%	9.8%	9.0%	8.8%	8.6%
Other	0.8%	0.7%	0.5%	0.4%	0.4%
Worked at Home	2.8%	6.9%	6.9%	6.8%	7.0%

***projected**

Source: U.S. Census Bureau

Figure 2-3: 2015 Journey to Work by Mode Share



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3 ZONING AND LAND USE

3.1 Introduction

Existing zoning and land use in the study area can help explain travel characteristics and traffic congestion as travel is a function of the spatial distribution of land uses. Different land uses have different trip generating characteristics thus the traffic on the street network is derived from there. Field surveys were conducted and secondary sources (Department of City Planning (DCP) reports/MAPPLUTO and zoning resolution) used to document the existing land uses.

3.2 Zoning

In general there are three basic zoning designations in New York City; residential (R), commercial (C) and Manufacturing (M). These are further subdivided to allow for low, medium and high density developments controlled by permitted coverage and floor area ratios.

Four recent rezonings in the study area (Greenpoint Williamsburg (2005), Grand Street (2008), Greenpoint Williamsburg Contextual (2009) and the New Domino (2010)) significantly increased the as of right development densities. See Figure 3-1.

The 2005 Greenpoint Williamsburg Rezoning affected 184 blocks in Brooklyn CD1 north of Broadway and along the waterfront. "*In the proposed action area, existing manufacturing zoning and special mixed-use district designations would be changed to permit residential use on the waterfront, residential and mixed use on most of the upland area, and to restrict certain areas currently zoned M3 to light industrial uses.* (NYCDCP)"

The Grand Street rezoning approved in 2008 affected 13 blocks between Berry Street and Marcy Avenue and aimed to "*preserve neighborhood character and scale by establishing contextual zoning districts that have height limits and street wall lineup provisions. It would reflect Grand Street's presence as a local retail corridor while protecting the residential character of lots adjacent to retail corridors*. (NYCDCP)"

In 2009 DCP rezoned an approximately 175 block area east of the 2005 rezoning at the request of Community Board 1 and local elected officials. "*Separate from the 2005 Greenpoint-Williamsburg Waterfront Rezoning, this rezoning seeks to protect the existing character of residential areas east of the 2005 rezoning area. The rezoning aims to preserve neighborhood character and scale by limiting the height of new development, to create opportunities and incentives for affordable housing through inclusionary zoning, and to support local retail corridors while protecting the residential character of nearby side streets*" (NYCDCP).

Community District 1 has seen an increase of approximately 9,000 dwelling units and 40,000 residents since 2005 as development occurred under the new zonings.

Figure 3-1: North Williamsburg Rezoning Context

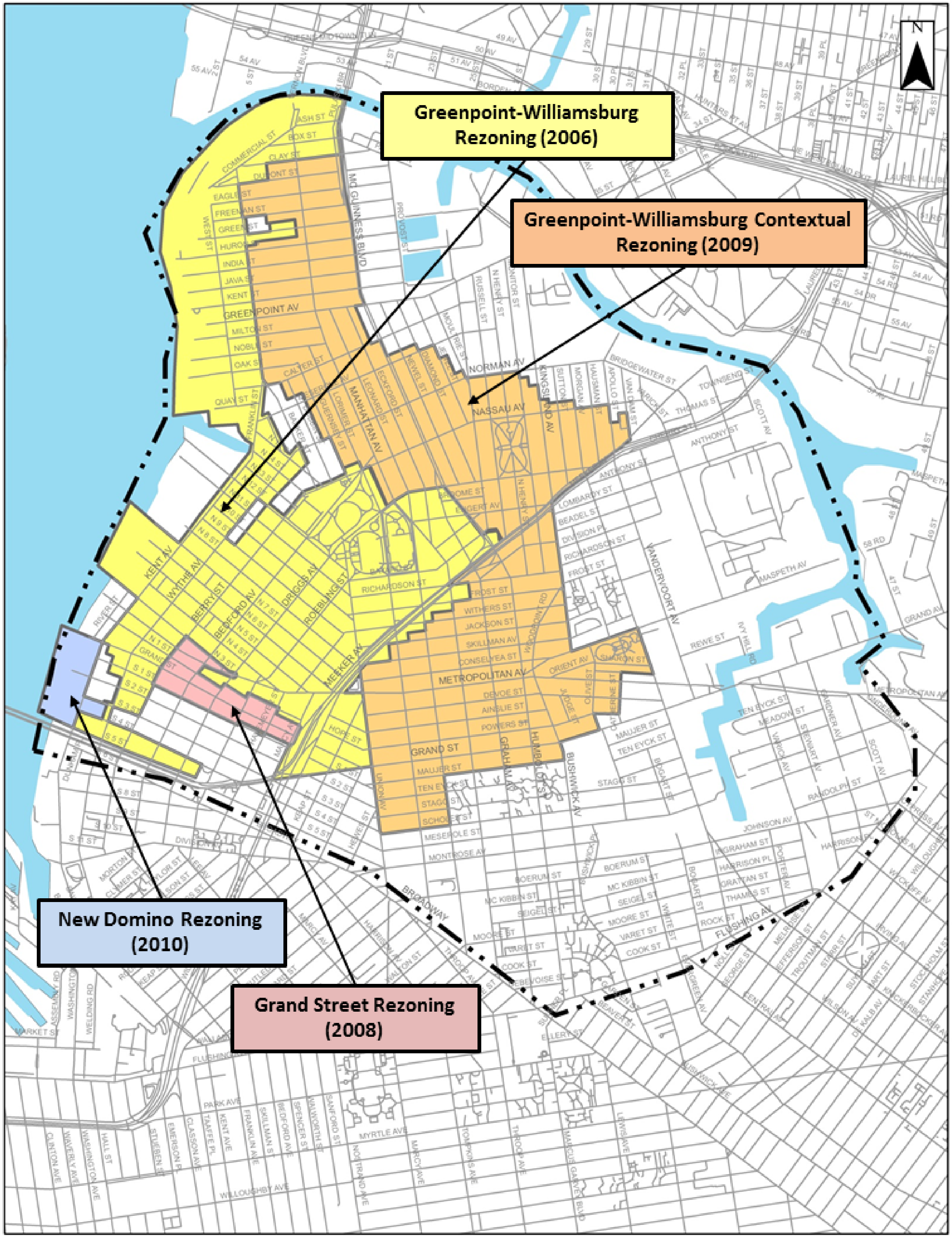
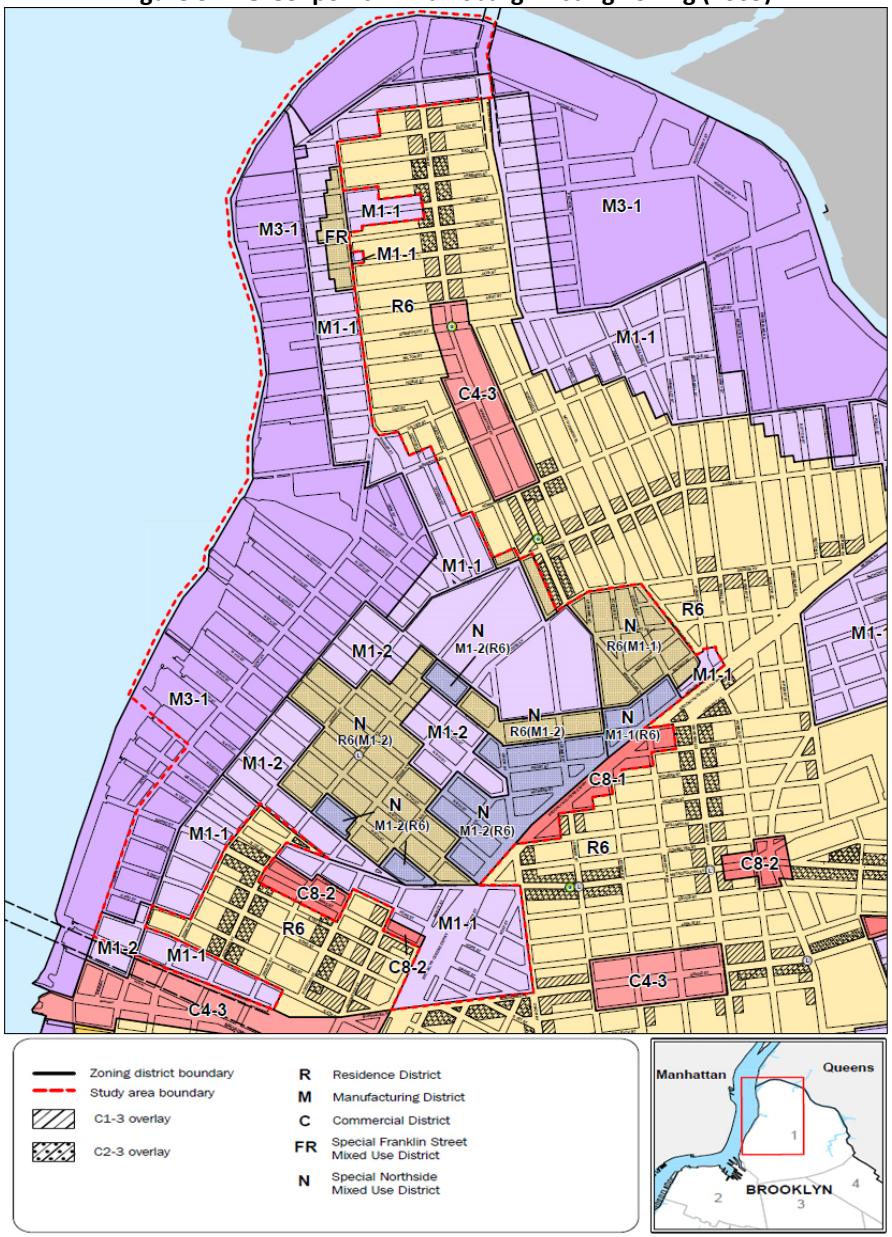
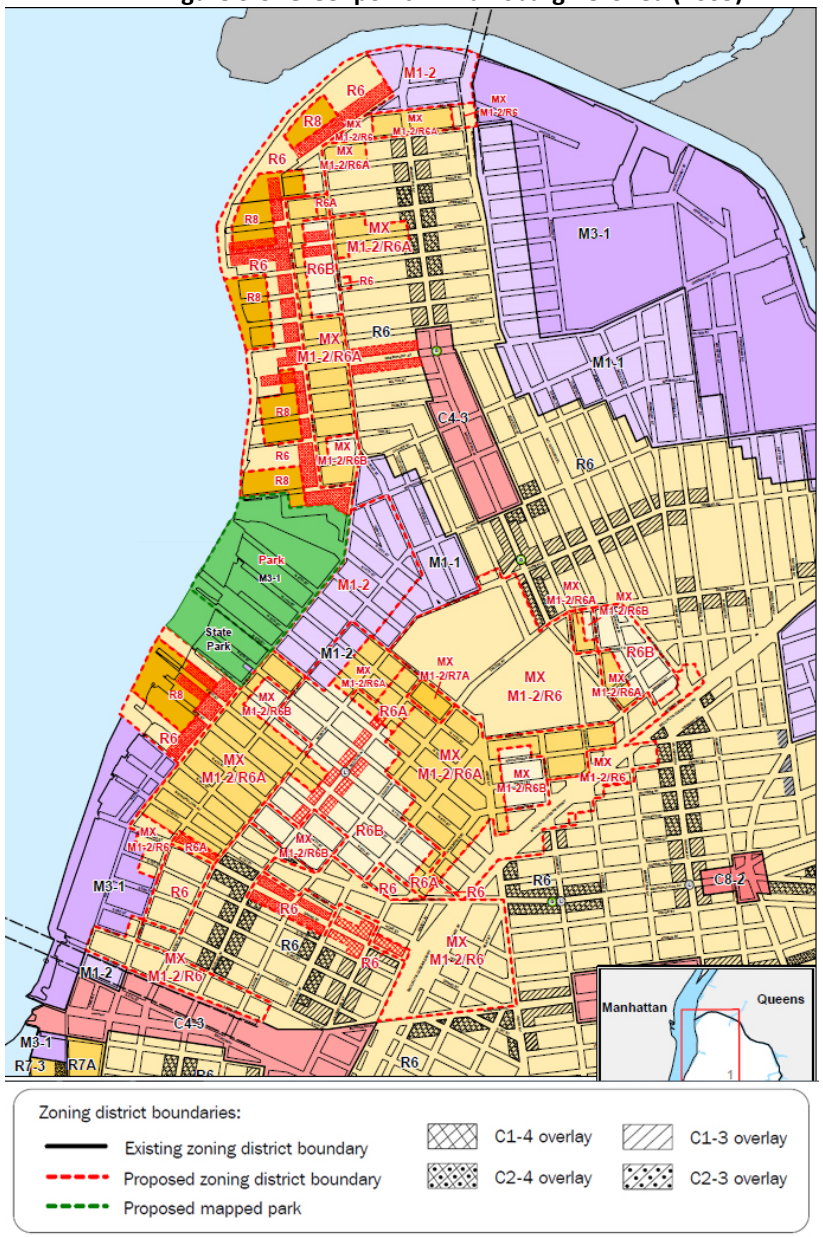


Figure 3-2: Greenpoint Williamsburg Existing Zoning (2005)



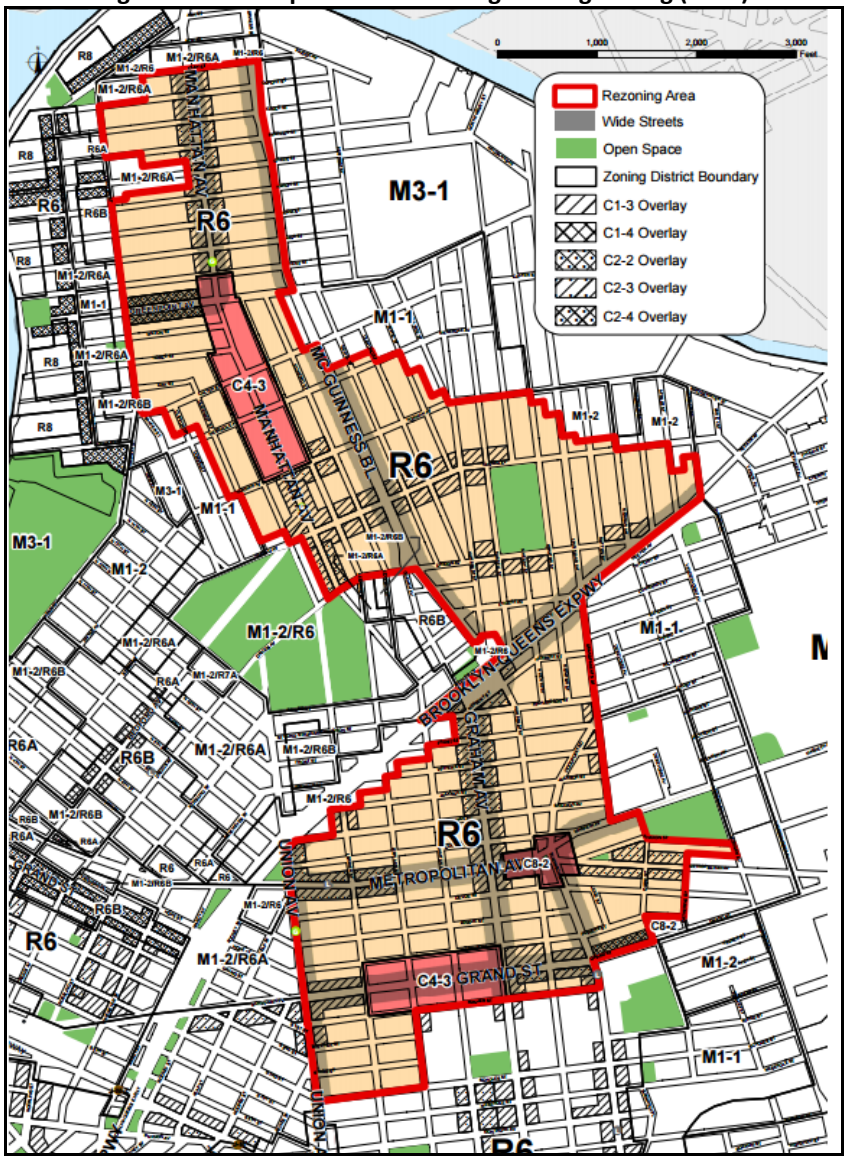
Source: NYC DCP

Figure 3-3: Greenpoint Williamsburg Rezoned (2005)



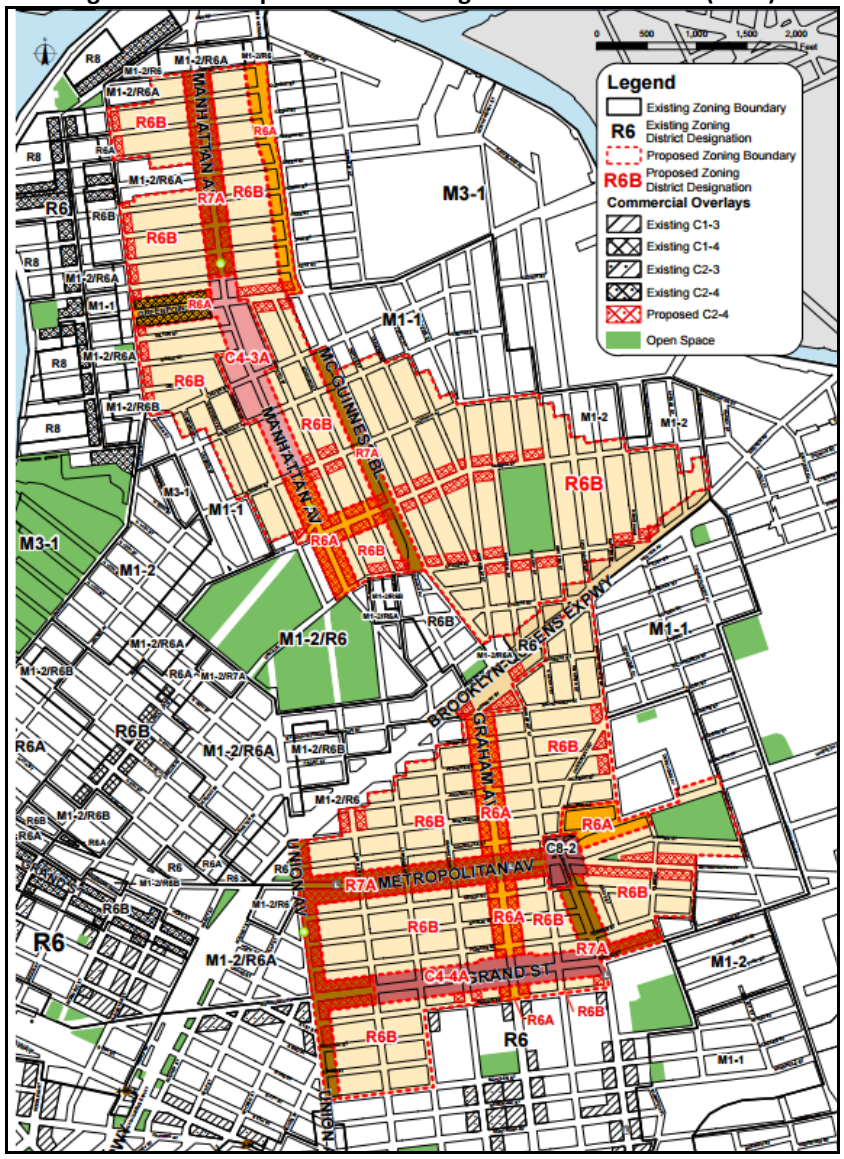
Source: NYC DCP

Figure 3-4: Greenpoint Williamsburg Existing Zoning (2009)



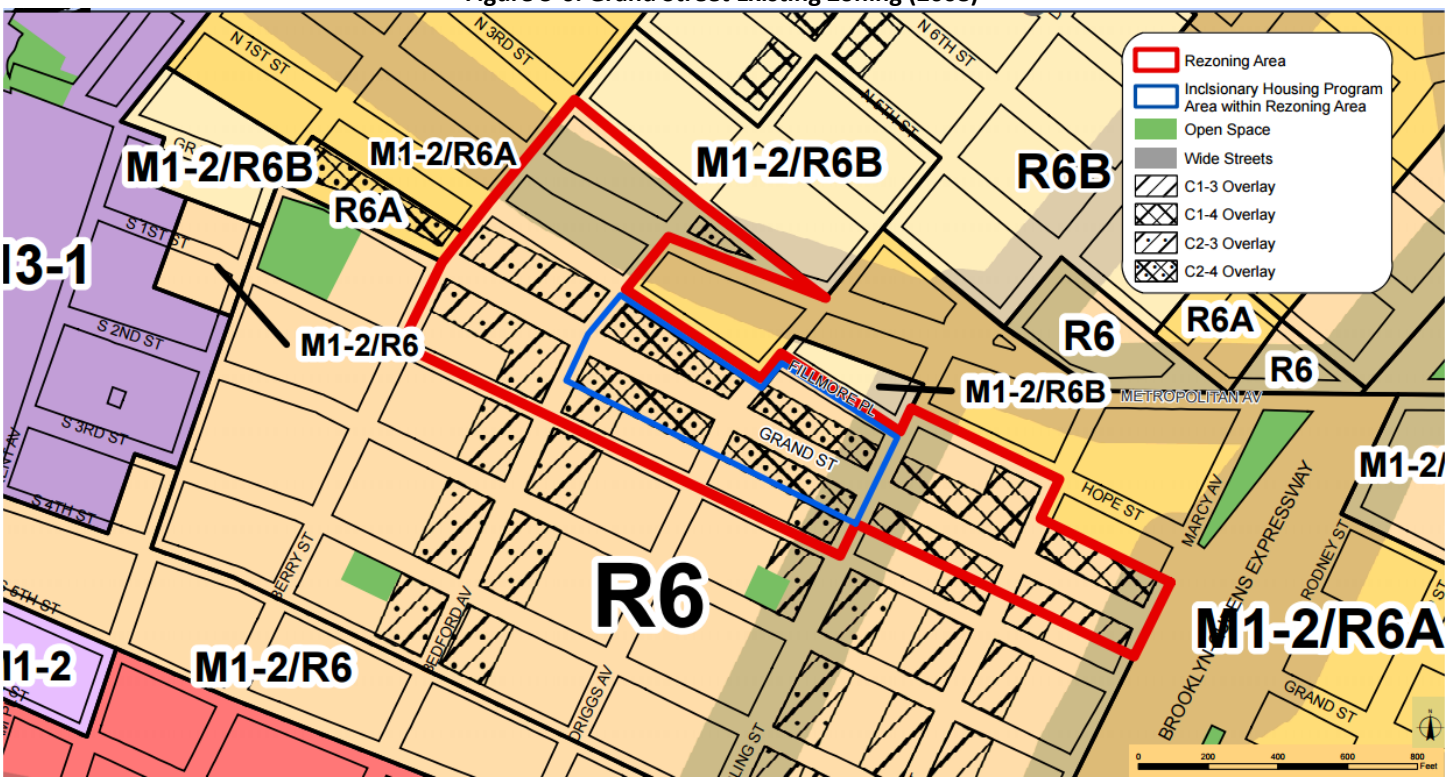
Source: NYC DCP

Figure 3-5: Greenpoint Williamsburg Contextual Rezoned (2009)



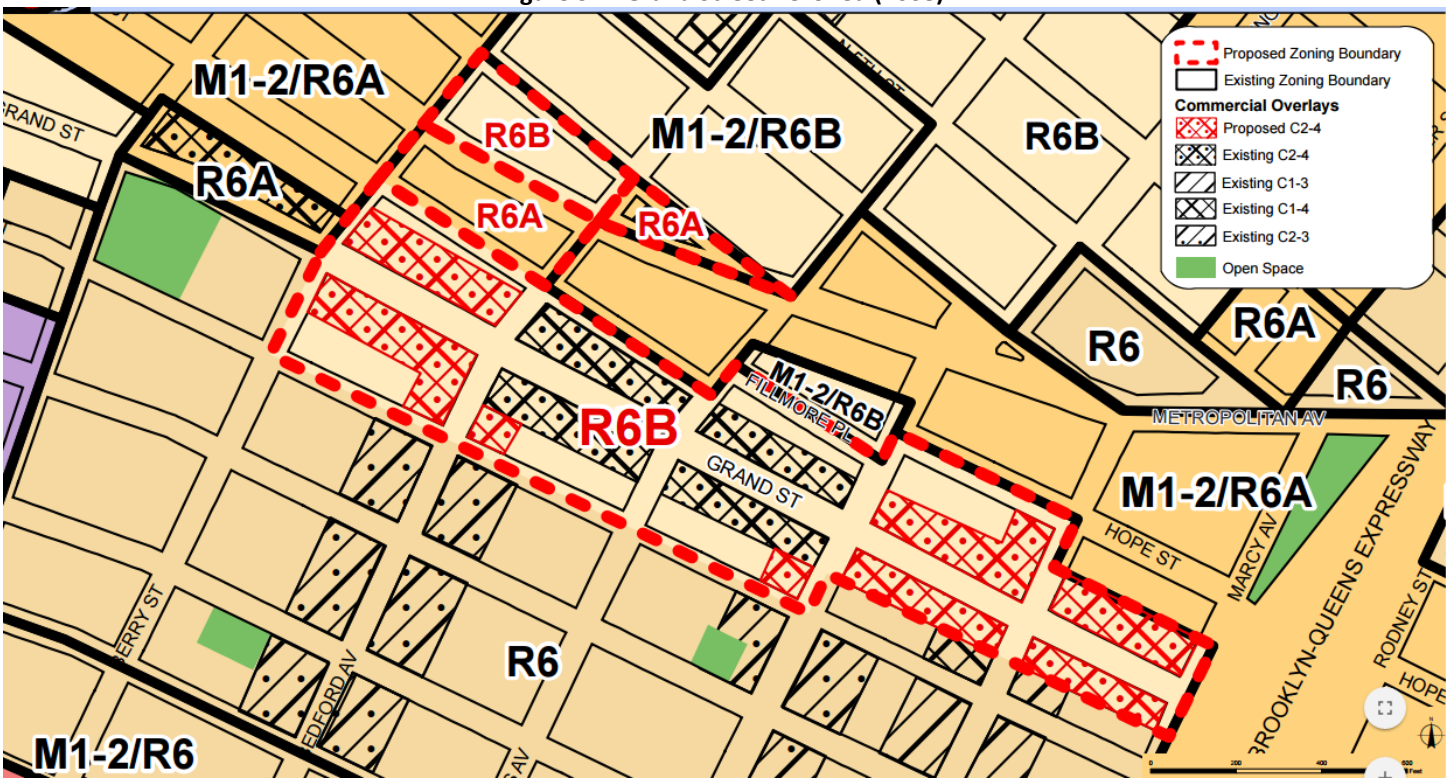
Source: NYC DCP

Figure 3-6: Grand Street Existing Zoning (2008)



Source: NYC DCP

Figure 3-7: Grand Street Rezoned (2008)



Source: NYC DCP

There are three types of residential zoning districts (R6, R7, R8), two commercial zoning districts (C4, C8) and two manufacturing zoning district (M1, M3) in the study area. The residential districts account for approximately 50% of the study area, manufacturing approximately 45% and commercial districts approximately 5%. See table 3-1 and figure 3-8.

Table 3-1: Zoning Districts within the Study Area

Zone Type	Zone Type	FAR	Percentage
Residential	R6B	2.0	35%
	R7A	4.0	5%
	R8	6.0	10%
Commercial	C4-3	3.0	2.5%
	C8-2	2.0	2.5%
Manufacturing	M1	2.0	15%
	M3	2.0	30%

Approximately 35% of the area is zoned R6B including a large district in the middle of the study area. This allows for medium density residential ranging from row houses to 4-5 story apartment complexes. Three small R7A districts exist along Flushing Avenue, McGuinness Boulevard and Bushwick Avenue. The R7 districts allow medium density 7-8 story apartment complexes. R8 districts area found along the waterfront west of Kent Avenue and Franklin Street. R8 districts allow high density residential 8-10 story apartment complexes but these can be taller dependent upon height regulations.

There are two C4 commercial districts, one located along Manhattan Avenue from Greenpoint Avenue to Norman Avenue, and the other along Grand Street from Union Avenue to Bushwick Avenue. These C4 districts allow department stores, theaters and other commercial/office uses that generate more traffic than neighborhood shopping areas. The only C8 district along Broadway from Hooper Street to Lynch Street provides for automotive and other heavy commercial/industrial uses.

In mixed use buildings, the commercial activity is located on the ground floor under the residential use. Commercial overlays (C1 and C2), that allow grocery stores, restaurants and other retail stores, exist along Franklin Street, Manhattan Avenue, Greenpoint Avenue, Nassau

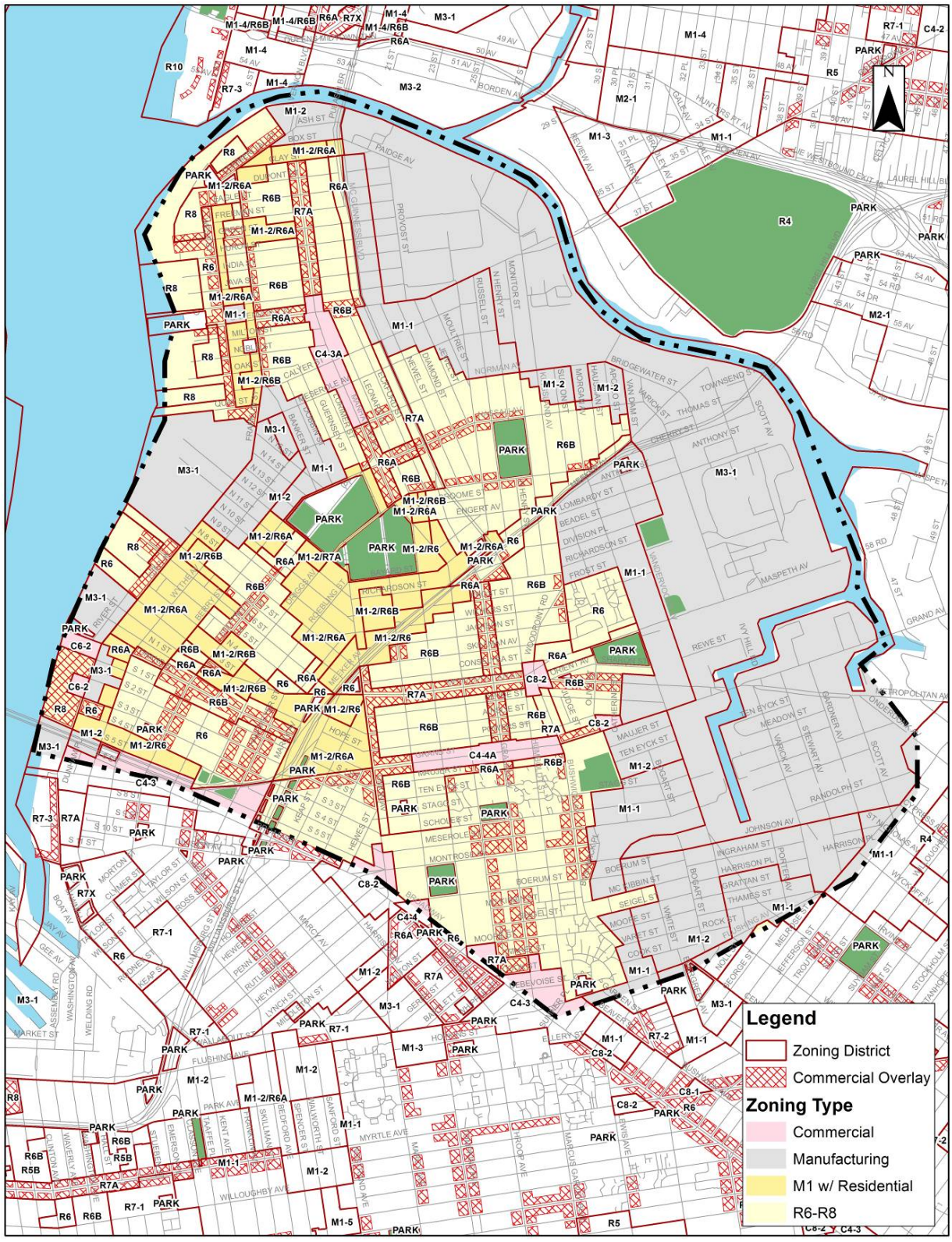
Avenue, Bedford Avenue, Metropolitan Avenue, Grand Street, Union Avenue, Graham Avenue and Bushwick Avenue.

A large cluster of M1 and M3 districts can be found in the eastern section of the study area east of McGuinness Boulevard, Morgan Avenue and Bushwick Avenue. Additionally there are M3 districts west of Kent Avenue south of N 15th Street and many M1-R6 districts south of McCarren Park that allow both light industrial uses and residential uses.

The M1 districts allow for light industrial uses such as woodworking shops, auto storage and repair shops, wholesale services and storage facilities while M3 districts, where heavy industries such as waste transfer stations, power stations and other public utilities, have a higher threshold for noise and other pollutants.

See figure 3-8.

Figure 3-8: Current Zoning Map (2017)



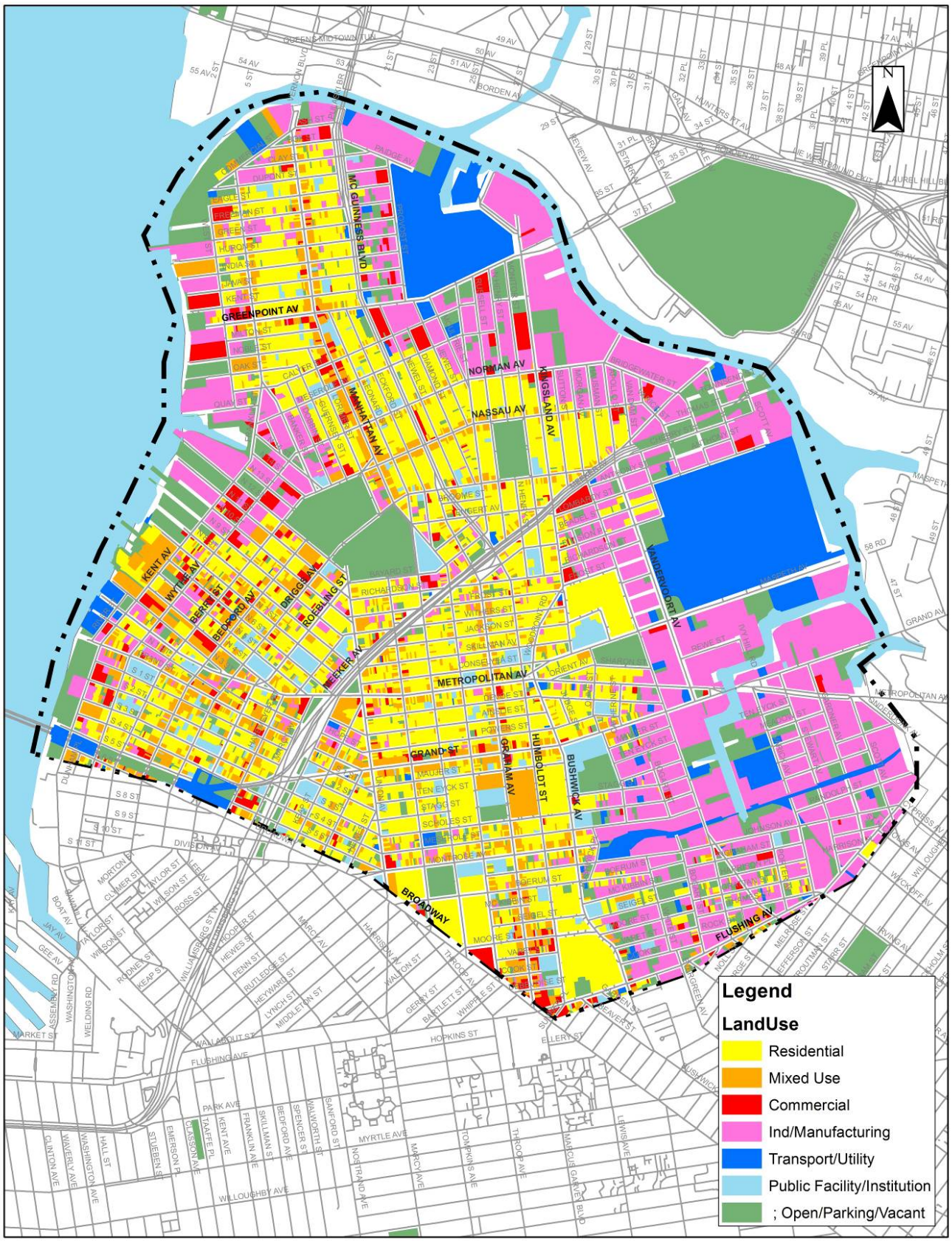
Source: NYC DCP

3.3 Land Use

As the zoning section outlines, the predominant land uses in the study area are residential and industrial. The residential uses are in the middle of the study area situated between two industrial districts. The North Brooklyn IBZ, in the eastern half of the study area, houses the Newtown Creek Wastewater Treatment Plant and the National Grid gas site along with several metal recycling, truck rental, and television/movie production facilities, a BP fuel depot and a FedEx distribution facility. The Greenpoint Williamsburg IBZ, located in the western part of the study area west of Berry Street between Calyer Street and North 9th Street, is much smaller with light manufacturing, catering and equipment rentals, food distribution and storage. Several hotels have recently opened in the IBZ primarily along Wythe Avenue. Other land uses include McCarren Park, Monsignor McGolrick Park, and the East River State Park, Bushwick Inlet Park and WNYC Transmitter Park all located along the East River waterfront. See figure 3-9.

The residential uses in the middle of the study area is generally medium density 3-5 story townhouses and 4-7 story apartment complexes and condos. Several commercial corridors ie. Manhattan Avenue, Greenpoint Avenue, Grand Street and Graham Avenue, generally consist of 3-5 story residential buildings with ground floor retail. Generally, the area bounded by Metropolitan Avenue, Union Avenue and N12th Street consists of mix of residential/commercial uses with many restaurants, shops, bars and clubs throughout the area.

Figure 3-9: Existing Land Use

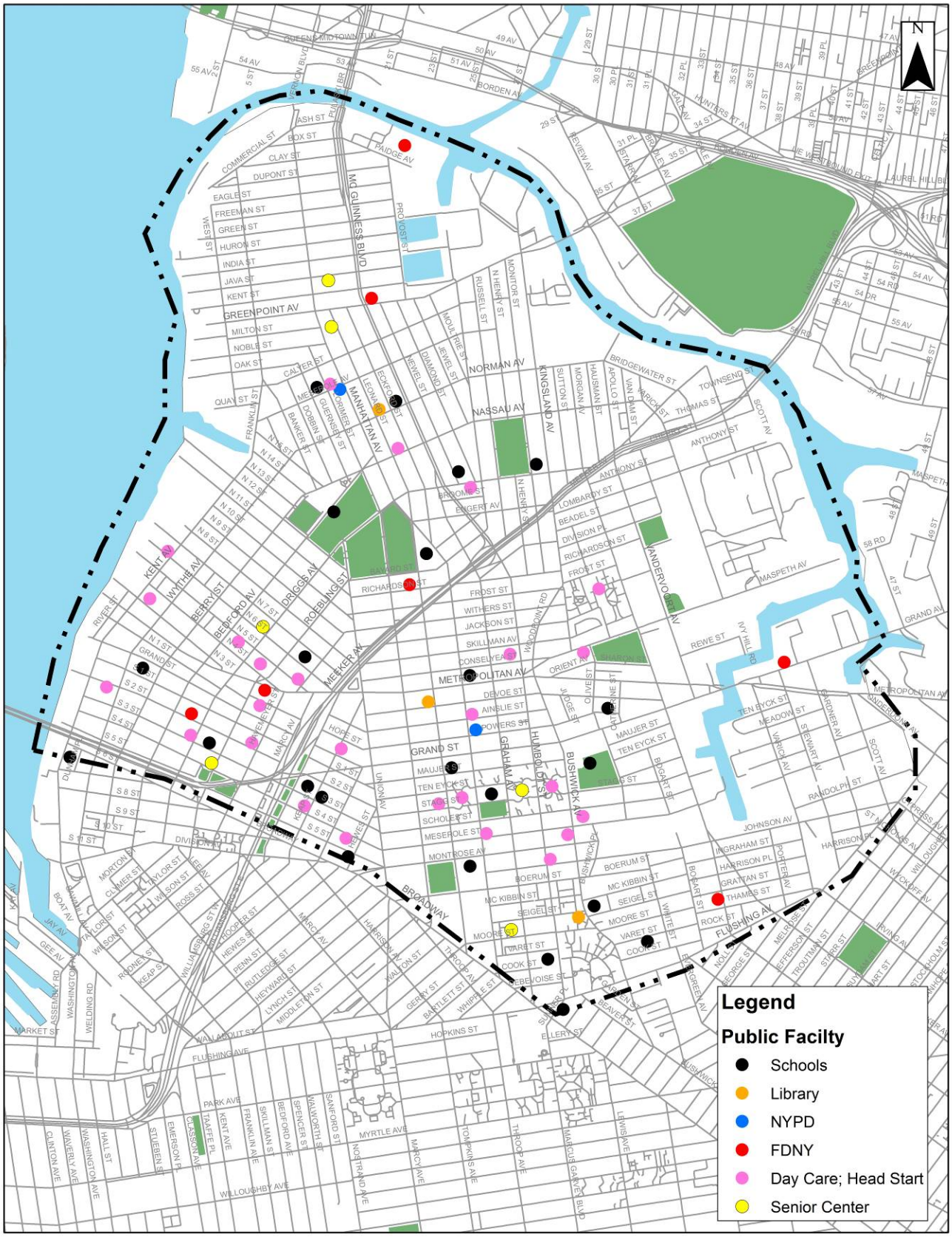


Source: NYC DCP

Public Facilities

Consistent with the residential land use distribution, schools, libraries, senior centers, NYPD and FDNY facilities are distributed throughout the south west of the study area. There are FDNY firehouses located on South 2nd Street between Bedford Avenue and Driggs Avenue, on Richardson Street Ave between Lorimer Street and Leonard Street, on Greenpoint Avenue between Provost Street and McGuinness Boulevard, on Morgan Avenue between Grattan Street and Thames Street and on Union Ave between Johnson and Montrose Avenues. The facility on Union Ave also houses an NYPD precinct house. There is also an NYPD Precinct located on Messerole Avenue between Lorimer Street and Manhattan Avenue. There are 33 public and 4 private/parochial schools distributed within the study area (15 elementary, 5 middle schools and 13 high schools). See figure 3-10.

Figure 3-10: Public Facilities



Source: NYC DCP

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4 TRAFFIC AND TRANSPORTATION

4.1 Introduction

The study area street network approximates to a grid-like pattern and is bounded on three sides by water; Newtown Creek on the east and north, and the East River on the west. This aspect creates limited crossing opportunities to Queens and Manhattan via the Pulaski, J.J. Byrne, Kosciusko, Grand Street, Metropolitan Avenue and Williamsburg Bridges. The Brooklyn-Queens Expressway (BQE), an elevated regional facility with an at-grade EB/WB service road (Meeker Avenue), divides the study area.

Street System and Roadway Characteristics

In the study area the Brooklyn-Queens Expressway (BQE) can be accessed via the entrance/exit ramps at Metropolitan Avenue, McGuinness Boulevard and Vandervoort Avenues. Another major connector just south of the study area is the Williamsburg Bridge which runs between Brooklyn and Manhattan. About 90 percent of the local streets operate as one-ways creating significant constraints for internal traffic circulation. The main east/west arterials in the study area are Grand Street, Metropolitan Avenue, Norman Avenue, Nassau Avenue, Meeker Avenue and Greenpoint Avenue. The main north/south arterials in the study area include Kent Avenue/Franklin Street, Wythe Avenue, Bedford Avenue, Manhattan Avenue, McGuiness Boulevard, Kingsland Avenue, Morgan Avenue, Vandervoort Avenue and Bushwick Avenue. See figure 4-1. The characteristics of the main arterials are described below.

Figure 4-1: Major Arterials in the Study Area

Kent Avenue operates one way northbound to N 14th Street where it becomes ***Franklin Avenue*** with two way operation. Kent Avenue has one moving lane with parking on both sides and a two-way protected bike lane on the west curb. Franklin Avenue is approximately 39' wide with one travel lane and a shared bike lane in both directions and parking on both sides. Waterfront recreation areas, the designation of Kent Avenue as part of the Brooklyn Waterfront Greenway initiative, high density residential uses and two ferry landings generate significant pedestrian and bike traffic along Kent Avenue. The B32 operates along Kent Avenue/Franklin Avenue which is also a local truck route.

Norman Avenue is 34' wide and operates as a two way street with one travel lane per direction and parking on both sides between Apollo Street and *Banker Street.* At Banker Street it becomes ***Wythe Avenue*** which operates one way southbound. It is 30' wide with one moving lane, a bicycle lane and parking on both sides. Norman Avenue is mainly residential in nature but Wythe Avenue is mostly commercial with many bars, restaurants and retail stores. The B32 operates southbound on Wythe Avenue to Broadway.

Bedford Ave extends from Shore Parkway in Sheepshead Bay to Manhattan Avenue in the Study Area. It is approximately 30' and operates one way northbound with one moving lane and parking on both sides. It typically has ground floor retail with 2-4 story residential use. The L train can be accessed from Bedford Avenue and N 7th Street and the B62 travels along Bedford Avenue from Broadway to Manhattan Avenue.

Nassau Avenue extends from Berry Street in the west to Varick Street in the east. Between Varick Street and Leonard Street Nassau Avenue is approximately 35' wide, operates two-way with one moving lane per direction and parking on both sides. Between Manhattan Avenue and Leonard Street westbound access is restricted to Buses only. Between Lorimer Avenue and Manhattan Avenue it operates one way eastbound with parking on both sides while between Lorimer Street and Guernsey Street it is two-way allowing westbound access to Guernsey Street. Between Guernsey Street and Berry Street it is one way eastbound with a bike lane and

parking on both curbs.

Greenpoint Avenue extends from West Street in the Study Area to Queens Boulevard via the J.J. Byrne Bridge. Greenpoint Avenue has one moving lane per direction with parking on both sides from West Street to McGuiness Boulevard. There are two westbound lanes and one eastbound lane from McGuiness Boulevard to Monitor Street. The J.J. Byrne Bridge has two lanes per direction. Greenpoint Avenue is generally 50' wide but 35' wide between McGuiness Boulevard and Manhattan Avenue. It has a shared or dedicated bike lane in both directions and is a local truck route. It has mixed residential/commercial uses along the western half more industrial uses in the eastern portion. The Greenpoint Avenue subway station is located at Manhattan Avenue and the B24 travels along the corridor.

Manhattan Avenue is a north-south corridor that extends from Broadway in the south to Commercial/Ash Street in the north. It operates one way northbound from Broadway to Leonard Street, has one moving lane and a bike lane with parking on both sides. The remainder of Manhattan Avenue operates as two-way but the bike lane is dropped between Greenpoint and Leonard Street where the roadway narrows to 35'. The G train has two stations on Manhattan Avenue; the Greenpoint Avenue Station and the Nassau Street Station. The B43 travels along Manhattan Avenue between Commercial Avenue and Leonard Street and the B62 operates between Freeman Street and Driggs Avenue. The corridor is predominantly commercial north of Driggs Avenue and predominately residential south of Driggs Avenue. It iss a local truck route between Commercial Street and Greenpoint Avenue.

McGuiness Boulevard, a major two way north-south corridor, extends from Meeker Avenue (BQE) across the Pulaski Bridge into Long Island City, Queens. A typical cross-section is 75' wide with two moving lanes in each direction, a 6' raised center median and parking on both sides. South of Meeker Avenue it becomes Humboldt Avenue which is southbound corridor that extends to Flushing Avenue. It is a local truck route and has a mix of medium density residential and commercial (car repair/gas stations). The B32 and B62 buses travel over the Pulaski Bridge and along the corridor to Manhattan Avenue via Green Street and Freeman

Street. A bike/pedestrian path across the Pulaski Bridge is located adjacent the southbound lanes with an entrance at Eagle Street.

Meeker Avenue EB and WB functions as the service road to and from the elevated BQE from Metropolitan Avenue to Vandervoort Avenue. The roadways are separated by the raised structure with parking permitted between the service roads. These corridors are 38' with three moving lanes and a parking lane. There are ramps to/from the BQE at McGuiness Boulevard and Vandervoort Avenue. The B24 travels on Meeker Avenue from Vandervoort BQE entrance/exit to Kingsland Avenue with two stops in each direction. Meeker Avenue is a local truck route while the BQE is a through truck route.

Kingsland Avenue, a two way corridor between Maspeth and Meeker Avenue, has one moving lane per direction with parking on both sides. Between Meeker Avenue and Greenpoint Avenue it is approximately 34' wide and operates one way northbound with one moving lane with parking on both curbs. The corridor is predominately residential with some commercial uses. The B24 operates between Maspeth and Meeker Avenues and it is a local truck route between Norman and Greenpoint Avenues.

Morgan Avenue, a two way corridor between Flushing and Meeker Avenues has one moving lane per direction but operates one way northbound between Meeker and Norman Avenues with one moving lane and parking on both sides. Parking is prohibited for the majority of the corridor north of Johnson Avenue and south of Meeker Avenue from 7AM to 7PM. The corridor is mainly industrial and is a local truck route. There is an L Train station at Harrison Avenue and the B60 operates between Johnson and Flushing Avenues.

Vandervoort Avenue, which is 50' wide, extends from Meeker Avenue WB to Grand Street. It operates two-way with one moving lane per direction with parking on both sides. The corridor is typically industrial in nature and is a local truck route.

Bushwick Avenue, a two way north-south corridor, extends from Maspeth Avenue to Jamaica Avenue. It has one moving lane per direction with parking on both sides. However, the

segment between Flushing Avenue and Grand Street has rush hour regulations ("no parking 7AM to 10AM" on the east curb and "no parking 4PM to 7PM" on the west curb) to provide an additional moving lane. The corridor is a mix of medium and high density residential with floor retail. The L Train has stops at the Grand Street Station and at the Montrose Avenue Station.

Grand Street is a two way east/west corridor with one moving lane per direction and parking on both sides. It intersects with the Borinquen Place entrance/exit ramps to the Williamsburg Bridge and is a major entry way to both Manhattan and Queens. It is a truck route and has bike lanes in both directions. The Q59 and Q54 buses travel along Grand Street and the L train has a station at Bushwick Avenue.

Metropolitan Avenue, a major east-west corridor, extends from River Street in the West to Jamaica Avenue in Queens. It has a typical cross section of approximately 41' with one moving lane per direction and parking on both sides. The corridor is a mix of residential and commercial uses in the western part and industrial uses in the eastern portion. The G train has a Station at Union Avenue and the L train has a station at Lorimer Street. The B24 travels along the corridor from Bushwick Avenue to Marcy Avenue while the Q59 travels along it from Union Avenue to Roebling Street. Metropolitan Avenue is a local truck route.

4.2 Traffic Data Collection

Existing traffic conditions were determined from field surveys conducted in 2016 and supplemented with information from previous studies and projects within the study area. Traffic volume counts were collected through automated traffic recorder (ATR) machines and manual turning movement counts (MTMC). See Figure 4-2.

Automatic Traffic Recorder (ATR) machines were placed at the following 24 locations for the duration of seven days to collect 24-hour traffic counts in 15 minute intervals:

1. Anthony Street between Vandervort Avenue and Morgan Avenue (EB/WB)
2. Anthony Street between Vandervort Avenue and Porter Avenue (EB/WB)
3. Berry Street between N 11 Street and N 12 Street

4. Bushwick Avenue between Metropolitan Avenue and Devoe Street (NB/SB)
5. Cherry Street between Vandervoort Avenue and the BQE EB entrance ramp
6. Flushing Avenue between Bushwick Avenue and Stanwix Street (EB/WB)
7. Franklin Street between Greenpoint Avenue and Kent Street (NB/SB)
8. Grand Street between Bushwick Avenue and Olive St/Waterbury Street (EB/WB)
9. Grand Street between Union Avenue and Lorimer Street (EB/WB)
10. Greenpoint Avenue between N Henry Street and Monitor Street (EB/WB)
11. Humboldt Street between Conselyea Street and Maspeth Avenue (SB)
12. Humboldt Street between Nassau Avenue and Driggs Avenue (SB)
13. Kent Avenue between North 6 Street and North 7 Street (NB)
14. Lombardy Street between Morgan Avenue and Vandervoort Avenue (EB)
15. McGuiness Blvd between Bayard Street and Meeker Avenue (NB/SB)
16. Meeker Avenue between Apollo Street and The BQE WB exit ramp
17. Metropolitan Avenue between Woodpoint Road and Olive Street
18. Morgan Avenue between Maspeth Avenue and Wither Street (Closer to Maspeth Ave) (NB/SB)
19. Nassau Avenue between Leonard Street and Eckford Street
20. North 9 Street between Berry Street and Bedford Avenue (EB)
21. Provost Street between Freeman Street and Green Street
22. Provost Street between Kent Street and Greenpoint Avenue
23. Vandervoort Avenue between Anthony Street and Meeker Avenue EB (NB/SB)
24. Wythe Avenue between N 12 Street and N 13 Street

Manual Turning Movement Counts (MTMC) were conducted at 65 locations for one weekday (Tuesday, Wednesday or Thursday) during the AM and PM peaks in 15 minute intervals.

1. Apollo Street and Meeker Avenue
2. Bayard St/Humboldt Street and McGuiness Boulevard
3. Bedford Avenue and N 9 Street
4. Bedford Avenue and N 7 Street
5. Berry Street and N 9 Street
6. Berry Street and N 11 Street
7. Flushing Avenue and Bushwick Avenue
8. Flushing Avenue and Knickerbocker Avenue
9. Flushing Avenue and Morgan Avenue

10. Franklin Street and Commercial Street
11. Franklin Street and Greenpoint Avenue
12. Franklin Street and Kent Street
13. Grand Street and Bushwick Avenue
14. Grand Street and Humboldt Street
15. Grand Street and Lorimer Street
16. Grand Street and Manhattan Avenue
17. Grand Street and Union Avenue
18. Grand Street and Waterbury St/Olive Street
19. Greenpoint Avenue and Humboldt Street
20. Greenpoint Avenue and N Henry Street
21. Humboldt Street and Herbert Street
22. Humboldt Street and Meeker Avenue (EB)
23. India Street and West Street
24. Johnson Avenue and Bushwick Avenue
25. Kent Avenue and N 9 Street
26. Kingsland Avenue and Meeker Avenue (EB)
27. Kingsland Avenue and Meeker Avenue (WB)
28. Manhattan Avenue and Green Street
29. Manhattan Avenue and Greenpoint Avenue
30. Manhattan Avenue and Meeker Street (EB)
31. Manhattan Avenue and Meeker Street (WB)
32. Manhattan Avenue and Norman Avenue
33. Maspeth Avenue and Vandervoort Avenue
34. Maspeth Avenue and Morgan Avenue
35. Maujer Street and Leonard Street
36. McGuiness Blvd and Meeker Avenue (WB)
37. Metropolitan Avenue and Bushwick Avenue
38. Metropolitan Avenue and Humbolt Street
39. Metropolitan Avenue and Manhattan Avenue
40. Metropolitan Avenue and Morgan Avenue
41. Metropolitan Street and Lorimer Street
42. Montrose Avenue and Bushwick Avenue
43. Montrose Avenue and Leonard Street
44. Montrose Avenue and Manhattan Avenue
45. Montrose Avenue and Union Avenue
46. Morgan Avenue and Meeker Avenue (EB)
47. Morgan Avenue and Meeker Avenue (WB)
48. Nassau Avenue and Humbolt Avenue
49. Nassau Avenue and Kingsland Avenue
50. Nassau Avenue and Lorimer Street
51. Nassau Avenue and Manhattan Avenue
52. Nassau Avenue and Leonard Street
53. Norman Avenue and Humboldt Street
54. Provost Street and Paidge Avenue
55. Provost Street and Eagle Street
56. Provost Street and Freeman Street
57. Provost Street and Green Street
58. Provost Street and India Street
59. Provost Street and Kent Street
60. Provost Street and Greenpoint Avenue
61. Rodney Street and Ainslie Street
62. Vandervoort Avenue and Meeker Avenue/Cherry Street
63. Wythe Avenue and N 12 Street

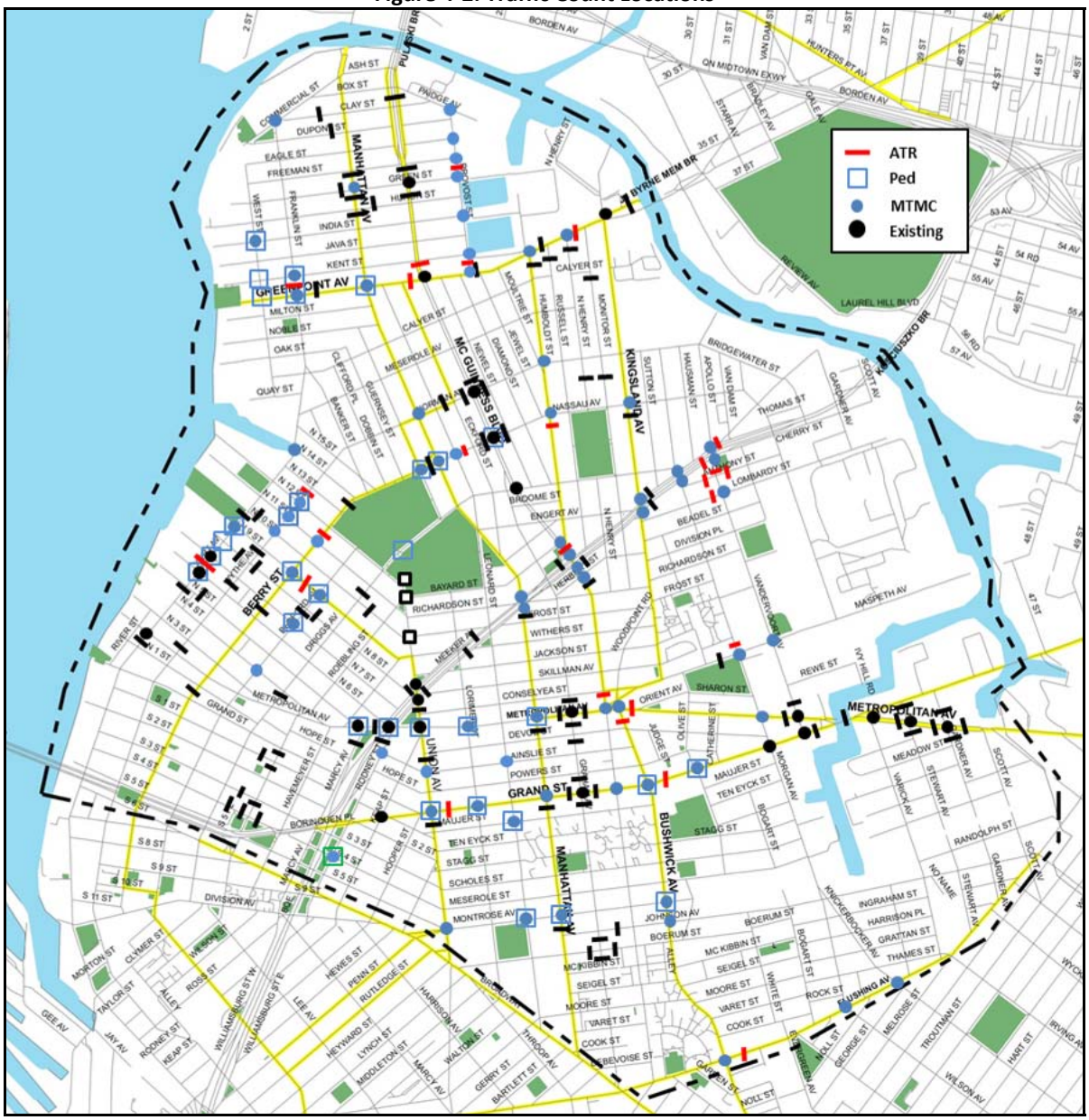
64. Wythe Avenue and N 11 Street

65. Wythe Avenue and N 10 Street

Pedestrian crosswalks counts were conducted at the following locations for one weekday (Tuesday, Wednesday, or Thursday) during the 7-9 AM and 4-6 PM peak periods in 15-minutes intervals:

1. Bedford Ave and N 7 St
2. Bedford Ave and N 9 St
3. Berry St and N 9 St
4. Franklin St and Greenpoint Ave
5. Franklin St and Kent St
6. Grand Ave and Waterbury St/Olive St
7. Grand St and Bushwick Ave
8. Grand St and Lorimer St
9. Grand St and Union Ave
10. India St and West St
11. Kent Ave and N 7 St
12. Kent Ave and N 9 St
13. Kent Ave and N6 St
14. Manhattan Ave and Greenpoint Ave
15. Marcy Ave and Metropolitan Ave
16. Maujer St and Leonard St
17. McGuiness Blvd and Nassau Ave
18. Metropolitan Ave and Manhattan Ave
19. Metropolitan Ave and Meeker St (NB)
20. Metropolitan Ave and Meeker St (SB)
21. Metropolitan Ave and Union Ave
22. Metropolitan St and Lorimer St
23. Montrose Ave and Bushwick Ave
24. Montrose Ave and Leonard St
25. Montrose Ave and Manhattan Ave
26. Nassau Ave and Lorimer St
27. Nassau Ave and Manhattan Ave
28. Union Ave and Driggs Ave
29. West Street and Kent Street
30. West St and and Greenpoint Ave
31. Wythe Avenue and N 12 Street
32. Wythe Avenue and N 11 Street

Figure 4-2: Traffic Count Locations



4.3 Network Traffic Volumes

Balanced traffic networks for the AM (7:45 – 8:45), and PM (5:00 – 6:00) peak hours were prepared using the ATRs and manual turning movement counts collected. The traffic volumes were plotted on traffic flow maps. In addition to the many counts available from previous studies, ATRs and MTMCs were conducted along with over 30 pedestrian count locations. Figures 4-3 through 4-6 show the 2016 existing conditions AM and PM peak hour traffic

volumes.

The highest traffic volume in the network occurs along McGuinness Boulevard, Meeker Avenue (particularly at entrance/exit ramps to the BQE such as Metropolitan Avenue, McGuinness Boulevard and Vandervoort Avenue), Bushwick Avenue and at bottlenecks such as the Greenpoint Avenue Bridge, Metropolitan Avenue Bridge

- Traffic volume along McGuinness Boulevard between the Pulaski Bridge and the BQE is approximately 1,100 and 1,350 vehicles southbound with 1,200 and 900 vehicles northbound during the AM and PM peak hours respectively.

- Meeker Avenue processed approximately 850 and 700 vehicles eastbound and 550 and 450 vehicles westbound during the AM and PM peak hours respectively.

- Traffic volume along Bushwick Avenue is approximately 350 and 750 vehicles southbound and 600 and 400 vehicles northbound during the AM and PM peak hours respectively

- Metropolitan Avenue Bridge traffic volume is 1,750 and 1,050 vehicles westbound and 600 and 1,250 vehicles eastbound during the AM and PM peak hours respectively

- Greenpoint Avenue Bridge traffic volume is approximately 850 and 750 vehicles westbound and 850 and 1,200 vehicles eastbound during the AM and PM peak hours respectively.

All other corridors experienced moderate traffic ranging from 100 to 650 vehicles per direction during AM and PM peak hours. Though traffic volumes were not very high in many locations, congestion with high delays and queues was very evident due to the high percentage of trucks, bikes, pedestrians, and the physical constraints on the street network. This was particularly prevalent on major commercial corridors and truck routes such as Manhattan Avenue and Morgan Avenue.

Figure 4-3: Existing Traffic Volumes –AM Peak (Part 1)

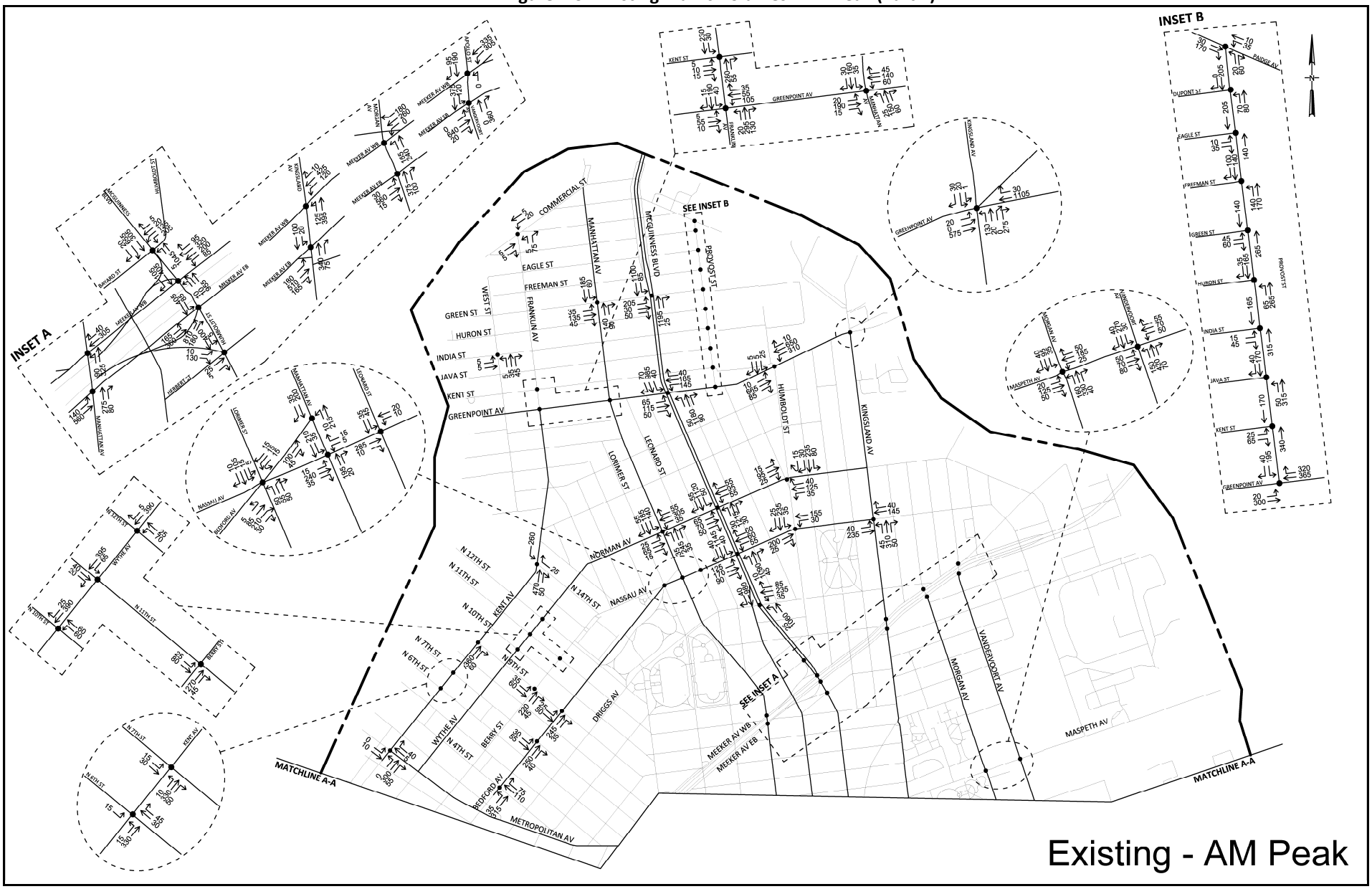


Figure 4-4: Existing Traffic Volumes –AM Peak (Part 2)

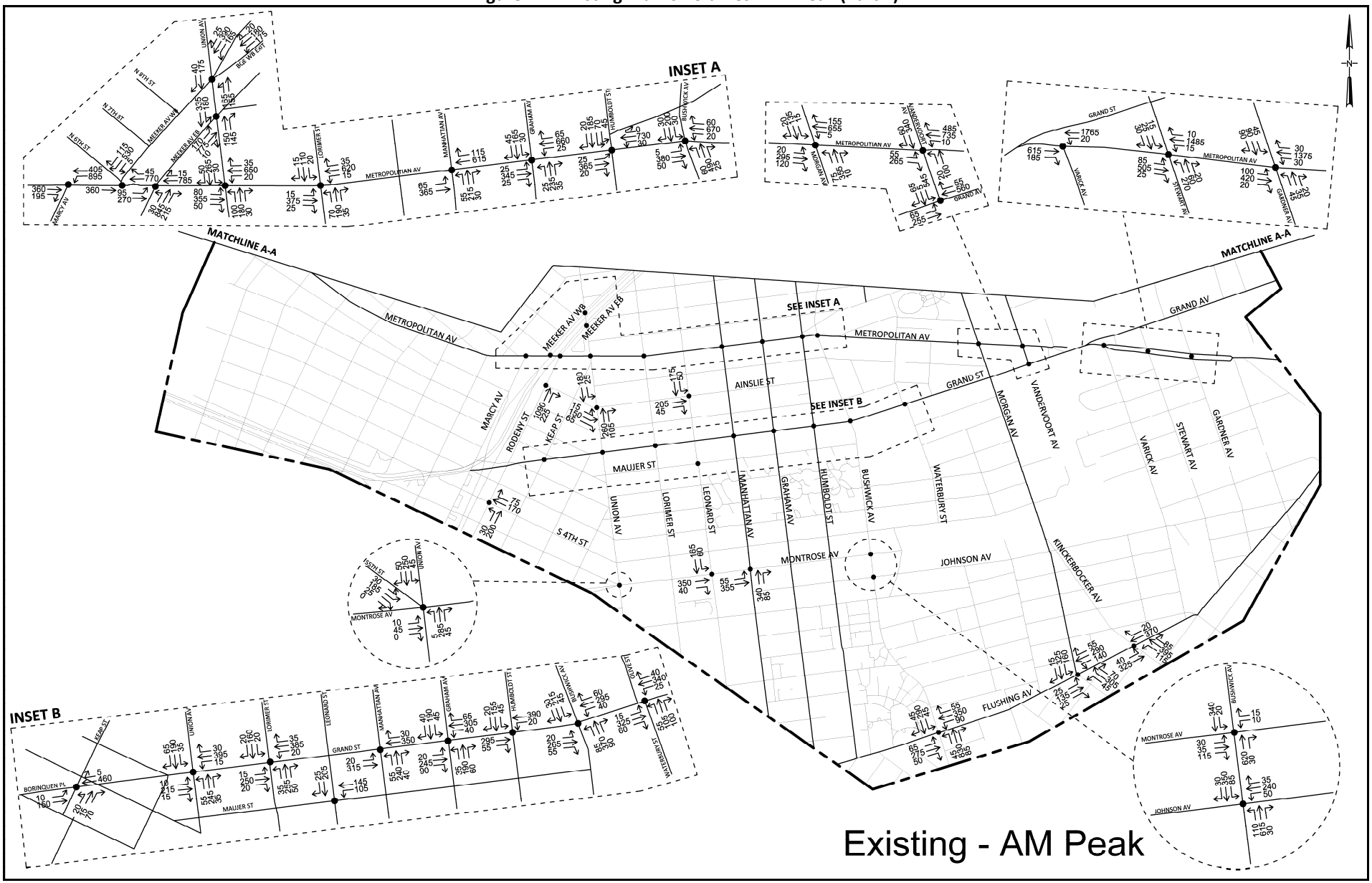


Figure 4-5: Existing Traffic Volumes –PM Peak (Part 1)

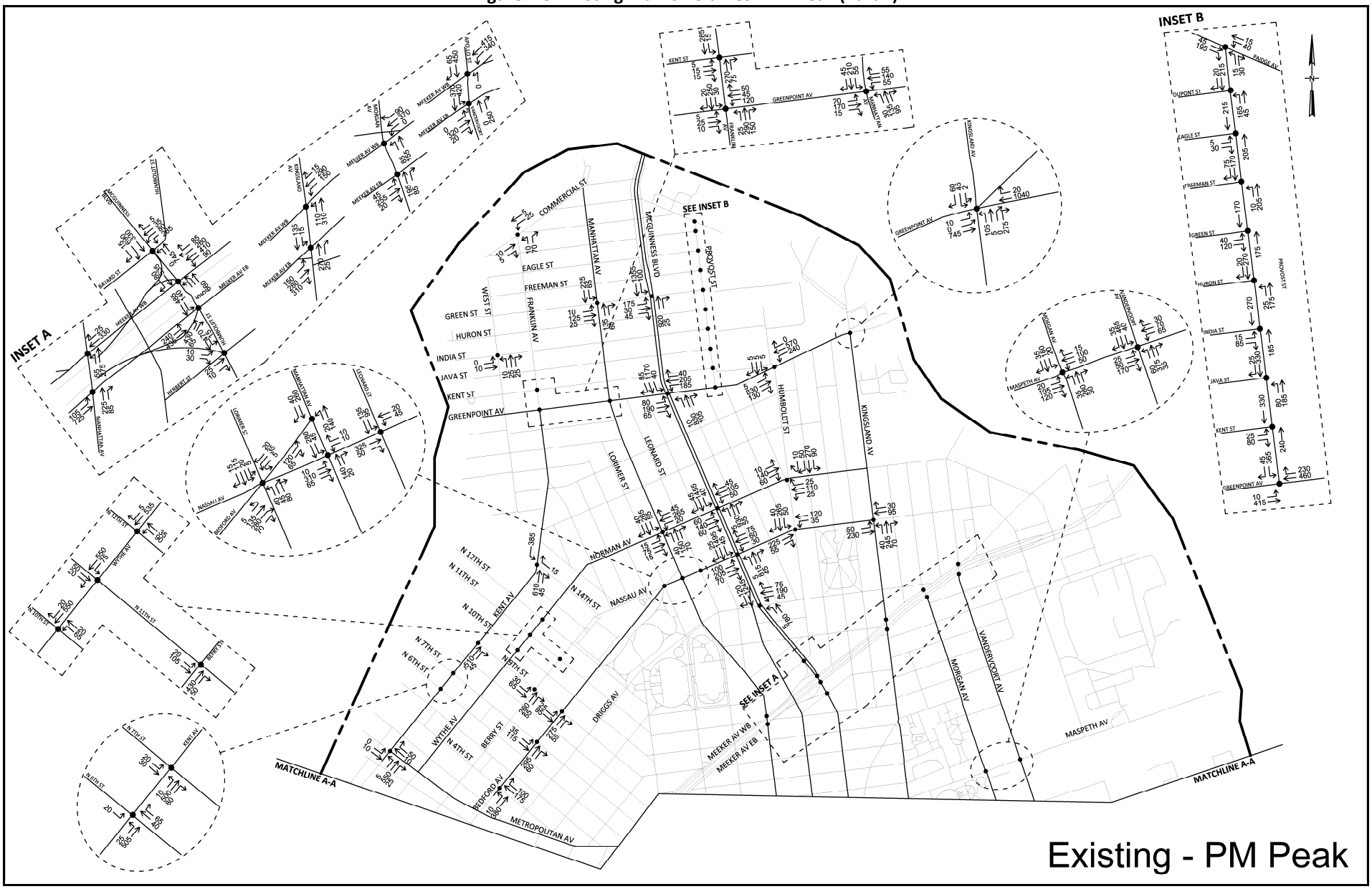
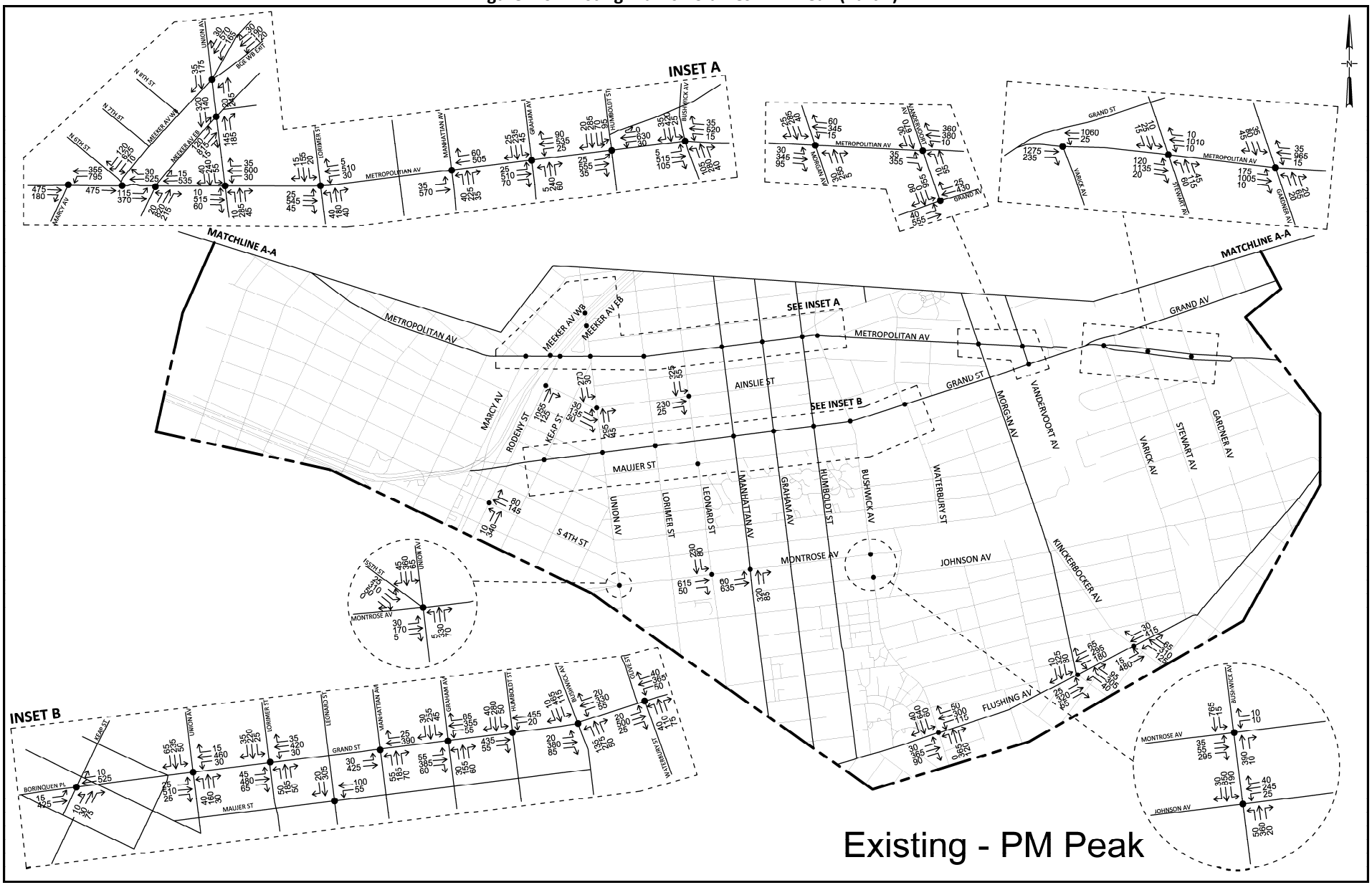


Figure 4-6: Existing Traffic Volumes –PM Peak (Part 2)



4.4 Street Capacity and Level of Service (LOS)

The capacity of the roadways is the maximum rate of flow which may pass through a section of roadway under prevailing traffic, roadway and signalization conditions. It is determined by several factors including turning movements, signal timing, geometric design of the intersection, pedestrian movements, type of vehicle, illegal and/or double parking, grade, roadway conditions, and weather. In determining street capacity within the study area, the 2000 Highway Capacity Manual (HCM) methodology was used. The methodology requires the use of official signal timings, street geometry, and other relevant information for performing capacity and LOS analysis. Field inventory documenting number of lanes, lane width bus stops, etc. was prepared and recorded.

The traffic flow characteristics are measured in terms of the volume-to-capacity (v/c) ratios and delays. The quality of the flow is expressed in terms of LOS, which is based on an average delay experienced per vehicle. When the v/c ratio exceeds 1.0, a facility or intersection is operating at or over capacity. In this situation, traffic congestion occurs with stop-and-start conditions with extensive vehicle queuing and delays. Volume-to-capacity ratios of less than 0.85 reflect acceptable traffic conditions, with average delays per vehicle of 45 seconds or less. Table 4-1 shows the level of service criteria as specified in the 2000 HCM Methodology.

Table 4-1: Signalized Intersection Level of Service (LOS) Criteria

Level of Service	Control Delay per Vehicle	Description of Traffic Condition
A	≤ 10.0	LOS A describes operations with low control delay, up to 10 sec/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all.
B	> 10 to 20	LOS B describes operations with control delay greater than 10 and up to 20 sec/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	> 20 to 35	LOS C describes operations with control delay greater than 20 and up to 35 sec/veh. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	>35 to 55	LOS D describes operations with control delay greater than 35 and up to 55 sec/veh. The influence of congestion becomes more noticeable at this level. Longer delays may result from a combination of unfavorable progression, long cycle lengths, and/or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	>55 to 80	LOS E describes operations with control delay greater than 55 and up to 80 sec/veh. These higher delay values generally indicate poor progression, long cycle length, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	LOS F describes operations with delay in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.
Sources:	Highway Capacity Manual, Transportation Research Board;	
Note: Control delay is measured in terms of seconds per vehicle (sec/veh).		

The 2016 Existing Conditions HCS analysis summary, v/c ratios, delays, and level of service (LOS) are shown on Table 4-2. The analysis shows that many intersections along Metropolitan Avenue and Grand Street experienced LOS D, E and F during the AM and PM peak hours. Figures 4-7 and 4-8 show the intersection LOS for the AM and PM peak hours. In addition to intersection LOS approach LOS are also shown. Figures 4-9 and 4-10 show approach LOS for the AM and PM peak hours.

Intersections with failing approaches LOS F in either the AM or PM peak hour are listed below.

1. Nassau Avenue and Lorimer Street (PM)
2. Nassau Avenue and Leonard St (PM)
3. McGuinness Boulevard and Driggs Avenue (AM)
4. McGuinness Boulevard and Humboldt Street (AM and PM)
5. McGuiness Boulevard and Meeker Avenue EB (AM and PM)
6. Meeker Avenue EB and Manhattan Avenue (AM and PM)
7. Meeker Avenue EB and Union Avenue (AM and PM)
8. Meeker Avenue WB and Union Avenue (AM)
9. Metropolitan Avenue and Manhattan Avenue (PM)
10. Metropolitan Avenue and Lorimer Street (AM and PM)
11. Metropolitan Avenue and Graham Avenue (AM and PM)
12. Metropolitan Avenue and Bushwick Avenue (AM)
13. Metropolitan Avenue and Stewart Avenue (AM and PM)
14. Metropolitan Avenue and Gardner Avenue (AM and PM)
15. Grand Street and Bushwick Avenue (AM and PM)
16. Bushwick Avenue and Montrose Avenue (PM)
17. Bushwick Avenue and Johnson Avenue (AM and PM)
18. Bushwick Avenue and Flushing Avenue (AM and PM)
19. Flushing Avenue and Knickerbocker Avenue (AM)

Table 4-2 Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Greenpoint Av & Franklin Av	NB	L	20	LTR	0.85	30.7	C	L	25	LTR	0.84	29.3	C
		T	295					T	290				
		R	130					R	150				
	SB	L	40	LTR	0.74	26.3	C	L	30	LTR	0.86	35.1	D
		T	190					T	250				
		R	15					R	20				
	EB	L	5	LTR	0.33	14.4	B	L	5	LTR	0.21	12.3	B
		T	55					T	25				
		R	10					R	10				
	WB	L	105	LTR	0.70	24.3	C	L	120	LTR	0.66	22.6	C
		T	55					T	45				
		R	35					R	50				
	Overall					26.4	C					28.5	C
Greenpoint Av & Manhattan Av	NB	L	25	LTR	0.57	28.6	C	L	30	LTR	0.65	31.8	C
		T	150					T	135				
		R	60					R	95				
	SB	L	35	LTR	0.70	35.9	D	L	55	LTR	0.85	46.9	D
		T	160					T	210				
		R	30					R	45				
	EB	L	20	LTR	0.86	54.7	D	L	20	LTR	0.77	41.4	D
		T	190					T	170				
		R	15					R	15				
	WB	L	60	LTR	0.74	38.3	D	L	55	LTR	0.68	33.2	C
		T	140					T	140				
		R	45					R	55				
	Overall					39.3	D					38.8	D
Greenpoint Av & McGuinness Blvd	NB	L	50	L	0.66	37.6	D	L	10	L	0.20	16.9	B
		T	1180	TR	0.98	43.7	D	T	830	TR	0.75	22.4	C
		R	90					R	105				
	SB	L	40	L	0.66	49.0	D	L	40	L	0.34	18.8	B
		T	985	TR	0.79	24.1	C	T	1170	TR	0.94	36.5	D
		R	70					R	85				
	EB	L	65	LTR	0.34	30.5	C	L	80	LTR	0.47	32.7	C
		T	115					T	190				
		R	50					R	65				
	WB	L	145	DefL				L	185	DefL	0.89	74	E
		T	185	LTR	0.49	33.2	C	T	205	LTR			
		R	40	TR				R	40	TR	0.63	39.4	D
	Overall					34.6	C					33.7	C
Greenpoint Av & Provost St	SB	L	195	LR	0.93	52.8	D	L	365	LR	1.01	67.5	E
		R	40					R	45				
	EB	L	20	LT	0.55	12.8	B	L	10	LT	0.66	15.2	B
		T	300					T	415				
	WB	T	365	TR	0.60	12.3	B	T	460	TR	0.58	11.9	B
		R	320					R	230				
	Overall					21.3	C					27.2	C
Greenpoint Av & Humboldt St	SB	L	25	LTR	0.29	43.5	D	L	5	LTR	0.10	39.0	D
		T	5					T	5				
		R	5					R	5				
	EB	L	10	L	0.08	5.9	A	L	5	L	0.08	6.1	A
		T	665	TR	1.01	49.5	D	T	830	TR	1.05	58.7	E
		R	85					R	130				
	WB	L	310	LTR	1.05	59.6	E	L	240	LTR	1.04	59.7	E
		T	650					T	570				
		R	10					R	0				
	Overall					54.1	D					58.3	E
Greenpoint Av & Kingsland Av	NB	L	30	L	0.08	31.2	C	L	30	L	0.08	31.2	C
		T	55	LTR	0.53	41.4	D	T	5	LTR	0.82	60.5	E
		R	85					R	190				
	SB	L	20	LR	0.10	22.9	C	L	40	LR	0.16	23.9	C
		R	20					R	20				
	EB	L	50	LT	0.66	8.6	A	L	10	LT	0.67	23.7	C
		T	770					T	965				
	WB	T	875	TR	0.67	24.1	C	T	735	TR	0.56	21.4	C
		R	20					R	15				
	Overall					18.8	B					27.3	C
Bedford Av & N 7th St	NB	T	250	TR	0.52	16.3	B	T	295	TR	0.64	19.3	B
		R	40					R	60				
	EB	L	30	LT	0.26	22.9	C	L	35	LT	0.46	26.8	C
		T	55					T	115				
	Overall					17.9	B					21.8	C

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Bedford Av & N 9th St	NB	T	245	TR	0.58	17.7	B	T	275	TR	0.55	16.7	B
		R	35					R	55				
	EB	L	25	LT	0.29	23.0	C	L	25	LT	0.29	23.2	C
		T	80					T	95				
	Overall					19.1	B					18.4	B
Nassau Av & Bedford Av/ Lorimer St	NB	L	50	LR	0.75	46.9	D	L	40	LR	1.04	106.7	F
		R	105					R	125				
	SB	L	20	LTR	0.49	30.0	C	L	25	LTR	0.65	36.0	D
		T	105					T	115				
		R	10					R	15				
	EB	T	295	TR	0.47	12.8	B	T	420	TR	0.65	16.7	B
		R	30					R	70				
	WB	L	30	LT	0.08	8.6	A	L	40	LT	0.12	9.1	A
		T	15					T	20				
	Overall					23.9	C					37.8	D
Bedford Av & Manhattan Av	NB	L	10	LT	0.48	20.5	C	L	20	LT	0.36	18.4	B
		T	215					T	140				
	SB	T	200	TR	0.75	32.2	C	T	260	TR	0.83	38.0	D
		R	35					R	40				
	EB	L	100	LR	0.52	23.1	C	L	120	LR	0.67	29.1	C
		R	45					R	65				
	Overall					26.1	C					30.7	C
Nassau Av & Leonard St	SB	L	45	LT	0.52	34.0	C	L	95	LT	1.00	86.0	F
		T	35					T	135				
	EB	T	285	TR	0.76	25.6	C	T	325	TR	0.89	37.4	D
		R	10					R	50				
	WB	L	10	LT	0.07	8.6	A	L	45	LT	0.26	10.8	B
		T	20					T	20				
	Overall					26.0	C					49.5	D
Nassau Av & McGuinness Blvd	NB	L	10	L	0.17	15.1	B	L	5	L	0.15	16.7	B
		T	1090	TR	0.82	25.4	C	T	815	TR	0.62	18.8	B
		R	45					R	45				
	SB	L	40	L	0.45	25.1	C	L	45	L	0.30	16.5	B
		T	1145	TR	0.87	29.0	C	T	1495	TR	1.03	57.9	E
		R	40					R	25				
	EB	L	125	LTR	0.94	68.5	E	L	100	LTR	0.90	60.8	E
		T	170					T	205				
		R	90					R	70				
	WB	L	55	LTR	0.45	34.1	C	L	30	LTR	0.43	33.6	C
		T	60					T	60				
		R	60					R	75				
	Overall					32.9	C					44.4	D
Nassau Av & Humboldt St	SB	L	35	LTR	0.66	20.0	B	L	50	LTR	0.80	26.5	C
		T	235					T	265				
		R	25					R	40				
	EB	T	200	TR	0.54	17.1	B	T	225	TR	0.57	18.0	B
		R	25					R	55				
	WB	L	30	LT	0.48	16.3	B	L	35	LT	0.36	14.2	B
		T	155					T	120				
	Overall					18.1	B					21.5	C
Nassau Av & Kingsland Av	NB	L	45	LTR	0.98	55.5	E	L	40	LTR	0.96	51.7	D
		T	310					T	245				
		R	50					R	70				
	EB	L	40	LT	0.70	22.3	C	L	50	LT	0.68	21.6	C
		T	235					T	230				
	WB	T	145	TR	0.55	17.9	B	T	95	TR	0.33	13.8	B
		R	40					R	30				
	Overall					35.6	D					34.6	C
Meeker Av EB & Metropolitan Av	NB	L	30	LTR	0.88	36.8	D	L	20	LTR	0.85	35.2	D
		T	845					T	820				
		R	215					R	215				
	EB	L	95	DefL	0.80	64.9	E	L	115	DefL			
		T	270	LT				T	370	LT	0.71	32.3	C
				T	0.73	38.5	D			T			
	WB	T	785	TR	0.79	33.4	C	T	535	TR	0.56	26.1	C
		R	15					R	15				
	Overall					36.9	D					31.9	C

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Meeker Av WB & Metropolitan Av	SB	L	5	LTR	0.55	24.4	C	L	10	LTR	0.64	26.5	C
		T	530					T	625				
		R	115					R	120				
	EB	T	360	T	0.53	26.5	C	T	475	T	0.70	31.6	C
	WB	T	770	TR	0.80	33.9	C	T	525	TR	0.57	26.3	C
		R	45					R	30				
	Overall					29.1	C					27.7	C
Meeker Av EB & Union Av	NB	T	150	TR	1.04	107.8	F	T	145	TR	1.05	111.9	F
		R	145					R	185				
	SB	L	180	DefL	0.33	27.3	C	L	140	DefL	0.26	26.2	C
		T	335	T	0.41	16.6	B	T	320	T	0.40	16.3	B
	EB	L	170	LTR	1.05	81.7	F	L	120	LTR	1.02	72.6	E
		T	775					T	815				
		R	10					R	15				
	Overall					67.9	E					65.1	E
Meeker Av WB & Union Av/ BQE Exit	NB	L	165	DefL	0.98	109.3	F	L	20	DefL			
		T	155	LT				T	245	LT	0.70	52.7	D
				T	0.59	50.4	D			T			
	SB	T	175	TR	0.75	58.0	E	T	175	TR	0.73	56.4	E
		R	40					R	35				
Meeker Av	WB	L	165	LTR	0.36	7.7	A	L	165	LTR	0.22	6.6	A
		T	390					T	570				
		R	25					R	30				
	Overall					37.0	D					33.6	C
Meeker Av WB & Union Av/ BQE Exit	NB	L	165	DefL	1.00	114.3	F	L	20	DefL			
		T	155	LT				T	245	LT	0.70	52.7	D
				T	0.59	50.4	D			T			
	SB	T	175	TR	0.75	58.0	E	T	175	TR	0.73	56.4	E
		R	40					R	35				
BQE Exit	WB	L	175	LTR	0.24	6.7	A	L	120	LTR	0.48	8.9	A
		T	180					T	190				
		R	20					R	30				
	Overall					44.1	D					25.9	C
Meeker Av EB & Manhattan Av	NB	T	275	TR	1.04	90.5	F	T	225	TR	1.00	83.7	F
		R	80					R	85				
	EB	L	140	LT	0.43	8.6	A	L	105	LT	0.48	9.1	A
		T	560					T	725				
	Overall					34.8	C					29.1	C
Meeker Av WB & Manhattan Av	NB	L	90	LT	0.73	37.8	D	L	55	LT	0.54	32.5	C
		T	325					T	275				
	WB	T	305	TR	0.24	7.1	A	T	330	TR	0.27	7.3	A
		R	40					R	25				
	Overall					24.6	C					19.3	B
Meeker Av EB & McGuinness Blvd	SB	L	85	LT	0.99	84.2	F	L	15	LT	1.05	95.9	F
		T	405					T	470				
	EB	L	165	L	0.42	35.9	D	L	240	L	0.84	48.0	D
		T	360	LT				T	435	LT	0.16	26.3	C
				T	0.46	35.1	D			T			
	Overall					59.3	E					72.5	E
Meeker Av EB & McGuinness Blvd/ BQE Exit	SB	L	85	LT	0.99	84.2	F	L	15	LT	1.03	92.3	F
		T	405					T	470				
	EB	L	810	L	1.32	191.4	F	L	430	L	0.71	46.0	D
		T	180	LT	0.43	31.3	C	T	65	LT			
				T						T	0.58	37.8	D
	Overall					132.9	F					63.8	E
Humboldt St & Herbert St	SB	L	5	LT	1.04	97.2	F	L	15	LT	0.99	84.1	F
		T	400					T	470				
	EB	T	25	TR	0.12	25.8	C	T	25	TR	0.11	30.2	C
		R	5					R	10				
	Overall					91.8	F					79.2	E
Humboldt St & Herbert St/ BQE Exit	SB	L	5	LT	0.82	58.8	E	L	15	LT	0.99	84.1	F
		T	400					T	470				
	EB	T	10	TR	0.38	34.7	C	T	10	TR	0.13	25.9	C
		R	130					R	30				
	Overall					51.8	D					78.7	E

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (Continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
								en as AM ON HCS					
Meeker Av WB & McGuinness Blvd	NB	L	20	LT	0.72	19.1	B	L	10	LT	0.61	14.6	B
		T	955					T	660				
	SB	T	405	T	0.75	53.0	D	T	535	T	0.91	63.6	E
		R	105	R	0.51	49.0	D	R	80	R	0.37	45.2	D
	WB	L	85	L	0.41	35.9	D	L	90	L	0.28	33.1	C
		T	200	TR	0.74	41.7	D	T	410	TR	0.87	46.8	D
		R	415					R	345				
	Overall					34.5	C					34.1	C
McGuinness Blvd & Humboldt St	NB	L	5	LT	0.70	14.5	B	L	0	LT	0.40	9.3	A
		T	1045					T	745				
	SB	T	305	TR	0.76	15.5	B	T	330	TR	0.83	17.8	B
		R	675					R	705				
	WB	L	330	LTR	0.98	85.6	F	L	365	LTR	1.21	162.9	F
		T	20					T	35				
		R	5					R	5				
	Overall					23.5	C					34.4	C
Meeker Av EB & Kingsland Av	NB	T	340	TR	0.55	26.2	C	T	270	TR	0.37	23.3	C
		R	75					R	25				
	SB	L	20	LT	0.38	25.0	C	L	15	LT	0.39	24.6	C
		T	100					T	135				
	EB	L	180	L	0.28	12.0	B	L	150	L	0.30	12.3	B
		T	510	TR	0.57	15.4	B	T	280	TR	0.57	15.4	B
		R	165					R	310				
	Overall					19.1	B					18.0	B
Meeker Av WB & Kingsland Av	NB	L	125	LT	0.65	28.3	C	L	110	LT	0.52	25.7	C
		T	395					T	310				
	WB	L	120	LTR	0.43	13.2	B	L	150	LTR	0.46	13.6	B
		T	425					T	290				
		R	10					R	15				
	Overall					20.9	C					18.9	B
Meeker Av EB & Morgan Av	NB	T	375	TR	1.02	76.4	E	T	195	TR	0.69	32.8	C
		R	100					R	85				
	EB	L	30	LTR	0.43	13.1	B	L	45	LTR	0.28	11.5	B
		T	560					T	255				
		R	15					R	20				
	Overall					40.6	D					21.0	C
Meeker Av WB & Morgan Av	NB	L	165	LT	0.51	25.6	C	L	85	LT	0.29	22.2	C
		T	240					T	155				
	WB	L	0	LT	0.20	10.8	B	L	0	LT	0.36	12.3	B
		T	260	R	0.31	12.3	B	T	370	R	0.15	10.6	B
		R	180					R	90				
	Overall					18.4	B					15.2	B
Apollo St & Meeker Av	SB	T	190	TR	0.29	15.4	B	T	450	TR	0.45	17.3	B
		R	95					R	65				
	WB	L	305	LT	0.78	28.8	C	L	340	LT	0.70	25.0	C
		T	335					T	415				
	Overall					24.7	C					21.6	C
Maspeth Av & Morgan Av	NB	L	160	LTR	1.05	66.0	E	L	35	LTR	0.78	23.5	C
		T	330					T	280				
		R	40					R	30				
	SB	L	35	LTR	0.19	9.7	A	L	20	LTR	0.22	9.9	A
		T	95					T	180				
		R	40					R	35				
	EB	L	20	LTR	0.49	18.0	B	L	20	LTR	0.79	29.1	C
		T	125					T	195				
		R	50					R	120				
	WB	L	25	LTR	0.30	14.2	B	L	50	LTR	0.21	13.5	B
		T	185					T	100				
		R	50					R	15				
	Overall					37.3	D					20.5	C
Maspeth Av & Vandervoort Av	NB	L	150	LTR	0.78	18.1	B	L	60	LTR	0.56	12.7	B
		T	420					T	375				
		R	70					R	35				
	SB	L	30	LTR	0.48	11.5	B	L	40	LTR	0.59	12.8	B
		T	270					T	465				
		R	40					R	35				
	EB	L	50	LTR	0.28	15.4	B	L	25	LTR	0.39	16.6	B
		T	70					T	50				
		R	80					R	170				
	WB	L	50	DefL				L	65	DefL			
		T	70	LTR	0.26	15.3	B	T	70	LTR	0.26	15.3	B
		R	55	TR				R	30	TR			
	Overall					15.6	B					13.8	B

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (Continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Metropolitan Av & Kent Av	NB	L	0	L	0.00	5.7	A	L	5	L	0.01	5.7	A
		T	300	TR	0.48	10.1	B	T	550	TR	0.73	15.8	B
		R	55					R	25				
	EB	L	0	LT	0.11	27.6	C	L	0	LT	0.11	27.7	C
		T	10					T	10				
	WB	T	5	TR	0.45	37.2	D	T	10	TR	0.58	43.2	D
		R	40					R	50				
	Overall					14.9	B					19.5	B
Metropolitan Av & Marcy Av	EB	T	360	TR	0.88	46.6	D	T	475	TR	1.00	68.5	E
		R	195					R	180				
	WB	L	895	L	0.91	25.8	C	L	795	L	0.85	21.9	C
		T	405	T	0.47	6.9	A	T	355	T	0.41	6.2	A
	Overall					27.3	C					35.0	C
Metropolitan Av & Union Av	NB	L	100	LTR	0.83	56.6	E	L	10	LTR	0.86	58.4	E
		T	180					T	285				
		R	30					R	45				
	SB	L	30	LTR	0.87	59.9	E	L	55	LTR	0.86	58.4	E
		T	265					T	240				
		R	50					R	40				
	EB	L	80	LTR	1.04	70.7	E	L	10	LTR	1.05	71.2	E
		T	355					T	515				
		R	50					R	60				
	WB	L	20	LTR	0.95	41.1	D	L	30	LTR	0.75	21.1	C
		T	650					T	500				
		R	35					R	35				
	Overall					55.1	E					50.0	D
Metropolitan Av & Lorimer St	NB	L	70	LTR	0.54	49.1	D	L	40	LTR	1.05	109.2	F
		T	190					T	180				
		R	35					R	40				
	SB	L	20	LTR	1.03	103.5	F	L	20	LTR	1.05	107.7	F
		T	110					T	155				
		R	15					R	15				
	EB	L	15	LTR	0.87	30.2	C	L	25	LTR	1.04	64.1	E
		T	375					T	545				
		R	25					R	45				
	WB	L	15	LTR	0.75	16.2	B	L	30	LTR	0.69	13.7	B
		T	620					T	510				
		R	35					R	5				
	Overall					40.7	D					63.0	E
Metropolitan Av & Manhattan Av	NB	L	55	LTR	0.87	61.6	E	L	40	LTR	1.05	115.2	F
		T	215					T	225				
		R	30					R	35				
	EB	L	65	LT	1.00	63.4	E	L	35	LT	0.93	33.9	C
		T	365					T	570				
	WB	T	615	TR	1.01	56.3	E	T	505	TR	0.60	11.6	B
		R	115					R	60				
	Overall					59.4	E					40.9	D
Metropolitan Av & Graham Av	NB	L	25	LTR	0.96	82.3	F	L	5	LTR	0.97	83.7	F
		T	235					T	240				
		R	35					R	60				
	SB	L	30	LTR	0.77	55.3	E	L	45	LTR	0.95	78.0	E
		T	165					T	235				
		R	45					R	25				
	EB	L	25	LTR	0.80	28.3	C	L	25	LTR	1.05	71.4	E
		T	345					T	510				
		R	25					R	70				
	WB	L	25	LTR	1.05	69.4	E	L	25	LTR	0.92	36.8	D
		T	660					T	535				
		R	65					R	90				
	Overall					60.0	E					62.0	E
Metropolitan Av & Humboldt St	SB	L	115	LTR	0.73	40.1	D	L	165	LTR	0.94	60.9	E
		T	185					T	285				
		R	20					R	20				
	EB	L	25	LTR	0.82	33.8	C	L	25	LTR	1.00	62.2	E
		T	365					T	555				
		R	20					R	35				
	WB	L	30	LTR	1.00	59.5	E	L	30	LTR	0.84	32.6	C
		T	730					T	630				
		R	0					R	0				
	Overall					47.5	D					51.0	D

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (Continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Metropolitan Av & Bushwick Av	NB	L	60	LTR	1.05	87.9	F	L	105	LTR	0.83	46.3	D
		T	490					T	280				
		R	25					R	40				
	SB	L	30	LTR	0.28	26.8	C	L	25	LTR	0.48	30.1	C
		T	200					T	420				
		R	30					R	35				
	EB	L	5	LTR	0.50	19.0	B	L	5	LTR	0.60	21.0	C
		T	380					T	515				
		R	50					R	105				
	WB	L	20	LTR	0.59	20.2	C	L	15	LTR	0.45	17.7	B
		T	670					T	520				
		R	60					R	35				
	Overall					39.4	D					27.6	C
Metropolitan Av & Morgan Av	NB	L	75	LTR	0.90	58.7	E	L	30	LTR	0.60	38.4	D
		T	355					T	255				
		R	10					R	5				
	SB	L	15	LTR	0.40	33.0	C	L	40	LTR	0.78	46.9	D
		T	135					T	285				
		R	20					R	25				
	EB	L	20	LTR	0.76	26.4	C	L	30	LTR	0.74	24.7	C
		T	295					T	345				
		R	120					R	95				
	WB	L	5	LTR	1.00	55.7	E	L	15	LTR	0.52	17.2	B
		T	655					T	345				
		R	155					R	60				
	Overall					46.8	D					30.4	C
Metropolitan Av & Vandervoort Av	NB	L	20	LT	0.17	28.7	C	L	10	LT	0.10	27.7	C
		T	100					T	55				
	SB	T	340	TR	0.50	33.8	C	T	670	TR	0.81	43.7	D
		R	60					R	30				
	EB	L	55	LR	1.00	67.7	E	L	35	LR	1.03	76.1	E
		R	265					R	355				
	WB	L	10	LTR	0.78	22.8	C	L	10	LTR	0.49	15.6	B
		T	735					T	380				
		R	485					R	360				
	Overall					33.5	C					39.4	D
Metropolitan Av & Stewart Av	NB	L	270	LTR	0.94	67.3	E	L	60	LTR	0.63	39.5	D
		T	60					T	115				
		R	20					R	45				
	SB	L	15	LTR	0.21	29.6	C	L	10	LTR	0.15	28.7	C
		T	25					T	25				
		R	30					R	15				
	EB	L	85	L	0.93	95.0	F	L	120	L	0.96	89.7	F
		T	505	TR	0.65	20.6	C	T	1135	TR	1.05	65.0	E
		R	25					R	20				
	WB	L	15	L	0.09	11.4	B	L	10	L	0.14	13.3	B
		T	1485	TR	1.01	50.9	D	T	1010	TR	0.77	22.3	C
		R	10					R	10				
	Overall					48.0	D					44.0	D
Metropolitan Av & Gardner Av	NB	L	45	LTR	0.30	31.2	C	L	20	LTR	0.32	31.4	C
		T	35					T	65				
		R	20					R	20				
	SB	L	45	LTR	0.72	43.7	D	L	35	LTR	0.50	35.4	D
		T	90					T	80				
		R	90					R	45				
	EB	L	100	L	0.97	101.6	F	L	175	L	1.00	89.6	F
		T	420	TR	0.81	31.3	C	T	1005	TR	1.05	67.4	E
		R	20					R	10				
	WB	L	30	LTR	1.00	46.9	D	L	15	LTR	0.79	23.1	C
		T	1375					T	965				
		R	30					R	35				
	Overall					45.0	D					45.4	D
Grand Av & Keap St/ Borinquen Pl	NB	L	20	LTR	0.36	26.4	C	L	10	LTR	0.38	26.6	C
		T	15					T	30				
		R	70					R	75				
	EB	L	10	L	0.08	16.5	B	L	15	L	0.14	17.8	B
		T	150	T	0.29	18.7	B	T	425	T	0.80	35.5	D
	WB	T	460	TR	0.90	45.8	D	T	525	TR	0.99	64.1	E
		R	5					R	10				
	Overall					36.5	D					47.4	D

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (Continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Grand Av & Union Av	NB	L	55	LTR	0.89	57.8	E	L	40	LTR	0.55	35.4	D
		T	245					T	160				
		R	35					R	30				
	SB	L	35	LTR	0.72	42.1	D	L	50	LTR	0.75	43.4	D
		T	190					T	235				
		R	65					R	65				
	EB	L	10	LTR	0.46	18.1	B	L	25	LTR	0.98	54.4	D
		T	215					T	510				
		R	15					R	25				
	WB	L	15	LTR	0.81	32.1	C	L	30	LTR	1.00	61.5	E
		T	395					T	460				
		R	30					R	15				
	Overall					38.5	D					52.3	D
Grand Av & Lorimer St	NB	L	35	LTR	0.84	51.9	D	L	50	LTR	0.88	56.9	E
		T	255					T	185				
		R	50					R	50				
	SB	L	20	LTR	0.48	33.0	C	L	25	LTR	0.68	39.7	D
		T	160					T	220				
		R	20					R	35				
	EB	L	15	LTR	0.64	24.1	C	L	45	LTR	1.05	76.1	E
		T	250					T	480				
		R	20					R	65				
	WB	L	20	LTR	0.76	28.8	C	L	30	LTR	0.95	50.2	D
		T	385					T	420				
		R	35					R	35				
	Overall					34.5	C					58.3	E
Grand Av & Manhattan Av	NB	L	55	LTR	0.84	51.2	D	L	55	LTR	0.89	58.7	E
		T	240					T	185				
		R	40					R	70				
	EB	L	20	LT	0.60	22.1	C	L	30	LT	0.87	39.3	D
		T	315					T	425				
	WB	T	350	TR	0.68	24.7	C	T	390	TR	0.71	25.6	C
		R	30					R	25				
	Overall					32.9	C					40.4	D
Grand Av & Graham Av	NB	L	35	LTR	0.80	49.1	D	L	30	LTR	0.72	43.2	D
		T	190					T	155				
		R	60					R	60				
	SB	L	45	LTR	0.63	37.4	D	L	45	LTR	0.78	44.8	D
		T	190					T	255				
		R	40					R	30				
	EB	L	20	LTR	0.78	32.1	C	L	55	LTR	1.04	74.8	E
		T	245					T	385				
		R	90					R	60				
	WB	L	40	LTR	0.81	32.8	C	L	55	LTR	1.00	62.9	E
		T	305					T	355				
		R	65					R	85				
	Overall					37.1	D					59.3	E
Grand Av & Humboldt St	SB	L	45	LTR	0.81	47.4	D	L	50	LTR	0.87	54.0	D
		T	155					T	280				
		R	20					R	40				
	EB	T	295	TR	0.90	43.8	D	T	435	TR	0.85	36.1	D
		R	55					R	55				
	WB	L	20	LT	0.80	31.1	C	L	20	LT	0.77	28.5	C
		T	390					T	455				
	Overall					40.2	D					38.9	D
Grand Av & Bushwick Av	NB	L	85	LTR	0.45	17.7	B	L	135	DefL	0.70	36.5	D
		T	370					T	275	TR	0.56	21.3	C
		R	90					R	50				
	SB	L	45	LTR	0.59	23.1	C	L	115	LTR	0.70	24.7	C
		T	215					T	465				
		R	30					R	10				
	EB	L	20	LTR	1.03	92.7	F	L	20	LTR	1.05	92.9	F
		T	265					T	380				
		R	55					R	85				
	WB	L	40	LTR	1.05	94.2	F	L	55	LTR	1.05	95.4	F
		T	295					T	330				
		R	60					R	20				
	Overall					53.7	D					55.3	E

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (Continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Grand Av & Waterbury St/ Olive St	NB	L	55	LTR	0.94	66.3	E	L	40	LTR	0.61	37.2	D
		T	105					T	110				
		R	100					R	75				
	EB	L	15	LTR	0.87	39.4	D	L	20	LTR	1.03	69.9	E
		T	325					T	500				
		R	60					R	25				
	WB	L	25	LTR	0.78	29.4	C	L	50	LTR	0.81	31.8	C
		T	340					T	365				
		R	40					R	40				
	Overall					44.1	D					49.2	D
Grand Av & Vandervoort Av	SB	L	545	L	0.67	28.4	C	L	955	L	1.04	69.8	E
		T	5	R	0.29	22.0	C	T	0	R	0.18	20.1	C
		R	65					R	80				
	EB	L	65	LT	0.99	79.3	E	L	40	LT	1.03	77.1	E
		T	255					T	555				
	WB	T	560	TR	1.02	73.0	E	T	430	TR	0.84	42.7	D
		R	55					R	25				
	Overall					52.7	D					64.6	E
Flushing Av & Bushwick Av	NB	L	45	LTR	0.98	54.7	D	L	0	LTR	0.98	66.1	E
		T	830					T	365				
		R	85					R	120				
	SB	L	45	LTR	0.99	74.8	E	L	60	LTR	0.64	28.8	C
		T	290					T	640				
		R	45					R	40				
	EB	L	65	LTR	1.05	93.9	F	L	30	LTR	1.05	90.5	F
		T	275					T	365				
		R	50					R	90				
	WB	L	90	LTR	1.05	86.0	F	L	115	LTR	1.05	92.0	F
		T	350					T	300				
		R	55					R	50				
	Overall					71.1	E					64.3	E
Flushing Av & Morgan Av	NB	L	45	LTR	0.59	27.2	C	L	40	LTR	0.51	25.4	C
		T	305					T	305				
		R	70					R	95				
	SB	L	160	LTR	0.94	53.3	D	L	80	LTR	0.95	56.9	E
		T	325					T	325				
		R	15					R	10				
	EB	L	25	LTR	0.51	16.7	B	L	25	LTR	0.97	52.9	D
		T	135					T	320				
		R	25					R	65				
	WB	L	140	LTR	0.89	35.5	D	L	180	LTR	1.02	60.5	E
		T	290					T	295				
		R	55					R	65				
	Overall					36.1	D					50.0	D
Flushing Av & Knickerbocker Av	NB	L	115	L	0.46	24.8	C	L	125	L	0.35	21.5	C
		T	395	TR	1.05	84.1	F	T	310	TR	0.93	53.7	D
		R	85					R	65				
	EB	L	40	LT	0.83	33.5	C	L	15	LT	0.94	46.8	D
		T	325					T	480				
	WB	T	370	T	0.74	25.4	C	T	415	T	0.76	26.7	C
		R	20	R	0.06	11.8	B	R	30	R	0.07	11.9	B
	Overall					45.8	D					39.5	D
Union Av & Ainslie St	NB	T	260	TR	0.63	16.0	B	T	295	TR	0.55	14.1	B
		R	105					R	45				
	SB	L	25	LT	0.33	10.7	B	L	30	LT	0.46	12.3	B
		T	180					T	270				
	EB	L	15	LTR	0.98	68.1	E	L	30	LTR	0.93	56.6	E
		T	150					T	135				
		R	65					R	50				
	Overall					29.9	C					24.8	C

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (Continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Union Av & Montrose Av/ S 5th St	NB	L	5	LTR	0.63	29.7	C	L	5	LTR	1.03	74.9	E
		T	285					T	330				
		R	45					R	70				
	SB	L	45	LTR	0.71	32.2	C	L	65	LTR	0.72	32.6	C
		T	250					T	360				
		R	50					R	45				
S 5th St	EB	L	30	LTR	0.41	23.5	C	L	25	LTR	0.74	34.3	C
		T	185					T	310				
		R	25					R	50				
	Overall					29.3	C					50.0	D
Union Av & Montrose Av/ S 5th St	NB	L	5	LTR	0.67	32.0	C	L	5	LTR	0.85	44.2	D
		T	285					T	330				
		R	45					R	70				
	SB	L	45	LTR	0.71	32.2	C	L	65	LTR	0.72	32.6	C
		T	250					T	360				
		R	50					R	45				
Montrose Av	EB	L	10	LTR	0.14	19.3	B	L	30	LTR	0.34	22.3	C
		T	45					T	170				
		R	0					R	5				
	Overall					30.8	C					34.9	C
Manhattan Av & Green St	NB	T	140	TR	0.45	14.7	B	T	135	TR	0.36	13.1	B
		R	90					R	60				
	SB	L	60	LT	0.68	22.3	C	L	65	LT	0.71	22.6	C
		T	185					T	225				
	EB	L	35	LTR	0.98	78.6	E	L	10	LTR	0.74	41.9	D
		T	135					T	125				
		R	45					R	25				
	Overall					37.1	D					24.5	C
Manhattan Av & Norman Av	NB	L	35	LTR	0.77	24.4	C	L	40	LTR	0.57	17.0	B
		T	245					T	150				
		R	35					R	70				
	SB	L	140	LTR	1.05	76.7	E	L	55	LTR	0.90	40.9	D
		T	185					T	265				
		R	55					R	40				
	EB	L	25	LTR	0.66	36.5	D	L	15	LTR	0.53	30.5	C
		T	65					T	75				
		R	15					R	15				
	WB	L	35	LTR	1.02	77.9	E	L	20	LTR	0.81	41.2	D
		T	305					T	265				
		R	55					R	45				
	Overall					55.8	E					33.0	C
Manhattan Av & Nassau Av	NB	T	195	TR	0.37	18.2	B	T	140	TR	0.33	17.7	B
		R	20					R	20				
	SB	L	35	LT	0.58	23.5	C	L	45	LT	0.68	25.9	C
		T	210					T	280				
	EB	L	15	LTR	1.00	71.2	E	L	10	LTR	1.01	69.0	E
		T	240					T	310				
		R	35					R	65				
	WB	L	5	LR	0.11	15.2	B	L	10	LR	0.09	15.0	B
		R	15					R	10				
	Overall					41.4	D					42.8	D
Manhattan Av & Montrose Av	NB	T	340	TR	1.05	72.8	E	T	320	TR	0.82	30.5	C
		R	85					R	65				
	EB	L	55	LT	0.35	10.9	B	L	60	LT	0.53	12.6	B
		T	355					T	635				
	Overall					43.5	D					19.0	B
Leonard St & Maujer St	SB	T	205	TR	0.59	22.5	C	T	305	TR	0.58	22.2	C
		R	25					R	20				
	WB	L	105	LT	0.24	8.5	A	L	55	LT	0.26	8.6	A
		T	145					T	100				
	Overall					15.5	B					15.1	B
Leonard St & Montrose Av	SB	L	60	LT	0.50	15.4	B	L	80	LT	0.60	17.3	B
		T	165					T	230				
	EB	T	350	TR	0.37	10.7	B	T	615	TR	0.54	12.3	B
		R	40					R	50				
	Overall					12.5	B					13.9	B

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (Continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
McGuinness Blvd & Green St	NB	T	1195	TR	0.89	30.2	C	T	920	TR	0.70	20.2	C
		R	25					R	25				
	SB	L	85	L	0.85	72.0	E	L	100	L	0.62	30.5	C
		T	1100	T	0.87	28.5	C	T	1355	T	1.05	61.9	E
	EB	L	205	LTR	0.81	52.0	D	L	175	LTR	0.73	45.6	D
		T	30					T	30				
		R	50					R	45				
	Overall					33.3	C					44.2	D
McGuinness Blvd & Norman Av	NB	L	30	L	0.50	29.0	C	L	5	L	0.16	17.0	B
		T	1215	TR	0.89	30.8	C	T	930	TR	0.73	21.7	C
		R	30					R	55				
	SB	L	50	L	0.65	43.7	D	L	40	L	0.32	18.1	B
		T	1120	TR	0.87	28.6	C	T	1455	TR	1.04	60.9	E
		R	55					R	45				
	EB	L	65	LTR	0.59	43.8	D	L	60	LTR	0.81	56.7	E
		T	70					T	140				
		R	50					R	60				
	WB	L	55	LTR	0.65	46.1	D	L	50	LTR	0.64	45.4	D
		T	95					T	105				
		R	55					R	45				
	Overall					32.2	C					45.5	D
McGuinness Blvd & Driggs Av	NB	L	25	L	0.34	19.5	B	L	5	L	0.14	15.5	B
		T	1060	T	0.84	27.5	C	T	780	T	0.62	19.0	B
	SB	T	980	TR	0.75	22.6	C	T	1245	TR	1.00	48.5	D
		R	40					R	120				
	WB	L	35	LTR	1.05	104.6	F	L	45	LTR	0.56	40.0	D
		T	235					T	190				
		R	85					R	75				
	Overall					35.8	D					37.9	D
Humboldt St & Norman Av	SB	L	80	LTR	0.78	26.2	C	L	60	LTR	0.90	36.2	D
		T	325					T	270				
		R	45					R	90				
	EB	L	15	LTR	0.36	14.1	B	L	10	LTR	0.54	17.7	B
		T	95					T	140				
		R	25					R	60				
	WB	L	40	LTR	0.58	18.8	B	L	25	LTR	0.46	16.0	B
		T	125					T	110				
		R	35					R	25				
	Overall					21.5	C					26.8	C
Bushwick Av & Montrose Av	NB	T	620	TR	1.00	54.6	D	T	390	TR	0.61	17.0	B
		R	30					R	10				
	SB	L	20	LT	0.48	13.8	B	L	15	LT	0.88	29.5	C
		T	340					T	765				
	EB	L	30	LTR	0.63	44.9	D	L	35	LTR	1.02	91.4	F
		T	35					T	55				
		R	115					R	295				
	WB	L	10	LR	0.22	34.2	C	L	10	LR	0.23	34.9	C
		R	15					R	10				
	Overall					39.5	D					41.0	D
Bushwick Av & Johnson Av	NB	L	110	LTR	1.04	64.3	E	L	50	LTR	0.85	32.4	C
		T	615					T	360				
		R	30					R	20				
	SB	L	85	LTR	0.55	15.1	B	L	190	LTR	1.05	64.7	E
		T	350					T	850				
		R	30					R	30				
	WB	L	50	LTR	0.98	84.6	F	L	25	LTR	1.00	90.5	F
		T	240					T	245				
		R	35					R	40				
	Overall					53.4	D					61.2	E
Kent Av & N 6th St	NB	L	15	L	0.03	5.9	A	L	25	L	0.05	6.0	A
		T	330	T	0.39	8.8	A	T	505	T	0.58	11.6	B
	EB	L	15	L	0.14	28.3	C	L	20	L	0.20	29.9	C
	WB	T	30	TR	0.28	29.9	C	T	40	TR	0.39	32.3	C
		R	45					R	65				
	Overall					13.0	B					15.2	B

Table 4-2: Traffic Capacity Analysis for Signalized Intersections - 2016 Existing Conditions (Continued)

Intersection	Approach	EXISTING : Weekday AM						EXISTING : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Kent Av & N 7th St	NB	L	10	L	0.02	5.8	A	L	10	L	0.02	5.8	A
		T	330	TR	0.48	10.0	A	T	500	TR	0.75	16.7	B
		R	50					R	80				
	EB	L	15	LT	0.35	32.8	C	L	20	LT	0.39	33.8	C
		T	30					T	30				
	Overall					13.0	B					18.2	B
Kent Av & N 14th St	NB	T	470	TR	0.83	22.7	C	T	610	TR	0.98	43.4	D
		R	50					R	45				
	SB	L	260	L	0.90	43.9	D	L	385	L	1.00	59.2	E
	WB	R	25	R	0.12	15.3	B	R	15	R	0.07	14.8	B
	Overall					29.1	C					48.3	D
Rodney St & S 4th St	NB	L	30	LT	0.46	11.5	B	L	10	LT	0.61	14.3	B
		T	200					T	340				
	WB	T	170	TR	0.95	58.1	E	T	145	TR	0.91	52.0	D
		R	75					R	80				
	Overall					34.8	C					29.7	C

Figure 4-7: Existing Intersection LOS D, E or F –AM Peak

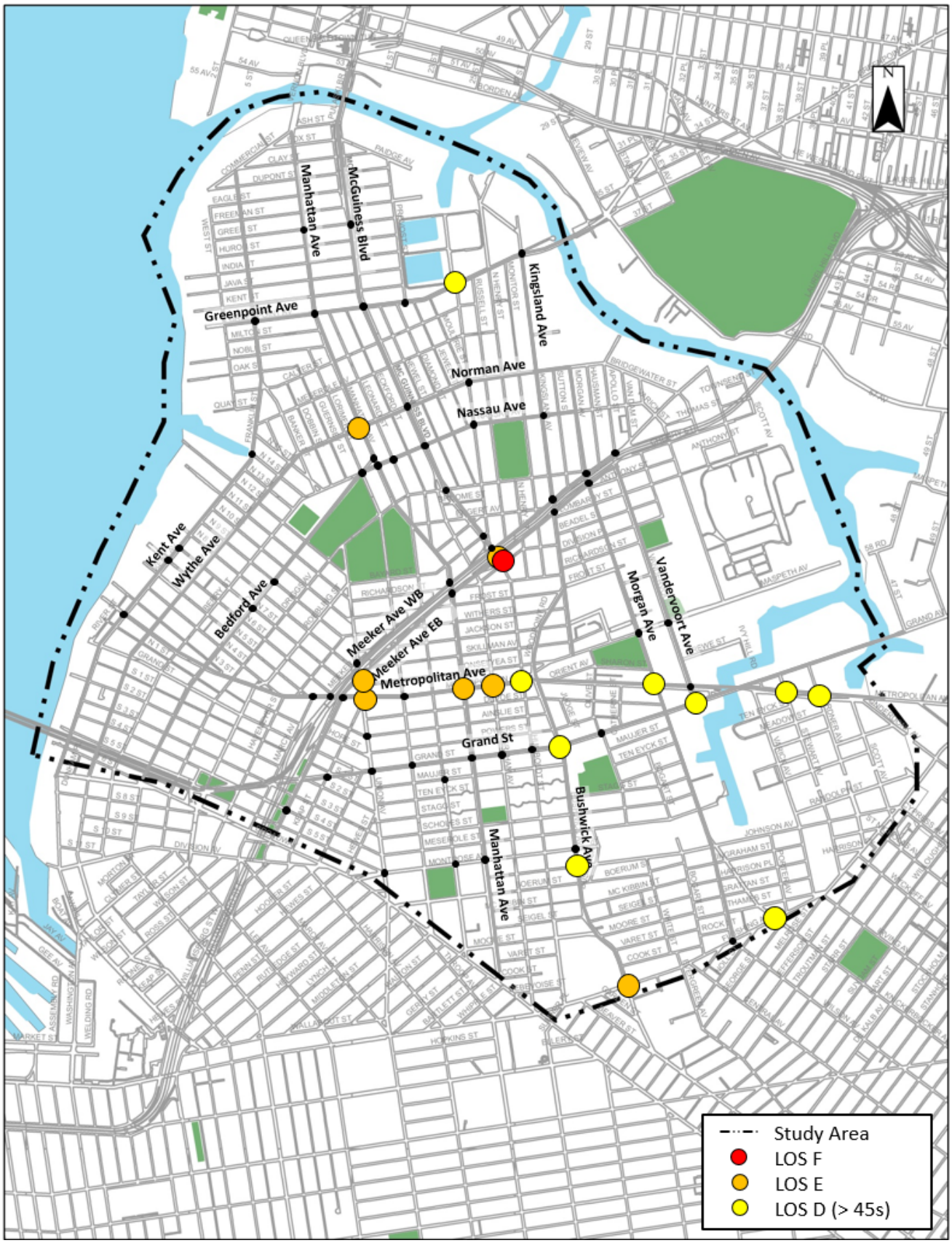


Figure 4-8: Existing Intersection LOS D, E or F –PM Peak

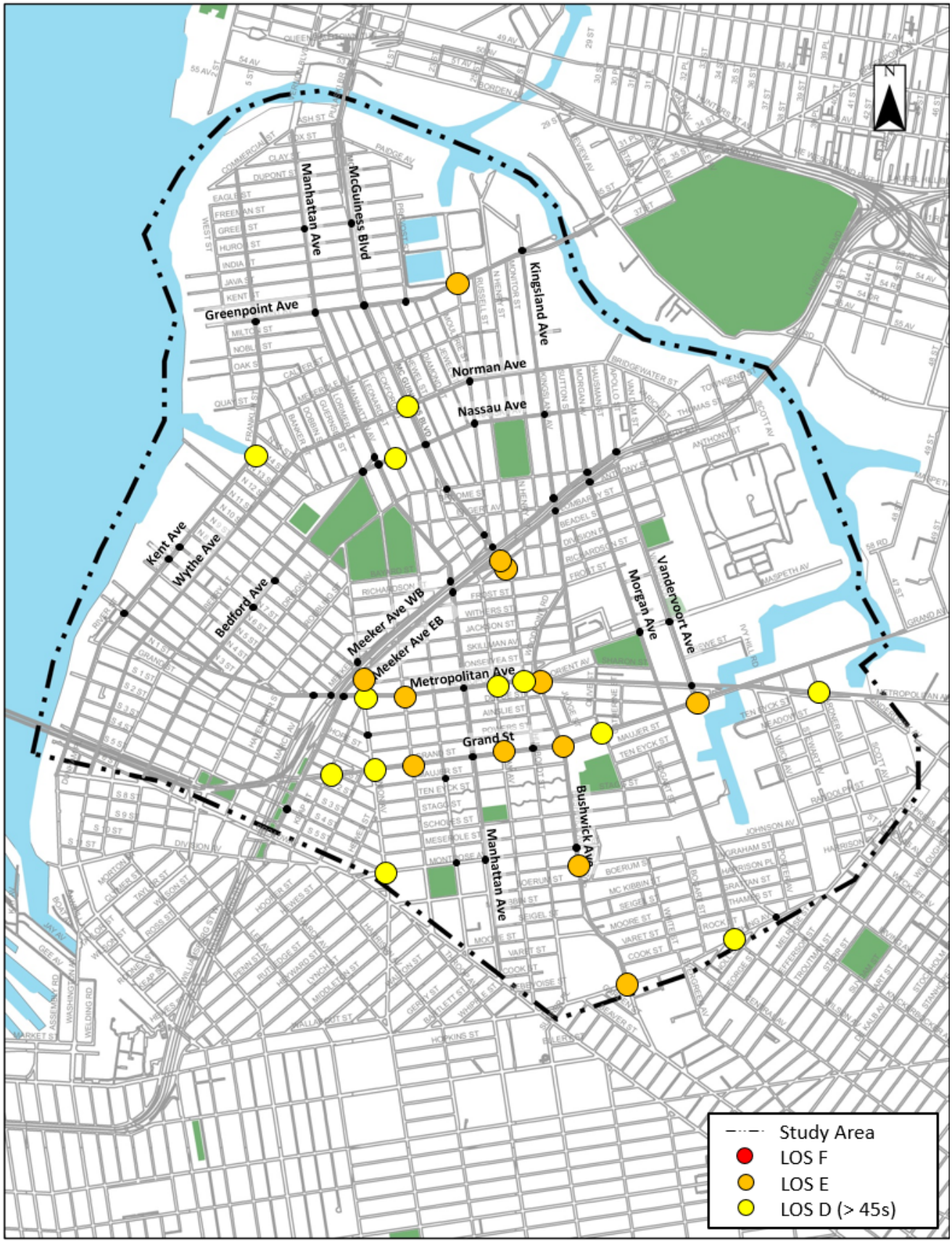


Figure 4-9: Existing Intersection Lane Group with LOS D, E or F –AM Peak

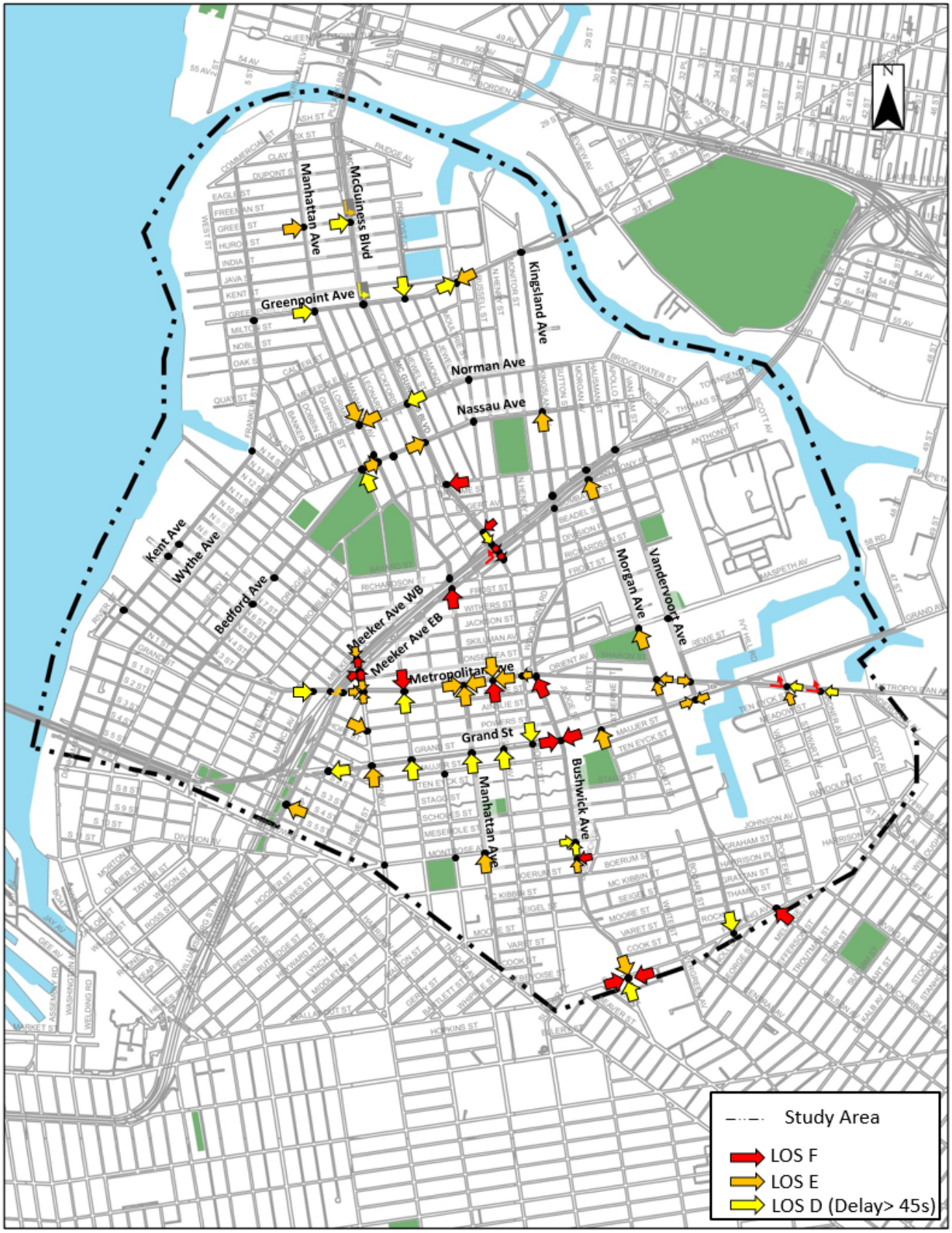
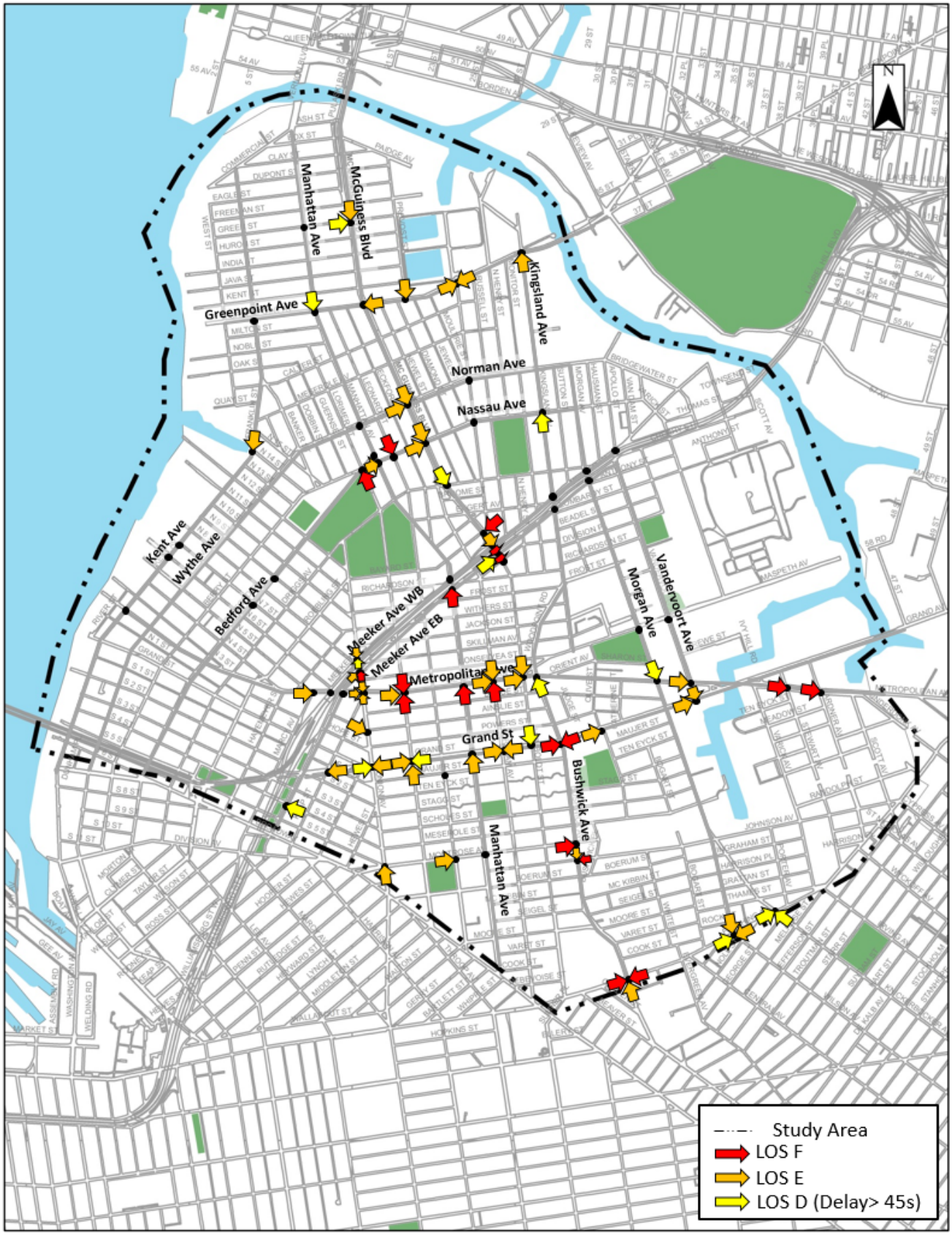


Figure 4-10: Existing Intersection Lane Group with LOS E or F – PM Peak



4.5 Vehicular Speeds

Many study area corridors experience slow travel speeds due to congestion and limited roadway capacity. This is evident along several commercial corridors during the peak hours. The conditions can be attributed to several factors such as a high percentage of buses, school buses and trucks in the traffic stream as well as illegal and double parked vehicles.

To measure peak hour travel time and vehicular speeds and to identify locations where traffic delay exists, speed and travel time runs were conducted along the corridors listed below. The "floating car" method (a technique whereby a field vehicle travels at speeds under prevailing traffic conditions) was used to measure travel time and speed. INRIX now provides average travel speed along many NYC corridors but INRIX speed data was unavailable at the time of this analysis.

East-West

1. Grand Street from Meeker Avenue to Gardner Avenue (EB & WB)
2. Greenpoint Avenue from Review Avenue to West Street (EB & WB)
3. Meeker Avenue from Metropolitan Avenue to Varick Avenue (EB & WB)
4. Metropolitan Avenue from Kent Avenue to Onderdonk Avenue (EB & WB)
5. Norman Avenue from Kingsland Avenue to Banker Street (EB & WB)

North-South

1. Bushwick Avenue from Metropolitan Avenue to Flushing Avenue (NB & SB)
2. Franklin Street from Commercial Street to N 14th Street (NB & SB)
3. Kent Avenue from Broadway to N 14th Street (NB)
4. Kingsland Avenue from Greenpoint Avenue to Metropolitan Avenue (NB & SB)
5. Manhattan Avenue from Ash Street to Broadway (NB & SB)

6. McGuinness Boulevard from Borden Avenue to Meeker Avenue (NB & SB)
7. Morgan Avenue from Meeker Avenue to Flushing Avenue (NB & SB)
8. Vandervoort Avenue from Meeker Avenue to Metropolitan Avenue (NB & SB)
9. Wythe Avenue from Banker Street to Broadway (SB)

The travel time runs were conducted for each peak period for one weekday concurrently with traffic volume data collection. Three travel runs were conducted for each corridor during each peak period. Figures 4-11 and 4-12 show the travel time run corridors with average travel speed by direction for the peak hours. Table 4-3 provides a summary of the travel speeds.

Average travel speed throughout the study area ranged from 6 mph to 15 mph, and from 4 mph to 14 mph during the AM and PM peak hour respectively. Average speed across all corridors was 10 mph and 9 mph in the AM and PM peak hours respectively. The slowest speeds were observed along Grand Street (WB) and Morgan Avenue (NB) in the AM and along Greenpoint Avenue (EB) and Meeker Avenue (EB) in the PM.

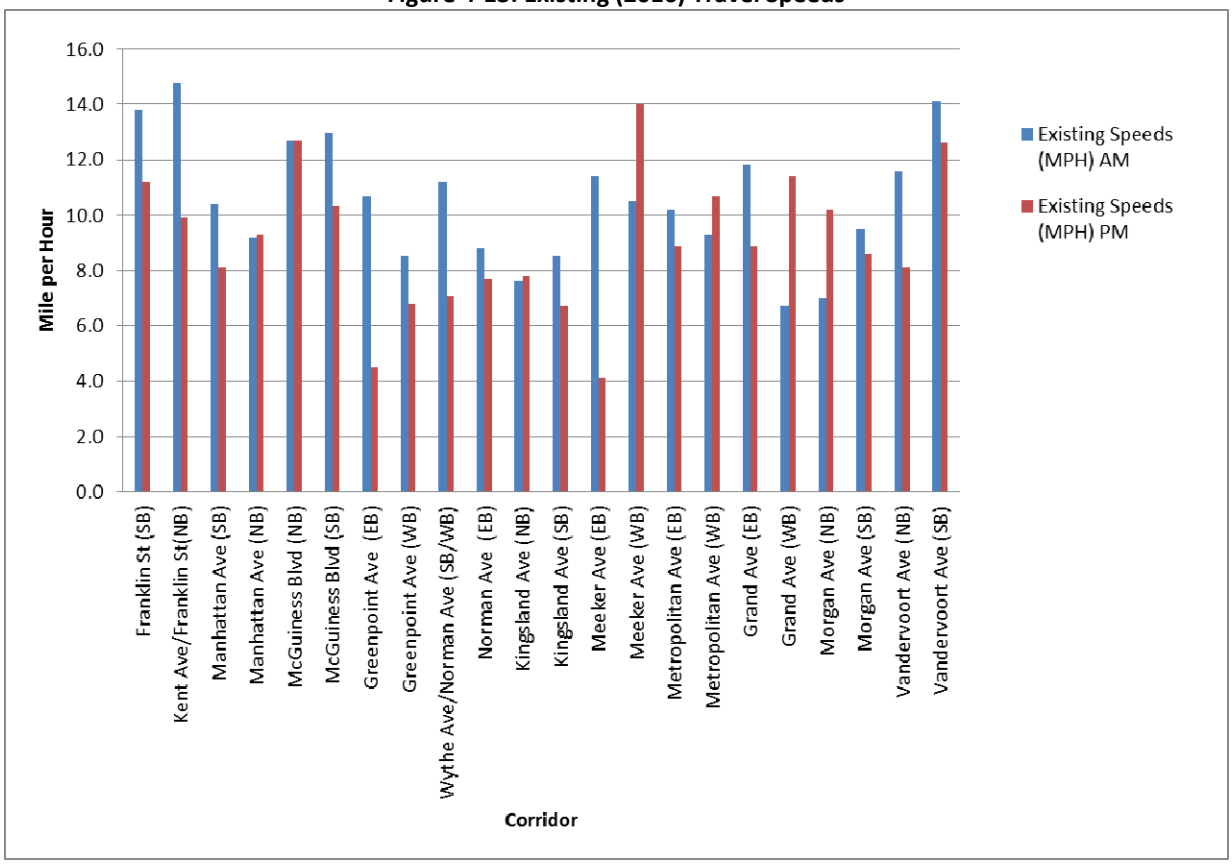
Figure 4-11: Existing Corridor Travel Speed (mph) –AM peak

Figure 4-12: Existing Corridor Travel Speed (mph) –PM peak

Table 4-3: Existing Travel Speeds Summary - AM Peak

Corridor	Direction	Between	Existing Speeds (MPH)	
			AM	PM
Franklin St (SB)	SB	Commercial St and N 14th St	13.8	11.2
Kent Ave/Franklin St(NB)	NB	Broadway and Commercial St	14.8	9.9
Manhattan Ave (SB)	SB	Commercial St and Leonard Ave	10.4	8.1
Manhattan Ave (NB)	NB	Broadway and Commercial St	9.2	9.3
McGuiness Blvd (NB)	NB	Meeker Ave WB and Jackson Ave	12.7	12.7
McGuiness Blvd (SB)	SB	Jackson Ave and Meeker Ave WB	13.0	10.3
Greenpoint Ave (EB)	EB	Manhattan Ave and Review Ave	10.7	4.5
Greenpoint Ave (WB)	WB	Review Ave and Franklin St	8.5	6.8
Wythe Ave/Norman Ave (SB/WB)	SB/WB	Kingsland Ave and Broadway	11.2	7.1
Norman Ave (EB)	EB	Banker St and Kingsland Ave	8.8	7.7
Kingsland Ave (NB)	NB	Metropolitan Ave and Greenpoint Ave	7.6	7.8
Kingsland Ave (SB)	SB	Meeker Ave and Metropolitan Ave	8.5	6.7
Meeker Ave (EB)	EB	Union Ave and Vandervoort Ave	11.4	4.1
Meeker Ave (WB)	WB	Vandervoort Ave and Union Ave	10.5	14.0
Metropolitan Ave (EB)	EB	Kent Ave and Scot Ave	10.2	8.9
Metropolitan Ave (WB)	WB	Scot Ave and Kent Ave	9.3	10.7
Grand Ave (EB)	EB	Rodney St to Gardner Ave	11.8	8.9
Grand Ave (WB)	WB	Gardner Ave to Rodney St	6.7	11.4
Morgan Ave (NB)	NB	Flushing Ave to Meeker Ave EB	7.0	10.2
Morgan Ave (SB)	SB	Meeker Ave EB to Flushing Ave	9.5	8.6
Vandervoort Ave (NB)	NB	Metropolitan Ave and Meeker Ave EB	11.6	8.1
Vandervoort Ave (SB)	SB	Meeker Ave EB to Metropolitan Ave	14.1	12.6
Average			**10.5**	**9.1**

Figure 4-13: Existing (2016) Travel Speeds



4.6 2026 Future Traffic Conditions

To establish the 2026 future traffic volumes, a background growth rate of 0.5% per year for the first five years and 0.25% per year for the next five years (0.38 percent per year over ten years) was applied to the existing traffic volume plus trips from known future developments.

Two significant developments that will generate additional trips are the Domino Sugar Factory site and the Greenpoint Landing development. The Domino site is expected to add more than 2,800 residential units and 700,000 sq. ft. of commercial space on Kent Ave between South 5th St and Grand St with a potential 2020 build year. The Greenpoint Landing development is expected to add 5,500 residential units to the area between Green Street and Clay Street west of West Street.

Figures 4-14 through and 4-17 show the 2026 future traffic network volume during the AM and PM peak hours. The future conditions and level of service (LOS) analysis were performed using the 2000 Highway Capacity Manual (HCM) methodology similar to the existing conditions. The analysis shows an additional eight intersections will deteriorate from LOS D to LOS E or F as listed below. Table 4-5 shows the volume/capacity ratios, delays and LOS for the signalized intersections during the AM and PM peak periods.

1. Greenpoint Avenue @ Manhattan Avenue
2. Greenpoint Avenue @ McGuinness Boulevard
3. Greenpoint Avenue @ Provost Street
4. Grand Avenue @ Lorimer Street
5. Flushing Avenue @ Morgan Avenue
6. McGuinness Boulevard @ Green Street
7. McGuinness Boulevard @ Norman Avenue
8. Humboldt Street @ Norman Avenue
9. Bushwick Avenue @ Montrose Avenue

Figure 4-14: Future (2026) Traffic Volumes –AM Peak (Part 1)

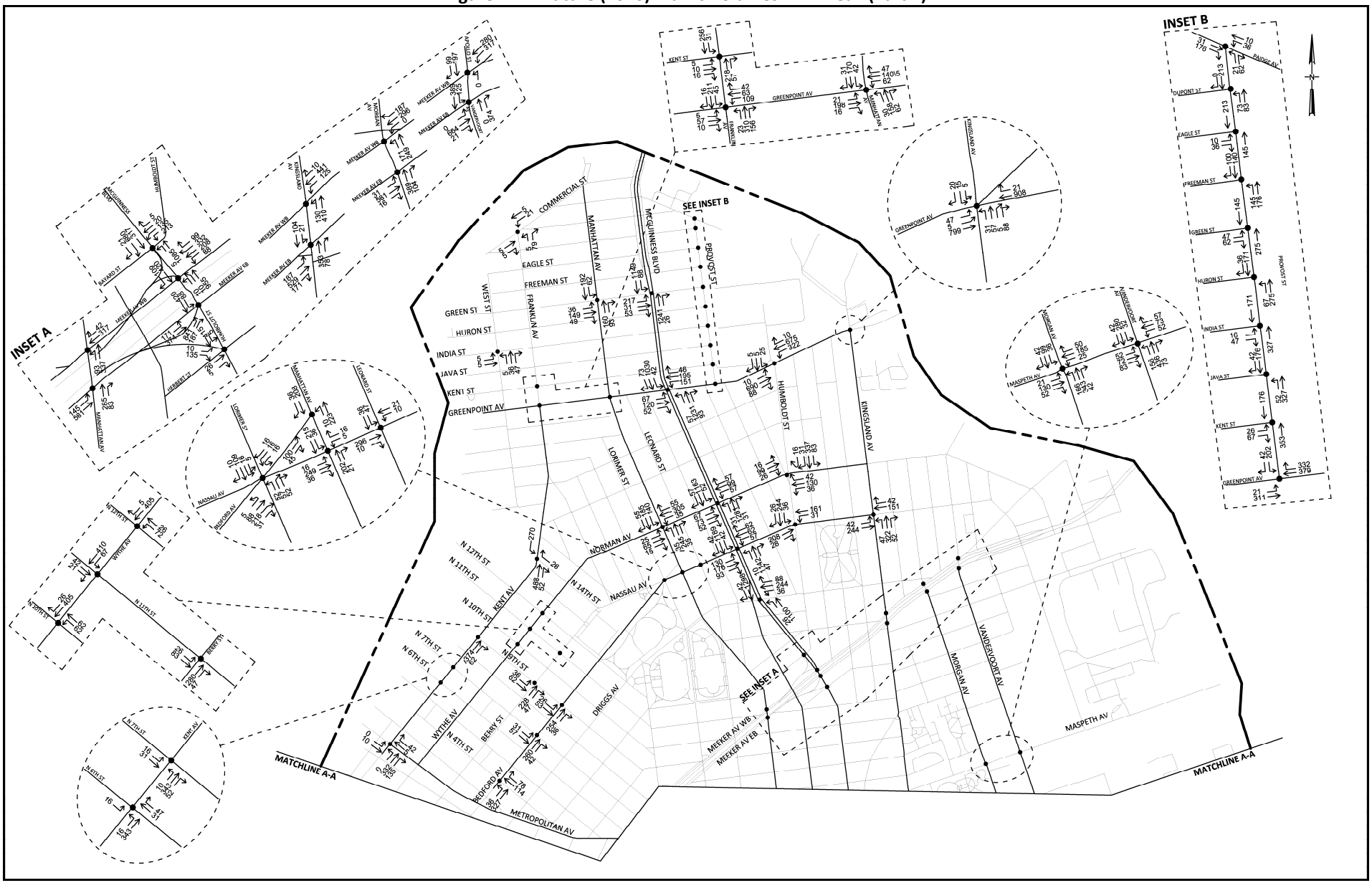


Figure 4-15: Future (2026) Traffic Volumes –AM Peak (Part 2)

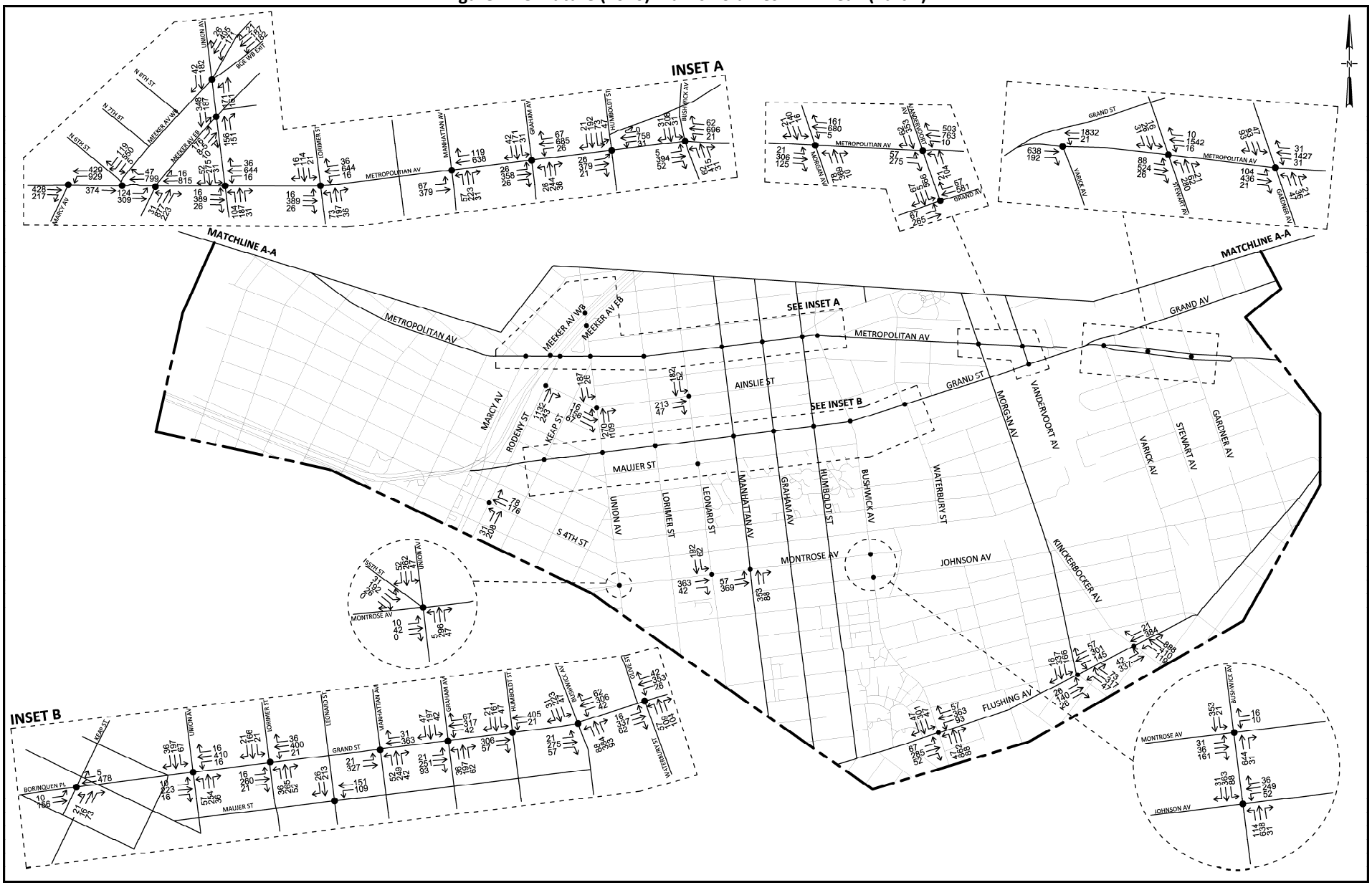


Figure 4-16: Future (2026) Traffic Volumes –PM Peak (Part 1)

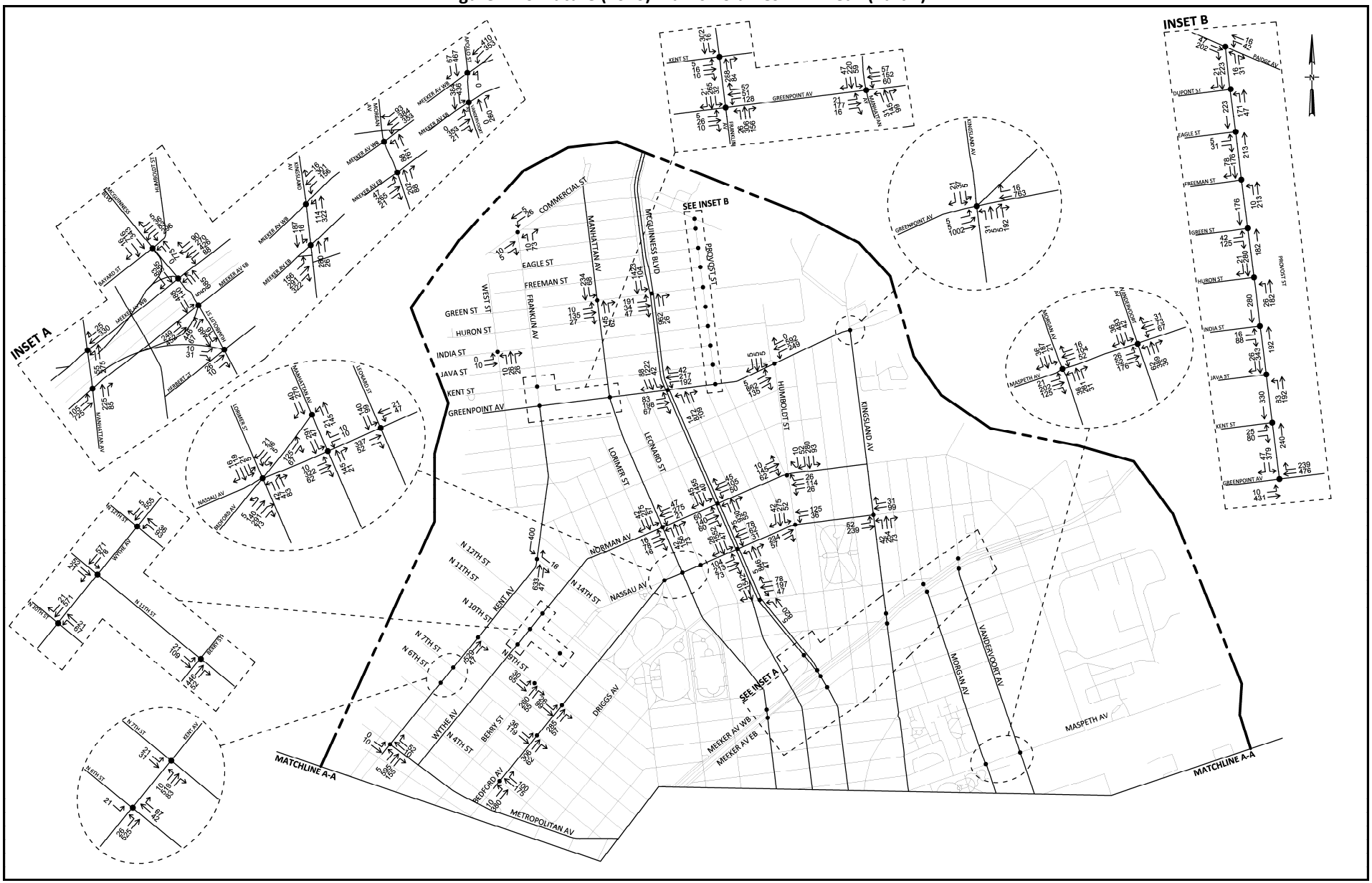


Figure 4-17: Future (2026) Traffic Volumes –PM Peak (Part 2)

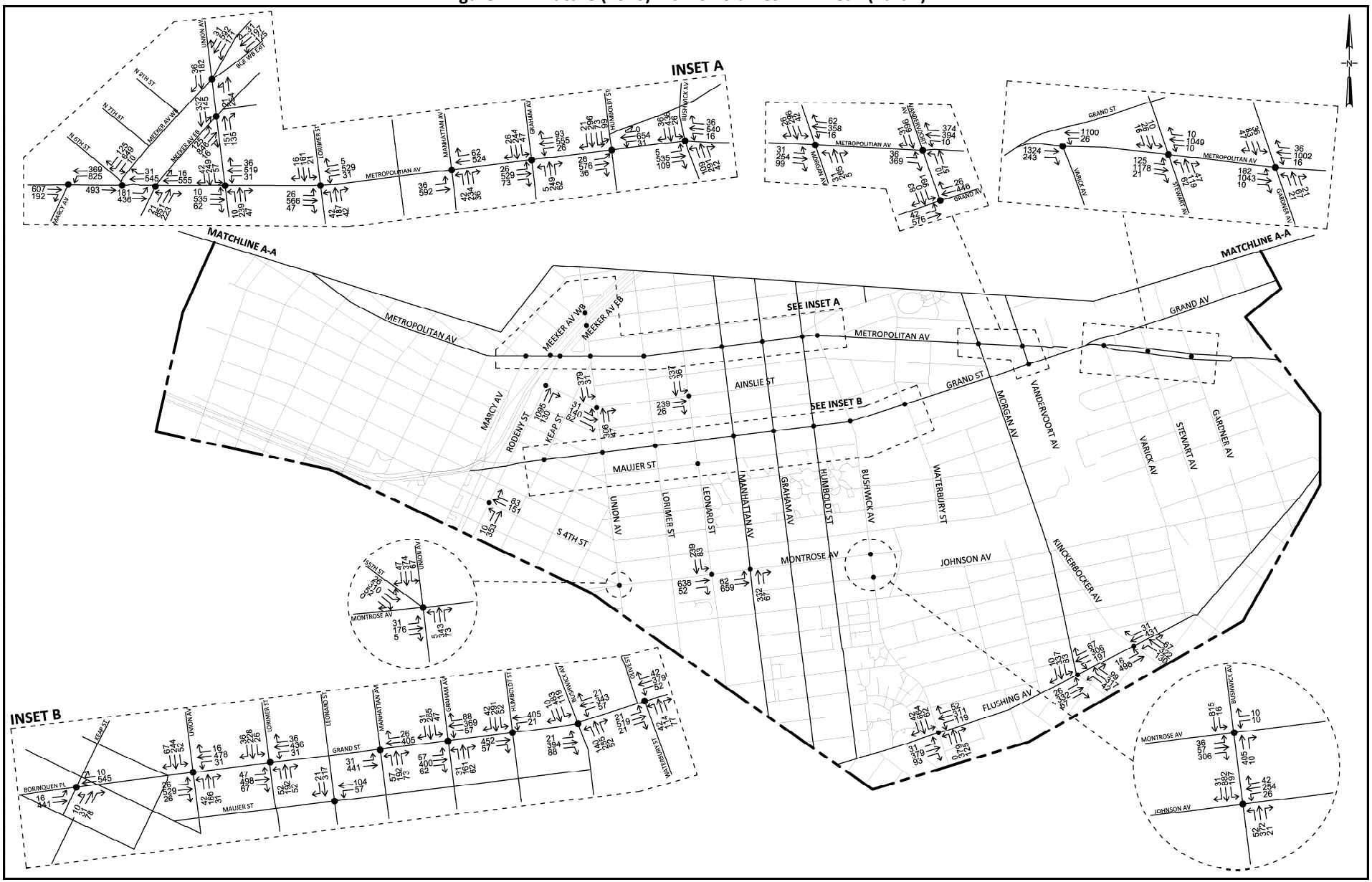


Table 4-4: Traffic LOS Summary – 2026 Future Conditions

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Greenpoint Av & Franklin Av	NB	L	23	LTR	0.90	36.8	D	L	26	LTR	0.89	33.5	C
		T	310					T	306				
		R	135					R	156				
	SB	L	45	LTR	0.82	32.3	C	L	32	LTR	0.91	41.7	D
		T	211					T	265				
		R	16					R	21				
	EB	L	5	LTR	0.34	14.5	B	L	5	LTR	0.21	12.3	B
		T	57					T	26				
		R	10					R	10				
	WB	L	109	LTR	0.77	27.9	C	L	128	LTR	0.71	24.7	C
		T	63					T	51				
		R	42					R	52				
	Overall					31.4	C					32.7	C
Greenpoint Av & Manhattan Av	NB	L	30	LTR	0.62	30.3	C	L	31	LTR	0.69	33.4	C
		T	158					T	145				
		R	62					R	99				
	SB	L	42	LTR	0.76	40.1	D	L	59	LTR	0.92	56.5	E
		T	170					T	220				
		R	31					R	47				
	EB	L	21	LTR	0.91	61.4	E	L	21	LTR	0.80	44.7	D
		T	198					T	177				
		R	16					R	16				
	WB	L	62	LTR	0.78	41.4	D	L	57	LTR	0.72	35.8	D
		T	145					T	152				
		R	47					R	60				
	Overall					43.1	D					43.3	D
Greenpoint Av & McGuinness Blvd	NB	L	57	L	0.79	75.7	E	L	14	L	0.33	23.4	C
		T	1231	TR	1.02	54.2	D	T	872	TR	0.78	23.9	C
		R	93					R	109				
	SB	L	42	L	0.79	75.5	E	L	42	L	0.30	17.7	B
		T	1030	TR	0.83	25.9	C	T	1222	TR	0.98	44.5	D
		R	73					R	88				
	EB	L	67	LTR	0.35	30.7	C	L	83	LTR	0.49	33.1	C
		T	120					T	198				
		R	52					R	67				
	WB	L	151	DefL	0.52	33.9	C	L	192	DefL	0.95	87.1	F
		T	195	LTR				T	217	LTR			
		R	46	TR	?	?	F	R	42	TR	0.66	40.8	D
	Overall					40.7	D					38.3	D
Greenpoint Av & Provost St	SB	L	202	LR	0.97	60.2	E	L	379	LR	1.05	78.7	E
		R	42					R	47				
	EB	L	21	LT	.58	12.6	B	L	10	LT	0.68	15.9	B
		T	311					T	431				
	WB	T	379	TR	0.62	12.6	B	T	478	TR	0.60	12.2	B
		R	332					R	239				
	Overall					23.2	C					30.50	C
Greenpoint Av & Humboldt St	SB	L	26	LTR	0.30	43.7	D	L	5	LTR	0.10	39.0	D
		T	5					T	5				
		R	5					R	5				
	EB	L	10	L	0.08	5.9	A	L	5	L	0.08	6.1	A
		T	690	TR	1.05	60.9	E	T	862	TR	1.09	72.5	E
		R	88					R	135				
	WB	L	322	LTR	1.09	73.3	E	L	249	LTR	1.08	73.1	E
		T	675					T	592				
		R	10					R	0				
	Overall					66.2	E					71.6	E
Greenpoint Av & Kingsland Av	NB	L	31	L	0.09	31.3	C	L	31	L	0.09	31.3	C
		T	57	LTR	0.56	42.6	D	T	5	LTR	0.85	64.0	
		R	93					R	197				
	SB	L	21	LR	0.11	23.0	C	L	42	LR	0.17	24.1	C
		R	21					R	21				
	EB	L	53	LT	0.69	9.0	A	L	10	LT	0.69	24.4	C
		T	799					T	1002				
	WB	T	908	TR	0.70	24.8	C	T	763	TR	0.59	21.8	C
		R	21					R	16				
	Overall					19.4	B					28.2	C
Bedford Av & N 7th St	NB	T	260	TR	0.55	16.7	B	T	306	TR	0.48	27.1	C
		R	42					R	62				
	EB	L	31	LT	0.28	23.1	C	L	36	LT	0.66	20.1	C
		T	57					T	119				
	Overall					18.3	B					22.4	C

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Bedford Av & N 9th St	NB	T	254	TR	0.60	18.2	B	T	285	TR	0.59	17.9	B
		R	36					R	57				
	EB	L	26	LT	0.29	23.2	C	L	26	LT	0.38	24.9	C
		T	83					T	99				
	Overall					19.5	B					20.0	B
Nassau Av & Bedford Av/ Lorimer St	NB	L	32	LR	0.73	46.7	D	L	32	LR	1.05	108.0	F
		R	109					R	135				
	SB	L	21	LTR	0.95	69.1	E	L	26	LTR	0.68	37.6	D
		T	109					T	119				
		R	110					R	16				
	EB	T	311	TR	0.49	13.2	B	T	436	TR	0.68	17.4	B
		R	31					R	73				
	WB	L	32	LT	0.08	8.7	A	L	36	LT	0.11	8.9	A
		T	16					T	21				
	Overall					36.2	D					38.5	D
Bedford Av & Manhattan Av	NB	L	10	LT	0.49	20.9	C	L	21	LT	0.37	18.6	B
		T	223					T	145				
	SB	T	208	TR	0.78	34.4	C	T	270	TR	0.86	41.4	D
		R	36					R	42				
	EB	L	104	LR	0.54	23.9	C	L	125	LR	0.69	30.4	C
		R	47					R	67				
	Overall					27.3	C					32.8	C
Nassau Av & Leonard St	SB	L	47	LT	0.54	35.0	C	L	99	LT	1.04	97.1	F
		T	36					T	140				
	EB	T	296	TR	0.79	27.6	C	T	337	TR	0.92	42.3	D
		R	10					R	52				
	WB	L	10	LT	0.07	8.6	A	L	47	LT	0.28	11.1	B
		T	21					T	21				
	Overall					27.6	C					55.7	E
Nassau Av & McGuinness Blvd	NB	L	10	L	0.19	16.1	B	L	5	L	0.17	17.5	B
		T	1132	TR	0.85	27.3	C	T	846	TR	0.65	19.4	B
		R	47					R	47				
	SB	L	42	L	0.39	22.8	C	L	47	L	1.07	71.3	E
		T	1189	TR	0.91	32.0	C	T	1552	TR			
		R	42					R	26				
	EB	L	130	LTR	0.97	75.1	E	L	104	LTR	0.94	67.0	E
		T	176					T	213				
		R	93					R	73				
	WB	L	57	LTR	0.47	34.4	C	L	31	LTR	0.44	33.9	C
		T	62					T	62				
		R	62					R	78				
	Overall					35.8						52.0	D
Nassau Av & Humboldt St	SB	L	36	LTR	0.68	20.9	C	L	52	LTR	0.83	28.9	C
		T	244					T	275				
		R	26					R	42				
	EB	T	208	TR	0.56	17.6	B	T	234	TR	0.59	18.5	B
		R	26					R	57				
	WB	L	31	LT	0.50	16.7	B	L	36	LT	0.38	14.4	B
		T	161					T	125				
	Overall					18.8	B					22.9	C
Nassau Av & Kingsland Av	NB	L	47	LTR	1.03	66.0	E	L	42	LTR	1.00	60.9	E
		T	322					T	254				
		R	52					R	73				
	EB	L	42	LT	0.73	23.5	C	L	52	LT	.71	22.80	C
		T	244					T	239				
	WB	T	151	TR	0.57	18.5	B	T	99	TR	0.34	14.0	B
		R	42					R	31				
	Overall					40.7	D					39.4	D
Meeker Av EB & Metropolitan Av	NB	L	31	LTR	0.91	39.7	D	L	21	LTR	0.89	37.7	D
		T	877					T	851				
		R	223					R	223				
	EB	L	99	DEF L	0.84	70.9	E	L	119	LT	1.10	92.7	F
		T	280	TR	0.76	40.6	D	T	384				
	WB	T	815	TR	0.82	35.1	D	T	555	TR	0.58	26.6	C
		R	16					R	16				
	Overall					39.4	D					46.9	D

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Meeker Av WB & Metropolitan Av	SB	L	5	LTR	0.57	24.8	C	L	10	LTR	0.66	27.2	C
		T	550					T	649				
		R	119					R	125				
	EB	T	374	T	0.55	27.0	C	T	493	T	0.72	32.8	C
	WB	T	799	TR	0.83	35.6	D	T	545	TR	0.59	26.8	C
		R	47					R	31				
	Overall					30.2	C					28.4	C
Meeker Av EB & Union Av	NB	T	156	TR	1.08	120.3	F	T	151	TR	1.04	108.0	F
		R	151					R	192				
	SB	L	187	DefL	0.35	27.8	C	L	145	DefL	0.27	25.7	C
		T	348	T	0.43	16.9	B	T	332	T	0.41	16.6	B
	EB	L	176	LTR	1.09	94.7	F	L	125	LTR	1.06	85.3	F
		T	805					T	846				
		R	10					R	16				
	Overall					77.0	E					70.7	E
Meeker Av WB & Union Av/ BQE Exit	NB	L	171	DefL	1.02	119.6	F	L	21	LT	0.75	55.5	E
		T	161	T	0.61	51.5	D	T	254				
	SB	T	182	TR	0.79	60.8	E	T	182	TR	0.76	58.6	E
		R	42					R	36				
Meeker Av	WB	L	171	LTR	0.37	7.9	A	L	171	LTR	0.49	9.1	A
		T	405					T	592				
		R	26					R	592				
	Overall					39.2	D					27.1	C
Meeker Av WB & Union Av/ BQE Exit	NB	L	171	DefL	1.02	119.6	F	L	21	LT	0.75	55.5	E
		T	161	T	0.61	51.5	D	T	254				
	SB	T	182	TR	0.79	60.8	E	T	182	TR	0.76	58.6	E
		R	42					R	36				
BQE Exit	WB	L	182	LTR	0.25	6.8	A	L	125	LTR	0.23	6.7	A
		T	187					T	197				
		R	21					R	31				
	Overall					46.7	D					35.1	D
Meeker Av EB & Manhattan Av	NB	T	285	TR	1.07	101.8	F	T	234	TR	1.04	95.0	F
		R	83					R	88				
	EB	L	145	LT	0.44	8.7	A	L	109	LT	.50	9.30	A
		T	581					T	753				
	Overall					38.6	D					32.4	C
Meeker Av WB & Manhattan Av	NB	L	93	LT	0.76	39.0	D	L	57	LT	0.56	32.9	C
		T	337					T	285				
	WB	T	317	TR	0.25	7.2	A	T	343	TR	0.28	7.4	A
		R	42					R	26				
	Overall					19.5	B					25.3	C
Meeker Av EB & McGuinness Blvd	SB	L	88	LTR	1.03	93.9	F	L	140	LTR	1.05	95.9	F
		T	420					T	488				
	EB	L	171	L	0.44	36.3	D	L	249	L	0.73	47.5	D
		T	374	LT	0.46	35.2	D	T	452	LT	0.34	33.1	C
	Overall											68.1	E
Meeker Av EB & McGuinness Blvd/ BQE Exit	SB	L	88	LTR	1.03	93.9	F	L	140	LTR	1.05	95.9	F
		T	420					T	488				
	EB	L	841	L	1.37	212.9	F	L	446	L	0.87	51.1	D
		T	187	LT	0.45	31.7	C	T	67	LT	0.17	26.4	C
	Overall												
Humboldt St & Herbert St	SB	L	5	LT	1.06	100.9	F	L	16	LT	1.00	85.9	F
		T	415					T	472				
	EB	T	26	TR	0.10	25.5	C	T	26	TR	0.13	25.9	C
		R	5					R	10				
	Overall												
Humboldt St & Herbert St/ BQE Exit	SB	L	5	LT	1.06	100.9	F	L	16	LT	1.00	85.9	F
		T	415					T	472				
	EB	T	10	TR	0.39	34.9	C	T	10	TR	0.11	30.2	C
		R	135					R	31				
	Overall												

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Meeker Av WB & McGuinness Blvd	NB	L	21	LT	0.74	20.0	B	L	10	LT	0.53	14.9	B
		T	991					T	685				
	SB	T	420	T	0.78	54.5	D	T	555	T	0.95	68.4	E
		R	109	R	0.53	49.6	D	R	83	R	0.38	45.6	D
	WB	L	88	L	0.41	35.9	D	L	93	L	0.28	33.2	C
		T	208	TR	0.77	42.8	D	T	426	TR	0.90	51.5	D
		R	431					R	360				
	Overall					35.5	D					44.0	D
McGuinness Blvd & Humboldt St	NB	L	5	LT	0.73	15.3	B	L	0	LT	0.42	9.5	A
		T	1085					T	773				
	SB	T	317	TR	0.79	16.5	B	T	343	TR	0.86	19.4	B
		R	701					R	732				
	WB	L	343	LTR	1.02	95.6	F	L	379	LTR	1.25	181.4	F
		T	21					T	36				
		R	5					R	5				
	Overall					25.5	C					37.9	D
Meeker Av EB & Kingsland Av	NB	T	353	TR	0.56	26.6	C	T	280	TR	0.38	23.5	C
		R	78					R	26				
	SB	L	21	LT	0.40	25.5	C	L	16	LT	0.51	27.2	C
		T	104					T	140				
	EB	L	187	L	0.29	12.1	B	L	156	L	0.32	12.5	B
		T	529	TR	0.59	15.8	B	T	291	TR	0.60	15.9	B
		R	171					R	291				
	Overall					19.5	B					18.9	
Meeker Av WB & Kingsland Av	NB	L	130	LT	0.67	29.0	C	L	114	LT	0.54	26.1	C
		T	410					T	322				
	WB	L	125	LTR	0.45	13.4	B	L	156	LTR	0.48	13.9	B
		T	441					T	301				
		R	10					R	16				
	Overall					21.3	C				19.20		C
Meeker Av EB & Morgan Av	NB	T	389	LTR	1.06	87.2	F	T	202	LTR	0.29	11.6	B
		R	104					R	88				
	EB	L	31	TR	0.45	13.3	B	L	47	TR	0.71	33.8	C
		T	581					T	265				
		R	16					R	21				
	Overall					45.3	D					21.6	C
Meeker Av WB & Morgan Av	NB	L	171	LT	0.53	25.9	C	L	88	LT	0.30	22.3	C
		T	249					T	161				
	WB	L	0	LT	0.23	11.6	B	L	0	LT	0.67	16.5	B
		T	270	R	0.32	12.5	B	T	384	R	0.15	10.6	B
		R	187					R	93				
	Overall					18.5	B					17.8	B
Apollo St & Meeker Av	SB	T	197	TR	0.30	15.5	B	T	467	TR	0.47	17.5	B
		R	99					R	67				
	WB	L	317	LT	0.73	26.8	C	L	353	LT	0.71	25.3	C
		T	348					T	431				
	Overall					23.0	C					21.8	C
Maspeth Av & Morgan Av	NB	L	166	LTR	1.10	81.9	F	L	36	LTR	0.81	25.4	C
		T	343					T	291				
		R	42					R	31				
	SB	L	36	LTR	0.20	9.8	A	L	21	LTR	0.23	10.0	A
		T	99					T	187				
		R	42					R	36				
	EB	L	21	LTR	0.51	18.4	B	L	21	LTR	0.83	31.7	C
		T	130					T	202				
		R	52					R	125				
	WB	L	26	LTR	0.31	14.3	B	L	52	LTR	0.22	13.5	B
		T	192					T	104				
		R	52					R	16				
	Overall					44.5	D					21.9	C
Maspeth Av & Vandervoort Av	NB	L	156	LTR	0.81	19.4	B	L	62	LTR	0.58	13.0	B
		T	436					T	389				
		R	73					R	36				
	SB	L	31	LTR	0.50	11.8	B	L	42	LTR	0.62	13.3	B
		T	280					T	483				
		R	42					R	36				
	EB	L	52	LTR	0.29	15.6	B	L	26	LTR	0.40	16.8	B
		T	73					T	52				
		R	83					R	176				
	WB	L	52	DefL				L	67	DefL			
		T	73	LTR	0.27	15.4	B	T	73	LTR	0.27	15.4	B
		R	57	TR				R	31	TR			
	Overall					16.3	B					14.1	B

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Metropolitan Av & Kent Av	NB	L	0	L	0.00	5.7	A	L	5	L	0.01	5.7	A
		T	332	TR	0.65	13.8	B	T	595	TR			
		R	135					R	155				
	EB	L	0	LT	0.11	27.6	C	L	0	LT	0.11	27.7	C
		T	10					T	10				
	WB	T	5	TR	0.47	37.9	D	T	10	TR	0.61	44.8	D
		R	42					R	52				
	Overall					17.2	B					21.6	C
Metropolitan Av & Marcy Av	EB	T	374	TR	0.92	51.2	D	T	493	TR	1.00	68.5	E
		R	202					R	187				
	WB	L	929	L	0.96	33.4	C	L	825	L	0.85	21.9	C
		T	420	TR	0.49	7.1	A	T	369	TR	0.41	6.2	A
	Overall					32.2	C					35.0	C
Metropolitan Av & Union Av	NB	L	104	LTR	0.87	60.1	E	L	10	LTR	0.76	49.3	D
		T	187					T	296				
		R	31					R	47				
	SB	L	31	LTR	0.90	64.3	E	L	57	LTR	0.89	62.7	E
		T	275					T	249				
		R	52					R	42				
	EB	L	16	LTR	1.08	82.1	F	L	10	LTR	1.08	83.2	F
		T	389					T	535				
		R	26					R	62				
	WB	L	21	LTR	0.99	49.4	D	L	31	LTR	0.77	22.4	C
		T	675					T	519				
		R	36					R	36				
	Overall					62.7	E					53.2	D
Metropolitan Av & Lorimer St	NB	L	73	LTR	1.22	171.6	F	L	42	LTR	1.06	114.2	F
		T	197					T	187				
		R	36					R	42				
	SB	L	21	LTR	0.53	47.9	D	L	21	LTR	0.61	50.8	D
		T	114					T	161				
		R	16					R	16				
	EB	L	16	LTR	0.90	34.6	C	L	26	LTR	1.08	77.3	E
		T	389					T	566				
		R	26					R	47				
	WB	L	16	LTR	0.78	17.5	B	L	31	LTR	0.67	13.4	B
		T	644					T	529				
		R	36					R	5				
	Overall					56.3	E					59.2	E
Metropolitan Av & Manhattan Av	NB	L	57	LTR	0.90	65.7	E	L	42	LTR	1.10	129.2	F
		T	223					T	234				
		R	31					R	36				
	EB	L	67	LT	1.07	83.4	F	L	36	LT	0.97	41.7	D
		T	379					T	592				
	WB	T	638	TR	1.05	67.1	E	T	524	TR	0.63	12.1	B
		R	119					R	62				
	Overall					71.4	E					47.2	D
Metropolitan Av & Graham Av	NB	L	26	LTR	1.00	91.2	F	L	5	LTR	1.01	92.0	F
		T	244					T	249				
		R	36					R	62				
	SB	L	31	LTR	0.78	55.9	E	L	47	LTR	0.98	85.9	F
		T	171					T	244				
		R	42					R	26				
	EB	L	26	LTR	0.83	31.0	C	L	26	LTR	1.09	87.0	F
		T	358					T	529				
		R	26					R	73				
	WB	L	26	LTR	1.10	83.6	F	L	26	LTR	0.95	42.8	D
		T	685					T	555				
		R	67					R	93				
	Overall					68.8	E					71.6	E
Metropolitan Av & Humboldt St	SB	L	120	LTR	0.76	41.9	D	L	172	LTR	0.98	68.6	E
		T	192					T	296				
		R	21					R	21				
	EB	L	26	LTR	0.86	37.7	D	L	26	LTR	1.04	72.7	E
		T	379					T	576				
		R	21					R	36				
	WB	L	31	LTR	1.04	70.2	E	L	31	LTR	0.87	35.4	D
		T	758					T	654				
		R	0					R	0				
	Overall					54.2	D					58.0	E

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Metropolitan Av & Bushwick Av	NB	L	62	LTR	1.09	101.4	F	L	109	LTR	0.86	49.4	D
		T	509					T	291				
		R	26					R	42				
	SB	L	31	LTR	0.29	27.0	C	L	26	LTR	0.50	30.4	C
		T	208					T	436				
		R	31					R	36				
	EB	L	5	LTR	0.52	19.4	B	L	5	LTR	0.62	21.5	C
		T	394					T	535				
		R	52					R	109				
	WB	L	21	LTR	0.61	20.8	C	L	16	LTR	0.47	18.0	B
		T	696					T	540				
		R	62					R	36				
	Overall					43.4	D					28.6	C
Metropolitan Av & Morgan Av	NB	L	78	LTR	0.93	64.5	E	L	31	LTR	0.63	39.2	D
		T	369					T	265				
		R	10					R	5				
	SB	L	16	LTR	0.42	33.4	C	L	42	LTR	0.81	49.5	D
		T	140					T	296				
		R	21					R	26				
	EB	L	21	LTR	0.76	26.0	C	L	31	LTR	0.76	26.0	C
		T	306					T	354				
		R	125					R	99				
	WB	L	5	LTR	0.30	13.5	B	L	16	LTR	0.54	17.6	B
		T	680					T	358				
		R	161					R	62				
	Overall					37.3	D					31.7	C
Metropolitan Av & Vandervoort Av	NB	L	21	LT	0.18	28.8	C	L	10	LT	0.10	27.8	C
		T	104					T	57				
	SB	T	353	TR	0.52	34.2	C	T	696	TR	0.84	45.7	D
		R	62					R	31				
	EB	L	57	LR	1.04	78.2	E	L	36	LR	1.07	88.2	F
		R	275					R	369				
	WB	L	10	LTR	0.81	24.1	C	L	10	LTR	0.51	15.9	B
		T	763					T	394				
		R	503					R	374				
	Overall					36.1	D					42.8	D
Metropolitan Av & Stewart Av	NB	L	280	LTR	0.98	75.1	E	L	62	LTR	0.65	40.4	D
		T	62					T	119				
		R	21					R	47				
	SB	L	16	LTR	0.21	29.7	C	L	10	LTR	0.15	28.8	C
		T	26					T	26				
		R	31					R	16				
	EB	L	88	L	0.97	105.8	F	L	125	L	1.00	102.2	F
		T	524	TR	0.68	21.4	C	T	1178	TR	1.09	78.8	E
		R	26					R	21				
	WB	L	16	L	0.09	11.6	B	L	10	L	0.15	13.7	B
		T	1542	TR	1.05	62.7	E	T	1049	TR	0.80	23.5	C
		R	10					R	10				
	Overall					56.4	E					50.7	D
Metropolitan Av & Gardner Av	NB	L	47	LTR	0.31	31.4	C	L	21	LTR	0.33	31.6	C
		T	36					T	67				
		R	21					R	21				
	SB	L	47	LTR	0.74	45.1	D	L	36	LTR	0.52	35.9	D
		T	93					T	83				
		R	93					R	47				
	EB	L	104	L	1.02	114.1	F	L	182	L	1.04	100.9	F
		T	436	TR	0.84	33.9	C	T	1043	TR	1.09	80.9	F
		R	21					R	10				
	WB	L	31	LTR	1.04	57.0	E	L	16	LTR	0.52	35.9	D
		T	1427					T	1002				
		R	31					R	36				
	Overall					52.3	D						
Grand Av & Keap St/ Borinquen Pl	NB	L	21	LTR	0.38	26.8	C	L	10	LTR	0.39	27.0	C
		T	16					T	31				
		R	73					R	78				
	EB	L	10	L	0.08	16.5	B	L	16	L	0.15	18.1	B
		T	156	T	0.30	18.9	B	T	441	T	0.83	38.0	D
	WB	T	478	TR	0.93	51.3	D	T	545	TR	1.03	73.1	E
		R	5					R	10				
	Overall					39.9	D					52.6	D

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Grand Av & Union Av	NB	L	57	LTR	0.92	62.5	E	L	42	LTR	0.57	36.0	D
		T	254					T	166				
		R	36					R	31				
	SB	L	36	LTR	0.74	43.4	D	L	52	LTR	0.77	45.1	D
		T	197					T	244				
		R	67					R	67				
	EB	L	10	LTR	0.48	18.5	B	L	26	LTR	1.02	64.4	E
		T	223					T	529				
		R	16					R	26				
	WB	L	16	LTR	0.86	36.8	D	L	31	LTR	1.04	36.0	D
		T	410					T	478				
		R	36					R	16				
	Overall					41.6	D					59.5	E
Grand Av & Lorimer St	NB	L	36	LTR	0.87	55.2	E	L	52	LTR	0.91	61.4	E
		T	265					T	192				
		R	52					R	52				
	SB	L	21	LTR	0.50	33.4	C	L	26	LTR	0.71	40.8	D
		T	166					T	228				
		R	21					R	36				
	EB	L	16	LTR	0.67	25.1	C	L	47	LTR	1.09	89.6	F
		T	260					T	498				
		R	21					R	67				
	WB	L	21	LTR	0.79	30.6	C	L	31	LTR	0.99	58.6	E
		T	400					T	436				
		R	36					R	36				
	Overall					36.3	D					66.5	E
Grand Av & Manhattan Av	NB	L	57	LTR	0.62	22.9	C	L	57	LTR	0.93	64.5	E
		T	249					T	192				
		R	42					R	73				
	EB	L	21	LT	.62	22.9	C	L	31	LT	0.91	44.1	D
		T	327					T	441				
	WB	T	363	TR	0.70	25.6	C	T	405	TR	0.73	26.9	C
		R	31					R	26				
	Overall					35.0	C					44.3	D
Grand Av & Graham Av	NB	L	36	LTR	0.83	51.7	D	L	31	LTR	0.74	44.7	D
		T	197					T	161				
		R	62					R	62				
	SB	L	47	LTR	0.65	38.5	D	L	47	LTR	0.81	47.1	D
		T	197					T	265				
		R	42					R	31				
	EB	L	21	LTR	0.82	34.8	C	L	57	LTR	1.07	86.2	F
		T	254					T	400				
		R	93					R	62				
	WB	L	42	LTR	0.84	35.1	D	L	57	LTR	1.04	73.0	E
		T	317					T	369				
		R	67					R	88				
	Overall					39.4	D					66.7	E
Grand Av & Humboldt St	SB	L	47	LTR	0.50	33.5	C	L	52	LTR	0.91	58.5	E
		T	161					T	291				
		R	21					R	42				
	EB	T	306	TR	0.69	26.0	C	T	452	TR	0.88	39.6	D
		R	57					R	57				
	WB	L	21	LT	0.73	26.4	C	L	21	LT	0.79	30.2	C
		T	405					T	472				
	Overall					27.9	C					42.1	D
Grand Av & Bushwick Av	NB	L	88	LTR	0.47	18.0	B	L	140	DefL	0.75	41.0	D
		T	384					T	285	TR	0.59	21.9	C
		R	93					R	52				
	SB	L	47	LTR	0.62	23.9	C	L	119	LTR	0.73	25.7	C
		T	223					T	483				
		R	31					R	10				
	EB	L	21	LTR	1.06	102.5	F	L	21	LTR	1.09	105.8	F
		T	275					T	394				
		R	57					R	88				
	WB	L	42	LTR	1.09	107.5	F	L	57	LTR	1.10	109.7	F
		T	306					T	343				
		R	62					R	21				
	Overall					59.4	E					62.1	E

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Grand Av & Waterbury St/ Olive St	NB	L	57	LTR	0.97	73.6	E	L	42	LTR	0.61	37.2	D
		T	109					T	114				
		R	104					R	78				
	EB	L	16	LTR	0.91	44.9	D	L	21	LTR	1.03	69.9	E
		T	337					T	519				
		R	62					R	21				
	WB	L	26	LTR	0.81	31.5	C	L	52	LTR	0.81	31.8	C
		T	353					T	379				
		R	42					R	42				
	Overall					48.9	D					49.2	D
Grand Av & Vandervoort Av	SB	L	566	L	0.69	29.2	C	L	991	L	1.08	83.3	F
		T	5	R	0.30	22.2	C	T	0	R	0.19	20.1	C
		R	67					R	83				
	EB	L	67	LT	1.03	90.1	F	L	42	LT	1.10	98.6	F
		T	265					T	576				
	WB	T	581	TR	1.06	83.9	F	T	446	TR	0.87	46.0	D
		R	57					R	26				
	Overall					58.8	E					77.6	E
Flushing Av & Bushwick Av	NB	L	47	LTR	1.02	64.9	E	L	0	LTR	1.01	75.9	E
		T	862					T	379				
		R	88					R	125				
	SB	L	47	LTR	1.03	85.1	F	L	62	LTR	0.68	29.8	C
		T	301					T	664				
		R	47					R	42				
	EB	L	67	LTR	1.11	114.0	F	L	31	LTR	1.09	104.1	F
		T	285					T	379				
		R	52					R	93				
	WB	L	93	LTR	1.08	97.5	F	L	119	LTR	1.09	104.0	F
		T	363					T	311				
		R	57					R	52				
	Overall					83.2	F					72.4	E
Flushing Av & Morgan Av	NB	L	47	LTR	0.62	27.8	C	L	42	LTR	0.53	25.8	C
		T	317					T	317				
		R	73					R	99				
	SB	L	166	LTR	0.97	60.4	E	L	83	LTR	0.98	64.3	E
		T	337					T	337				
		R	16					R	10				
	EB	L	26	LTR	0.53	17.3	B	L	26	LTR	1.02	63.5	E
		T	140					T	332				
		R	26					R	67				
	WB	L	145	LTR	0.93	40.6	D	L	197	LTR	1.07	77.5	E
		T	301					T	306				
		R	57					R	67				
	Overall					40.0	D					59.6	E
Flushing Av & Knickerbocker Av	NB	L	119	L	0.47	25.3	C	L	130	L	0.36	21.8	C
		T	410	TR	1.09	96.6	F	T	322	TR	0.96	60.6	E
		R	88					R	67				
	EB	L	42	LT	0.86	37.3	D	L	16	LT	0.98	55.7	E
		T	337					T	498				
	WB	T	384	T	0.76	26.8	C	T	431	T	0.79	28.4	C
		R	21	R	0.06	11.8	B	R	31	R	0.07	11.9	B
	Overall					51.3	D					44.8	D
Union Av & Ainslie St	NB	T	270	TR	0.66	16.7	B	T	306	TR	0.57	14.5	B
		R	109					R	47				
	SB	L	26	LT	0.34	10.8	B	L	31	LT	0.48	12.5	B
		T	187					T	280				
	EB	L	16	LTR	1.02	77.9	E	L	31	LTR	0.97	64.0	E
		T	156					T	140				
		R	67					R	52				
	Overall					33.2	C					27.0	C

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Union Av & Montrose Av/ S 5th St	NB	L	5	LTR	0.65	30.6	C	L	5	LTR	0.74	34.3	C
		T	296					T	343				
		R	47					R	73				
	SB	L	47	LTR	0.75	33.7	C	L	67	LTR	0.75	34.0	C
		T	262					T	374				
		R	52					R	47				
S 5th St	EB	L	31	LTR	0.43	23.9	C	L	26	LTR	0.77	36.0	D
		T	192					T	322				
		R	26					R	52				
	Overall					30.4	C					34.8	C
Union Av & Montrose Av/ S 5th St	NB	L	5	LTR	0.70	33.2	C	L	5	LTR	0.88	48.0	D
		T	296					T	343				
		R	47					R	73				
	SB	L	47	LTR	0.75	33.7	C	L	67	LTR	0.75	34.0	C
		T	262					T	374				
		R	52					R	47				
Montrose Av	EB	L	10	LTR	0.14	19.2	B	L	31	LTR	0.36	22.5	C
		T	42					T	176				
		R	0					R	5				
	Overall					32.2	C					37.0	D
Manhattan Av & Green St	NB	T	160	TR	0.49	15.4	B	T	145	TR	0.33	12.8	B
		R	93					R	62				
	SB	L	62	LTR	0.71	23.9	C	L	68	LTR	0.58	17.8	B
		T	192					T	234				
	EB	L	36					L	10				
		T	149	LTR	1.06	101.0	F	T	135	LTR	0.67	37.3	D
		R	49					R	27				
	Overall					45.1	D					21.2	C
Manhattan Av & Norman Av	NB	L	36	LTR	0.81	26.4	C	L	42	LTR	0.60	17.8	B
		T	254					T	156				
		R	36					R	73				
	SB	L	145	LTR	1.09	88.5	F	L	57	LTR	0.93	47.0	D
		T	192					T	275				
		R	57					R	42				
	EB	L	26	LTR	0.68	38.0	D	L	16	LTR	0.56	31.7	C
		T	67					T	78				
		R	16					R	16				
	WB	L	36	LTR	1.06	89.5	F	L	21	LTR	0.85	44.5	D
		T	317					T	275				
		R	57					R	47				
	Overall					63.3	E					36.2	D
Manhattan Av & Nassau Av	NB	T	202	TR	0.38	18.4	B	T	145	TR	0.34	17.9	B
		R	21					R	21				
	SB	L	36	LT	0.60	24.1	C	L	47	LT	0.71	27.2	C
		T	218					T	291				
	EB	L	16	LTR	1.05	83.0	F	L	10	LTR	1.02	72.2	E
		T	249					T	322				
		R	36					R	67				
	WB	L	5	LR	0.12	15.3	B	L	10	LR	0.09	15.0	B
		R	16					R	10				
	Overall					46.5	D					44.5	D
Manhattan Av & Montrose Av	NB	T	353	TR	1.09	84.9	F	T	332	TR	0.85	33.2	C
		R	88					R	67				
	EB	L	57	LT	0.36	11.0	B	L	62	LT	0.54	12.9	B
		T	369					T	659				
	Overall					49.8	D					20.2	C
Leonard St & Maujer St	SB	T	213	TR	0.62	23.2	C	T	317	TR	0.58	22.2	C
		R	26					R	21				
	WB	L	109	LT	0.25	8.5	A	L	57	LT	0.26	8.6	A
		T	151					T	104				
	Overall					15.9	B					15.1	B
Leonard St & Montrose Av	SB	L	62	LT	0.57	16.7	B	L	83	LT	0.62	17.9	B
		T	192					T	239				
	EB	T	363	TR	0.39	10.8	B	T	638	TR	0.56	12.5	B
		R	42					R	52				
	Overall					13.2	B					14.2	B

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
McGuinness Blvd & Green St	NB	T	1241	TR	0.93	34.0	C	T	962	TR	0.73	21.2	C
		R	26					R	26				
	SB	L	88	L	0.98	109.0	F	L	104	L	0.70	38.1	D
		T	1149	T	0.91	37.6	D	T	1423	T	1.10	80.5	F
	EB	L	217	LTR	0.86	57.3	E	L	191	LTR	0.79	49.8	D
		T	31					T	34				
		R	53					R	47				
	Overall					38.2	D					54.7	D
McGuinness Blvd & Norman Av	NB	L	31	L	0.57	35.9	D	L	5	L	0.17	17.9	B
		T	1261	TR	0.93	34.6	C	T	965	TR	0.75	22.6	C
		R	31					R	57				
	SB	L	52	L	0.76	60.4	E	L	42	L	0.36	19.8	B
		T	1163	TR	0.90	31.6	C	T	1510	TR	1.08	74.6	E
		R	57					R	47				
	EB	L	67	LTR	0.61	44.5	D	L	62	LTR	0.83	59.4	E
		T	73					T	145				
		R	52					R	62				
	WB	L	57	LTR	0.67	47.4	D	L	52	LTR	0.66	46.5	D
		T	99					T	109				
		R	57					R	47				
	Overall					35.6	D					52.7	D
McGuinness Blvd & Driggs Av	NB	L	26	L	0.38	21.5	C	L	5	L	0.16	17.0	B
		T	1100	T	0.88	29.8	C	T	810	T	0.65	19.5	B
	SB	T	1017	TR	0.78	23.7	C	T	1292	TR	1.04	59.0	E
		R	42					R	125				
	WB	L	36	LTR	1.09	117.9	F	L	47	LTR	0.58	40.6	D
		T	244					T	197				
		R	88					R	78				
	Overall					39.1	D					43.9	D
Humboldt St & Norman Av	SB	L	83	LTR	1.00	56.7	E	L	93	LTR	0.93	41.0	D
		T	337					T	280				
		R	47					R	62				
	EB	L	16	LTR	0.58	18.8	B	L	10	LTR	0.56	18.1	B
		T	99					T	145				
		R	26					R	62				
	WB	L	42	LTR	0.61	19.6	B	L	26	LTR	0.48	16.3	B
		T	130					T	114				
		R	36					R	26				
	Overall					38.7	D					29.5	C
Bushwick Av & Montrose Av	NB	T	644	TR	1.04	65.0	E	T	405	TR	0.63	17.7	B
		R	31					R	10				
	SB	L	21	LT	0.50	14.1	B	L	16	LT	0.93	35.7	D
		T	353					T	815				
	EB	L	31	LTR	0.79	55.0	D	L	36	LTR	1.06	102.3	F
		T	36					T	57				
		R	161					R	306				
	WB	L	10	LR	0.23	34.5	C	L	10	LR	0.24	35.0	C
		R	16					R	10				
	Overall					46.6	D					47.1	D
Bushwick Av & Johnson Av	NB	L	114	LTR	1.04	64.3	c	L	52	LTR	0.90	39.3	D
		T	638					T	374				
		R	31					R	21				
	SB	L	88	LTR	0.55	15.1	B	L	197	LTR	1.09	78.3	E
		T	363					T	882				
		R	31					R	31				
	WB	L	52	LTR	0.98	84.6	F	L	26	LTR	1.04	103.3	F
		T	249					T	254				
		R	36					R	42				
	Overall					53.4	D					73.0	E
Kent Av & N 6th St	NB	L	16	L	0.03	5.9	A	L	26	L	0.05	6.0	A
		T	343	T	0.40	8.9	A	T	524	T	0.60	11.6	B
	EB	L	16	L	0.15	28.5	C	L	21	L	0.21	30.4	C
	WB	T	31	TR	0.29	30.1	C	T	42	TR	0.41	32.7	C
		R	47					R	67				
	Overall					13.1	B					15.6	B

Table 4-4: Traffic LOS Summary – 2026 Future Conditions (Continued)

Intersection	Approach	FUTURE : Weekday AM						FUTURE : Weekday PM					
		Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS	Movement	Volume	Lane Group	V/C Ratio	Avg Delay	LOS
Kent Av & N 7th St	NB	L	10	L	0.02	5.8	A	L	10	L	0.02	5.8	A
		T	343	TR	0.49	10.2	B	T	519	TR	0.78	17.6	B
		R	52					R	83				
	EB	L	16	LT	0.37	33.4	C	L	21	LT	0.41	34.4	C
		T	31					T	31				
	Overall					13.3	B					19.40	B
Kent Av & N 14th St	NB	T	488	TR	0.86	25.2	C	T	633	TR	1.02	52.7	D
		R	52					R	47				
	SB	L	270	L	0.93	49.6	D	L	400	L	1.04	69.1	E
	WB	R	26	R	0.12	15.4	B	R	16	R	0.08	14.8	B
	Overall					32.5	C					57.6	E
Rodney St & S 4th St	NB	L	31	LT	0.48	11.7	B	L	10	LT	0.62	14.9	B
		T	208					T	353				
	WB	T	176	TR	0.98	66.4	E	T	151	TR	0.95	59.2	E
		R	78					R	83				
	Overall					39.0	D					33.1	C

4.7 Future Speeds

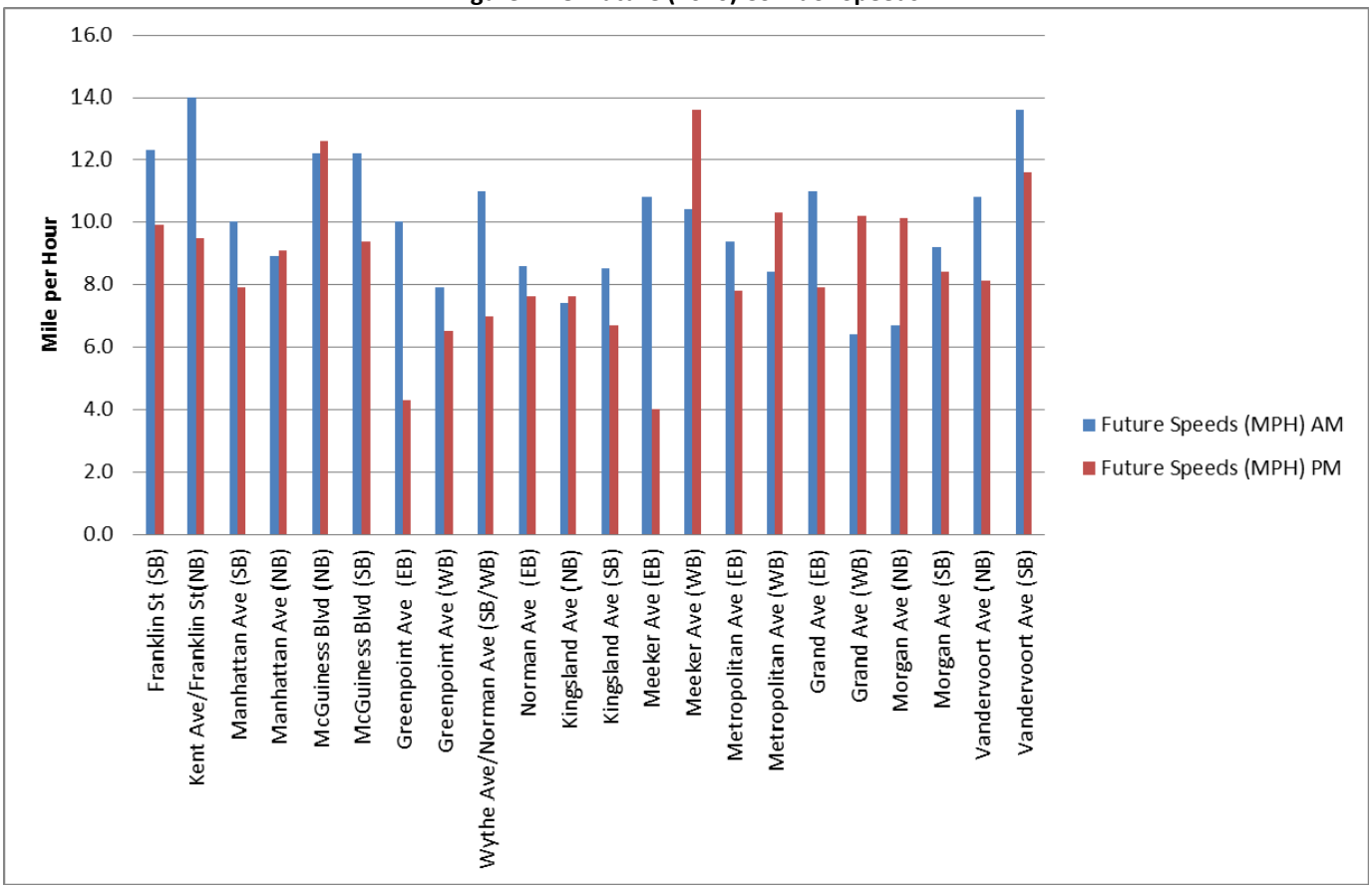
The 2026 future travel speeds along the study area's corridors were calculated using HCS future delays and measured existing speeds. The existing travel time and delays as well as future delays were used to compute future travel speeds which is one factor in determining future congestion. For segments with no detailed analysis, average corridor delays were used to compute speeds.

Tables 4-5 shows the existing and future travel speeds while figure 4-18 plots future travel speeds during the AM and PM peak periods.

Table 4-5: Existing (2016) and Future (2026) Travel Speeds

Corridor	Direction	Between	Existing Speeds (MPH)		Future Speeds (MPH)	
			AM	PM	AM	PM
Franklin St (SB)	SB	Commercial St and N 14th St	13.8	11.2	12.3	9.9
Kent Ave/Franklin St(NB)	NB	Broadway and Commercial St	14.8	9.9	14.0	9.5
Manhattan Ave (SB)	SB	Commercial St and Leonard Ave	10.4	8.1	10.0	7.9
Manhattan Ave (NB)	NB	Broadway and Commercial St	9.2	9.3	8.9	9.1
McGuiness Blvd (NB)	NB	Meeker Ave WB and Jackson Ave	12.7	12.7	12.2	12.6
McGuiness Blvd (SB)	SB	Jackson Ave and Meeker Ave WB	13.0	10.3	12.2	9.4
Greenpoint Ave (EB)	EB	Manhattan Ave and Review Ave	10.7	4.5	10.0	4.3
Greenpoint Ave (WB)	WB	Review Ave and Franklin St	8.5	6.8	7.9	6.5
Wythe Ave/Norman Ave (SB/WB)	SB/WB	Kingsland Ave and Broadway	11.2	7.1	11.0	7.0
Norman Ave (EB)	EB	Banker St and Kingsland Ave	8.8	7.7	8.6	7.6
Kingsland Ave (NB)	NB	Metropolitan Ave and Greenpoint Ave	7.6	7.8	7.4	7.6
Kingsland Ave (SB)	SB	Meeker Ave and Metropolitan Ave	8.5	6.7	8.5	6.7
Meeker Ave (EB)	EB	Union Ave and Vandervoort Ave	11.4	4.1	10.8	4.0
Meeker Ave (WB)	WB	Vandervoort Ave and Union Ave	10.5	14.0	10.4	13.6
Metropolitan Ave (EB)	EB	Kent Ave and Scot Ave	10.2	8.9	9.4	7.8
Metropolitan Ave (WB)	WB	Scot Ave and Kent Ave	9.3	10.7	8.4	10.3
Grand Ave (EB)	EB	Rodney St to Gardner Ave	11.8	8.9	11.0	7.9
Grand Ave (WB)	WB	Gardner Ave to Rodney St	6.7	11.4	6.4	10.2
Morgan Ave (NB)	NB	Flushing Ave to Meeker Ave EB	7.0	10.2	6.7	10.1
Morgan Ave (SB)	SB	Meeker Ave EB to Flushing Ave	9.5	8.6	9.2	8.4
Vandervoort Ave (NB)	NB	Metropolitan Ave and Meeker Ave EB	11.6	8.1	10.8	8.1
Vandervoort Ave (SB)	SB	Meeker Ave EB to Metropolitan Ave	14.1	12.6	13.6	11.6
Average			**10.5**	**9.1**	**10.0**	**8.6**

Figure 4-18: Future (2026) Corridor Speeds



5 PUBLIC TRANSPORTATION

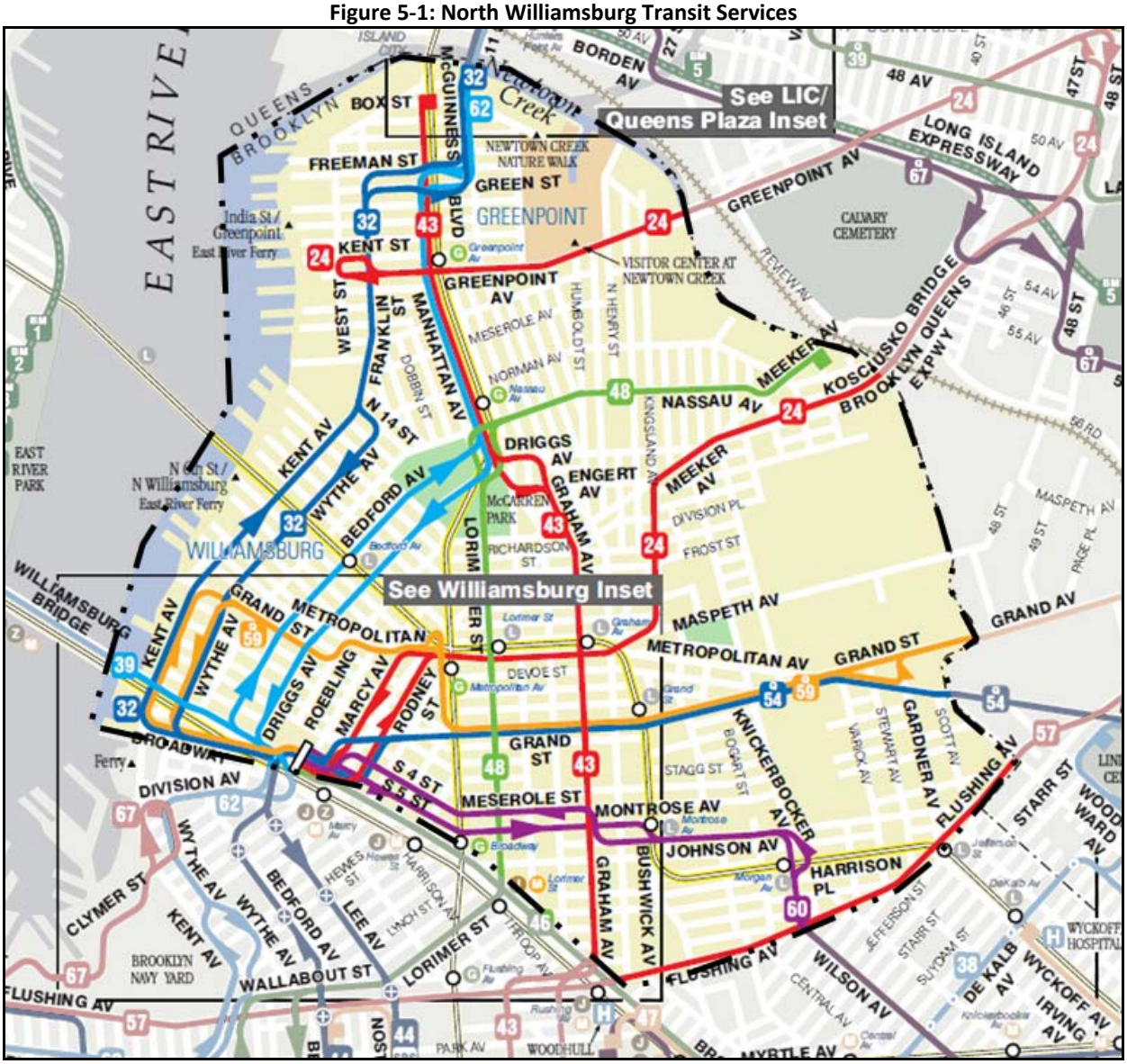
5.1 Introduction

Public transportation plays a vital role in providing service to residents, workers and visitors to the area. The study area is served by five subway lines (J, M, Z, G, L) stopping at 14 subway stations and eleven bus routes. There are bus routes along most of the major north-south corridors (Kent Avenue, Wythe Avenue, Bedford Avenue, Driggs Avenue, Manhattan Avenue, Lorimer Street and Graham Avenue) and east-west corridors (Nassau Avenue, Metropolitan Avenue, Grand Street and Greenpoint Avenue). While the residential and commercial areas in the west and middle of the study area are well served by transit, the manufacturing districts located in the eastern third section have fewer transit options. A map of transit services in the North Williamsburg Study Area is shown in figure 5-1.

5.2 Buses

Bus service in the study area extends to the Lower East Side (B39), Long Island City (B32, B62), Sunnyside (B24), Crown Heights (B43), Marine Park (B46), Flatbush (B48), Red Hook (B47), Maspeth (B47), Canarsie (B60), Jamaica (Q54) and Rego Park (Q59). The Williamsburg Bridge Plaza Terminal, located at Broadway and Havemeyer Street is the terminal point for the B24, B39, B44, B46, B60 and Q54 bus routes. Bus routes within the study area are shown in Figure 5-1 and bus frequency data is shown in table 5-1.

Figure 5-1: North Williamsburg Transit Services



Source: Metropolitan Transportation Authority

B24 - The B24 provides service from Williamsburg Bridge Plaza Terminal over the Kosciusko Bridge on the BQE into Sunnyside Queens and then back via Greenpoint Avenue and West Street. The B24 operates along Greenpoint Avenue, Meeker Avenue, Kingsland Avenue, Metropolitan Avenue, Marcy Avenue and Rodney Street. Major transfer points occur at the bus terminal (B39, B60, B46, B44, B32, B62, Q59, Q54), at Metropolitan Avenue and Union Street (G train, Q59), Metropolitan Avenue and Lorimer Street (L Train, B48), Metropolitan Ave and

Graham Avenue (L Train, B43) and at Greenpoint Avenue and Manhattan Avenue (G Train, B43, B62)

B32 – The B32 began operating September 2013, providing service from the Williamsburg Bridge Plaza Terminal over the Pulaski Bridge into Long Island City at 44th Drive. Within the study area it operates on Broadway, Kent Avenue, Wythe Avenue, Franklin Avenue, Freeman Street and Green Street. Major transfer points are the Williamsburg Bridge Plaza Terminal (B39, B60, B46, B44, B24, B62, Q59, and Q54) and Greenpoint Avenue and Franklin Avenue (B24).

B39 – The B39 serves as a shuttle from Williamsburg to Manhattan operating between the Williamsburg Bridge Plaza Terminal over the Williamsburg Bridge to Allan Street in Manhattan. Service was discontinued in 2010 and then reinstated January 2013. Major transfer points are the Williamsburg Bridge Plaza Terminal (B32, B60, B46, B44, B24, B62, Q59, and Q54) and Essex Street in Manhattan (J, M, Z, F trains)

B43 – The B43 operates from Box Street and Manhattan Avenue to Flatbush Avenue and Empire Boulevard serving the Crown Heights, Bed Stuy, Williamsburg and Greenpoint Neighborhoods. Within the study area it travels along Manhattan Avenue and Graham Avenue. Major transfer points are located at Manhattan Avenue and Greenpoint Avenue (G Train, B24, B62), Manhattan Avenue and Nassau Avenue (G Train, B48, B62), Graham Avenue and Metropolitan Avenue(L Train), Graham Avenue and Grand Street (Q54, Q59) and Graham Avenue and Flushing Avenue(J/M Trains, B46, B47, B15)

B46: The B46 operates between DeKalb Avenue/Malcolm X Blvd and Kings Plaza and/or Avenue H/Utica Avenue daily at all times. Late nights B46 buses also operate between Williamsburg Bridge Plaza and Kings Plaza. Within the study area, the B46 operates along Broadway. The major transfer points in the study area along this route are Marcy Avenue Station (J, M, Z trains) and the Williamsburg Bridge Plaza (B32, B60, B46, B44, B24, B62, Q59, Q54). The B46 has the third highest annual ridership in the MTA bus system.

B48 – The B48 operates from Nassau Ave and Varick St in the study area to Flatbush Avenue and Empire Boulevard in Lefferts Garden. Within the study area the B48 operates along Nassau Avenue and Lorimer Street with major transfer points at Nassau Avenue and Manhattan Avenue (G Train, B62, B43), at Lorimer Street and Metropolitan Ave (L Train, B24), Lorimer Street and Grand Street (Q54, Q59) and at Lorimer Street and Broadway (J/M Train, B46).

B57 – The B57 travels from Beard Street in Red Hook to Flushing Avenue and Grand Avenue in Maspeth. Within the study area the B57 travels along Flushing Avenue with a major transfer point at Flushing Avenue and Broadway (J/M Trains, B46, B43, B47, and B15)

B60 – The B60 travels from the Williamsburg Bridge Plaza Bus Terminal to Flatlands Avenue in Canarsie serving the, Williamsburg, Bushwick Brownsville and Canarsie neighborhoods. Within the study area the B60 travels along S 4th Street, S 5th Street, Meserole Street, Montrose Avenue, Johnson Avenue and Morgan Avenue. Major transfer points are at Montrose Avenue and Bushwick Avenue (L Train) and Morgan Avenue and Harrison Place (L Train)

B62 - The B62 runs from Fulton Mall in Downtown Brooklyn to Queens Plaza in Long Island City. In the study area it runs along Bedford Avenue, Driggs Avenue and Manhattan Avenue. Major transfer points occur at the Williamsburg Bridge Bus Terminal (B32, B60, B46, B44, B24, B62, Q59, Q54), at Bedford Avenue and N 7th St (L Train), at Nassau Avenue and Manhattan Avenue (G Train, B48,B43) and at Manhattan Avenue and Greenpoint Avenue (G Train, B24, B43)

Q54 – The Q54 travels from the Williamsburg Bridge Plaza bus terminal to 170trh St and Jamaica Avenue in Jamaica Queens. The route services the Jamaica, Kew Gardens, Middle Village, Ridgewood and Williamsburg neighborhoods. In the study area the Q54 travels along Grand Street. Major transfer points include the Williamsburg Bridge Plaza bus terminal (B32, B60, B46, B44, B24, B62, Q59, Q54), Grand Street and Lorimer St (B48), Graham Avenue (B43) and Bushwick Avenue (L Train, Q59).

Q59 – The Q59 travels between Williamsburg Bridge Plaza bus terminal and the Rego Park subway station at Queens Boulevard and 63rd Drive serving the Williamsburg, Maspeth and

Elmhurst neighborhoods. In the study area the Q59 travels along Kent Avenue, Wythe Avenue, Metropolitan Avenue and Grand Street. Major transfer points include the Williamsburg Bridge Plaza bus terminal (B32, B60, B46, B44, B24, B62, Q59, Q54), Metropolitan Avenue and Union Avenue (G Train), Grand Street and Bushwick Avenue (L Train).

Table 5-1: Average Bus Frequency (Minutes)

Route	Weekday					Saturday					Sunday				
	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night
B46	3	9	5	6	60	9	8	7	7	60	7	9	8	10	60
B46 SBS	3	6	3	5	-	7	6	6	7	-	12	8	8	10	-
Q54	6	15	8	15	60	20	20	15	20	60	20	20	15	20	60
B43	8	20	10	10	45	15	12	15	20	45	20	20	20	20	45
B60	8	12	10	15	60	20	12	15	15	60	20	20	20	20	60
B62	8	20	12	12	50	20	8	8	15	50	20	20	20	15	50
B57	12	20	12	20	-	20	20	15	15	-	20	20	20	30	-
Q59	10	20	10	20	45	20	15	12	15	45	30	15	12	30	45
B48	12	20	20	30	45	20	20	20	20	45	20	20	20	30	45
B24	15	30	20	30	-	30	30	30	30	-	30	30	30	30	-
B32	30	30	30	30	-	30	30	30	30	-	30	30	30	30	-
B39	30	30	30	30	-	30	30	30	30	-	30	30	30	30	-

Notes: AM=7-9AM, Noon=11AM-1PM, PM=4pm-7pm, Eve=7pm-9pm Night=Midnight-4AM
"-" denotes no service during this period
Headway in minutes
Source: Metropolitan Transportation Authority

5.3 Bus Ridership

Bus ridership includes all passengers who board buses using a valid Metro Card, cash, transfer, SBS ticket, or pass. Ridership does not include employees, non-revenue passengers (e.g., children under 44" tall traveling with an adult). Average weekday, Saturday, and Sunday ridership includes every weekday, Saturday, and Sunday in the year, except major holidays. Average weekend ridership is the two day sum of average Saturday plus average Sunday ridership. Ridership on major holidays (New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas) is included only in the annual total.

At the end of 2015, the MTA and New York City Transit bus had 238 local, seven Select Bus Service and 62 express routes. The B46 had the third highest annual ridership (14,076,206) while the next highest in the study area was the Q54, ranked 62nd (3,703,056 passengers). 2016 bus ridership within the study area is shown in the Table 5-2.

Table 5-2: 2016 Bus Ridership

Route	Weekday	Weekend	Annual	System Rank
B46	43,463	54,891	14,076,206	3
Q54	11,952	12,074	3,703,056	57
B43	10,540	11,716	3,322,487	70
B60	9,906	11,059	3,125,722	83
B62	7,882	9,814	2,544,178	100
B57	7,244	8,189	2,293,279	106
Q59	7,127	7,987	2,252,528	109
B48	3,851	4,378	1,218,214	145
B24	2,390	2,651	753,841	158
B32	819	747	249,020	172
B39	260	306	82,769	182

Ranking based on 182 routes
Source: Metropolitan Transportation Authority

5.4 Subway Service

The Metropolitan Transportation Authority – New York City Transit (MTA-NYCT) operates five subway routes (G, J, M, Z, L) making stops at thirteen stations within the study area: Marcy Avenue (J, M, Z), Hewes Street (J, M), Lorimer Street (J,M), Flushing Avenue (J, M), Greenpoint Avenue (G) Nassau Avenue (G), Metropolitan Avenue/Lorimer St (G, L), Broadway (G), Bedford Avenue (L), Graham Avenue (L), Grand Street (L), Morgan Avenue (L) and Montrose Avenue (L). Table 5-3 lists the subway lines, stations and station ridership.

The "J/ Z" train operates from Jamaica Center in the Jamaica to Broad Street in Manhattan. The Z train makes skip stops during the peak hours on weekdays. On Weekdays the "J/Z" train makes skip stop Manhattan bound from 7:15am to 8:18 am and from 4:55pm to 5:45pm Jamaica bound while running local in Manhattan at all times. In the study area it stops at the Marcy Avenue (J, M, Z), Hewes Street (J, M), Lorimer Street (J,M) and Flushing Avenue (J, M) station.

The "M" train provides service from Forest Hills-71st Avenue-Queens Boulevard in the Queens to Middle Village-Metropolitan Avenue in Queens. During late night and weekends the "M" train runs only from Forrest Hills/71st Avenue to Myrtle Avenue. In the study area it stops at the Marcy Avenue (J, M, Z), Hewes Street (J, M), Lorimer Street (J,M) and Flushing Avenue (J, M) station.

The “G” train provides service from Court Square/45 Road in the Queens to Church Avenue-McDonald Avenue in Brooklyn. In the study area it stops at the Greenpoint Avenue, Nassau Avenue, Metropolitan Avenue and Broadway stations.

The “L” Train provides service from 8th Avenue and 14th Street in Manhattan to Rockaway Parkway Station in Canarsie serving the Canarsie, Brownsville, Ridgewood, Williamsburg, East Village and Greenwich Village. Within the study area it stops at the Bedford Ave, Lorimer Street, Graham Avenue, Grand Street, Morgan Avenue and Montrose Avenue stations.

5.5 Subway Ridership

Subway ridership consists of all passengers (other than NYC Transit employees) who enter the subway system, including passengers who transfer from buses. Ridership does not include passengers who exit the subway or passengers who transfer from other subway lines. Bedford Avenue station has the highest ridership in the study area. It is ranked 31 out of 421 stations with over 27,000 average weekday riders. The Hewes Street (J/M) station has the lowest ridership in the study area and ranks 371 with approximately 2,800 average weekday riders. Subway station ridership (2016) within the study area is shown in Table 5-3.

Table 5-3: 2016 Subway Ridership

Station	Weekday	Weekend	Annual	Annual Rank (of 421)
Bedford Ave (L)	27,486	49,479	9,688,560	31
Lorimer St (L)/Metro	15,082	24,167	5,156,893	90
Marcy Ave (JMZ)	13,815	13,808	4,272,443	115
Graham Ave (L)	10,483	11,996	3,324,292	153
Flushing Ave (JM)	9,347	9,328	2,894,033	180
Greenpoint Ave (G)	9,413	10,109	2,951,454	175
Nassau Ave (G)	9,150	9,560	2,851,899	181
Grand St (L)	6,977	7,256	2,174,128	225
Morgan Ave (L)	7,592	12,480	2,614,617	193
Montrose Ave (L)	7,007	10,119	2,338,094	215
Lorimer St (JM)	5,183	5,194	1,595,826	295
Broadway (G)	4,340	5,292	1,397,227	313
Hewes St (JM)	2,866	3,291	913,179	371

Source: Metropolitan Transportation Authority

Canarsie Tunnel Rehabilitation/L Train

The rehabilitation of the Canarsie Tunnel to repair damage caused by Hurricane Sandy, planned for 15-20 months beginning in April 2019, will result in reduced L train service late nights and on weekends. The MTA is instituting measures such as increased J/Z, M and G train service, shuttle bus service to other Brooklyn subway stations, and M14 SBS in order to help minimize effects of the L-Train capacity reduction.

5.6 Ferry Service

There are two East River Ferry landings in the study area; Greenpoint landing at India Street and North Williamsburg landing at North 5th Street pier while the Schaefer's Landing/South Williamsburg landing is located just south of the study area at South 10th Street. During the AM (7:45-8:45) and PM (5:00-6:00) weekday peak hour the ferry runs every 20 minutes in both direction. From 5/2017 to 5/2018 there was an average of 107 boarding and 5 alighting northbound and 108 boarding and 6 alighting southbound in the AM peak hour and 17 boarding and 53 alighting northbound and 19 boarding and 45 alighting southbound in the pm peak hour on each ferry from the three stops combined. The North Williamsburg Landing

accounts for 54% of the total peak hour activity (boarding and alighting) while the Greenpoint landing accounts for 28% and South Williamsburg accounts for 18%.

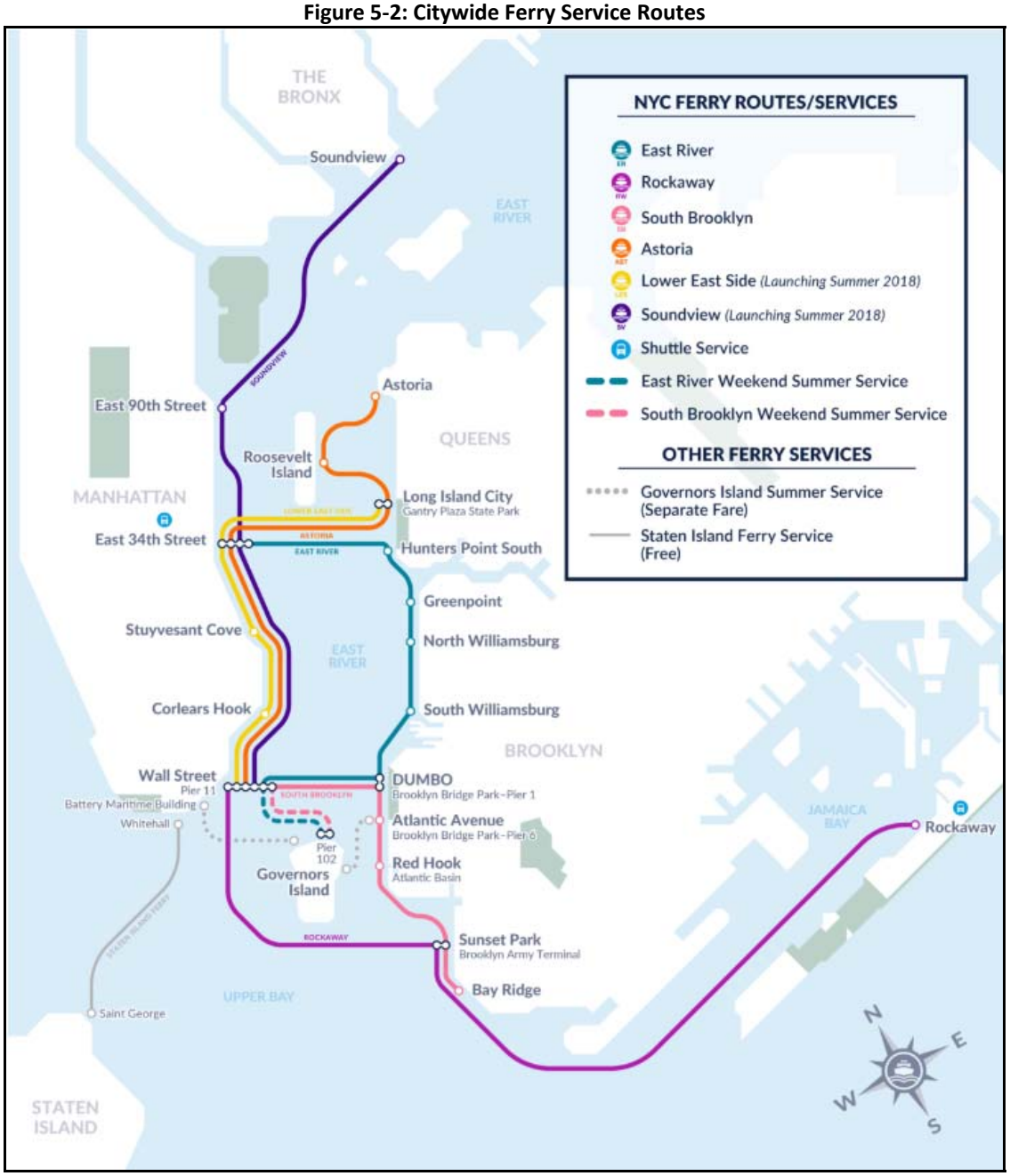
Citywide ferry service has recently added new routes to the existing operations and the price of ferry ride has decreased to the price of a MTA transit ride with free transfers between ferry routes. The lower price and increase in routes and frequency has led to increased ridership across the citywide ferry system though the ridership totals are a small portion of the total transit ridership. See figure 5-2 and table 5-4.

Table 5-4: 2017 Average Ferry Boarding/Alighting Activity

			NB	SB
Greenpoint	AM	On	29	33
		Off	1	1
	PM	On	5	4
		Off	16	14
North Williamsburg	AM	On	62	60
		Off	2	2
	PM	On	8	10
		Off	32	21
South Williamsburg	AM	On	15	15
		Off	2	3
	PM	On	4	5
		Off	13	10

Source: NYCEDC

Figure 5-2: Citywide Ferry Service Routes



Source: NYCEDC

6 PARKING

6.1 Introduction

The purpose of the parking analysis is to develop a comprehensive understanding of the study area's parking needs and demand. ARUP was contracted to collect and analyze on and off street parking in the primary study area. The analysis examined parking supply and demand for all identified off-street facilities as well as on-street activity along six major corridors and two focus areas during the AM, midday, PM, and Saturday midday peak hours. Also included in the assessment is parking utilization and illegal parking activity. Parking management strategies are explored, especially for areas with parking shortfall. Provided herein is a summary of findings and recommendations. For the entire parking report, see Appendices A.

6.1 On Street Parking

Focus Areas

The on-street parking analysis addresses parking in two focus areas and along seven major corridors, see Figure 6-1.

Focus Area 1 is bounded by N. 12th Street, Union Avenue, Meeker Avenue, S. 1st Street and Kent Avenue on the north, east, south, and west respectively. The area is primarily residential and commercial uses. Several blocks in the northwest corner of the study area are located in the Greenpoint/Williamsburg Industrial Business Zone.

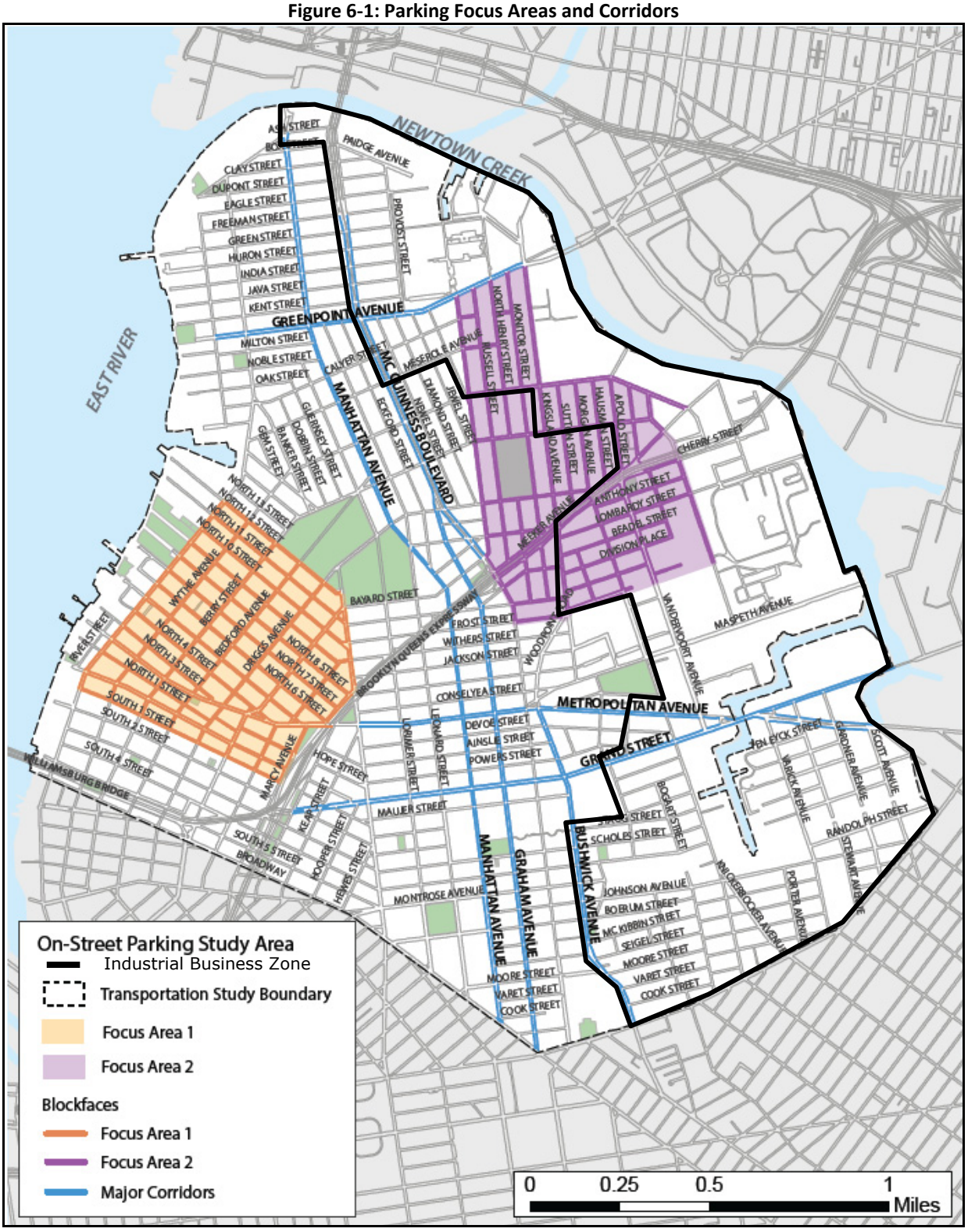
Focus Area 2 is bounded by Greenpoint Avenue, Kingsland Avenue, Norman Avenue, Bridgewater Street, Varick Street/Avenue, Frost Street and Humboldt Street to the north, east, south, and west respectively. It consists primarily of residential and industrial uses. The residential uses are concentrated south of Norman Avenue and east of Van Dam Street north of the BQE, and east of Kingsland Avenue south of the BQE. Industrial uses are concentrated in the area located in the East Williamsburg Industrial Business Zone (IBZ).

There are many corridors traversing the study area performing significant functions such as facilitating regional/inter-borough (Brooklyn, Manhattan, and Queens) flows; as well as serving significant commercial and/or industrial activity. The major corridors selected for parking analysis are as follows:

- Manhattan Avenue from Commercial Street to Broadway
- McGuiness Boulevard from Freeman Street to Humboldt Street/Bayard Street
- Greenpoint Avenue from West Street to Kingsland Avenue
- Metropolitan Avenue from Union Avenue to Scott Avenue
- Grand Street from Union Avenue to Newtown Creek Bridge and Borinquen Place from Rodney Street to Union Avenue (one corridor)
- Bushwick Avenue from Metropolitan Avenue to Flushing Avenue
- Graham Avenue from Driggs Avenue to Broadway

Manhattan Avenue (north of BQE), Graham Avenue, Grand Street and Metropolitan are commercial in nature while Grand Street and Metropolitan Avenue (east-west principal arterials) provide access to the industrial zones and the BQE.

Figure 6-1: Parking Focus Areas and Corridors



Parking Demand

Table 6-1 details the parking capacity and demand in the two focus areas and along the major corridors. Complete blockface parking utilization maps for the AM, MD, PM and Saturday midday are in Appendix A.

Focus area 1 is primarily residential and commercial with metered parking along Bedford Avenue and truck loading zones along N 3rd Street, N 7th Street and N 12th Street. The highest parking demand occurs Saturday midday with 86% utilization while the lowest is in the PM (71%).

Focus area 2 which is predominantly industrial has the highest utilization with 89% in the AM and Midday and the lowest on Saturday midday at 68%.

Metered parking can be found along Manhattan Avenue, Greenpoint Avenue, Graham Avenue and Grand Street with the highest utilization in the midday being 85% and the lowest (69%) in the PM.

Table 6-1: Focus Area Parking Capacity and Demand

Focus Area 1	AM		Midday		PM		Saturday	
	Cap	Dem	Cap	Dem	Cap	Dem	Cap	Dem
Unmetered	3,489	80%	3,500	85%	4,151	71%	3,957	86%
Metered	99	79%	99	88%	-	0%	99	92%
Truck Loading	107	26%	100	21%	11	25%	33	43%
Total	3,695	78%	3,699	83%	4,162	71%	4,089	86%
Focus Area 2	**AM**		**Midday**		**PM**		**Saturday**	
	Cap	Dem	Cap	Dem	Cap	Dem	Cap	Dem
Unmetered	3,556	90%	3,562	90%	3,842	70%	3,733	68%
Metered	-	0%	-	0%	-	0%	-	0%
Truck Loading	84	56%	84	36%	9	38%	33	47%
Total	3,640	89%	3,646	89%	3,851	70%	3,766	68%
Major Corridors	**AM**		**Midday**		**PM**		**Saturday**	
	Cap	Dem	Cap	Dem	Cap	Dem	Cap	Dem
Unmetered	1,635	82%	1,875	85%	2,868	69%	2,134	78%
Metered	717	61%	717	84%	-	0%	721	79%
Truck Loading	29	39%	26	71%	9	36%	18	60%
Total	2,381	75%	2,618	85%	2,877	69%	2,873	78%
Combined Areas	AM		Midday		PM		Saturday	
	Cap	Dem	Cap	Dem	Cap	Dem	Cap	Dem
Unmetered	8,680	84%	8,937	87%	10,861	70%	9,824	77%
Metered	816	63%	816	84%	-	0%	820	81%
Truck Loading	220	39%	210	33%	29	32%	84	48%
Total	9,716	82%	9,963	86%	10,890	70%	10,728	77%

Illegal Parking

Parking at hydrants and in driveways accounts for most illegal parking offenses observed reflective of high parking demand on busier streets though there were instances of vehicles illegally parked on relatively quiet streets, which suggests a lack of enforcement. Double parking was observed along commercial corridors; Grand Street, Manhattan Avenue and Graham Avenue where short term demand is high. In focus area 2 parking regulation signs were often missing or vandalized. The full parking study report in Appendices A identifies individual blockfaces with illegal parking.

6.2 Off Street Parking

There are 13 garages and 7 surface lots in the study area. See Figure 6-2. Table 6-2 shows the associated address, capacity and price by hour, day and month. The average capacity of the 13 garages is 145 spaces. The average price for the garages is $5.3/hour and $18.1/day. The garages are generally located near waterfront recreation areas off Kent Avenue and near McCarren Park.

Figure 6-2: Off-Street Parking Facilities

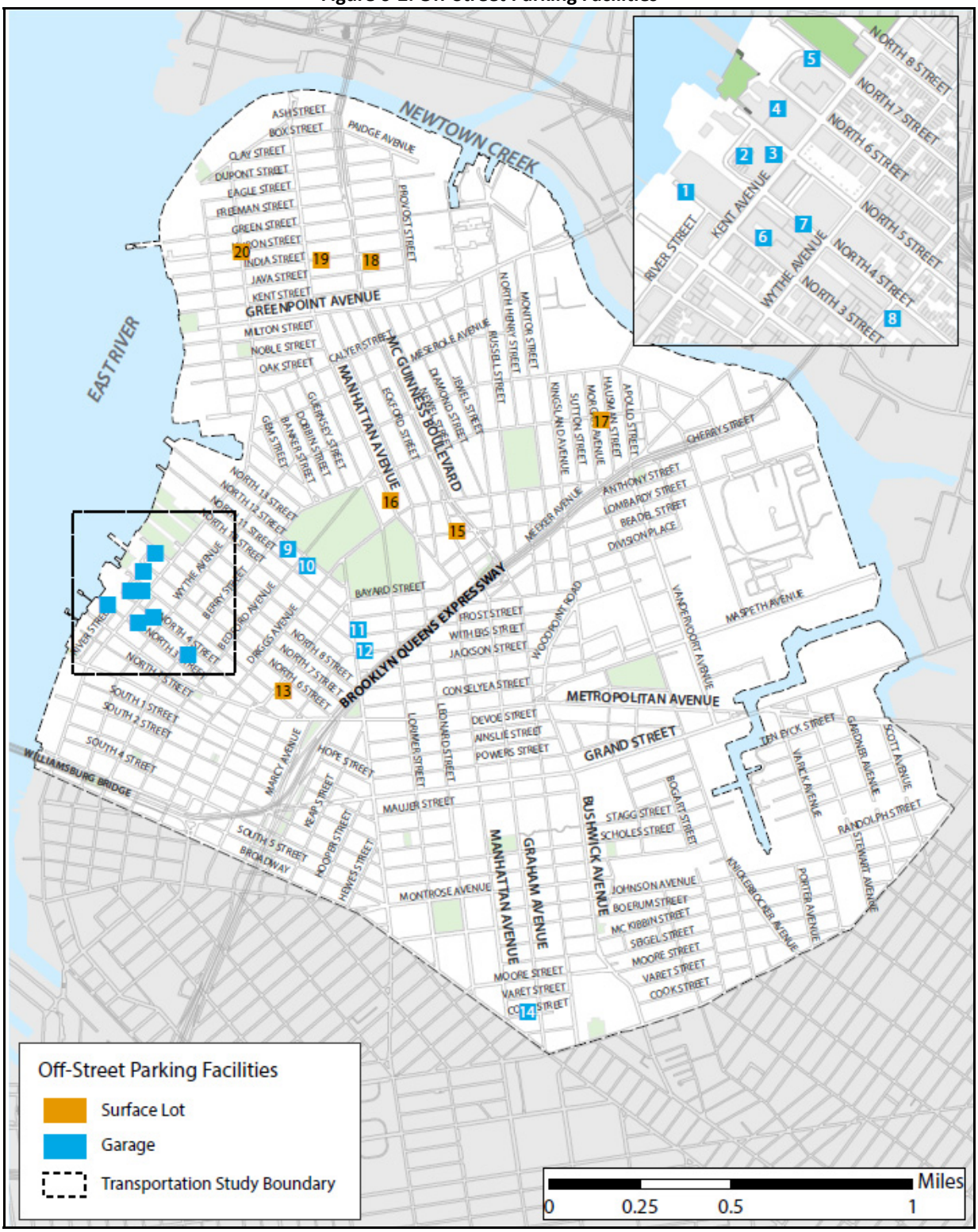


Table 6-2: Off Street Parking Facility Data

Map ID	DCA License	License Type	Cate-gory	Business Name	Primary Address	Cap-acity	Hourly	Daily	Monthly
1	1368505-DCA	Business	Garage	Quick PARK 184 Management	10 N 3RD ST	200	$4.53	$17.21	$271.80
2	2023581-DCA	Business	Garage	NORTH 4TH PLACE GARAGE CORP.	1 N 4TH PL	76	$4.53	$18.12	$300.00
3	2034907-DCA	Business	Garage	QUIK PARK LINC MANAGMENT LLC	20 N 5TH ST	174	$4.53	$17.21	$271.80
4	1386288-DCA	Business	Garage	22/34 NORTH 6TH GARAGE CORP.	22 N 6TH ST	308	$4.53	$18.12	$300.00
5	1435282-DCA	Business	Garage	34 NORTH 7TH PARKING CORP.	34 N 7TH ST	142	$4.53	$18.12	$300.00
6	2006294-DCA	Business	Garage	LAZ PARKING NEW YORK/NEW JER-SEY, LLC	175 KENT AVE	140	$4.53	$15.40	$294.45
7	2000894-DCA	Business	Garage	MP 50 NORTH LLC	51 N 4TH ST	139	$4.53	$18.12	$249.50
8	1409794-DCA	Business	Garage	QUIK Park Berry	197 BERRY ST	142	$4.53	$17.21	$271.80
9	1427222-DCA	Business	Garage	LM NORTH 12TH GARAGE, LLC	135 N 11TH ST	97	$5.43	$19.93	$317.10
10	1474717-DCA	Business	Garage	IMPARK BEDFORD AVENUE GARAGE	101 Bedford Ave	202	$6.34	$21.74	$271.80
11	1451283-DCA	Business	Garage	UNION AVE. OPERATING LLC	568 UNION AVE	65	$7.25	$21.75	$235.57
12	1451283-DCA	Business	Garage	MTP - 544 Union Ave	29 WITHERS ST	100	$7.25	$21.75	$235.57
13	1004302-DCA	Business	Surface Lot	INGENITO, FRANK	113 ROEBLING ST	6	N/A	N/A	NOT LISTED
14	1335541-DCA	Business	Garage	PROPARK AMERICA NEW YORK, LLC	21 COOK ST	94	$6.34	$18.12	$226.50
15	0699282-DCA	Business	Surface Lot	RUFRANO, ANNA	540 GRAHAM AVE	14	N/A	N/A	NOT LISTED
16	0812452-DCA	Business	Surface Lot	O.S. CARBURATORS & IGNITION SALES & SERVICES CORP.	577 MANHATTAN AVE	99	N/A	N/A	$200.00
17	1261502-DCA	Business	Surface Lot	SALVATOR, JOSEPH	284 NASSAU AVE	25	N/A	N/A	NOT LISTED
18	1297011-DCA	Business	Surface Lot	IRVING SEVRANSKY TRUST DTD 02/26/2001	210 INDIA ST	23	N/A	N/A	$180.00
19	0366601-DCA	Business	Surface Lot	TRACHTMAN, WILLIAM	152 INDIA ST	20	N/A	N/A	NOT LISTED
20	0901401-DCA	Business	Surface Lot	ABIDI, JAVED	177 FRANKLIN ST	35	N/A	N/A	NOT LISTED

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7 PEDESTRIAN AND BICYCLE

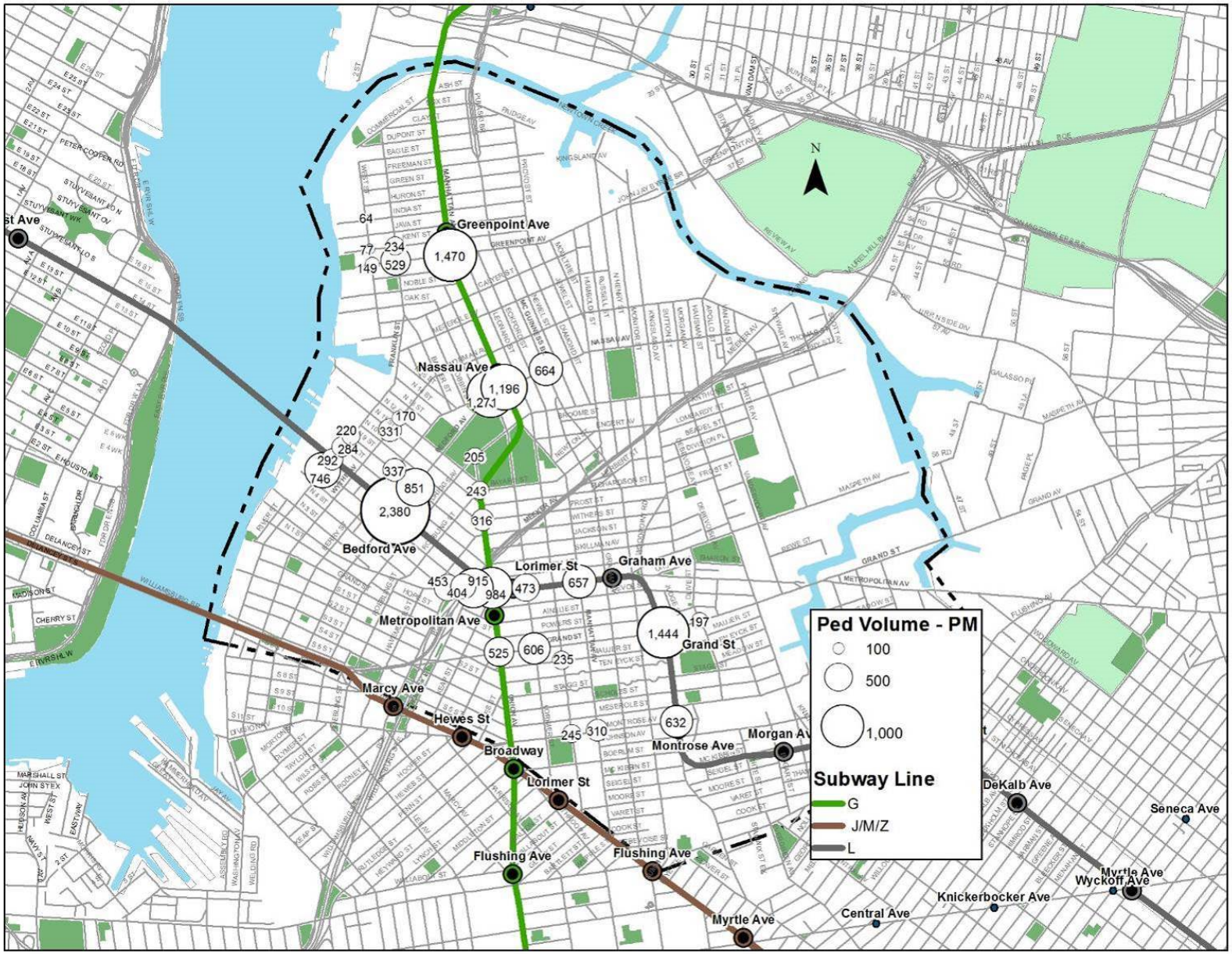
7.1 Introduction

Walking and bicycling account for 9% and 3.5% of the journey to work mode share respectively in the study area.

The pedestrian analysis, which focused on crosswalks and sidewalks was confined to areas where high pedestrian volumes were observed such as subway stations like the Bedford Avenue and Metropolitan Avenue L train stations and the Nassau Avenue G train station, and located near the head of McCarren Park, another significant pedestrian trip generator. Other high pedestrian trip generators include the waterfront recreation areas around Bushwick Inlet Park, the Williamsburg commercial core area south of N 11 Street and west of Bedford Avenue and the commercial corridors of Manhattan Avenue, Grand Avenue and Graham Avenue. Figure 7-1 shows pedestrian intersection volume at selected intersections.

The bike network, which shares the road with vehicles or has designated space in the roadway, is concentrated in the west covering the waterfront as well as the residential and commercial core areas. The east half of the study area has less bike facilities where the land use is industrial in nature and has continuity and connectivity deficiencies. The heavily used bike routes are Kent Avenue, Grand Avenue and Greenpoint Avenue.

Figure 7-1: Pedestrian Volume



7.2 Existing Conditions Pedestrian Analysis

The pedestrian analysis focused on crosswalks at select intersections (major corridors, adjacent to schools, subway, or transfer points among other locations). Pedestrian counts were conducted at 35 intersections along major corridors during the weekday AM and PM peak hours. See intersections listed below and the pedestrian volume in Figures 7-2 and 7-3.

1. West Street and India Street (unsignalized)
2. West Street and Kent Street (unsignalized)
3. West Street and Greenpoint Avenue (unsignalized)
4. Franklin Avenue and Kent Street (unsignalized)
5. Franklin Street and Greenpoint Avenue
6. Greenpoint Avenue and Manhattan Avenue
7. Kent Avenue and N 6th Street
8. Kent Avenue and N 7th Street
9. Kent Avenue and N 8th Street (unsignalized)
10. Kent Avenue and N 9th Street
11. Wythe Avenue and N 12th Street
12. Wythe Avenue and N 11th Street
13. Berry Street and N 9th Street (unsignalized)
14. Bedford Avenue and N 7th Street
15. Bedford Avenue and N 9th Street
16. Union Avenue and Driggs Avenue (unsignalized)
17. Union Avenue and Bayard Street
18. Union Avenue and Frost Street (unsignalized)
19. Nassau Avenue and Bedford Avenue
20. Nassau Avenue and Manhattan Avenue
21. Nassau Avenue and McGuinness Boulevard
22. Metropolitan Avenue and Marcy Avenue
23. Metropolitan Avenue and Meeker Avenue WB
24. Metropolitan Avenue and Meeker Avenue EB

25. Metropolitan Avenue and Union Avenue
26. Metropolitan Avenue and Lorimer Street
27. Metropolitan Avenue and Manhattan Avenue
28. Grand Street and Union Avenue
29. Grand Street and Lorimer Street
30. Grand Street and Bushwick Avenue
31. Grand Street and Waterbury Street
32. Maujer Street and Leonard Street
33. Montrose Avenue and Leonard Street
34. Montrose Avenue and Manhattan Avenue
35. Montrose Avenue and Bushwick Avenue

Figure 7-2: 2015 Pedestrian Volume AM (Part 1)

Figure 7-3: 2015 Pedestrian Volume AM (Part 2)

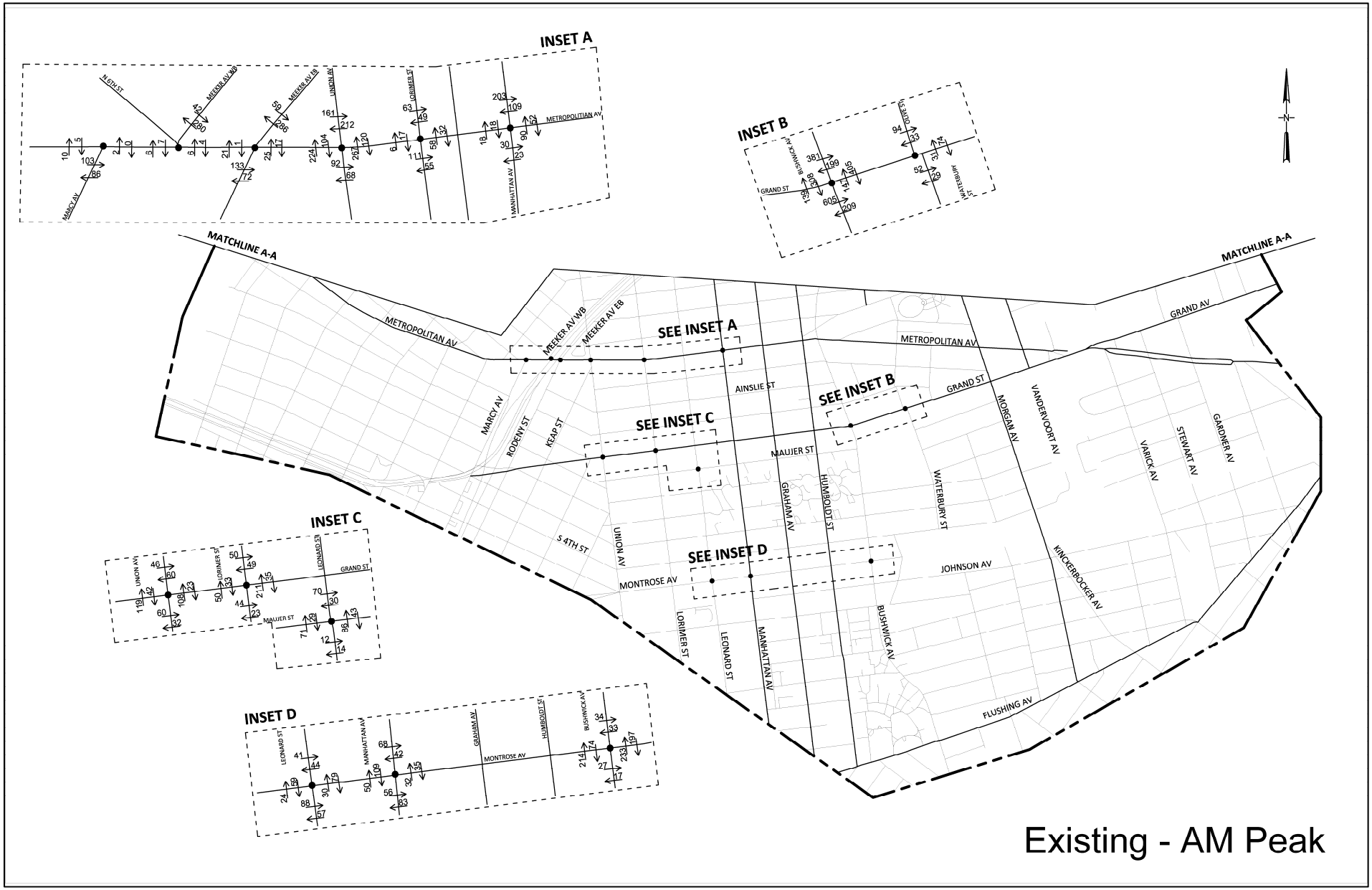
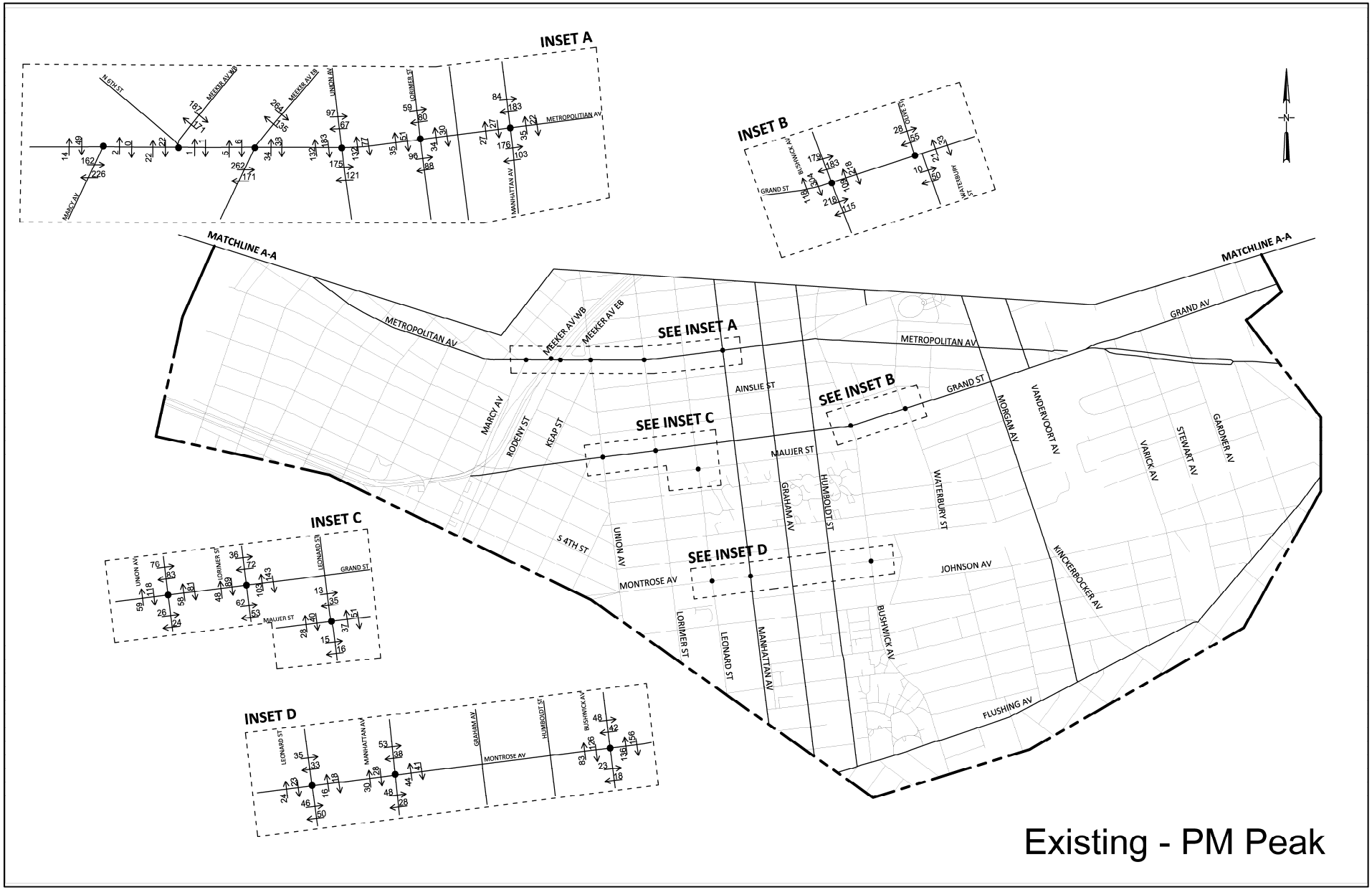


Figure 7-4: 2015 Pedestrian Volume PM (Part 1)

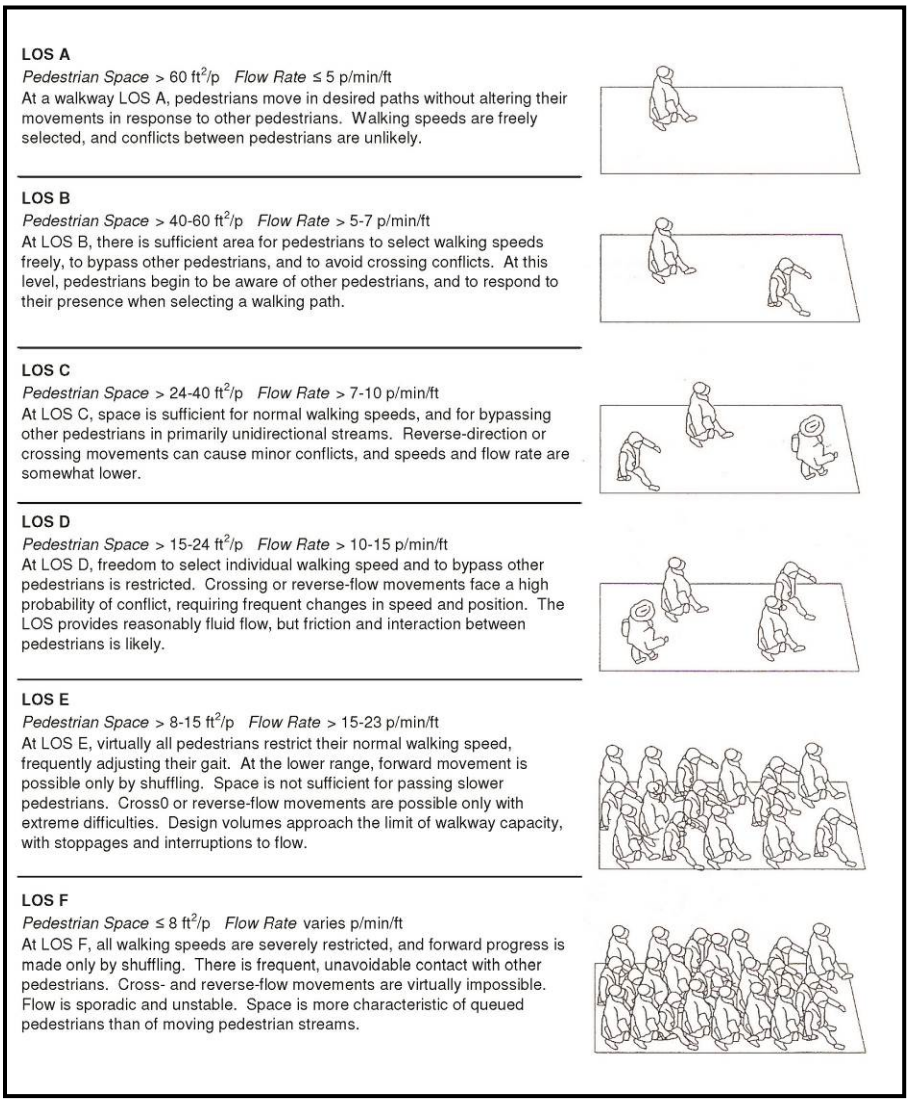
Figure 7-5: 2015 Pedestrian Volume PM (Part 2)



Level of Service Analysis & Methodology

The Highway Capacity Manual methodology was used to determine pedestrian level of service at the crosswalks and corners for the 27 signalized intersections of the 35 locations where counts were done. The analysis examined the crosswalk level of service (LOS) for the AM and PM peak hours. The pedestrian LOS is measured in terms of square feet of space per pedestrian (SF/P), as indicated in Figure 7-4. This indicates the quality of pedestrian movement and comfort, and is defined in a density-comfort relationship. Pedestrian volumes were collected in 15-minute increments during the weekday peak hours – 7:45 a.m.-8:45 a.m. and 5:00 p.m.-6:00 p.m.

Figure 7-6: Pedestrian Level of Service (LOS) Criteria



The analysis showed all crosswalks analyzed have LOS A or B except the south and west crosswalk of Bedford Avenue and N 7th Street with the Bedford Avenue L Train Station entrance and the south crosswalk of Marcy Avenue and Metropolitan Avenue which has heavy vehicle conflicts from vehicles entering the BQE entrance ramp. Table 7-1 shows the results of the crosswalk LOS analysis.

Table 7-1: Existing Crosswalk Level of Service

No.	Intersection	Crosswalk	AM		PM	
			SF/P	LOS	SF/P	LOS
1	Bedford Av & N 7th St	North	510.4	A	94.5	A
		South	139.1	A	48.6	B
		East	150.2	A	72.2	A
		West	26.1	C	21.8	D
2	Bedford Av & N 9th St	North	127.6	A	157.3	A
		South	105.6	A	76.5	A
		East	416.9	A	323.9	A
		West	446.0	A	309.9	A
3	Franklin St & Greenpoint Ave	North	279.9	A	204.1	A
		South	262.8	A	142.5	A
		East	141.7	A	147.9	A
		West	313.4	A	202.6	A
4	Waterbury & Grand St	North	318.2	A	473.3	A
		South	392.3	A	694.8	A
		East	-	-	-	-
		West	212.4	A	407.1	A
5	Bushwick Ave & Grand St	North	97.3	A	158.1	A
		South	62.2	A	173.5	A
		East	43.8	B	71.8	A
		West	66.0	A	70.1	A
6	Lorimer & Grand St	North	496.3	A	489.5	A
		South	659.5	A	362.3	A
		East	98.2	A	120.1	A
		West	318.6	A	173.5	A
7	Union Ave & Grand St	North	400.3	A	280.1	A
		South	474.4	A	1043.8	A
		East	176.5	A	199.6	A
		West	175.3	A	146.8	A
8	Kent Ave & N 6th St	North	457.0	A	545.2	A
		South	183.2	A	281.0	A
		East	318.0	A	193.1	A
		West	127.7	A	108.8	A
9	Kent Ave & N 7th St	North	1741.5	A	1474.4	A
		South	279.8	A	407.7	A
		East	408.0	A	181.0	A
		West	229.5	A	112.7	A
10	Kent Ave & N 9th St	North	1073.7	A	171.6	A
		South	2162.9	A	526.1	A
		East	1561.9	A	1882.2	A
		West	-	-	-	-
11	Wythe Avenue and N 11th Street	North	1748.6	A	687.9	A
		South	4255.8	A	1354.0	A
		East	728.2	A	692.2	A
		West	963.3	A	250.0	A
12	Wythe Avenue and N 12th Street	North	8634.3	A	5754.8	A
		South	1582.4	A	1221.5	A
		East	759.0	A	818.1	A
		West	1820.3	A	471.6	A
13	Manhattan Ave & Greenpoint Ave	North	197.7	A	160.6	A
		South	298.8	A	121.0	A
		East	115.5	A	65.5	A
		West	137.6	A	90.0	A
14	Marcy Ave & Metropolitan Ave	North	-	-	-	-
		South	146.8	A	55.4	B
		East	-	-	-	-
		West	-0.7	F	-9.9	F

Table 7-1: Existing Crosswalk Level of Service (Continued)

No.	Intersection	Crosswalk	AM		PM	
			SF/P	LOS	SF/P	LOS
15	Leonard St & Amujer St	North	149.1	A	650.6	A
		South	895.5	A	579.1	A
		East	153.8	A	207.7	A
		West	129.6	A	235.4	A
16	McGuiness Blvd & Nassau Ave	North	145.2	A	173.1	A
		South	220.1	A	125.3	A
		East	205.9	A	158.6	A
		West	208.0	A	205.6	A
17	Manhattan Ave & Metropolitian Ave	North	124.7	A	261.1	A
		South	1086.5	A	273.6	A
		East	156.9	A	262.7	A
		West	609.8	A	218.5	A
18	Meeker Ave WB & Metropolitan	North	61.8	A	63.7	A
		South	-	-	-	-
		East	949.0	A	390.8	A
		West	1853.7	A	3301.2	A
19	Meeker Ave EB & Metropolitan Ave	North	70.1	A	69.2	A
		South	159.6	A	91.8	A
		East	518.8	A	273.4	A
		West	1026.7	A	2444.8	A
20	Union Ave & Bayard Street	North	470.6	A	451.0	A
		South	629.0	A	577.9	A
		East	590.0	A	673.6	A
		West	1474.7	A	916.8	A
21	Union Ave & Metropolitan Ave	North	137.6	A	346.6	A
		South	307.0	A	185.4	A
		East	61.2	A	122.2	A
		West	63.8	A	76.0	A
22	Lorimer Ave & Metropolitan Ave	North	360.8	A	332.5	A
		South	392.1	A	429.7	A
		East	201.0	A	270.6	A
		West	613.0	A	198.8	A
23	Bushwick Ave & Montrose Ave	North	886.9	A	804.2	A
		South	812.6	A	1035.6	A
		East	61.7	A	86.9	A
		West	100.7	A	140.6	A
24	Leonard St & Montrose Ave	North	84.9	A	299.9	A
		South	177.9	A	193.5	A
		East	204.9	A	481.2	A
		West	357.3	A	665.3	A
25	Manhattan Ave & Montrose Ave	North	237.5	A	270.6	A
		South	250.8	A	377.2	A
		East	235.9	A	194.3	A
		West	98.1	A	252.1	A
26	Lorimer & Nassau Ave	North	214.0	A	123.1	A
		South	182.7	A	149.2	A
		East	231.6	A	76.0	A
		West	171.3	A	130.7	A
27	Manhattan Ave & Nassau Ave	North	189.3	A	175.6	A
		South	97.4	A	71.1	A
		East	262.5	A	83.3	A
		West	177.7	A	118.5	A

7.3 Future Conditions Pedestrian Analysis

Pedestrian volumes are expected to increase resulting from new developments and economic growth. The 2024 future pedestrian volumes were projected using .5% per year for the first five years and .25% per year for the next five years as recommended in the CEQR Technical Manual. Additionally, pedestrian trips generated by the Greenpoint Landing and Domino Sugar development in the EIS's were added to the network. The 2026 pedestrian volume are shown in Figures 7-7 through 7-10 and the projected crosswalk LOS is shown in Table 7-2.

Figure 7-7: 2026 Pedestrian Volume AM (Part 1)

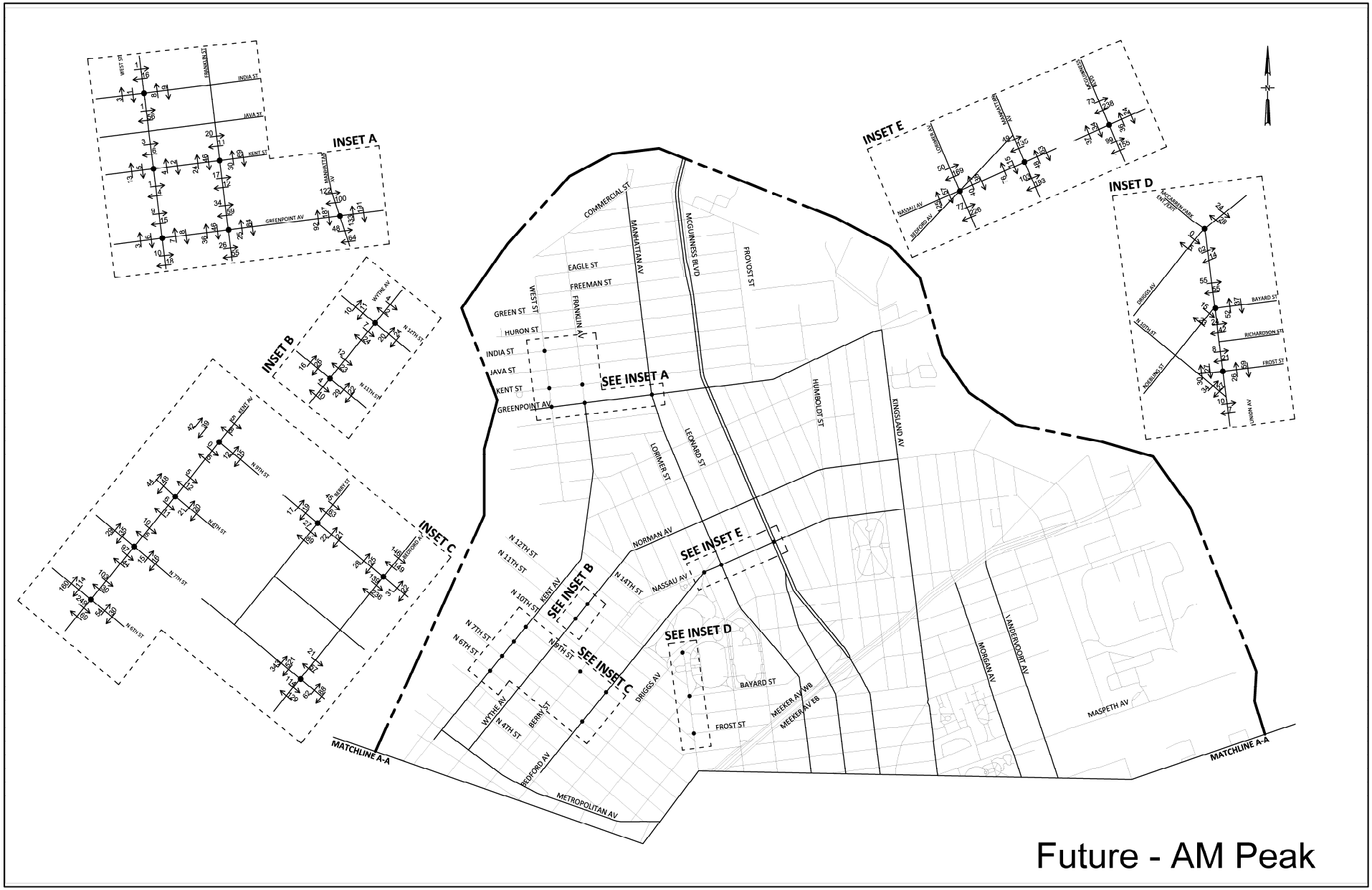


Figure 7-8: 2026 Pedestrian Volume AM (Part 2)

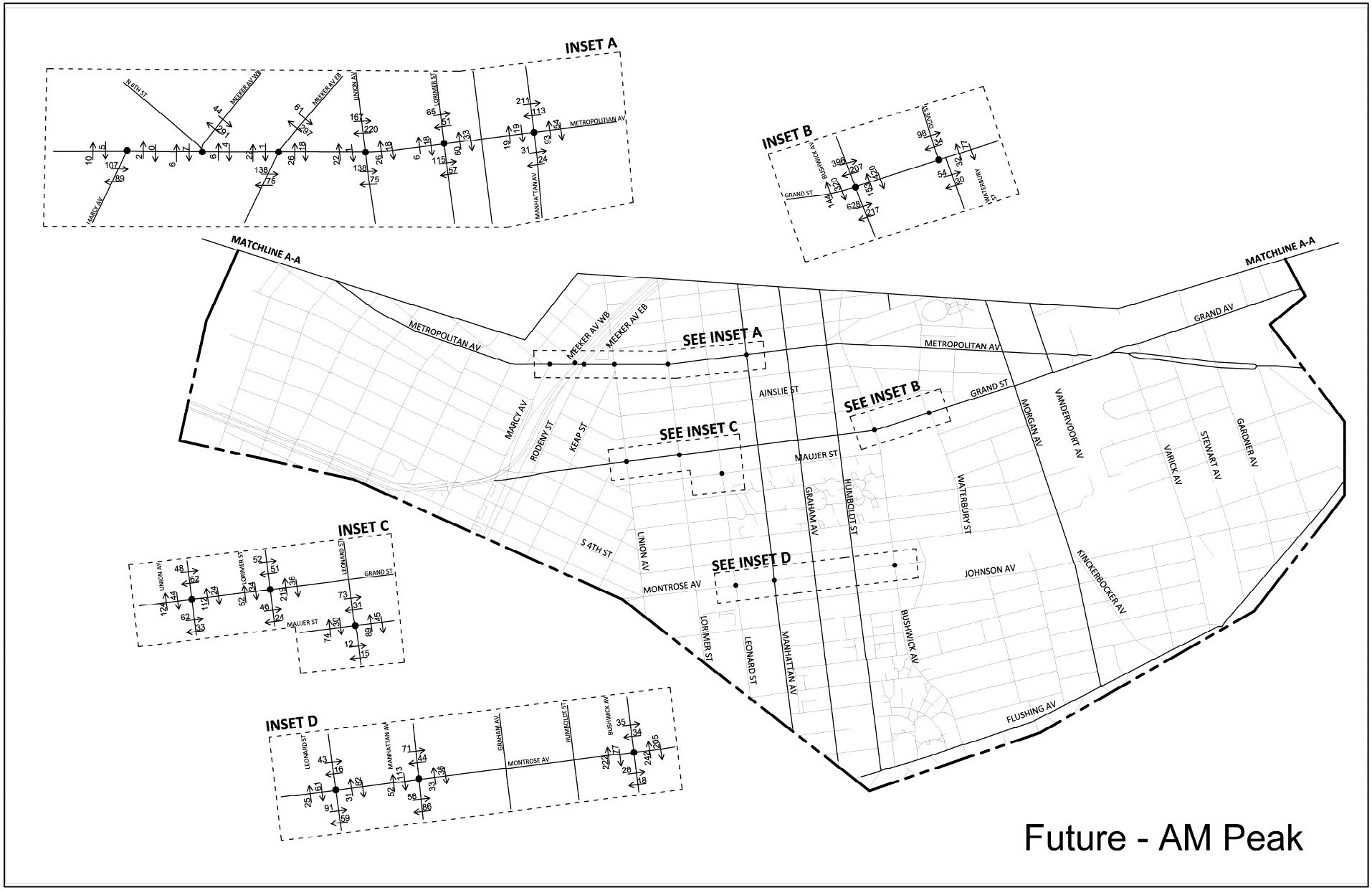


Figure 7-9: 2026 Pedestrian Volume PM (Part 1)

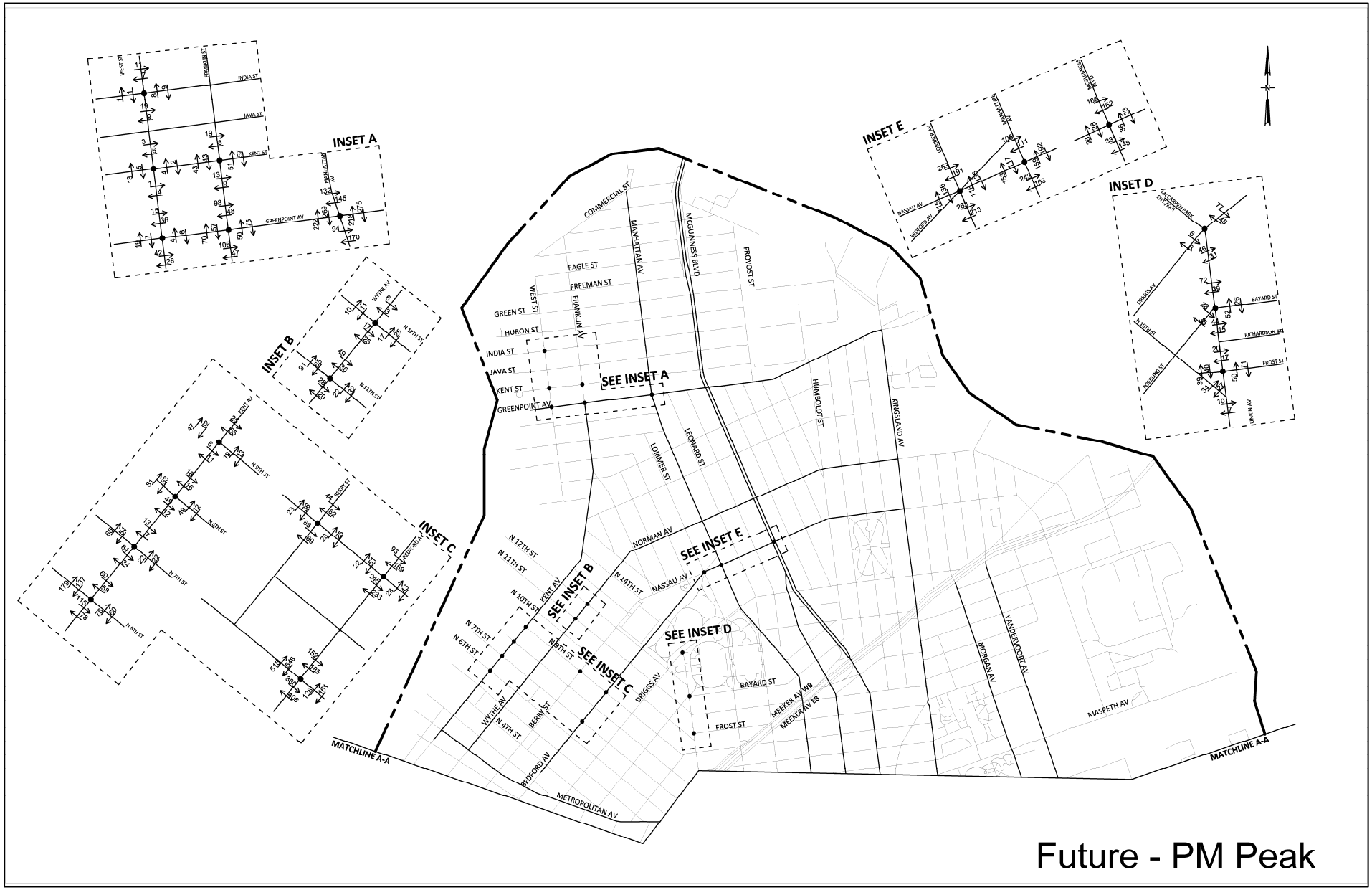


Figure 7-10: 2026 Pedestrian Volume PM (Part 2)

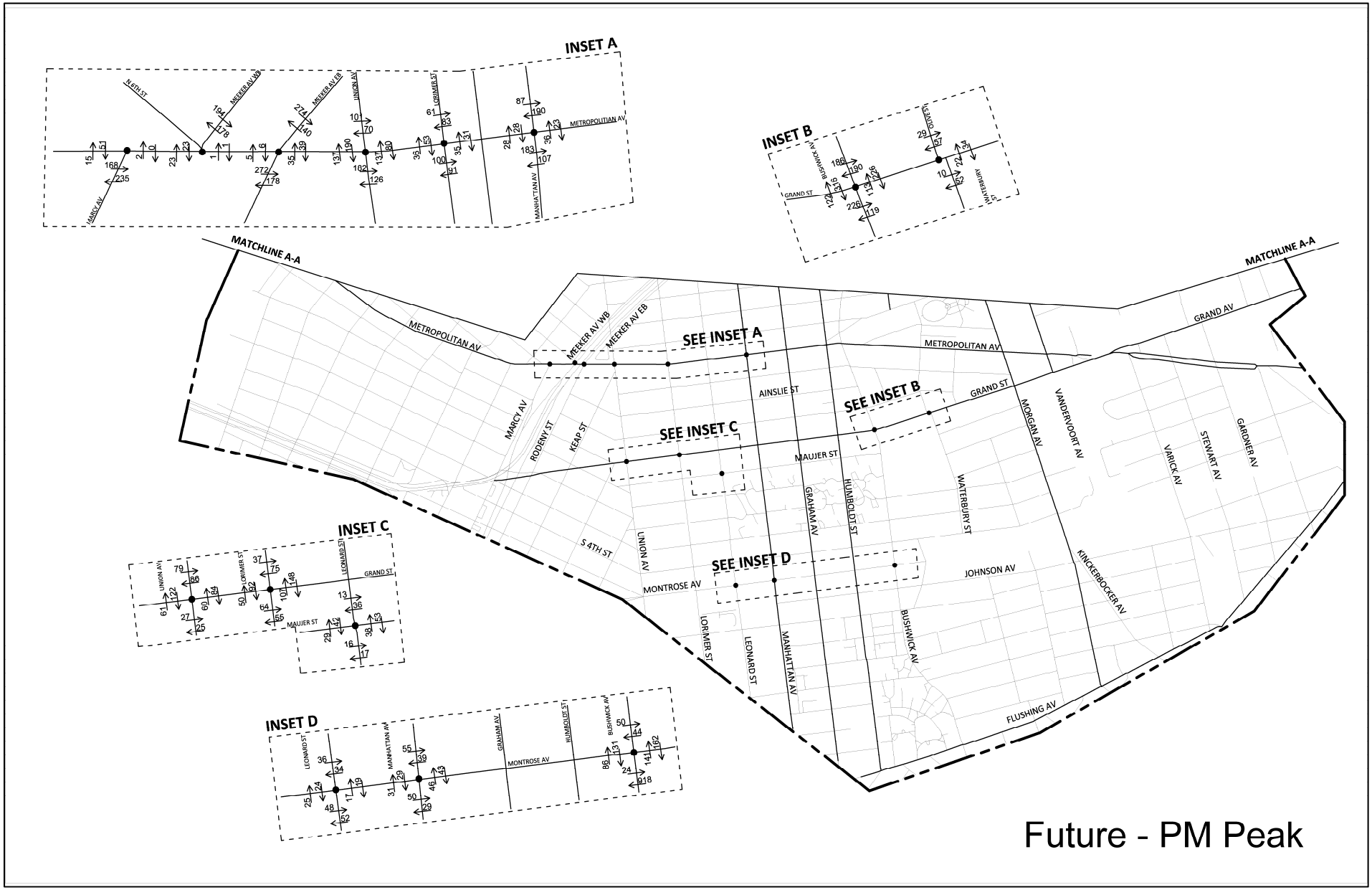


Table 7-2: 2026 Projected Crosswalk Level of Service

No.	Intersection	Crosswalk	AM		PM	
			SF/P	LOS	SF/P	LOS
1	Bedford Av & N 7th St	North	490.4	A	90.6	A
		South	133.7	A	46.6	B
		East	145.0	A	69.3	A
		West	25.0	C	20.9	D
2	Bedford Av & N 9th St	North	123.1	A	151.6	A
		South	101.4	A	73.4	A
		East	401.3	A	310.0	A
		West	428.8	A	297.0	A
3	Franklin St & Greenpoint Ave	North	242.9	A	195.6	A
		South	253.0	A	136.8	A
		East	136.4	A	141.9	A
		West	302.0	A	211.7	A
4	Waterbury & Grand St	North	305.9	A	460.4	A
		South	378.2	A	672.1	A
		East	186.5	A	366.8	A
		West	-	-	-	-
5	Bushwick Ave & Grand St	North	93.4	A	152.0	A
		South	59.7	B	167.3	A
		East	42.0	B	69.1	A
		West	63.3	A	67.3	A
6	Lorimer & Grand St	North	476.9	A	471.9	A
		South	631.0	A	350.0	A
		East	94.4	A	115.7	A
		West	307.4	A	167.2	A
7	Union Ave & Grand St	North	385.6	A	269.7	A
		South	459.6	A	1003.5	A
		East	169.7	A	192.5	A
		West	167.8	A	141.8	A
8	Kent Ave & N 6th St	North	439.6	A	526.6	A
		South	176.1	A	270.9	A
		East	306.5	A	186.0	A
		West	122.9	A	104.5	A
9	Kent Ave & N 7th St	North	2328.0	A	1474.4	A
		South	267.6	A	395.0	A
		East	381.5	A	172.7	A
		West	222.2	A	108.9	A
10	Kent Ave & N 9th St	North	1588.0	A	168.7	A
		South	3201.6	A	540.7	A
		East	1947.1	A	1783.2	A
		West	-	-	-	-
11	Wythe Avenue and N 11th Street	North	1702.5	A	663.0	A
		South	4255.8	A	1296.7	A
		East	699.5	A	666.3	A
		West	917.0	A	241.9	A
12	Wythe Avenue and N 12th Street	North	8634.3	A	5754.8	A
		South	1529.4	A	1159.3	A
		East	725.0	A	778.7	A
		West	1820.3	A	454.4	A
13	Manhattan Ave & Greenpoint Ave	North	190.3	A	154.5	A
		South	287.9	A	116.6	A
		East	111.0	A	62.9	A
		West	132.4	A	86.5	A
14	Marcy Ave & Metropolitan Ave	North	-	-	-	-
		South	-0.7	F	-9.5	F
		East	-	-	-	-
		West	603.9	A	103.7	A

Table 7-2: 2026 Projected Crosswalk Level of Service (Continued)

No.	Intersection	Crosswalk	AM		PM	
			SF/P	LOS	SF/P	LOS
15	Leonard St & Amujer St	North	335.6	A	637.1	A
		South	858.5	A	543.7	A
		East	148.0	A	200.6	A
		West	124.5	A	225.6	A
16	McGuiness Blvd & Nassau Ave	North	139.4	A	166.6	A
		South	211.2	A	120.6	A
		East	199.0	A	152.4	A
		West	202.0	A	197.6	A
17	Manhattan Ave & Metropolitian Ave	North	119.8	A	251.4	A
		South	1046.9	A	262.9	A
		East	151.4	A	253.5	A
		West	577.4	A	210.6	A
18	Meeker Ave WB & Metropolitan	North	59.2	B	61.1	A
		South	-	-	-	-
		East	949.0	A	8760.0	A
		West	1853.7	A	140.3	A
19	Meeker Ave EB & Metropolitan Ave	North	-	-	-	-
		South	495.7	A	88.1	A
		East	153.3	A	265.9	A
		West	985.9	A	907.3	A
20	Union Ave & Bayard Street	North	453.4	A	434.2	A
		South	459.7	A	554.6	A
		East	779.1	A	647.5	A
		West	1397.2	A	843.0	A
21	Union Ave & Metropolitan Ave	North	132.4	A	332.1	A
		South	293.9	A	178.0	A
		East	58.8	B	117.5	A
		West	61.3	A	73.1	A
22	Lorimer Ave & Metropolitan Ave	North	347.8	A	320.6	A
		South	378.1	A	351.1	A
		East	194.4	A	262.3	A
		West	800.1	A	191.9	A
23	Bushwick Ave & Montrose Ave	North	861.0	A	769.9	A
		South	777.9	A	987.6	A
		East	59.2	B	83.6	A
		West	96.7	A	135.2	A
24	Leonard St & Montrose Ave	North	81.0	A	291.2	A
		South	171.9	A	22.9	D
		East	197.5	A	454.6	A
		West	344.5	A	638.0	A
25	Manhattan Ave & Montrose Ave	North	227.1	A	261.8	A
		South	242.0	A	362.6	A
		East	109.2	A	185.4	A
		West	94.4	A	243.6	A
26	Lorimer & Nassau Ave	North	206.1	A	118.6	A
		South	175.9	A	143.4	A
		East	225.6	A	73.3	A
		West	164.5	A	125.9	A
27	Manhattan Ave & Nassau Ave	North	181.9	A	168.9	A
		South	263.5	A	68.3	A
		East	91.3	A	80.0	A
		West	171.0	A	113.9	A

7.4 Bicycle Facilities

Bike lanes and paths cover much of the west half of the study area with Bicycle lanes on most of the major corridors in the area. The eastern half of the study area has less coverage with more industrial uses and heavy truck traffic. There are protected bike lanes on the Williamsburg Bridge and Pulaski Bridge; and bike lanes on the Greenpoint Avenue and Metropolitan Ave Bridges. A planned protected bike and pedestrian path will be in place with the completion of phase two of the Kosciusko Bridge. Kent Avenue is part of the Brooklyn Greenway Initiative which is a planned 14 mile pedestrian and bicycle route connecting communities along the Brooklyn waterfront. The existing bike lanes and routes are listed below and shown in Figure 7-11.

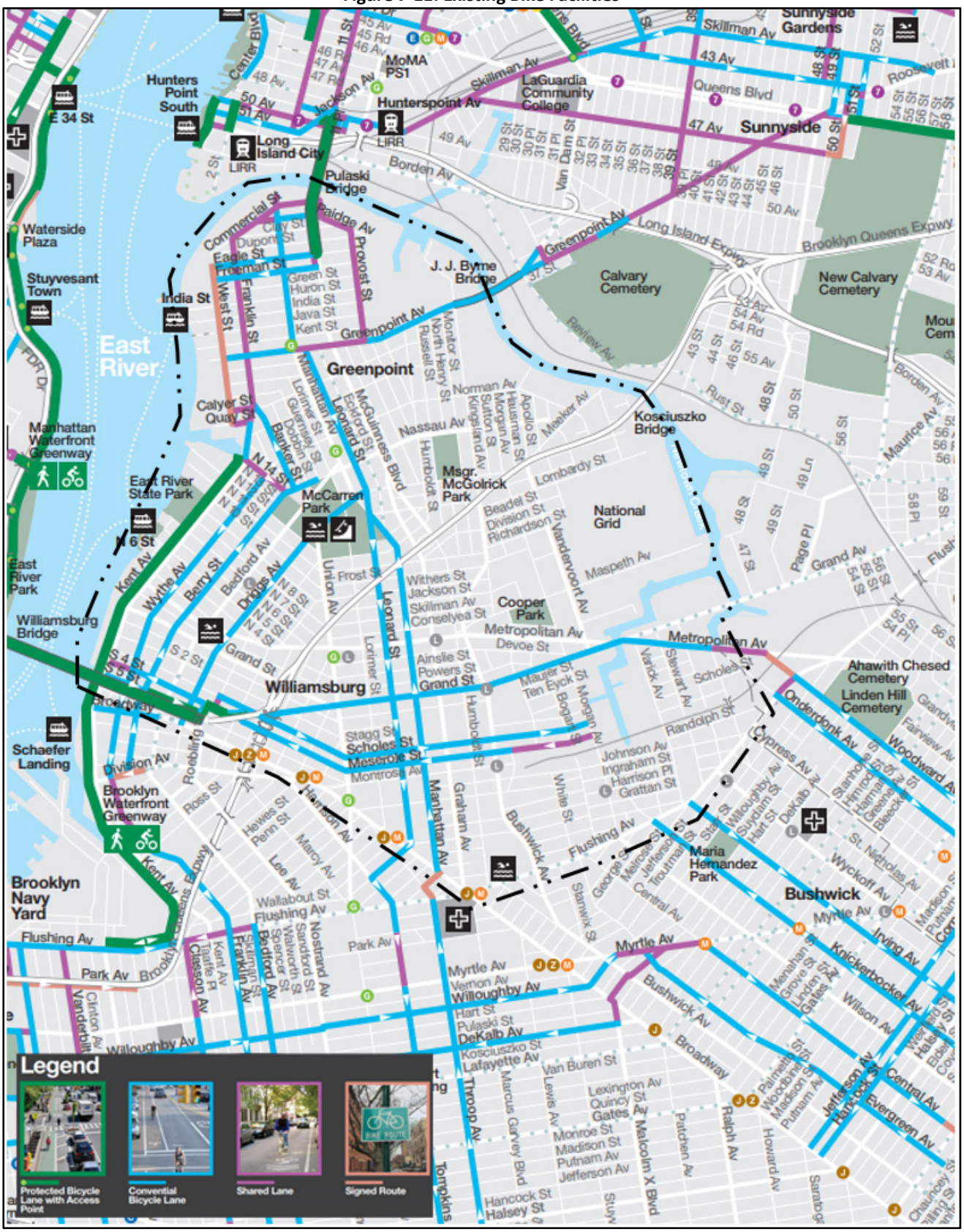
North/South Bike Lanes

- Kent Ave (NB/SB)
- Wythe Ave (SB)
- Berry St (NB)
- Driggs Ave (SB)
- Manhattan Avenue (NB/SB)
- Leonard St (SB)

East/West Bike Lanes

- Greenpoint Avenue (East/West)
- Grand Avenue (East/West)
- Eagle Street (East)
- Freeman Street (West)

Figure 7-11: Existing Bike Facilities



Bike Volume

The heaviest bicycle traffic into and out of the study area occurs on the Williamsburg Bridge where 650 and 675 bikes travel to and from Manhattan during the AM and PM peak hours respectively. On the Pulaski Bridge 50 and 225 bikes travel to and from Queens during the AM and PM peak hours respectively. More than 150 bikes were observed along Grand Avenue during both peak hours while approximately 50 bikes travel across the Metropolitan Bridge during both peak hours. Bridge crossings and selected bike volume are shown in figure 7-12.

Challenges/Issues

Several bike network issues were observed and raised during public comment.

- The northbound bike lane on Berry Street ends abruptly at Guernsey Street facing head-on vehicular traffic.
- There is a difficult transition on Kent Avenue at N 14th Street in both directions as the two way bike lane on the west curb splits to opposite sides of the street
- The Pulaski Bridge Bike lane is accessible only from the west side of McGuinness Boulevard. This is particularly difficult to access as McGuinness Boulevard is separated by a concrete median and unsignalized until Green Street.
- The narrow roadway of Manhattan Avenue between Greenpoint Avenue and Leonard Street is not a designated bike route but is used as a continuation of the bike lanes north and south of this segment.

Figure 7-12: Existing AM/PM Bicycle Volume

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8 CRASH/SAFETY ANALYSIS

8.1 Introduction

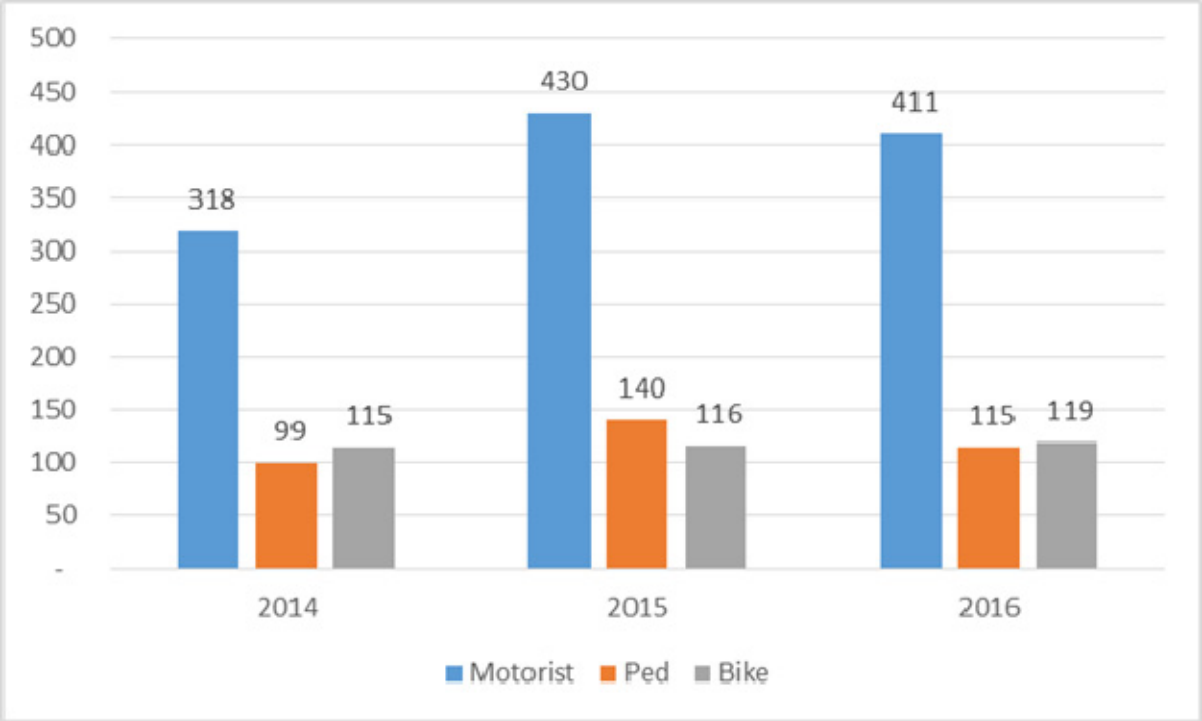
The analysis of crashes and safety is an important component of traffic and transportation planning studies, as traffic related crashes can lead to loss of life and/or property damage. This analysis serves to identify safety issues and where necessary recommend measures to enhance safety.

In order to identify locations with crash and safety issues in the study area, it was necessary to examine the crash history for patterns. Crash data for the most recent three years (2014 to 2016) was assembled and analyzed. Fatality data was collected from 2012 to 2018. Records from the New York City Department of Transportation (NYCDOT) crash database, which includes data from the New York State Department of Motor Vehicle (NYSDMV) and New York City Police Department (NYPD) were used to provide information on crash location, severity, collision type, time of day, and other factors such as weather.

8.2 Crashes 2014-2016

Crash records were examined for every intersection within the study area for the period 2014-2016. There were 2,117 crashes resulting in 1,482 injuries to the driver/passenger, 354 pedestrian injuries and 354 bicyclist injuries. The data shows total reportable crashes increased 10% from 2014 to 2015 and increased 3% in 2016. Pedestrian crashes increased 41% in 2015 and then decreased 18% in 2016 while bike crashes remained relatively constant over this time. Figure 8-1 shows the total reportable crashes from 2014 to 2016.

Figure 8-1: Injuries by Year (2014-2016)



8.3 Vision Zero Priority Intersections and Corridors

The NYC Vision Zero Action Plan is a set of initiatives to reduce death and serious injuries on city streets. A major part of the plan is to identify priority intersections and corridors in the city. Priority intersections have the highest pedestrian KSI (killed or severely injured) that cumulatively account for 15% of the boroughs total pedestrian KSI. Priority corridors were selected from a ranked per mile KSI list until the cumulative number of KSI reached half of the boroughs total. There is one vision zero priority intersection in the study area ie. Metropolitan and Bushwick Avenues. The Vision Zero priority corridors are Broadway, Graham Avenue, Bushwick Avenue, Flushing Avenue and Knickerbocker Avenue. Vision Zero priority intersections and corridors are shown in figure 8-2.

8.4 High Crash Locations

The most recent three years (2014-2016) analysis resulted in three intersections identified as High Crash Locations. High crash locations are characterized as having five or more pedestrian or bike crashes or 23 or more reportable crashes in any one year between 2014 and 2016. The Bushwick Avenue and Flushing Avenue intersection had six bike crashes in 2014. The Grand Street and Union Avenue intersection had five bike crashes in 2016. The intersection of McGuinness Boulevard and Nassau Avenue had five pedestrian crashes in 2016. Table 8-1 shows the crash data at the three High Crash Locations.

Table 8-1: High Crash Location (2014-2016)

	2014			2015			2016		
	Motor	Bike	Ped	Motor	Bike	Ped	Motor	Bike	Ped
BUSHWICK AV / FLUSHING AV	10	6	0	2	2	1	2	1	1
UNION AV / GRAND ST	6	4	3	4	4	3	4	5	0
MC GUINNESS BLVD / NASSAU AV	6	0	0	2	0	0	4	0	5

8.5 Fatalities & Injuries

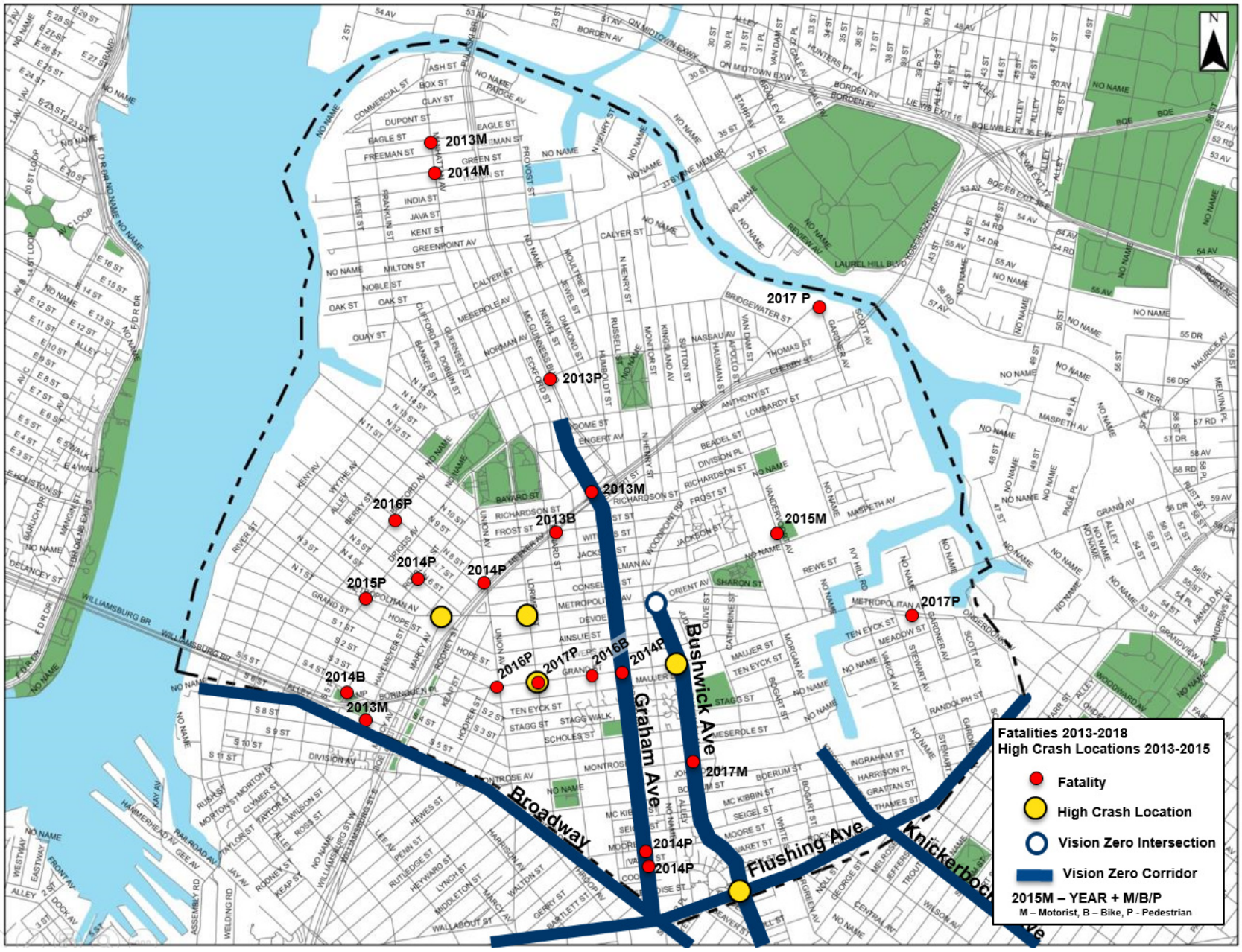
Between 2012 and 2018 (February), there were 33 fatalities including eight motorists, nineteen pedestrians and six bicyclist. Five fatalities occurred along Broadway, Grand St and on Metropolitan Avenue. Table 8-2 provides additional crash statistics at the fatality locations, while figure 8-2 shows both high crash and fatality locations.

Table 8-2: Crash Statistics at Fatality Locations

Location	Fatalities							2014-2016				
	2012	2013	2014	2015	2016	2017	2018	Crashes	Injuries	A	B	C
Bedford Ave @ N 8 St					1 (P)			2	2	-	1	1
Broadway @ Debevoise St	1 (P)							11	13	-	2	11
Broadway @ Flushing Avenue			1 (P)					49	55	4	4	47
Broadway @ Hooper St		1 (P)						12	15	1	1	13
Broadway @ Keap St		1 (M)						9	10	-	1	9
Broadway @ Lynch St		1 (P)						3	4	-	-	4
Bushwick Ave @ Montrose Ave						1 (M)		10	9	1	1	7
Franklin Ave @ Noble St						1 (B)		1	-	-	-	-
Graham Ave @ Moore ST			1 (P)					10	11	1	1	9
Graham Ave @ Varet St			1 (P)					3	1	-	-	1
Grand St @ Graham Ave			1 (P)					21	19	-	2	17
Grand St @ Lorimer St						1 (P)		19	20	-	4	16
Grand St @ Manhattan Ave					1 (B)			14	9	1	3	5
Grand St @ Union Ave					1 (P)			24	27	4	6	17
Johnson Ave @ Stewart Ave	1 (M)							7	6	-	-	6
Keap St/S 1 St @ Borinquen Pl	2 (P)							18	17	2	5	10
Manhattan Ave @ Eagle St		1 (M)						-	-	-	-	-
Manhattan Ave @ Green St			1 (M)					4	5	1	1	3
Maspeth Ave @ Vandervoort Ave				1(M)				8	11	-	4	7
McGuiness Blvd @ Nassau Ave		1 (P)						15	15	2	-	13
Meeker Ave @ Frost St		1 (B)						-	-	-	-	-
Meeker Ave @ Graham Ave		1 (M)						5	6	-	-	6
Meeker Ave @ Stewart Ave						1 (P)		1	-	-	-	-
Meeker Ave @ Union Ave			1 (P)					1	-	-	-	-
Metropolitan Ave @ Driggs Ave				1 (P)				5	4	-	-	4
Metropolitan Ave @ Graham Ave						1 (B)		9	8	1	3	4
Metropolitan Ave @ Humboldt St	1 (P)							5	9	-	1	8
Metropolitan Ave @ Scott Ave						1 (P)		3	4	1	1	2
Metropolitan Ave @ Stewart Ave	1 (B)							6	5	1	-	4
Roebling St @ N 6 St			1 (P)					-	-	-	-	-
Roebling St @ S 4 St			1 (B)					1	1	1	-	-
Williamsburg Bridge Exit St @ S 5 St		1 (M)						-	-	-	-	-

M – Motorist, P – Pedestrian, B - Bicycle

Figure 8-2: High Crash Locations (2014-2016) and Fatalities (2012-2018)



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9 GOODS MOVEMENT

9.1 Introduction

With two Industrial Business Zones (IBZ) and approximately 40% of the land devoted to industrial uses, truck traffic servicing the manufacturing and commercial establishments is very high. The distribution of goods requires curbside loading/unloading creating high parking demand while the commercial and industrial activities create quality of life issues such as noise, air quality, etc.

9.2 Truck Routes

The truck route network consists of through and local routes. Through Truck routes primarily consist of major urban arterials and must be used by trucks that have neither an origin nor destination within the borough. Local truck routes are designated for trucks with an origin and destination within a borough. This includes trucks that are traveling to make a delivery, or for loading or servicing. Trucks should only use non-designated routes at the beginning or end of a trip, when traveling between their origin/destination and a truck route. Local and through truck routes are shown in figure 9-1.

The Brooklyn Queens Expressway and Williamsburg Bridge are major through truck routes of regional significance in the study area. There are several local truck routes throughout the study area connecting to regional facilities. The North-South Local Truck Routes are:

- Kent Avenue northbound from Broadway to N 14th Street
- Franklin Street from N 14th Street to Commercial Street
- Manhattan Avenue between Commercial Street and Greenpoint Avenue
- McGuinness Boulevard from Meeker Avenue to the Pulaski Bridge
- Provost Street between Paidge Avenue and Greenpoint Avenue

- Union Avenue between N 11th Street and Broadway
- Morgan Avenue between Meeker Avenue and Flushing Avenue
- Vandervoort Avenue between Meeker Avenue and Grand Street
- Varick Street between Grand Street and Flushing Avenue
- North Henry Street northbound from Greenpoint Avenue to Norman Avenue
- Kingsland Avenue northbound from Norman Avenue to Greenpoint Avenue

East-West Local Truck Routes

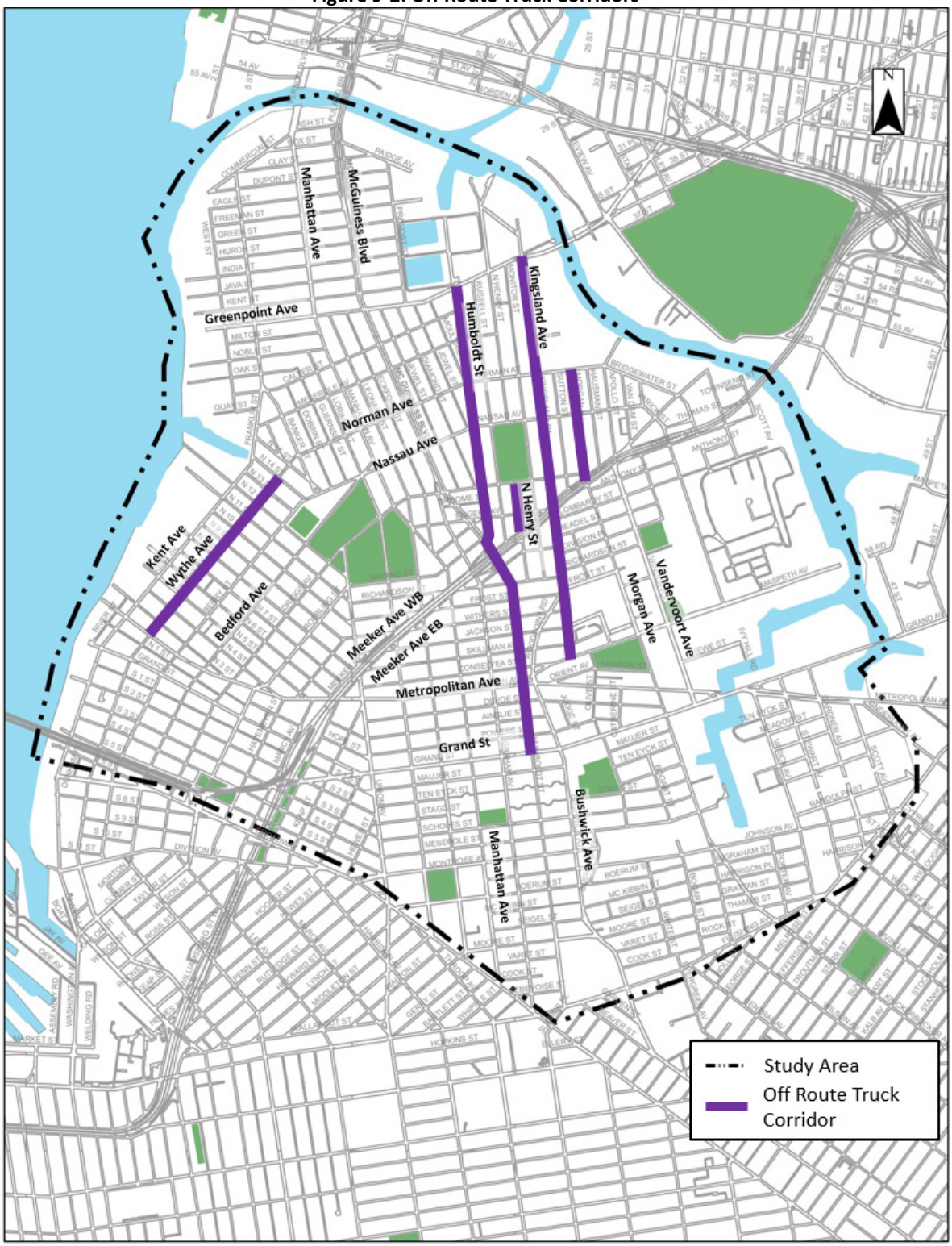
- Marcy Avenue/Meeker Avenue westbound between Varick Street and Broadway
- Rodney Street/ Meeker Avenue eastbound between Varick Street and Broadway
- Metropolitan Avenue between Kent Avenue and Gardener Avenue
- Grand Street between Rodney Street and Gardner Avenue
- Greenpoint Avenue between West Street and JJ Byrne Bridge
- Freeman Street westbound between McGuinness Boulevard and Provost Street
- Green Street eastbound between McGuinness Boulevard and Provost Street

Off Route Trucks

Trucks are required by law to use designated through and local truck routes except to access an origin or destination from the nearest point of a designated route using the most direct route, and then returning to the nearest designated truck route by the most direct route. A common complaint was trucks operating off route in the area which was confirmed through field observation. See figure 9-2 which shows and include Wythe Avenue, Humboldt St, Kingsland Avenue, Morgan Avenue and N. Henry Street commonly used by trucks.

Figure 9-1: Truck Routes in the Study Area

Figure 9-2: Off Route Truck Corridors



9.3 Truck Traffic Volume

As noted, the limited crossings over Newtown Creek and the East River result in high traffic volume on the approach routes creating bottlenecks. This condition accounts for the protracted and recurring congestion with impacting truck traffic seeking to access industrial and commercial destinations and regional facilities in and near the study area.

Figure 9-3 shows AM peak hour (7:45-8:45) truck ranges of volume while figure 9-4 shows segments with % truck traffic and ranges of total intersection volume. The highest truck traffic volume was observed on McGuinness Boulevard, Meeker Avenue, Greenpoint Avenue, Vandervoort Avenue and Metropolitan Avenue.

The truck traffic has a 50/50 directional split over both the Pulaski Bridge and JJ Byrne Bridger with approximately 110 and 170 trucks per direction on the Pulaski Bridge and the JJ Byrne Bridge respectively. However, westbound truck volume on the Grand Avenue Bridge has 170 and 60 trucks exiting. Trucks exceeded 25% of the total traffic along segments of Greenpoint Avenue, Vandervoort Avenue, Metropolitan Avenue and Grand Street.

ATRI currently provides a level of origin and destination data for freight within NYC. However, the ATRI data was not available at the time of the study analysis period.

Figure 9-3: AM Truck Activity

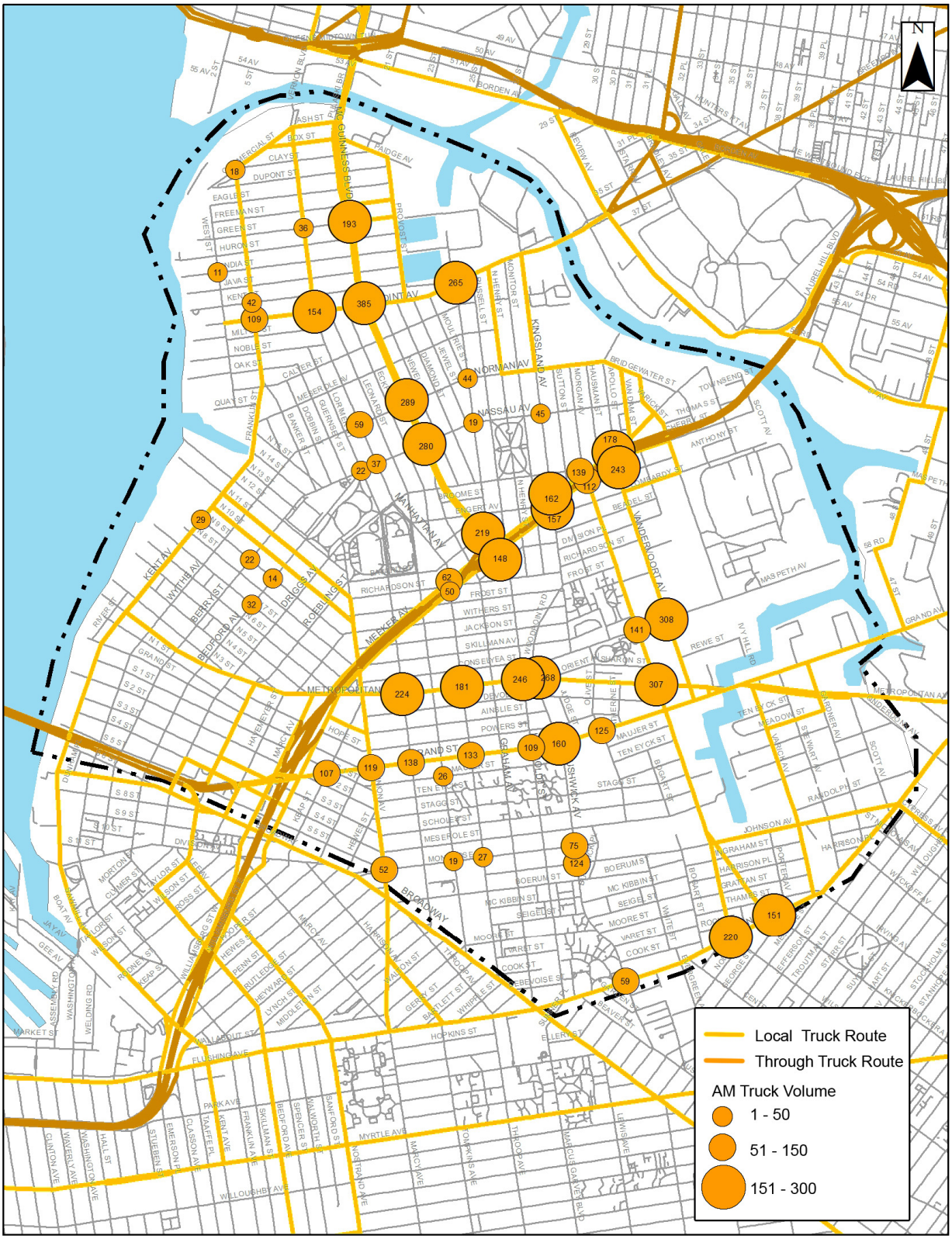
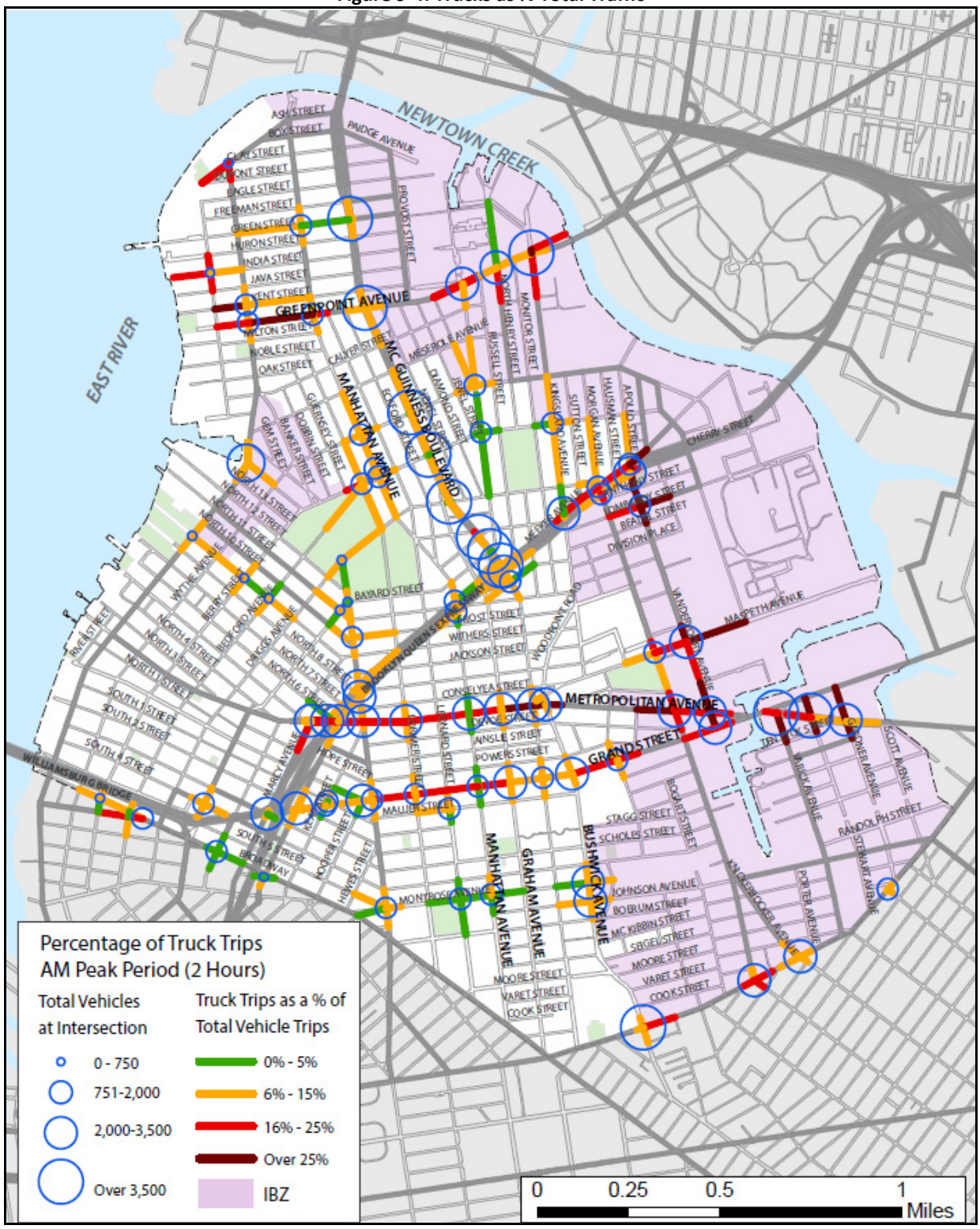


Figure 9-4: Trucks as % Total Traffic

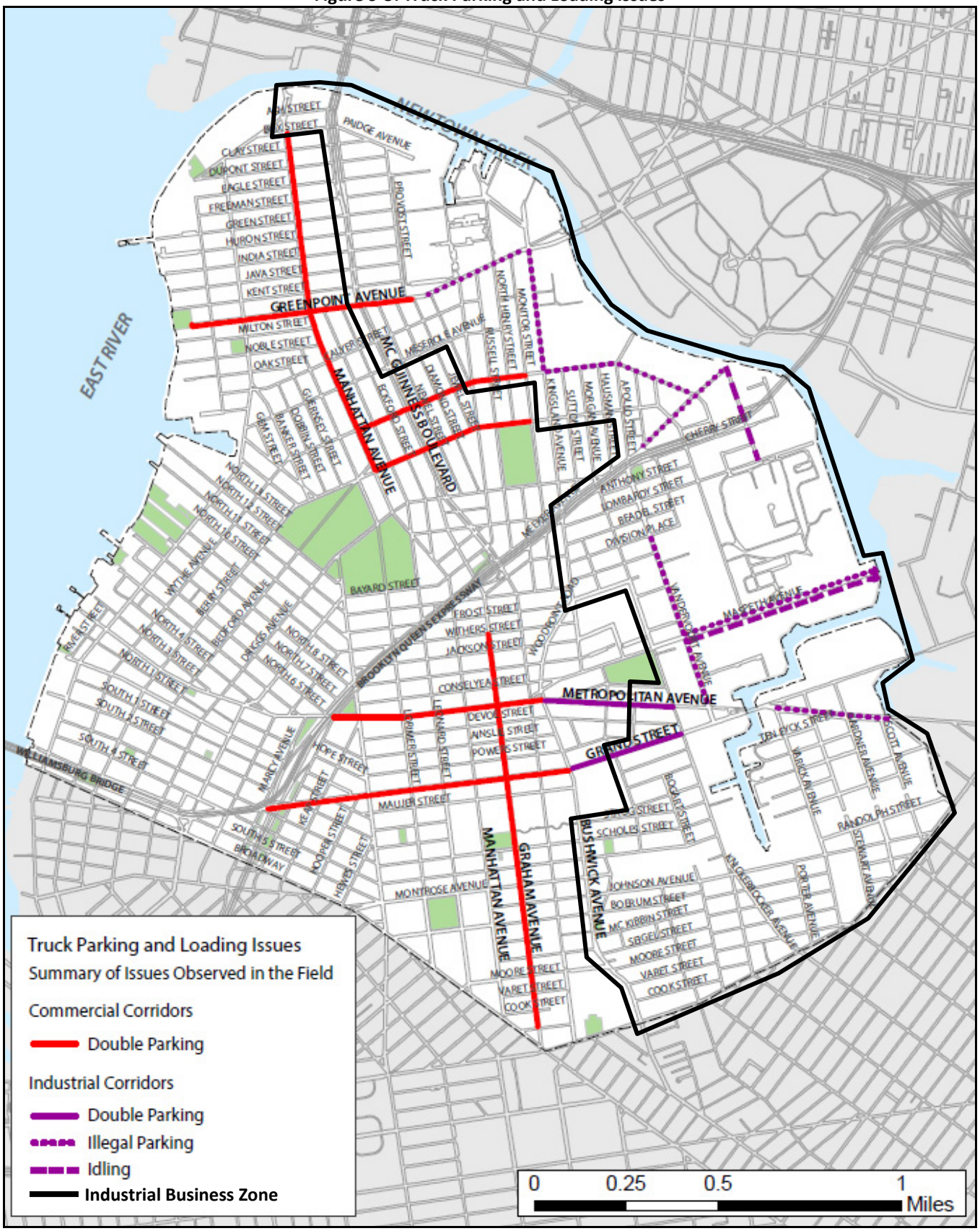


9.4 Truck Parking and Loading/Unloading

In most situations, it is legal for commercial vehicles to double park for pickups, drop offs, deliveries, or service calls if the posted regulations allow stopping, standing, or parking during that time and there are no open curb spaces within 100 feet on either side of the street that could be used instead. Additionally the vehicle must not block a bicycle lane.

However, double parking impedes visibility and reduces roadway capacity and creates congestion. Double parking is indicative of inadequate parking supply or inappropriate parking regulations. Figure 9-5 shows locations of observed double parking, illegal parking and truck idling in commercial and industrial areas. Commercial corridors where double parking was prevalent are Manhattan Avenue, Graham Avenue, Metropolitan Avenue, Grand Street, Greenpoint Avenue, Nassau Avenue and Norman Avenue. The industrial area loading and unloading space needs are reflected in trucks waiting for loading docks while illegally standing or parked. Illegal truck parking was observed along Maspeth Avenue, Vandervoort Avenue, Kingsland Avenue, Meeker Avenue east of Apollo Street and Greenpoint Avenue east of Moultrie Street while truck idling was observed along Gardner Avenue and Maspeth Avenue.

Figure 9-5: Truck Parking and Loading Issues



9.5 Identified Improvements

Signage - Interconnecting truck routes need visible signage to alert truck drivers of designated routes. Of the 89 intersecting truck routes in the study area only ten had all necessary signage with 57 having no signage and 22 intersections having some signage. See figure 9-6 for inventory. As part of NYCDOT's Smart Truck Management Plan, all missing signage will be installed.

Potential Truck Route Changes - The truck route evaluation identified two issues in the study area as shown in Figure 9-7:

- North Henry and Kingsland Avenue which are the designated local truck routes between Norman Avenue and Greenpoint Avenue are both northbound corridors. This leaves no southbound truck route for access into the North Brooklyn IBZ. As a result trucks are using Monitor Street for southbound access and some trucks are progressing past Norman Avenue to Meeker Avenue and the BQE through a residential area on a non-designated route.

- N 10th Street and N 11th Street provide east and west access between Kent Avenue and Union Avenue. However, While Kent Avenue is one way northbound to N 14th Street, Franklin Avenue is a two way local truck route and trucks traveling southbound on Franklin are forced to use N 14th Street and Wythe Avenue, a non-designated route, to get access to N 11th Street.

  Daylighting - Several intersections within the North Brooklyn Industrial Zone were identified for potential daylighting to facilitate turning and easier access onto the local truck routes. These intersections are shown in figure 9-8.

Figure 9-6: Truck Route Signage Inventory

Figure 9-7: Truck Route Issues

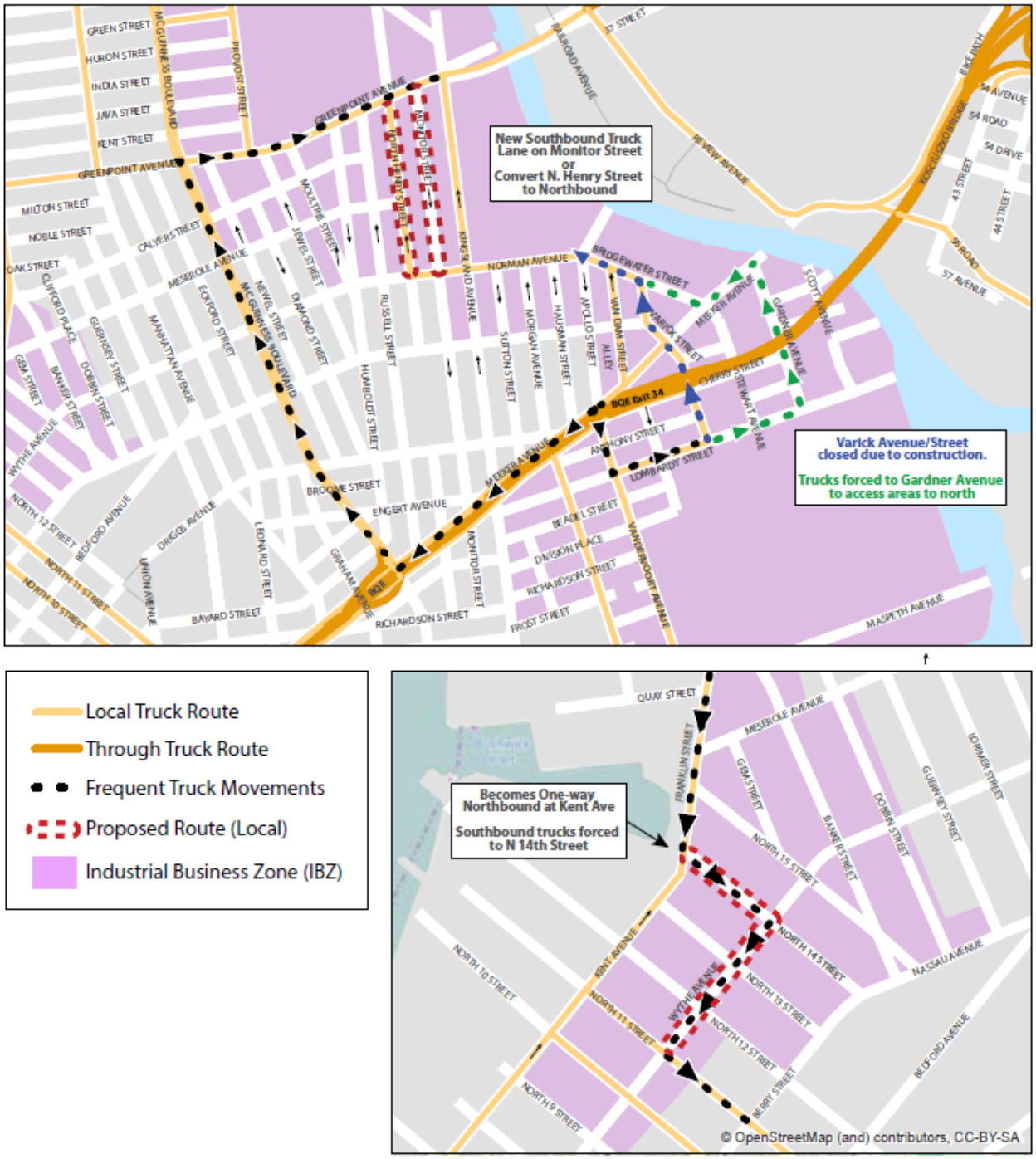


Figure 9-8: Intersections for Proposed Daylighting

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10 PUBLIC OUTREACH AND COMMUNITY INPUT

10.1 Introduction

To facilitate effective public participation and community outreach, a public participation plan was prepared which provided for a series of Technical Advisory Committee (TAC) meetings, public meetings, creation of a web portal for online comments and an email address for online communications. To that end NYCDOT hosted three TAC meetings, four public meetings as well as attended and participated in local community festivals. In addition presentations were made to elected officials, Brooklyn Community Board (CB) 1 and the CB1 Transportation Committee. See list of meetings below. The full notes of meeting and online web portal user comments can be found in Appendix B.

10.2 List of Meetings

- TAC Meeting #1 (Kickoff) – February 23, 2016
- Public Meeting #1 (Kickoff) – May 12, 2016
- Public Meeting #2 (Kickoff) – May 16, 2016
- NYCDOT Booth @ Go Green Festival – June 4, 2016
- TAC Meeting #2 (Existing Conditions) – March 9, 2017
- Public Meeting #3 (Existing Conditions) – March 30, 2017
- Meeting with CM Steven Levin (Preliminary Recommendations) – Jan 31, 2018
- Meeting with CM Antonio Reynoso (Preliminary Recommendations) –March 2, 2018
- CB1 Presentation (Summary of Recommendations) – April 10, 2018
- CB1 Transportation Committee Meeting) – May 31, 2018
- Public Meeting #4 (Full Recommendations) – June 6, 2018

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11 ISSUES AND RECOMMENDATIONS

11.1 Identified Issues

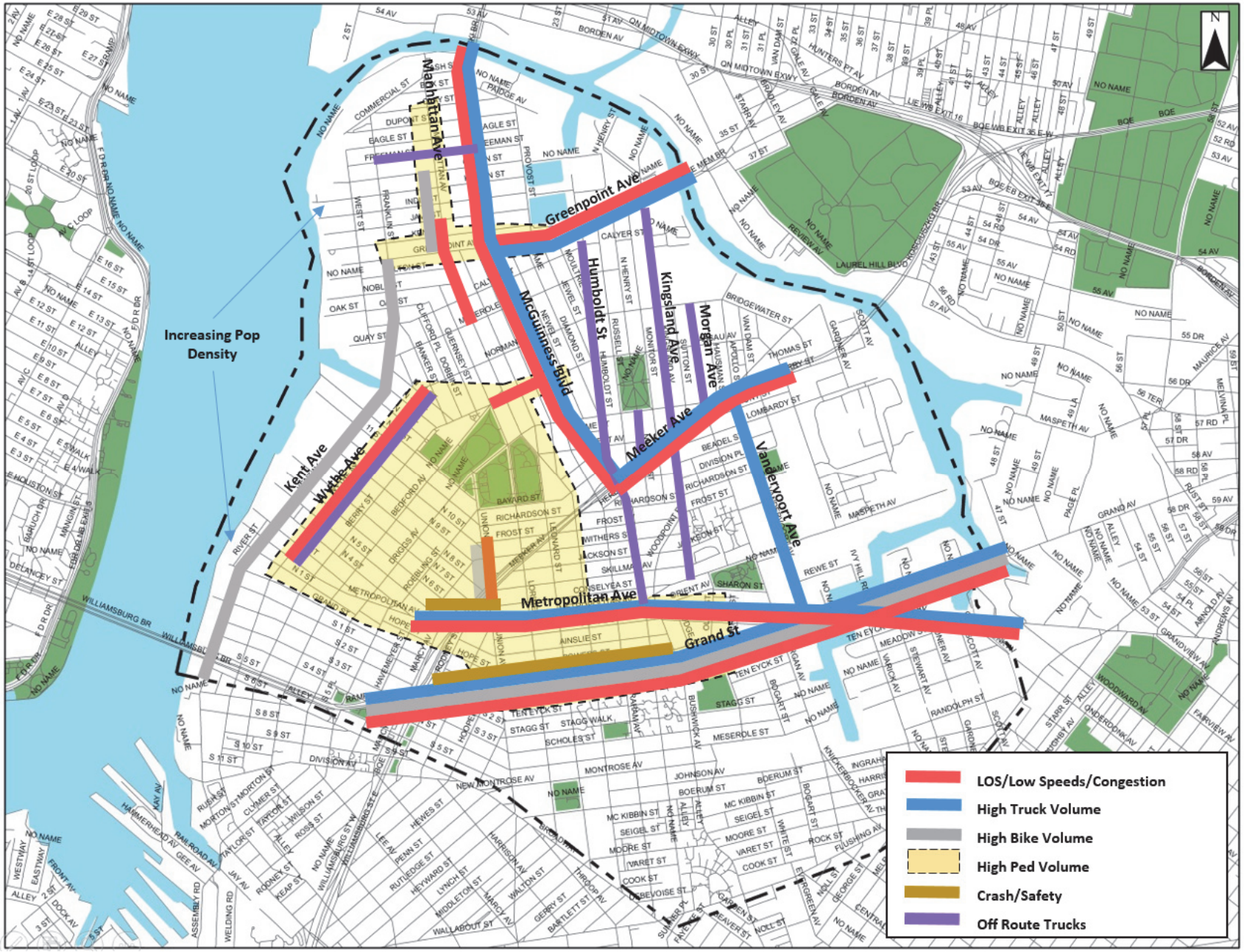
The existing conditions analysis identified many issues with respect to the transportation network such as congestion, slow travel speeds, high truck, bike and pedestrian activity, and parking/loading/unloading. The projected population growth and increased development density between 2010 and 2020 reflected in the number of residential buildings under construction (ie. Greenpoint Landing and the Domino Sugar complex) can only magnify these issues.

To be more specific *congestion* and slow speeds were observed along Greenpoint Avenue, Meeker Avenue, Kingsland Avenue, McGuinness Boulevard, Metropolitan Avenue and Grand Avenue during the AM and PM peak hours. Segments of these corridors are designated local *truck routes* with heavy truck traffic and off-route trucks are of great concern to the residential community. Non truck route segments of Morgan Ave, Monitor Avenue, Kingsland Avenue, Humboldt Avenue, Apollo Street and Wythe Avenue were used by trucks.

The highest observed *pedestrian* volume occur along Bedford Avenue, Metropolitan Ave and Grand Street near transit stations and commercial retail centers. *Bike* activity is high along Grand Street as bicyclists make their way to and from the Williamsburg Bridge.

Figure 11-1 provides a composite view of the issues and activities in the study area.

Figure 11-1: Study Area Issues



11.2 Other Initiatives

A primary function of planning is coordination hence this effort seeks to coordinate and build upon other initiatives in the area. Figure 11-2 shows other planned or recently implemented projects within the study area. Provided below is a brief description of the initiatives.

Meeker Avenue Improvements – A multi-phase project to enhance safety, improve through traffic operation and bike connections as well as to fully and efficiently use the space under the BQE.

Freeman Street/McGuinness Boulevard Connections – Plans are being pursued to open the intersection of McGuinness Boulevard at Freeman Street providing safe access for bikes and pedestrians to bus stops as well as the pedestrian/bike path on the Pulaski Bridge which currently is only accessible from the west side of McGuinness Boulevard.

Brooklyn Greenway (West Street) –West Street direction changed to one-way northbound with a two way bike lane implemented on the corridor. This route is a major north/south connection to the JJ Byrne Bridge into Queens.

McGuinness Boulevard Leading Pedestrian Intervals (LPI) – Safe pedestrian crossings on McGuinness Boulevard was a key community concern. Seven second LPIs were added to the signal plan summer 2017 along McGuinness Boulevard at Messerole Avenue, Norman Avenue, Nassau Avenue and Driggs Avenue that increased pedestrian crossing time.

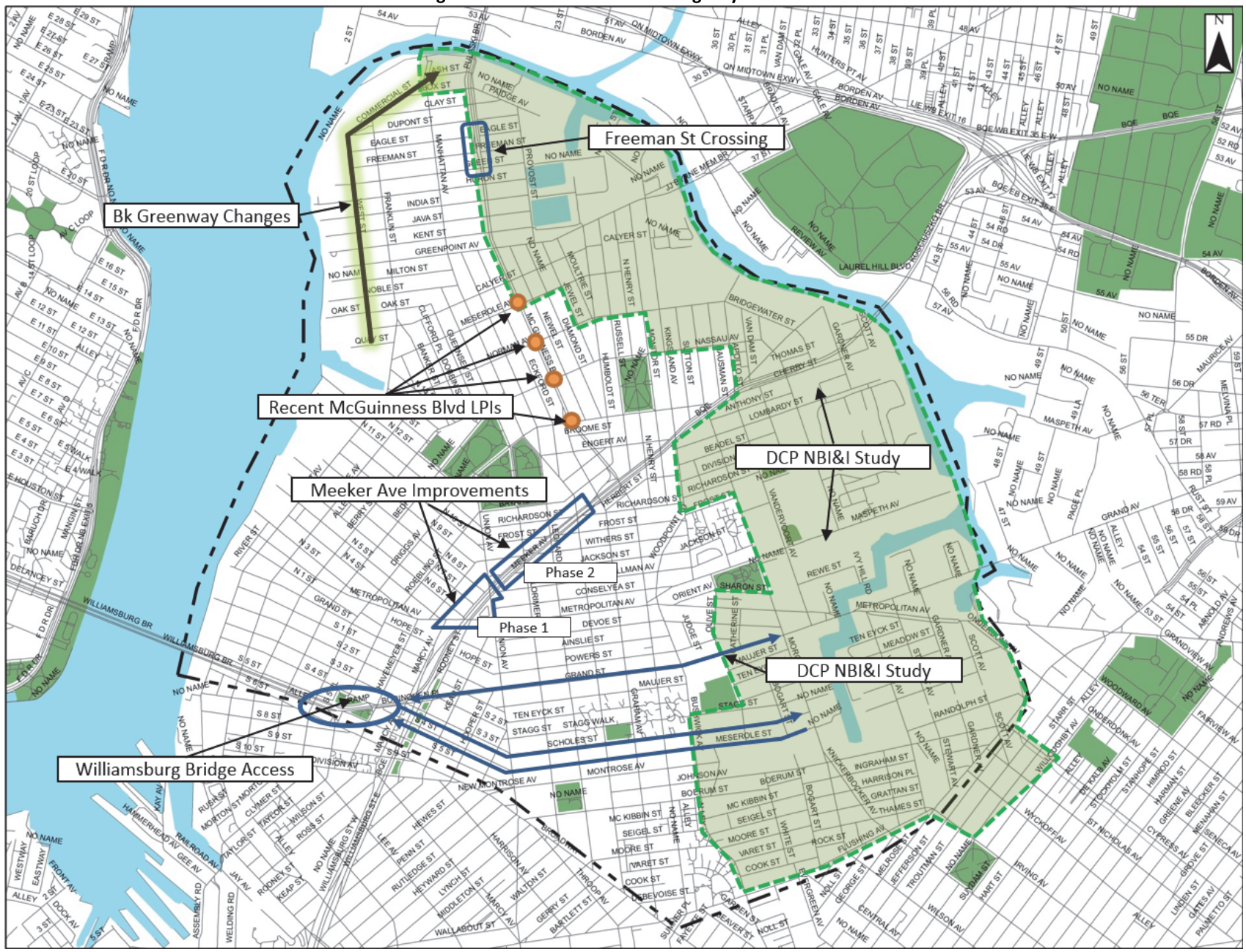
Williamsburg Bridge Access and the Grand Street Redesign – To address pedestrian and bike safety issues and as a part of the L Train shutdown, improvements are being implemented for bike and pedestrian access to and from the Williamsburg Bridge along Borinquin Plaza and Grand Street.

North Brooklyn Industry and Innovation Plan (NYC Department of City Planning) - This study seeks to preserve and strengthen the existing industrial base and explores new models for

innovation districts in the North Brooklyn IBZ while identifying transportation, infrastructure and resiliency improvements.

See figure 11-2 for other intiatives.

Figure 11-2: NYCDOT and other Agency Initiatives



11.3 Area Wide Actions

In addition to specific recommended projects there are three sets of general area wide intersection improvements described below and shown in figure 11-3.

Crosswalk Daylighting – There are eight school crossing/crosswalks where there are no stop controls on major streets. These locations will be targeted to provide better sight distance and enhanced pedestrian safety which would entail new signage, high visibility crosswalks, relocation of the crosswalk to far side of intersection and daylighting as necessary.

- Messerole Ave and Guernsey St
- Calyer ST and Lorimer St
- Wythe Ave and S 1 St
- Berry St and S 2 St
- Berry ST and S 3 St
- Manhattan Ave and Conselyea St
- Maspeth Ave and Kingsland Ave
- Powers St and Olive St
- White St and McKibben St

Stop Controls – The community feedback included many requests for safer pedestrian crossings at unsignalized intersections. Warrant analysis will be conducted for 17 intersections identified to evaluate feasibility of installing stop controls. Those that do not meeting stop control warrants will be evaluated for enhanced crosswalks.

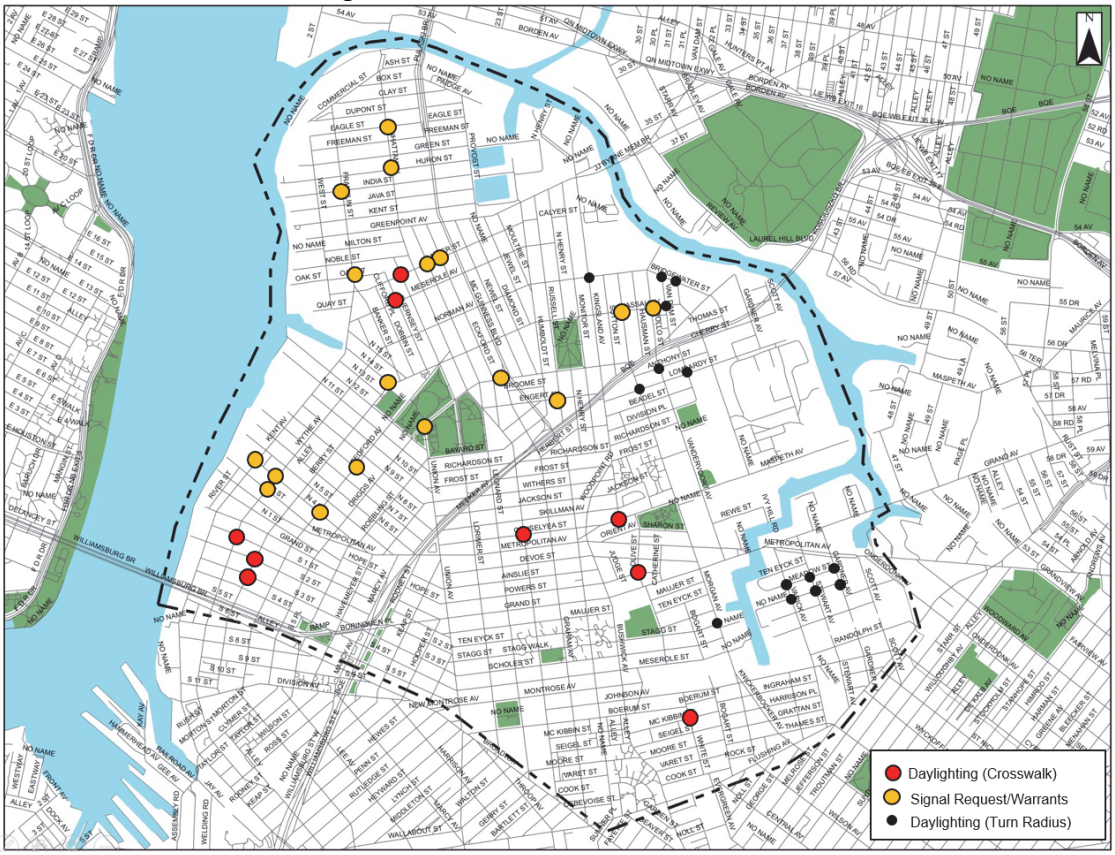
- Manhattan Ave and Eagle St
- Manhattan Ave and Huron Ave
- Franklin St and India St
- Franklin St and Oak St
- Calyer St and Leonard ST
- Calyer St and Eckford St
- Nassau Ave and N 14 St
- Kent Ave and N 4 St
- Wythe Ave and N 4 St
- Wythe Ave and N 3 St
- Bedford Ave and N 4 St
- Bedford Ave and N 8 St
- Union Ave and Driggs Ave

- Driggs Ave and Graham Ave
- Russel St and Engert Ave
- Nassau Ave and Morgan Ave
- Nassau Ave and Apollo St

Turn Radius Daylighting – Narrow roadways in industrial business zones and along truck routes can create difficult turn maneuvers for large vehicles resulting in delay and obstructions. Intersections within the North Brooklyn IBZ and along truck routes were selected for potential daylighting to increase the turning radii and to better accommodate large vehicles.

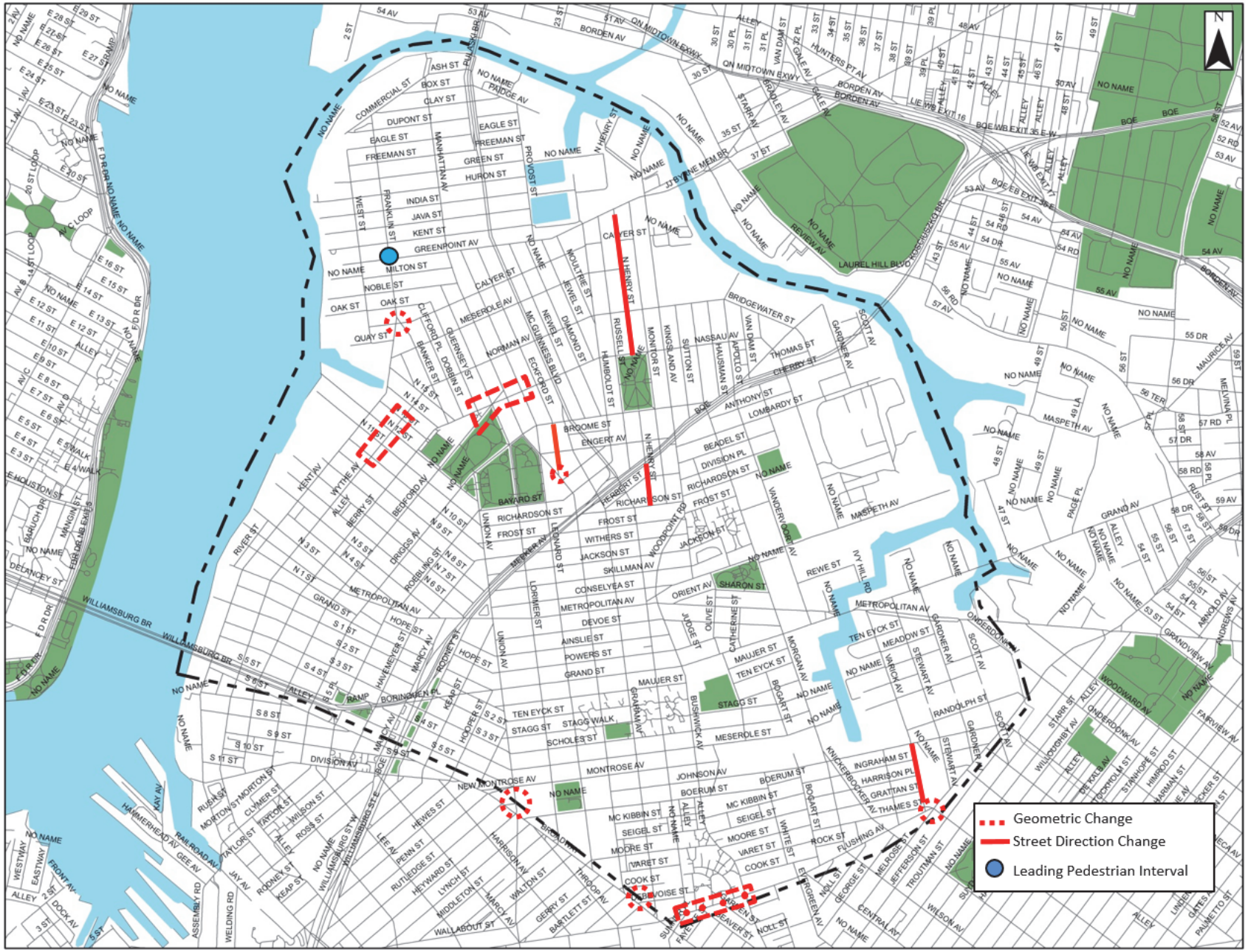
- Norman Ave and Kingsland Ave
- Bridgewater St and Van Dam St
- Bridgewater St and Varick St
- Nassau Ave and Van Dam St
- Vandervoort Ave and Anthony St
- Lombardy St and Morgan Ave
- Lombardy St and Porter Ave
- Beadle St and Morgan Ave
- Morgan Ave and Stagg St
- Meadow St and Varick Ave
- Meadow Ave and Stewart Ave
- Meadow Ave and Gardner Ave
- Stagg St and Varick Ave
- Stagg St and Stewart Ave
- Stagg Stand Gardner Ave

Figure 11-3: Area Wide Recommendations



The set of improvement measures which seek to reduce congestion and enhance pedestrian safety are comprised of geometric changes, street directional and parking regulation changes as shown in Figure 11-4.

Figure 11-4: Improvement Measures



Bedford Avenue/Nassau Avenue/Lorimer Street

Issues:

- The convergence of Bedford and Nassau Avenues create two triangles setback from the existing pedestrian crossings.
- The EB bike lane on Nassau Avenue is discontinued at Guernsey Street resulting in a difficult transition for bikes.
- The merge from EB Nassau Ave to EB Bedford Ave is very short and vehicles often ignore the street markings creating unsafe conditions.
- Nassau Avenue between Manhattan Avenue and Leonard Avenue is marked as a two way street but only WB buses are allowed. Unsuspecting auto drivers often proceed on the bus only segment.

Proposal:

- Convert Nassau Avenue between Guernsey Street and Lorimer Street to one way EB allowing for improved geometric design and the continuation of Nassau Avenue bike lane.
- Convert Bedford Avenue between Lorimer Street and Bedford Avenue to one way EB with geometric changes creating shorter pedestrian crossings.
- Paint WB traffic lane on Nassau Avenue between Manhattan Avenue and Lorimer Street red with Bus Only Markings to clarify traffic regulations.

Figures 11-5 and 11-6 illustrate the existing and proposed conditions.

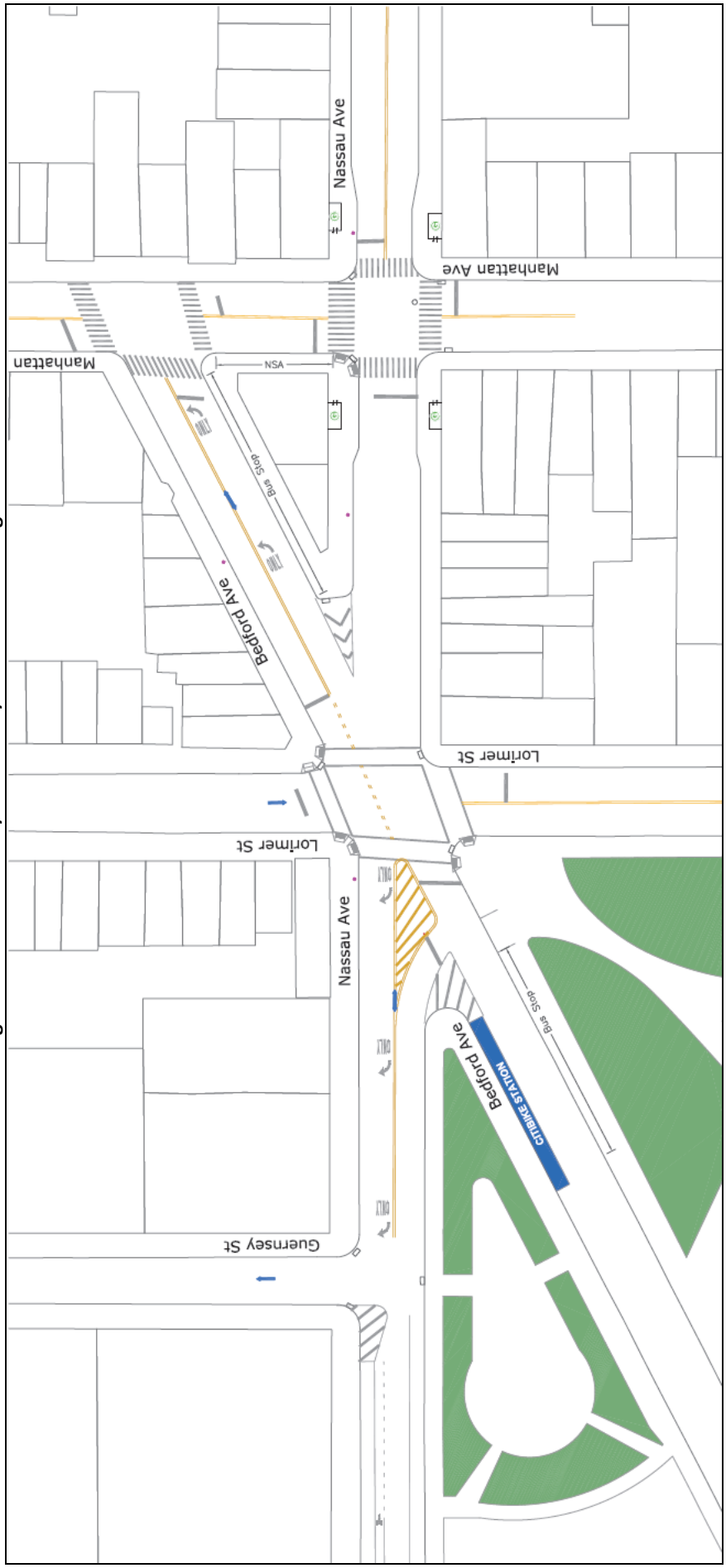


Figure 11-5: Bedford Ave/Nassau Ave/Lorimer St - Existing

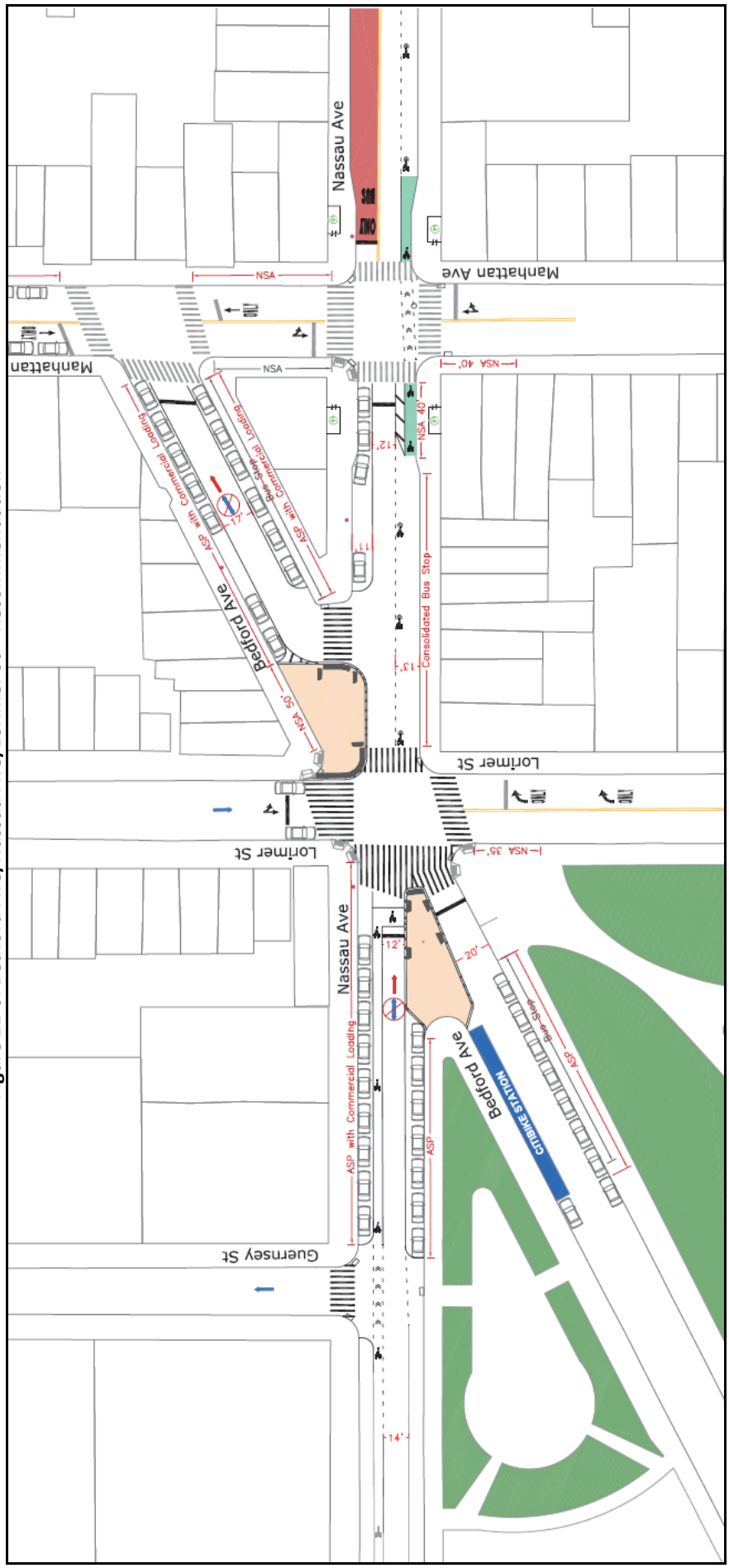


Figure 11-6: Bedford Ave/Nassau Ave/Lorimer St – Recommendation

Franklin Street @ Banker Street

Issues:

- Vehicles turning EB from both NB and SB Franklin Street accelerate past Banker Street making it difficult for NB Banker to proceed safely.

Proposal:

- Reduce roadway on Calyer Street between Franklin St and Banker St from 32’ to 16’ with striping and flexible ballards.

Figures 11-7 and 11-8 illustrate the existing and proposed conditions.

Figure 11-7: Franklin Street and Banker Street - Existing

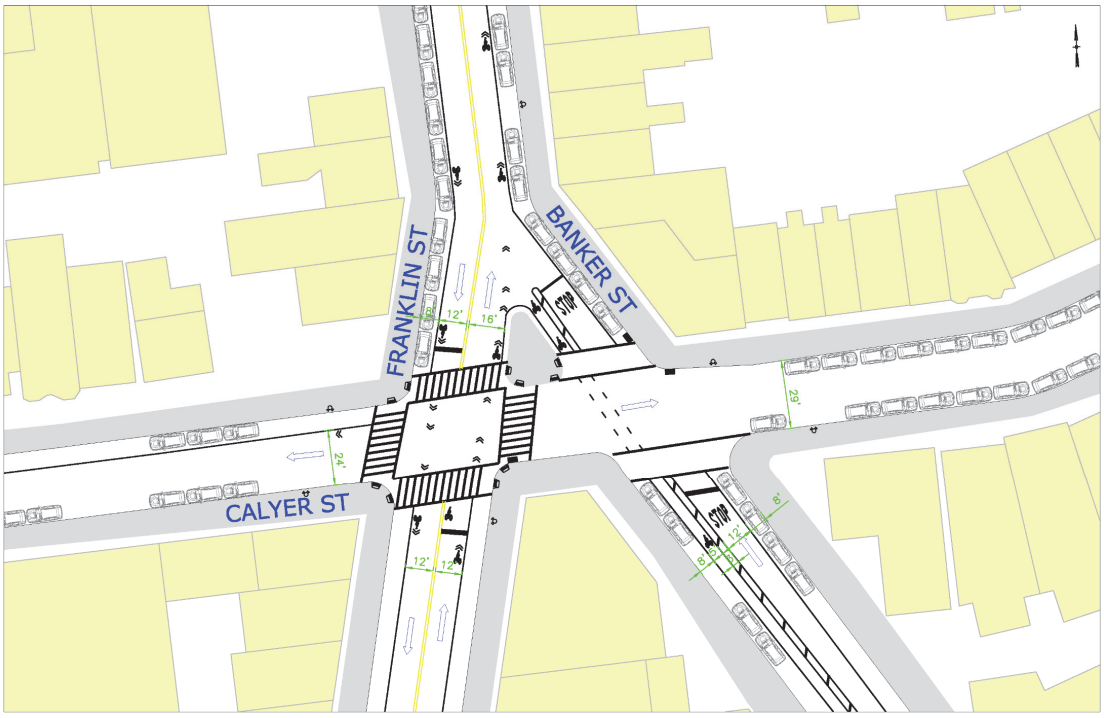
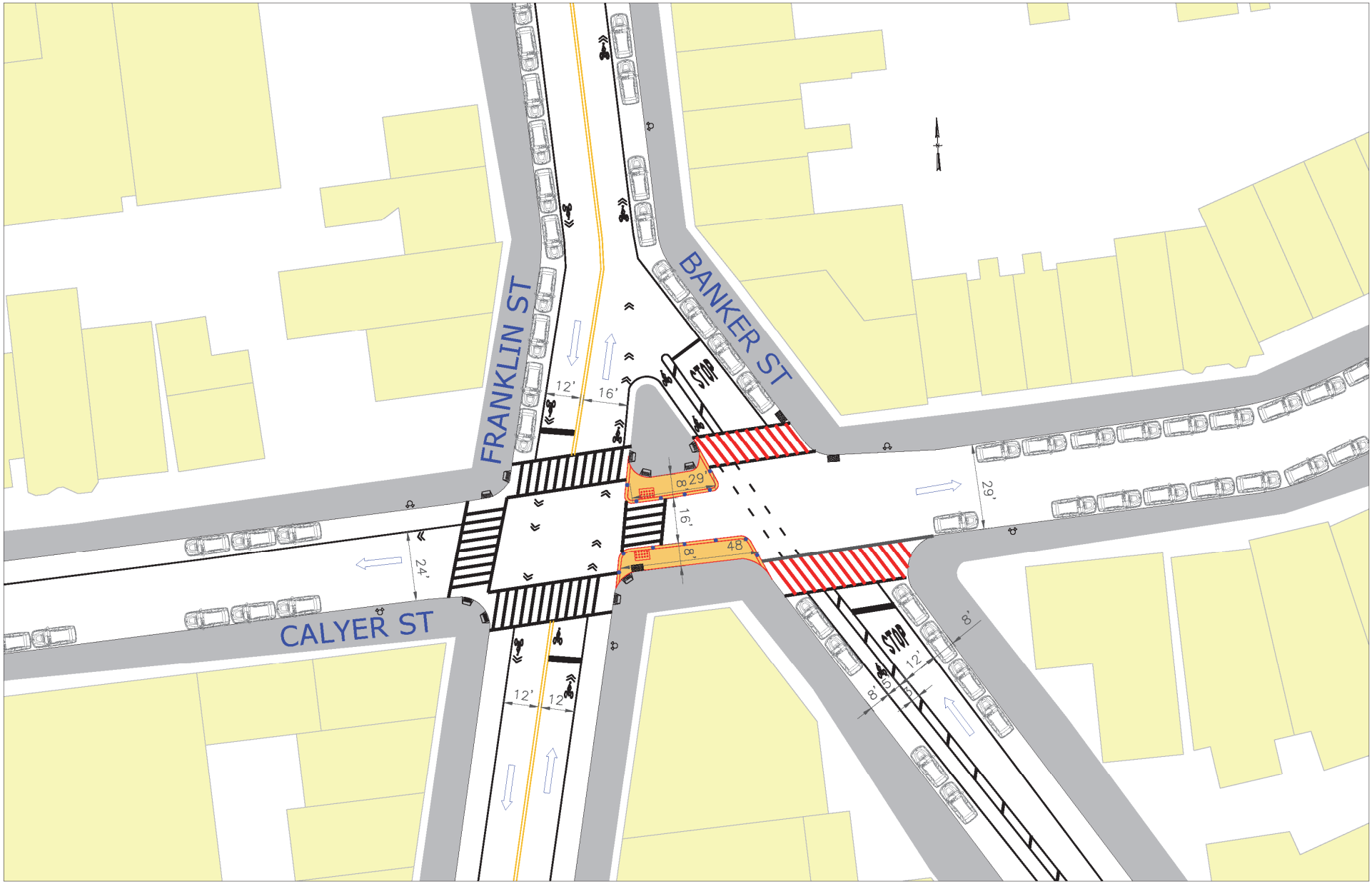


Figure 11-8: Franklin Street and Banker Street - Proposed



Manhattan Avenue and Eckford Street

Issues:

- Eckford Street is 30’ and operates two way with parking on both sides between Manhattan Avenue and Driggs Avenue
- Long 65’ Pedestrian crossing on the Northeast curb of Manhattan Avenue at Eckford Street (across from K-12 school)
- Obtuse angle for right turns onto Eckford Street from Manhattan Avenue allows for high speed turns

Proposal:

- Convert Eckford Street between Driggs Avenue and Manhattan Avenue from two-way to one-way NB and build out a concrete curb extension to minimize pedestrian crossing distance.
- Evaluate feasibility of enhanced pedestrian crossing between the extended curb and south curb of Manhattan Avenue

Figures 11-9and 11-10 and 11-11 illustrate the existing and proposed conditions.

Figure 11-9: Manhattan Ave and Eckford Street - Existing

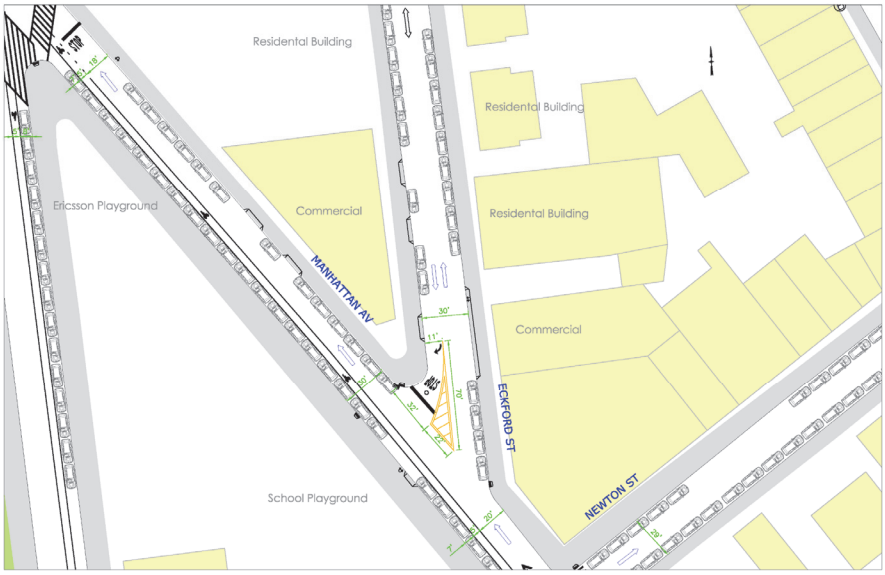


Figure 11-10: Manhattan Ave and Eckford Street - Proposed

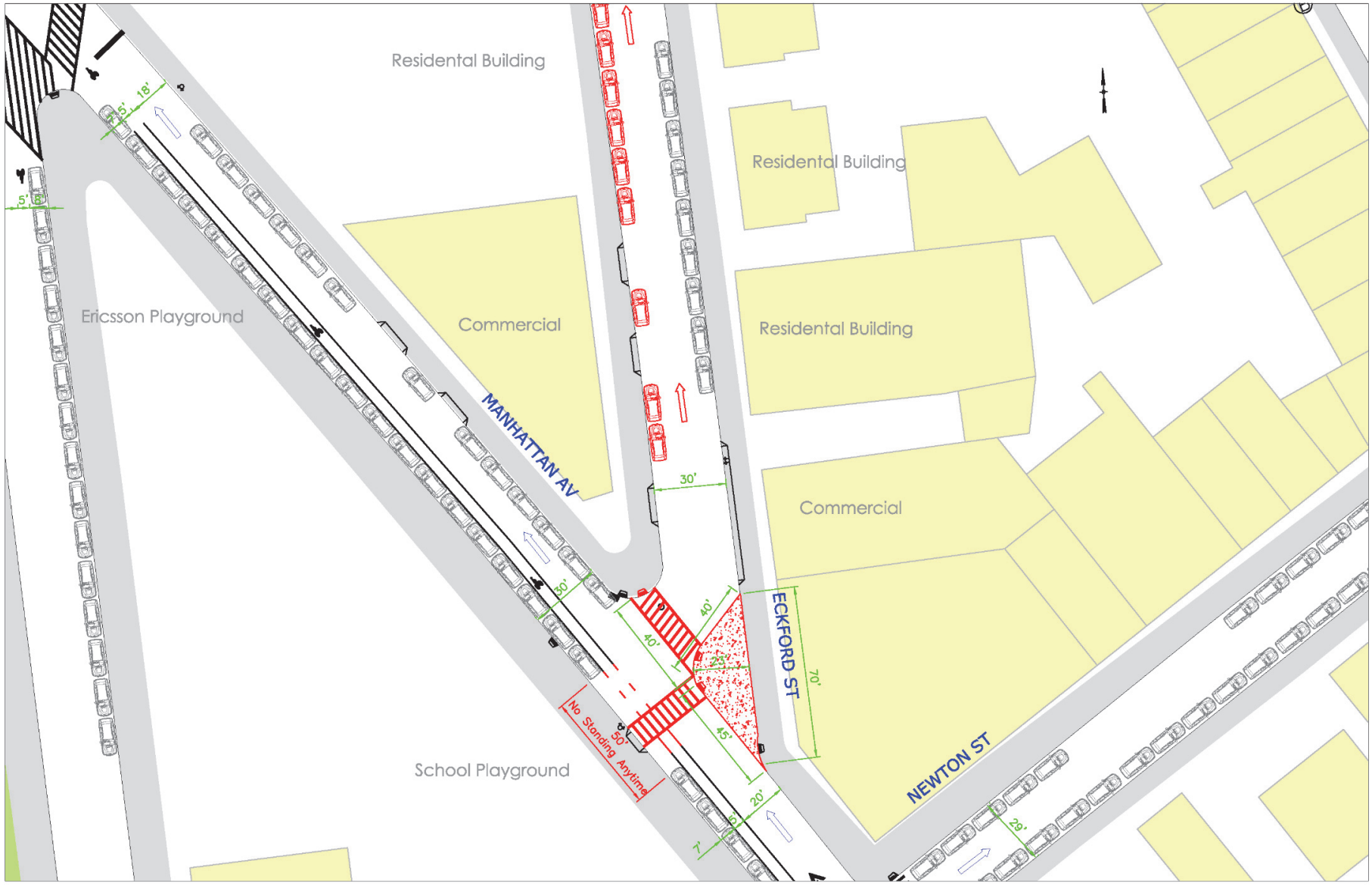
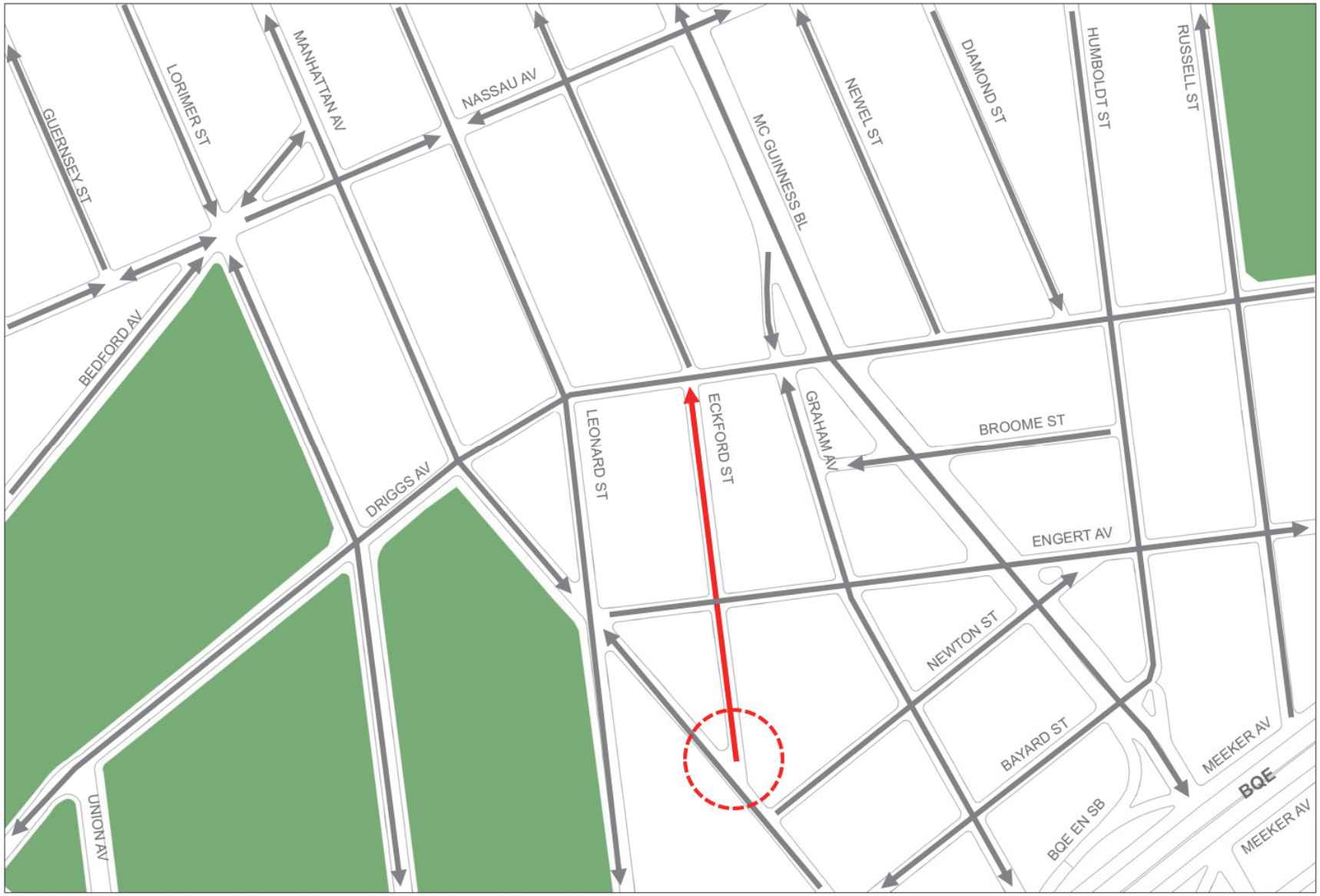


Figure 11-11: Manhattan Ave and Eckford Street – Proposed Street Direction Changes



North Henry Street from Richardson Street to Meeker Ave EB

Issues:

- North Henry Street is a 30’ roadway operating two-way with parking on both sides creating sideswipe conditions

Proposal:

- Convert North Henry Street between Richardson Street to Meeker Avenue EB to one way NB
- Extend curb on SW corner of Meeker Avenue EB and North Henry Street to reduce pedestrian crossing distance.

Figures 11-12, 11-13 and 11-14 illustrate the existing and proposed conditions.

Figure 11-12: North Henry Street from Richardson Street to Meeker Avenue EB - Existing

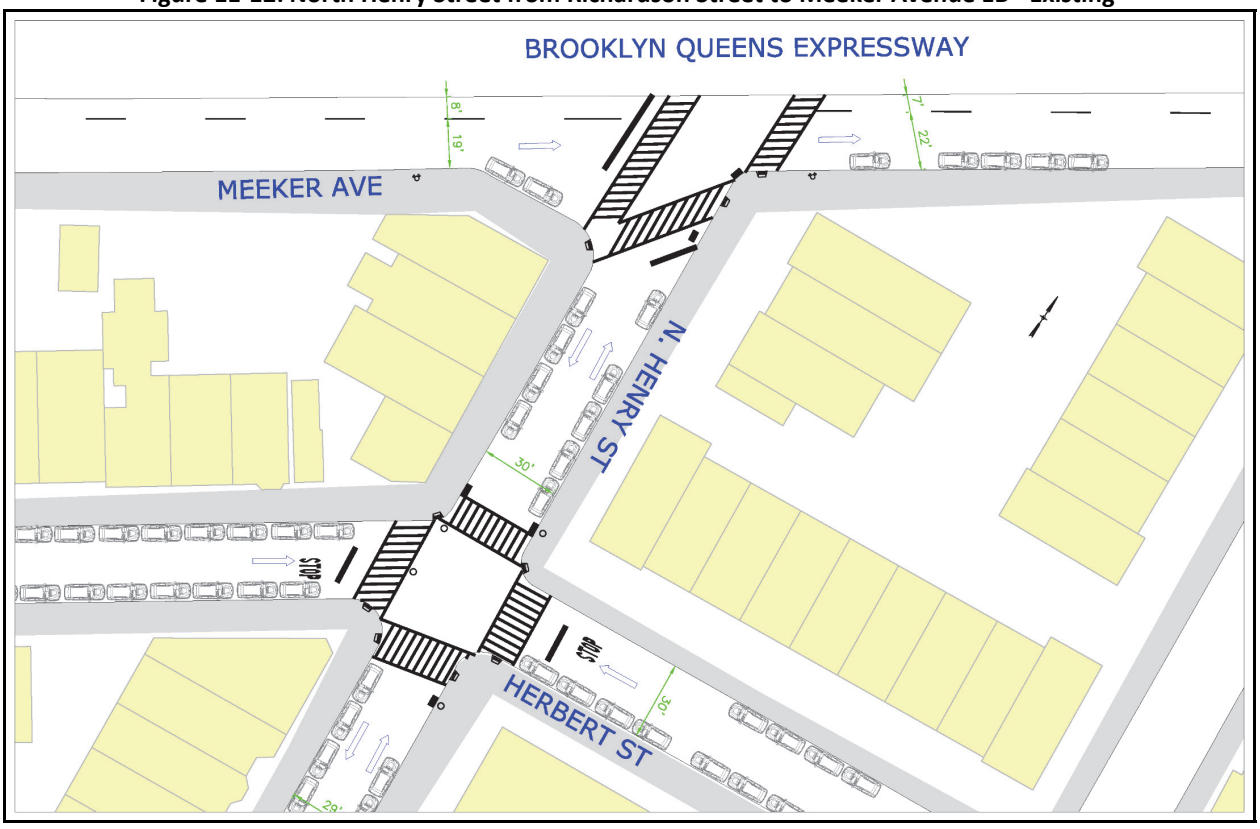


Figure 11-13: North Henry Street from Richardson Street to Meeker Avenue EB – Proposed

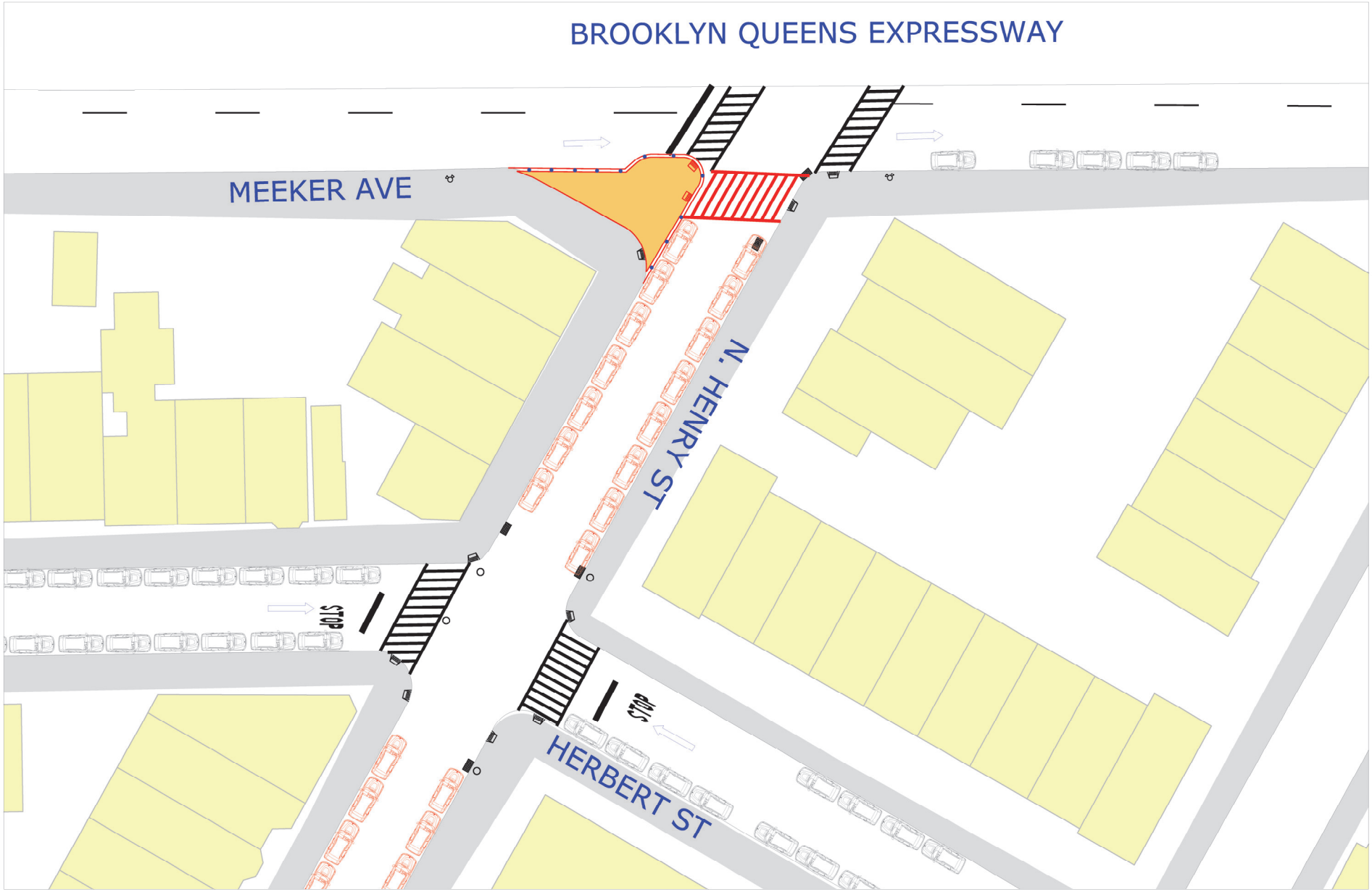
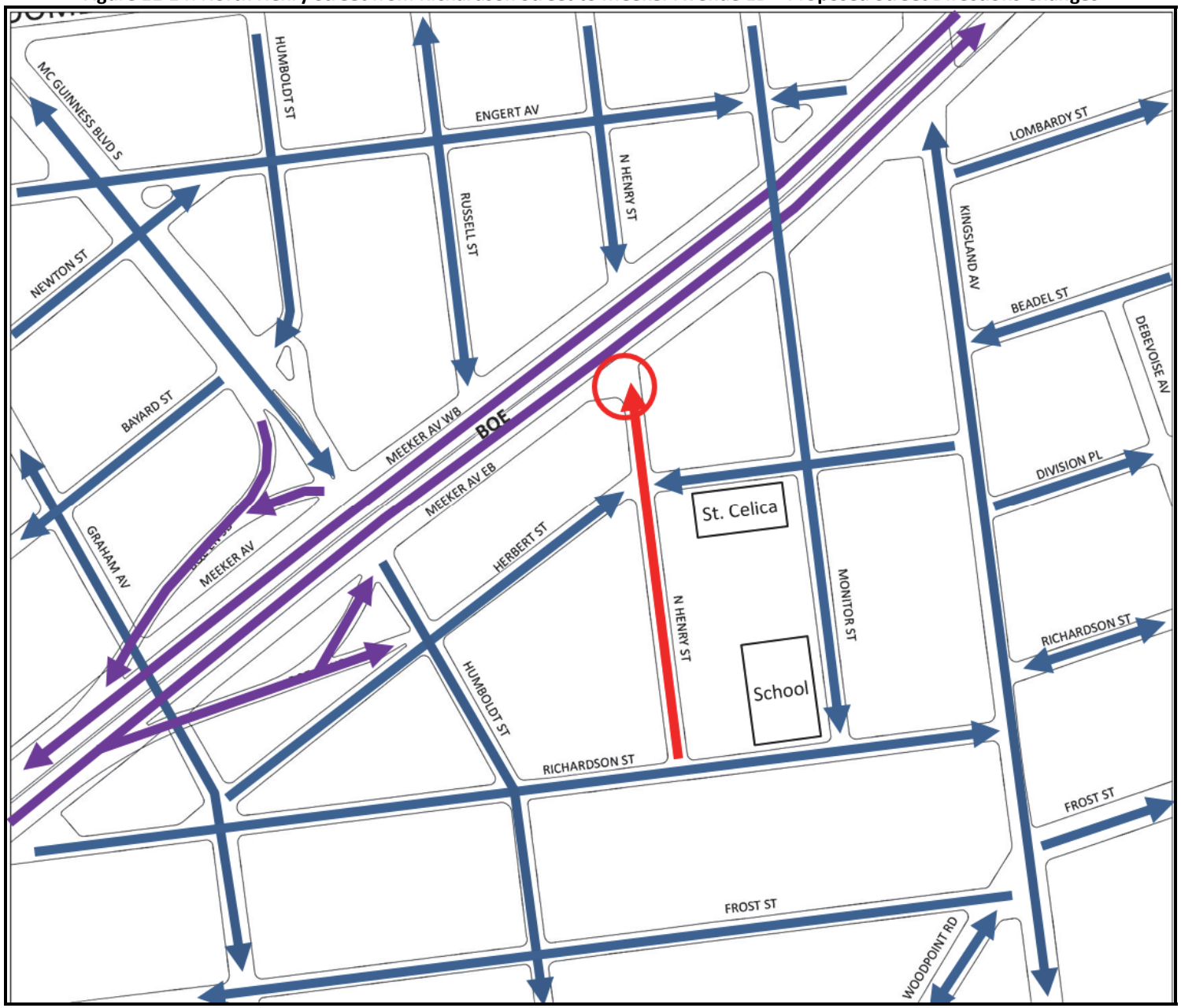


Figure 11-14: North Henry Street from Richardson Street to Meeker Avenue EB – Proposed Street Directions Changes



North Henry Street from Norman Avenue to Greenpoint Avenue

Issues:

- North Henry Street and Kingsland Avenue are both northbound truck routes with no southbound truck access into the North Brooklyn IBZ. This forces trucks to use Monitor Street often going all the way to Meeker Ave SB past P.S. 110 and Msgr. McGolrick Park.

Proposal:

- Convert North Henry Street from Norman Avenue to Greenpoint Avenue to one way southbound

Figures 11-15 and 11-16 show the existing and proposed conditions.

Figure 11-15: North Henry Street from Nassau Avenue to Greenpoint Avenue- Existing

Figure 11-166: North Henry Street from Nassau Avenue to Greenpoint Avenue - Proposed

Maspeth Avenue and Woodpoint Road

Issues:

- High pedestrians volume crosses Maspeth Avenue where there is no stop controls and crosswalks

Proposal:

- Conduct stop control warrant to determine feasibility and provide curb extensions and pedestrian refuge area as necessary

This location is currently on hold due to MTA substation construction. Figures 11-17 and 11-18 show the existing and proposed conditions.

Figure 11-17: Maspeth Avenue and Woodpoint Road - Existing

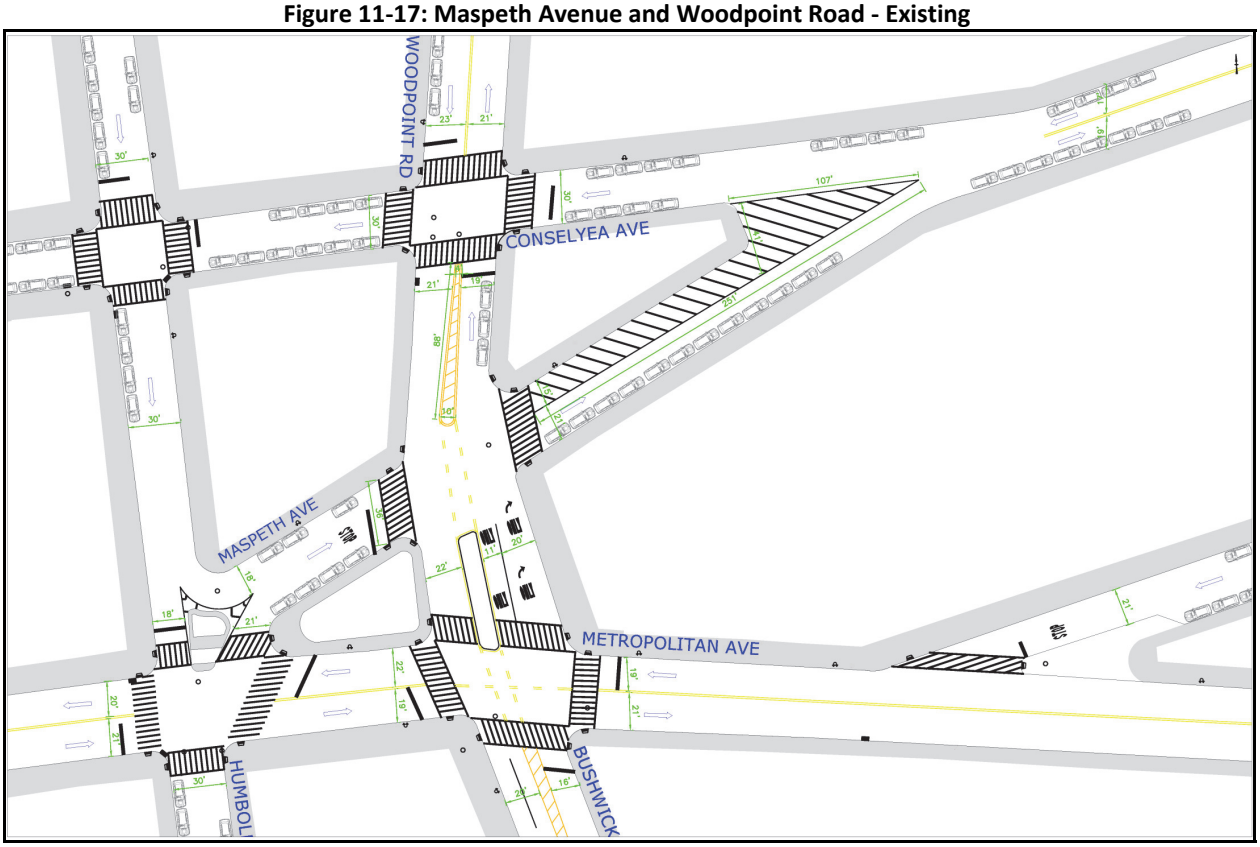
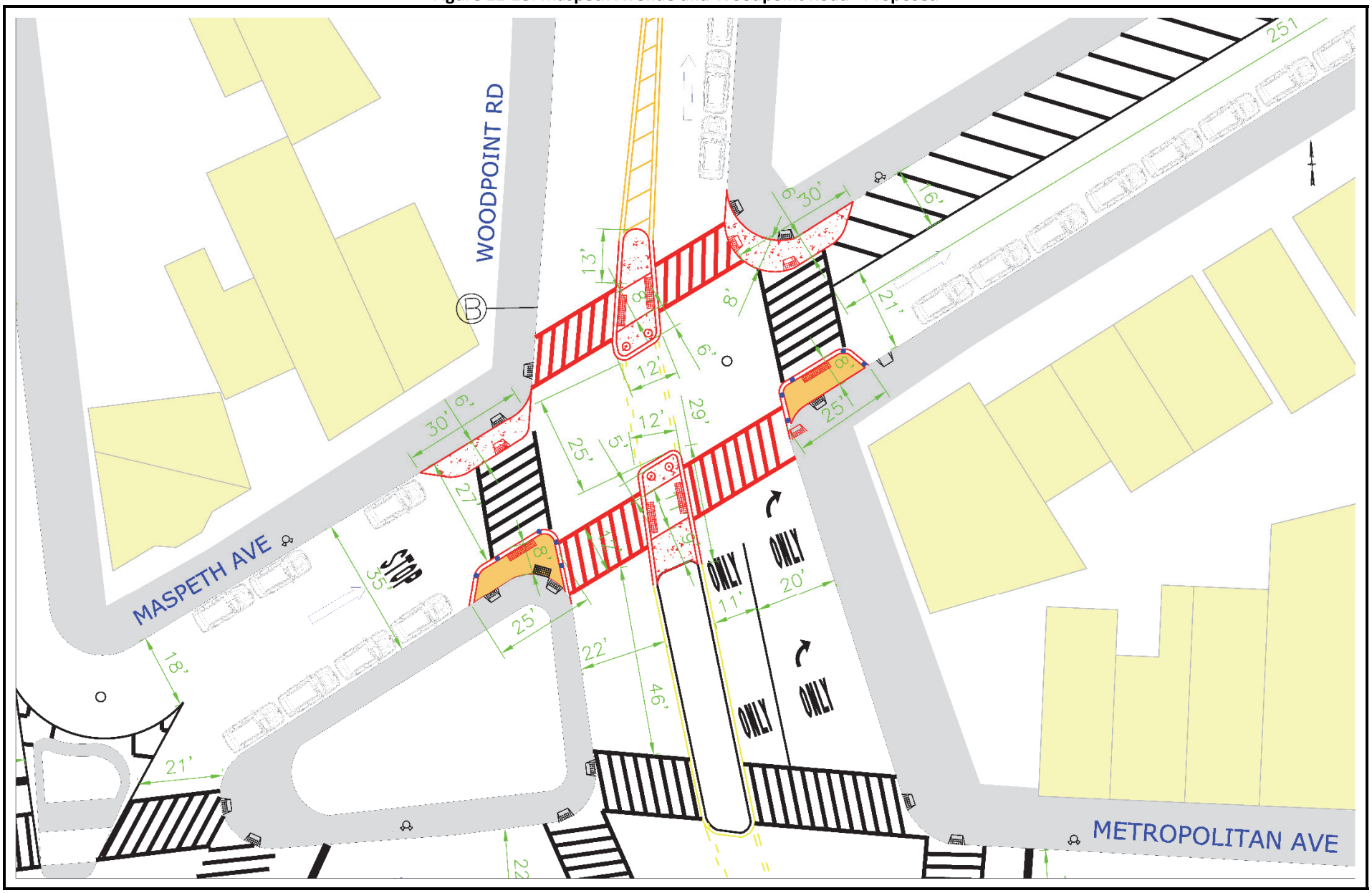


Figure 11-18: Maspeth Avenue and Woodpoint Road - Proposed



Broadway and Union Ave

Issues:

- Elevated subway columns in roadway encourage pedestrians to enter roadway
- Long pedestrian crossing distances

Proposal:

- Use paint and bollards to close the slips created by the columns and provide curb extensions to decrease pedestrian crossing distances.
- Restrict NB and SB right turns at Broadway as it is accessible from previous block at Lynch Street and Johnson Street.

Figures 11-19 through 11-20 show the existing and proposed conditions.

Figure 11-19: Broadway and Union Avenue/Boerum Street - Existing

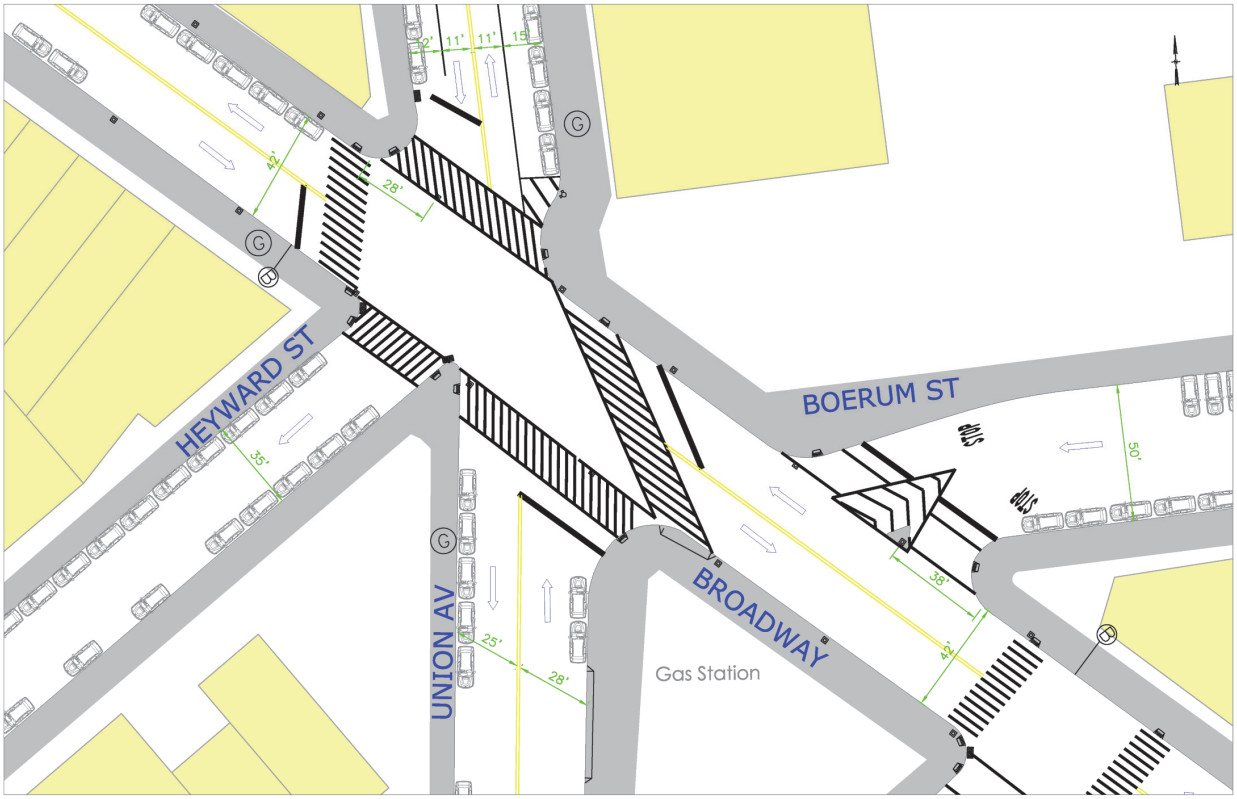
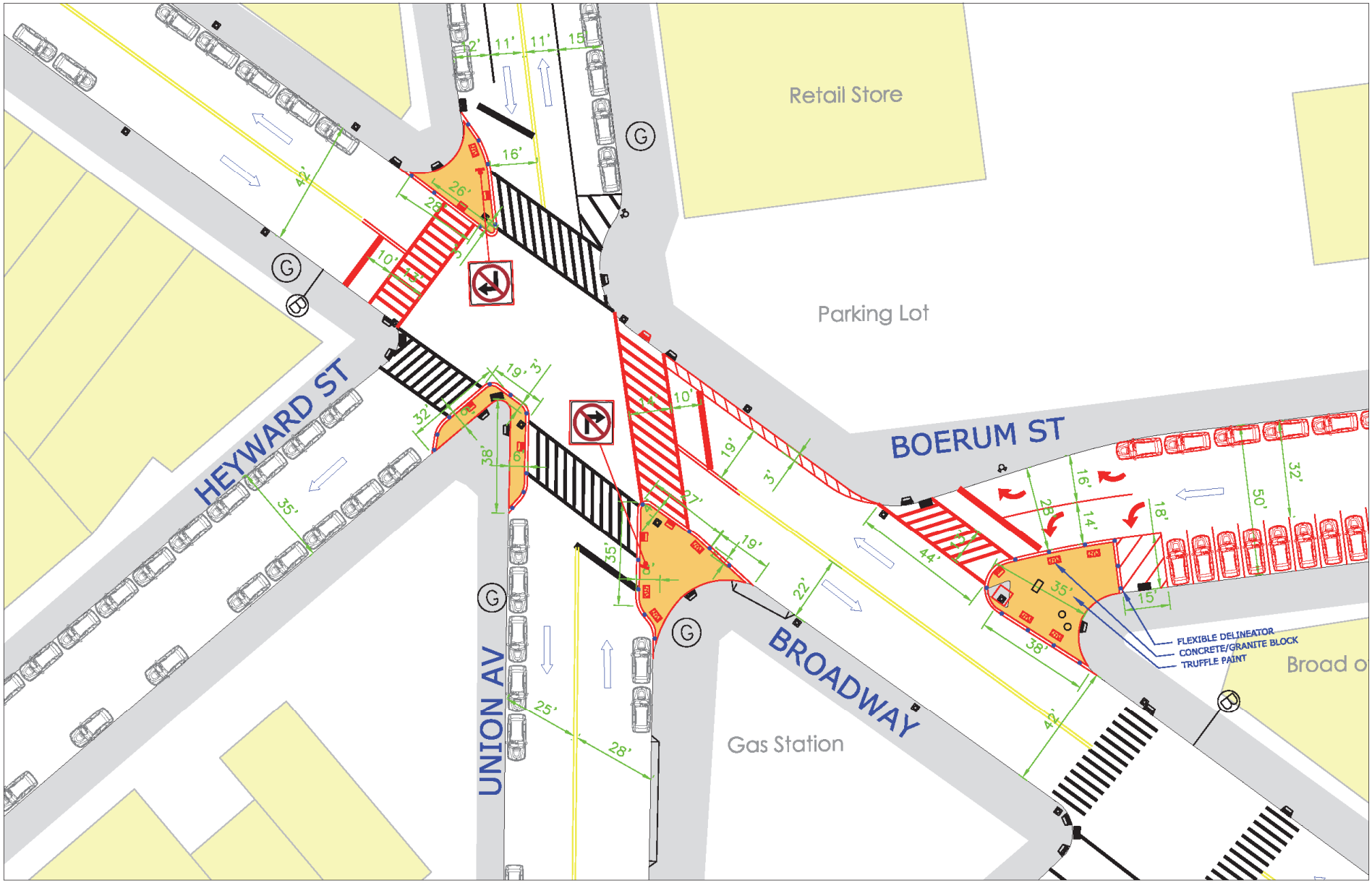


Figure 11-20: Broadway and Union Avenue/Boerum Street – Proposed



Broadway and Debevoise Street

Issues:

- Elevated subway structure in middle of crosswalk creates confusion.
- East leg crosswalk is set behind existing bus stop which creates obstructed views of crossing pedestrians.

Proposal:

- Provide painted curb extensions and bollards to narrow roadway and reduce crosswalk distances. Relocate crosswalk on EB approach in front of the bus stop.

Figures 11-21 and 11-22 show the existing and proposed conditions.

Figure 11-21: Broadway and Debevoise Street - Existing

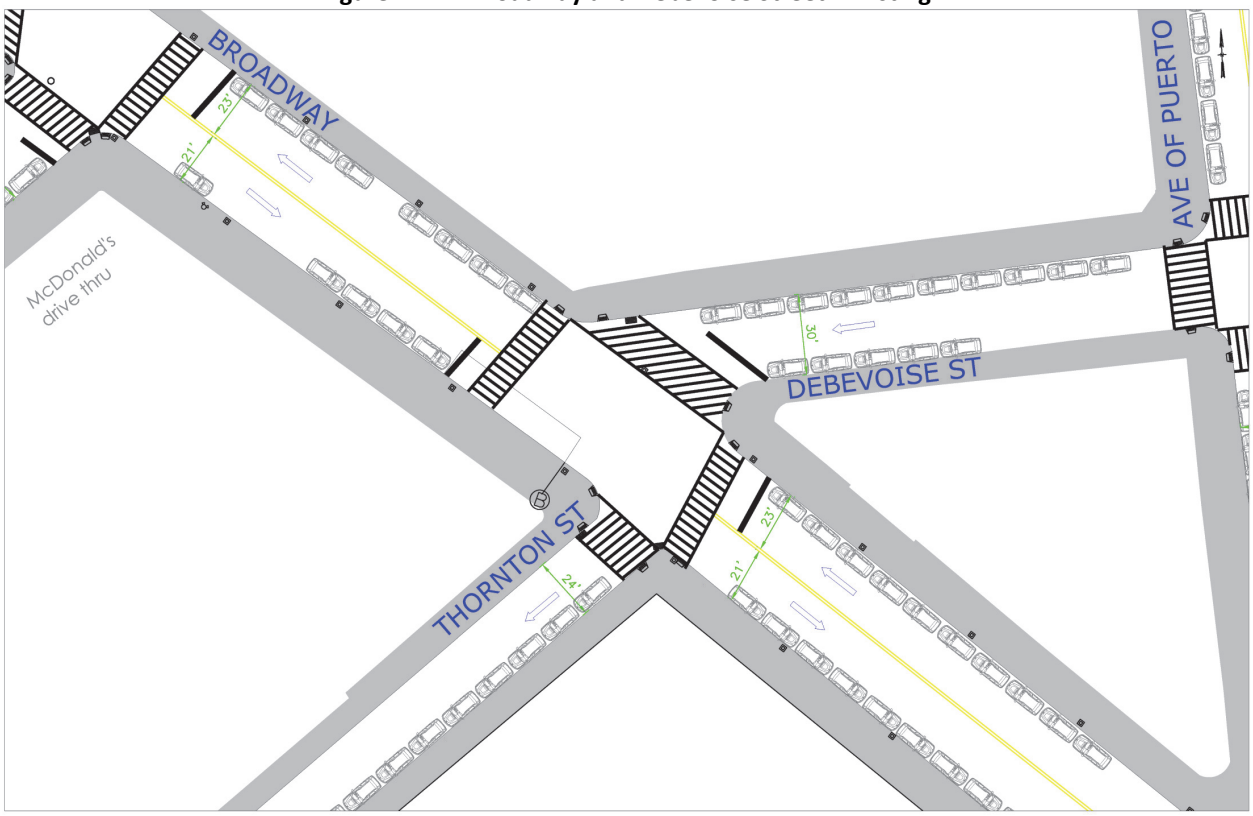
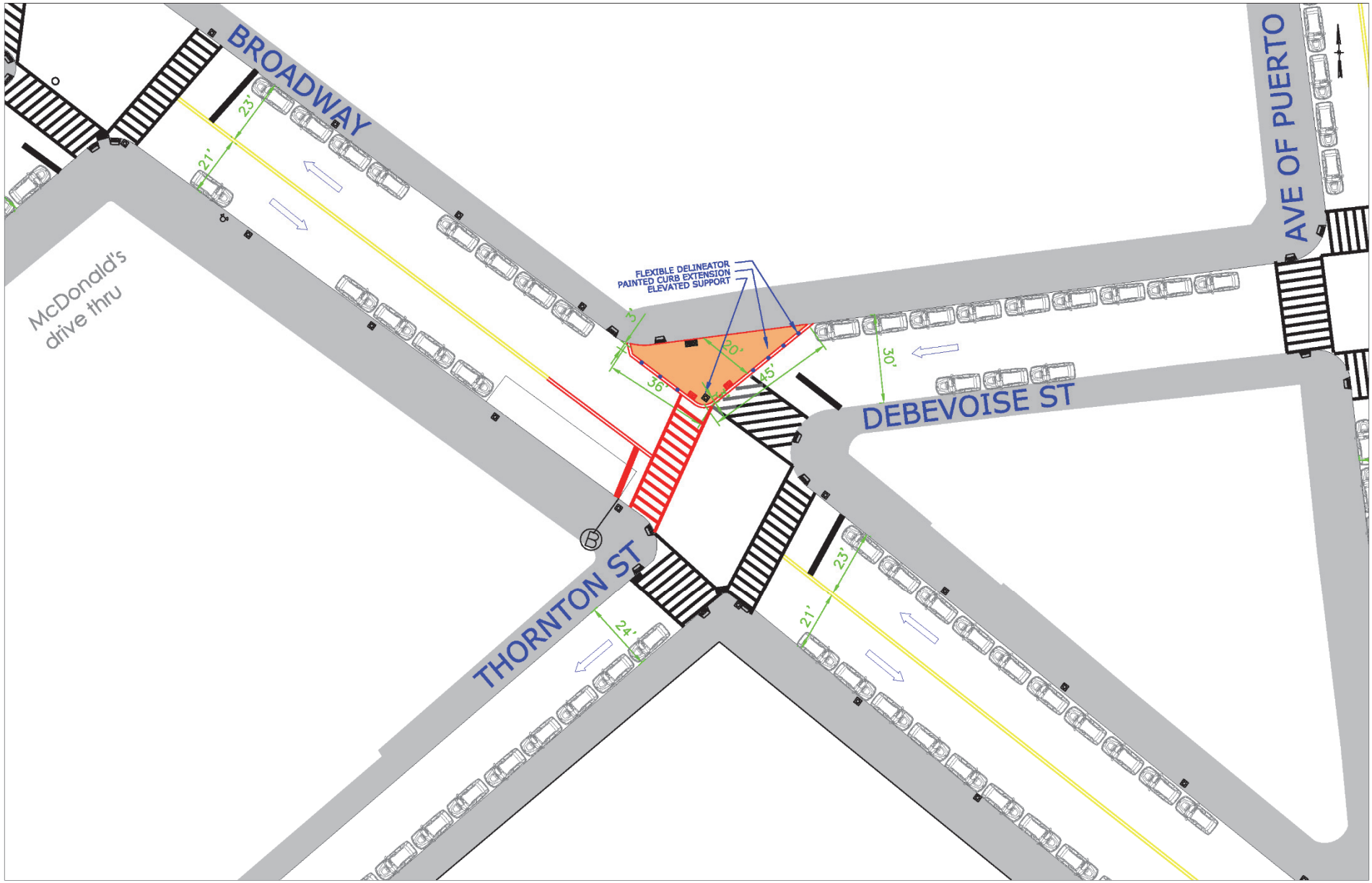


Figure 11-22: Broadway and Debevoise Street - Proposed



Flushing Avenue from Humboldt Street to Bushwick Avenue

Issues:

- Flushing Avenue is a Vision Zero priority corridor with 167 injuries and 12 serious injuries along this segment (2010-2014)
- Land uses include grade school, playgrounds and daycare facilities which attract vulnerable population to the area

Proposal:

- Provide concrete and paint/bollard curb extensions to shorten the pedestrian crossing distances across Flushing Avenue

Figures 11-23 through 11-27 show the existing and proposed conditions.

Figure 11- 23: Flushing Avenue from Humboldt Street to Bushwick Avenue – Existing and Proposed

Figure 11-24: Flushing Avenue and Humboldt Street- Proposed

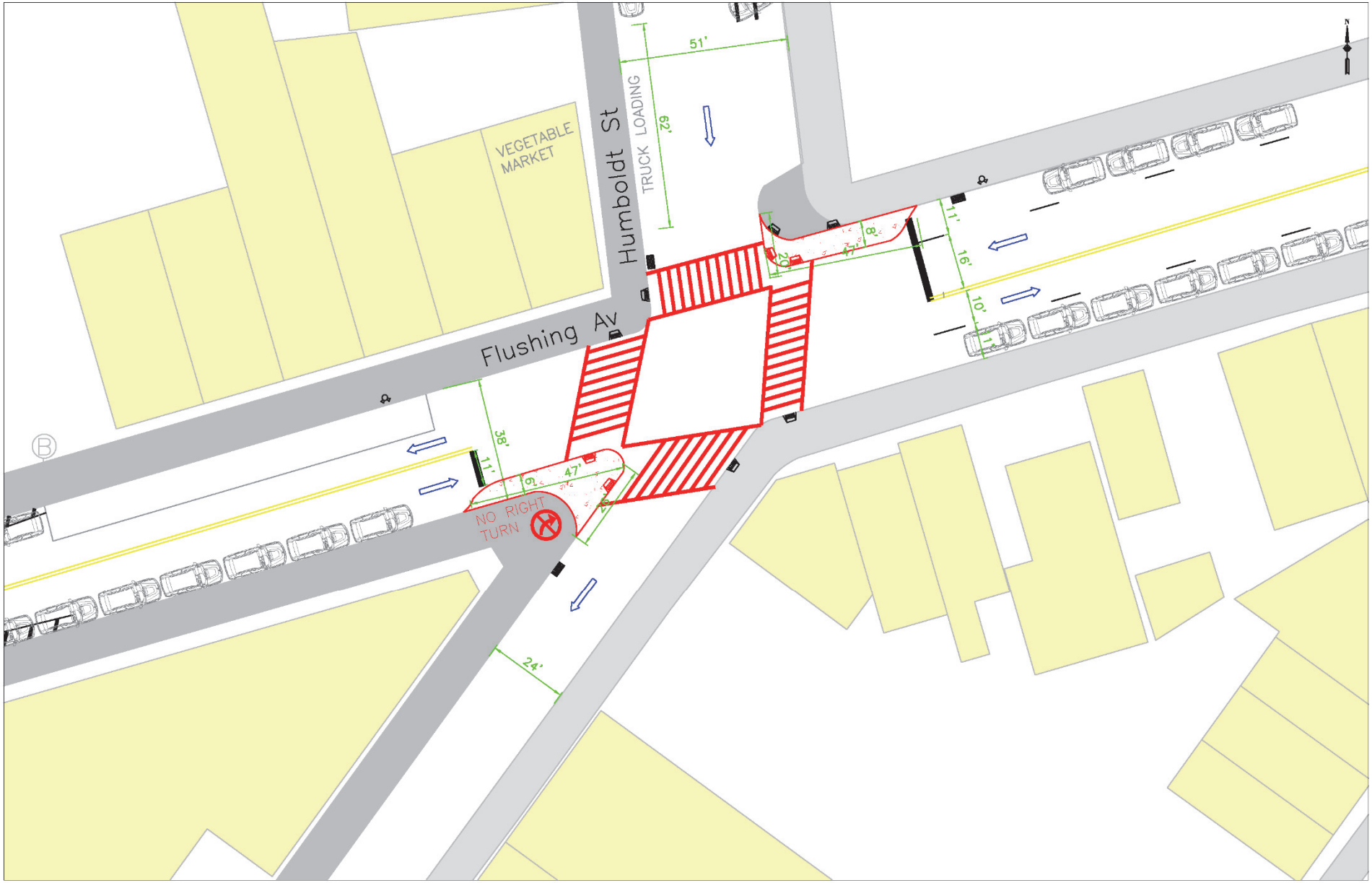


Figure 11-25: Flushing Avenue and Beaver Street – Proposed

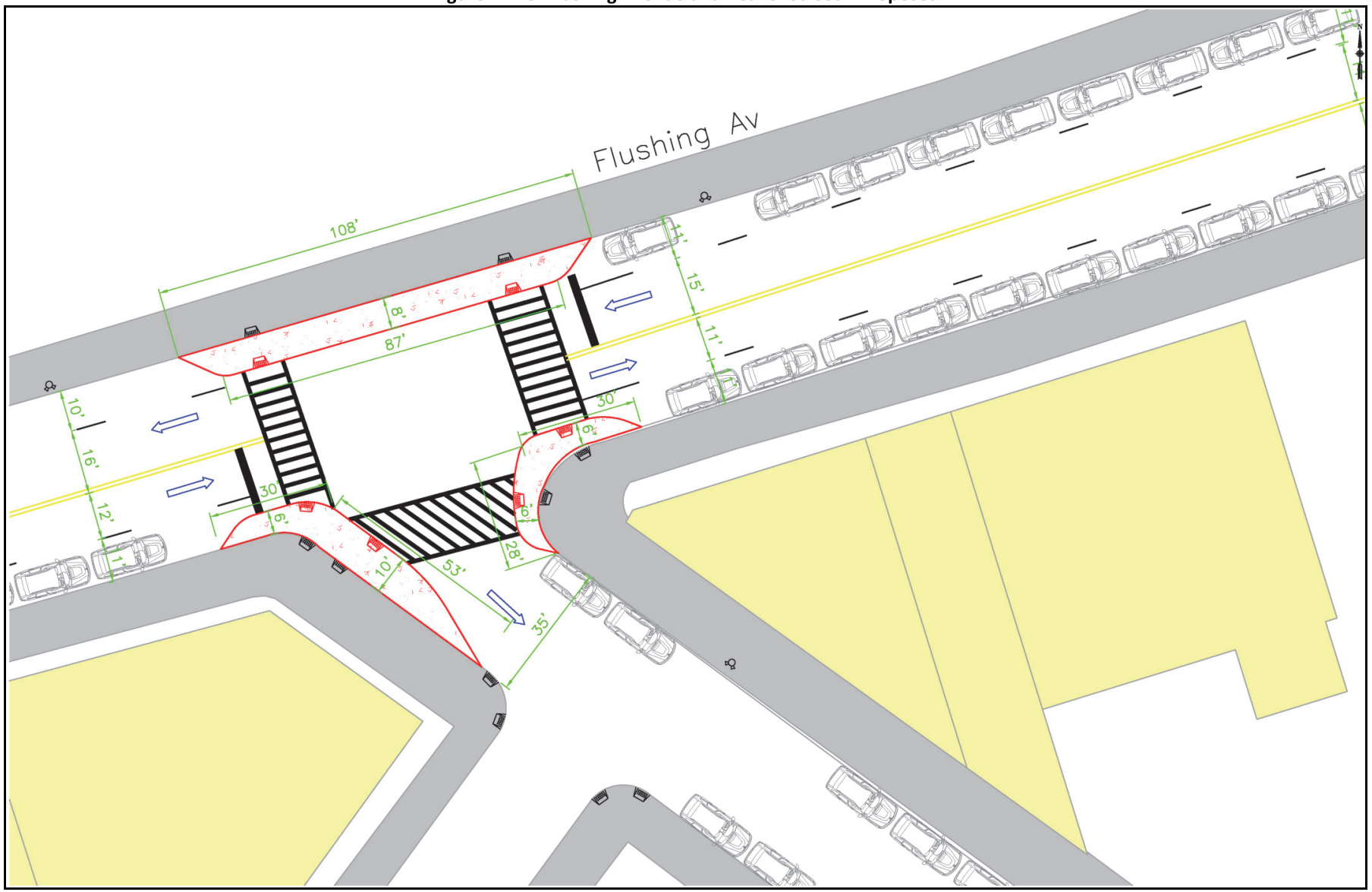


Figure 11-26: Flushing Avenue and Garden Street - Proposed

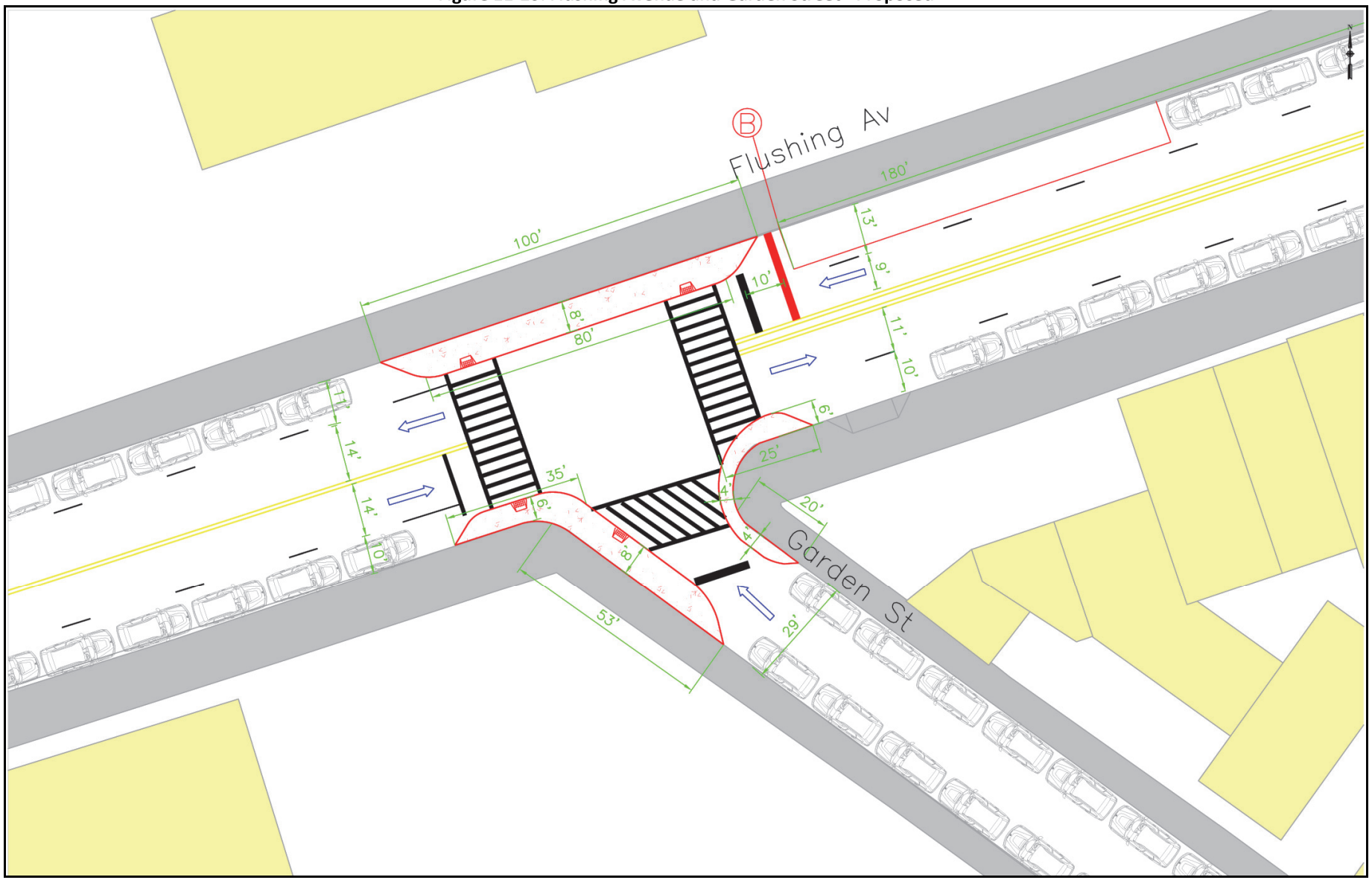


Figure 11-27: Flushing Avenue and Bushwick Avenue - Proposed

Flushing Avenue and Varick Avenue/Irving Avenue

Issues:

- Complex intersection with limited pedestrian crossings
- Varick Avenue between Flushing Avenue and Johnson Avenue is a narrow 34’ two-way truck route with parking on both sides

Proposal:

- Convert Varick Avenue between Johnson Avenue to Flushing Avenue to one way SB operation
- Expand the existing pedestrian island and install curb extensions and crosswalks

Figures 11-28, 11-29 and 11-30 show the existing and proposed conditions.

Figure 11-28: Flushing Avenue and Varick Avenue/Irving Avenue - Existing

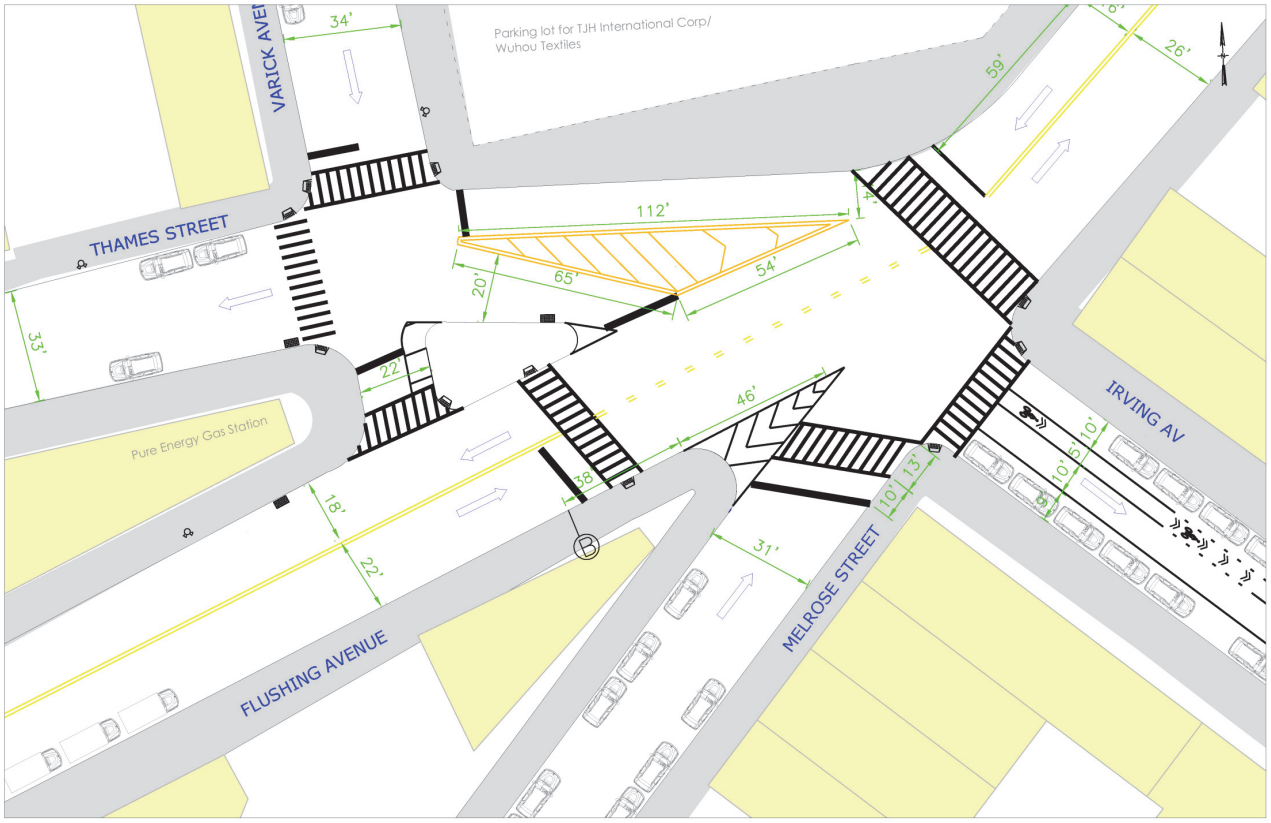


Figure 11-29: Flushing Avenue and Varick Avenue/Irving Avenue - Proposed

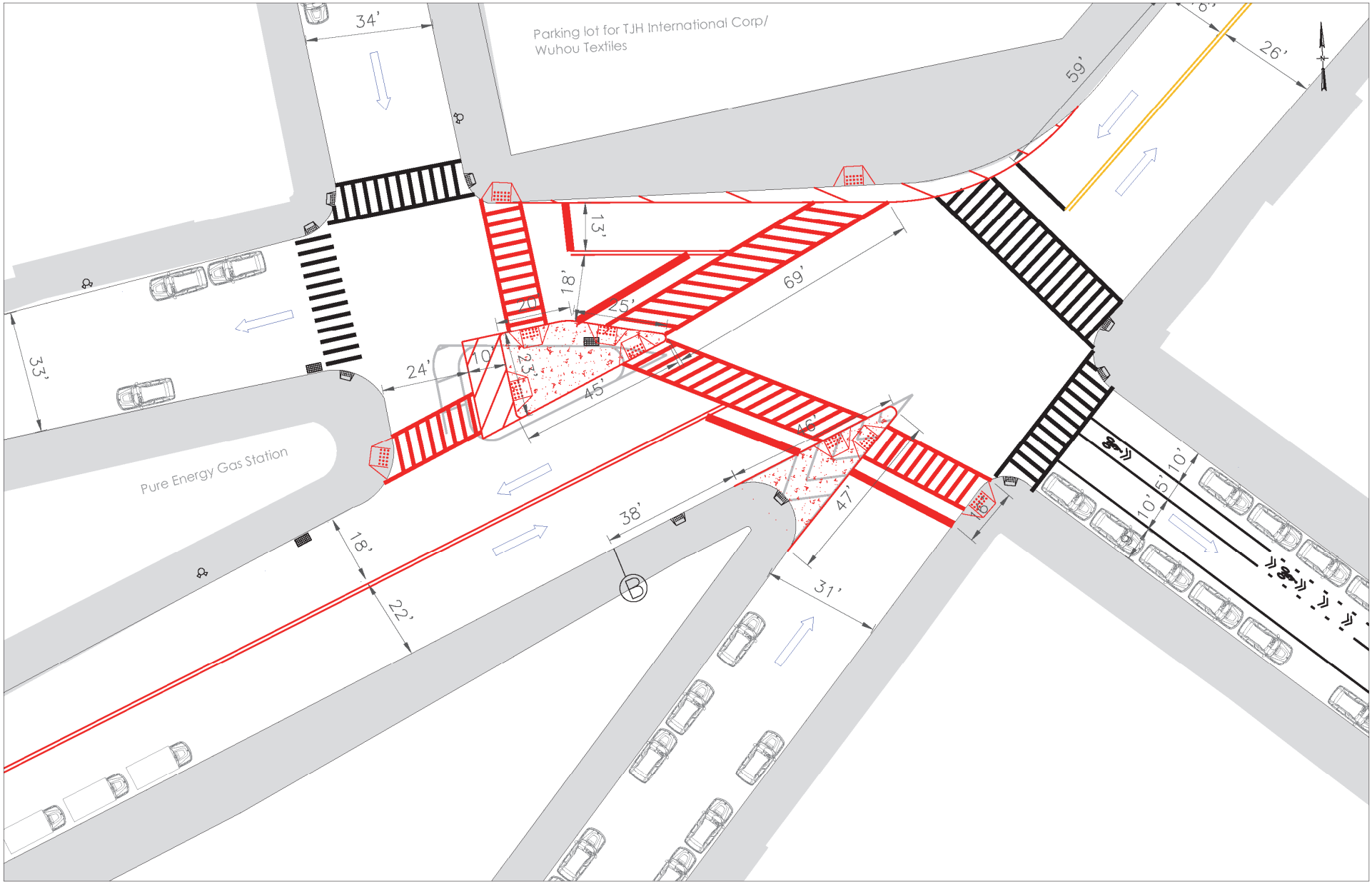


Figure 11-30: Flushing Avenue and Varick Avenue/Irving Avenue – Proposed Street Direction Change

11.4 Continued Analysis and Evaluation

Several congested corridors were evaluated for potential improvement measures during the study. However, ongoing construction made it impossible for some locations to be fully evaluated. Further evaluation will be conducted for locations such as the following when conditions permit.

- The conversion of Kent Ave from Clymer St to N 14th St to one way northbound left Wythe Avenue as the only southbound route within 5 blocks on the western boundary of the study area. Members of the community have voiced concerns regarding congestion along Wythe Avenue south of N 13th Street particularly late night and on the weekends. Recent and ongoing construction of three new hotels and an upcoming commercial building between N 13th Street and N 9th Street further impact the curbside loading activities and add to the congestion. Following the opening of the Hoxton Hotel the corridor was re-evaluated and a lack of parking enforcement was identified as a source of congestion. Meetings with NYPD regarding parking enforcement are ongoing and evaluation of the corridor will continue as construction of the office & commercial building at 25 Kent Avenue nears completion.

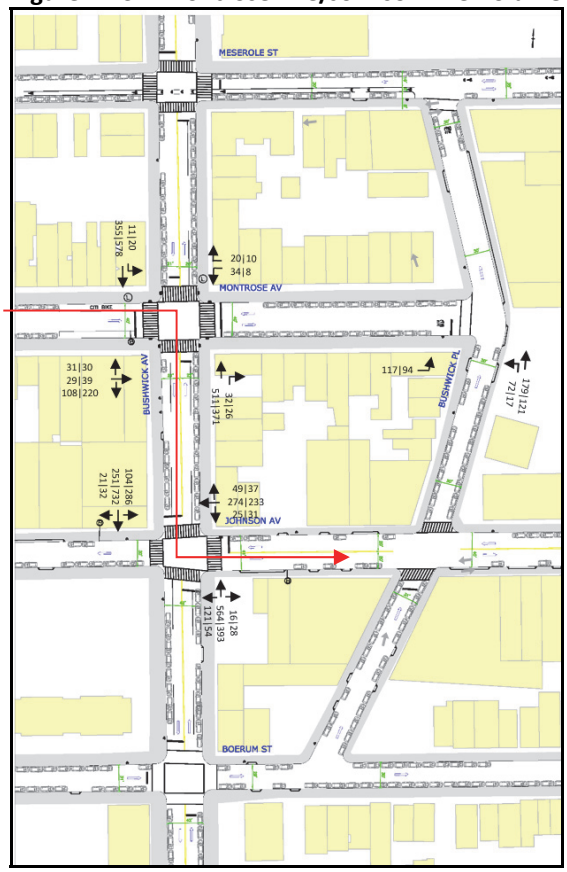
- Morgan Avenue and Vandervoort Avenue – Morgan Avenue and Vandervoort Avenue are two major north-south routes between Greenpoint Avenue and Grand Street with Vandervoort operating as a two way 60’ roadway and Morgan Ave operating as a two way 40’ roadway that extends to Flushing Avenue. Both corridors are local truck routes south of Greenpoint Avenue. However many trucks proceed north of Greenpoint Avenue which is off route.

  Congestion occurs along both corridors during the peak periods as vehicles approach Meeker Avenue and Metropolitan Avenue. There is potential for the two corridors to operate as one way pairs with Morgan Avenue operating with two lanes southbound and Vandervoort Avenue operating with three lanes northbound. This change would alleviate off-route truck issue north of Meeker Avenue and could potentially add

northbound capacity. However, Morgan Avenue is the more desirable route for trucks and bikes as it continues to Flushing Avenue and Knickerbocker Avenue. This potential recommendation will need to be modeled and evaluated post Kosciusko Bridge construction.

- Montrose Avenue/Johnson Avenue - Heavy eastbound traffic volume along Montrose Avenue transitions to Johnson Avenue at Bushwick Avenue creating congestion (particularly in the AM peak hour). There is potential to use Bushwick Place as an alternative route to Johnson Avenue but the proposal needs further evaluation.

Figure 11-31: Montrose Ave/Johnson Ave Volume



- Morgan Avenue/Knickerbocker Avenue/Johnson Avenue – Morgan Avenue diverges at Johnson Avenue with Knickerbocker Avenue a one way northbound and Morgan Avenue being one way southbound between Johnson Avenue and Harrison Avenue. Short

queue length on Johnson Avenue between Morgan Avenue and Knickerbocker and heavy turn volume often leads to spillback and congested conditions at this intersection.