CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Environmental Assessment

August 2022

APPENDICES – VOLUME 1

Federal Lead Agency

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NEW YORK CITY DOT

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 2, Project Alternatives

August 2022

Contents

2A, Previous Studies and Concepts Considered

- 2007 PlaNYC Mayor's Plan
- 2008 Traffic Congestion Mitigation Commission Study
- 2015 Move NY Fair Plan proposed by citizens' group known as Move NY
- 2018 Fix NYC Advisory Panel Recommendation
- 2018 Metropolitan Transportation Sustainability Advisory Workgroup Recommendation

For more than 45 years, State and City of New York officials and stakeholder and advocacy groups have studied various concepts for addressing traffic congestion in Manhattan, including introducing tolls. These concepts, and associated studies, are described here and summarized in **Table 2A-1** at the end of this section.

In 1973, then-New York State Governor Nelson Rockefeller and then-New York City Mayor John Lindsay submitted to the U.S. Environmental Protection Agency, as part of New York State's plan to achieve compliance with the Clean Air Act, a proposal for a congestion management plan that included tolls on the East and Harlem River Bridges. According to an article in *The New York Times* when the plan was canceled,[1] the U.S. Environmental Protection Agency determined that other measures being taken by the state and city to invest in its public transit system made tolling the bridges unnecessary at that time. Other traffic control measures were put into effect at that time including bus and bicycle lanes, a reduction in on-street parking spaces, and introduction of vehicle inspections related to emissions.

In April 2007, then-Mayor Michael Bloomberg released New York City's PlaNYC, a long-term plan that included a congestion pricing proposal for the area of Manhattan south of 86th Street (Item 2 in **Table 2A-1**). The revenues generated by the congestion fee were to be used to fund capital investments in the transit network.[2] In this concept, passenger vehicles and trucks entering, leaving, and operating within the area of Manhattan south of 86th Street during the business day (weekdays 6:00 a.m. to 6:00 p.m.) would pay a daily fee. Emergency vehicles, transit vehicles, taxis, FHVs, and vehicles with handicapped license plates would be exempt. Roads on the periphery (the West Side Highway/Route 9A and the Franklin D. Roosevelt [FDR] Drive) would not be included in the zone. The tolling concept included a credit provided to vehicles that paid inbound tolls at bridges or tunnels. This concept was predicted to result in a 6.3 percent reduction in average vehicle-miles traveled (VMT) in the area of Manhattan south of 86th Street.

In response to the proposal included in PlaNYC, in July 2007, the State of New York created the New York City Traffic Congestion Mitigation Commission, a 17-member body appointed by the governor based on recommendations from the New York City mayor and leaders in the New York State Assembly, New York State Senate, and New York City Council. The mandate of the commission was to study and evaluate approaches to reducing congestion in the busiest parts of Manhattan, including the PlaNYC proposal and other concepts to be developed by the new commission, and recommend a comprehensive traffic congestion mitigation plan. The legislation that established the commission required any recommendation to achieve at least a 6.3 percent reduction in average VMT in the area south of 86th Street, which was the amount identified by PlaNYC as achievable with that concept. Building from the PlaNYC proposal, the Traffic Congestion Mitigation Commission evaluated congestion reduction concepts for the area of Manhattan south of 86th Street (Items 3a through 3f in **Table 2A-1**) and used the 6.3 percent reduction in average VMT in the area south of 86th Street as a screening threshold for the additional concepts under consideration.

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1 *The New York Times.* "City Drops Proposal to Charge Bridge Tolls." September 15, 1981.

2 The City of New York, Mayor Michael R. Bloomberg. April 2007. *PlaNYC: A Greener, Greater New York*. http://www.nyc.gov/html/planyc/downloads/pdf/publications/full_report_2007.pdf.

The Traffic Congestion Mitigation Commission studied a range of different concepts for reducing congestion (Item 3a in Table 2A-1), including the following:

- Providing telecommuting incentives
- Increasing the cost of parking in the business district
- Reducing the use of government-issued parking permits
- Providing additional taxi stands to reduce cruising
- Increasing cab fares and fees charged to cabs
- Raising tolls or implementing variable tolls on existing facilities
- Adding East River bridge tolls
- Rationing license plates
- Instituting mandatory carpooling
- Creating High-Occupancy Toll lanes
- Establishing congestion pricing with the following parameters:
  - With a 60th Street northern boundary
  - With an 86th Street northern boundary
  - With no intra-zonal charge and no free periphery
  - With variable charges or extended hours
  - With an exemption for hybrid vehicles
  - With a credit for other tolls paid
- Introducing various truck restrictions

The Traffic Congestion Mitigation Commission compared this wide range of concepts against the following:

- Evaluation criteria related to reductions in VMT
- Social and environmental considerations
- Potential revenues raised for the MTA
- Feasibility
- The degree to which the concept was based on congestion mitigation approaches that have been successfully implemented in other cities

Using this approach, the Traffic Congestion Mitigation Commission identified five options with different approaches to reducing congestion—congestion pricing, bridge tolling, pricing of parking and taxis, and license plate rationing—and evaluated those in more detail (Items 2, 3b, 3c, 3d, and 3e in Table 2A-1). Based on that evaluation, in January 2008, the Traffic Congestion Mitigation Commission issued a report that recommended a modified version of the PlaNYC concept, with the northern boundary of the tolling zone at 60th Street (Item 3f in Table 2A-1). The boundary was shifted so that trips from the Upper East Side and Upper West Side to Midtown and south of Midtown would be subject to the toll. In this modified plan, passenger vehicles and trucks entering the area of Manhattan south of 60th Street during the business day (weekdays 6:00 a.m. to 6:00 p.m.) would pay a daily fee. Roads on the periphery (the West Side Highway/Route 9A and the FDR Drive) were included in the zone. A credit would be provided to vehicles that paid inbound tolls at bridges or tunnels. The recommended concept also included a package of parking and taxi policies to discourage driving within the zone, including placing a surcharge on FHVs during certain hours, increasing parking meter rates, and eliminating resident parking tax exemptions. To address the possibility that drivers would park in the neighborhoods adjacent to the tolling zone and complete their trip with transit, the Traffic Congestion Mitigation Commission's plan included a recommendation that the City of New York be required to offer communities a residential parking permit program prior to the start of congestion pricing and to track park-and-ride activity as part of a comprehensive monitoring program. The Traffic Congestion Mitigation Commission concluded that the recommended plan would exceed the 6.3 percent VMT reduction required by the state legislation that established the commission, would raise an estimated $491 million per year for transportation investment, and would have considerably lower operating and capital costs and a simpler fee structure than the original PlaNYC proposal. A tolling zone boundary at 60th Street (with the area south of 60th Street included in the zone) rather than 86th Street would also lead to many more intra-Manhattan trips being charged the toll. However, the recommendation was not enacted by the New York State Legislature and did not advance.[3]

In 2015, a citizens' group known as Move NY released a proposal, dubbed the Move NY Fair Plan, to reduce congestion in the Manhattan CBD and generate revenue for MTA (Item 4 in **Table 2A-1**). That plan involved adjusting tolls throughout New York City, including the following:

- Implementing new tolls on the four untolled East River bridges that connect to the Manhattan CBD (Brooklyn, Manhattan, Williamsburg, and Ed Koch Queensboro Bridges)
- Charging a toll for vehicles entering the Manhattan CBD by crossing at 60th Street
- Providing a credit to vehicles that enter the Manhattan CBD for tolls paid at the RFK Bridge within the previous hour
- Reducing tolls on TBTA's other bridges that do not lead to the Manhattan CBD

The plan also included a new surcharge on FHVs in the Manhattan CBD instead of a CBD toll.[4] While this proposal by a citizens' group had no official status and thus could not be approved or implemented without further action by others, its recommendations were considered by a panel formed by New York State Governor Andrew M. Cuomo in October 2017 (discussed below).

In October 2017, then-New York State Governor Andrew M. Cuomo created the Fix NYC Advisory Panel—consisting of community representatives, government officials, and business leaders from across the New York City region—to recommend actions to address the increasing traffic congestion in the Manhattan CBD and to identify sources of revenue to address deficiencies in the transit system. The panel examined various congestion pricing approaches for the Manhattan CBD, among other potential options, and considered programs implemented in other cities (Singapore, London, Stockholm, and Milan) (Item 5 in **Table 2A-1**). In

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3 *Report to the Traffic Congestion Mitigation Commission and Recommended Implementation Plan*. January 31, 2008. https://www.dot.ny.gov/programs/congestion_mitigation_commission/final-recommendation.
4 https://movenewyork.wordpress.com/watch-read-learn/.

its January 2018 final report, the panel recommended short-term investments to improve connectivity between the Manhattan CBD and surrounding areas, including the following:

- Improving enforcement of traffic laws within the Manhattan CBD
- Addressing the distribution of government-issued parking permits, which are often used illegally and contribute to congestion
- Investigating the contribution of commuter, intercity, charter, and tour buses to congestion in Manhattan
- Reforming taxi regulations
- Implementing a surcharge on taxi and FHV trips in Manhattan south of 96th Street (This surcharge was implemented in February 2019.)

The report also recommended the long-term strategy of installing a tolling program for the Manhattan CBD, defined as the area "bounded by 60th Street on the north and Battery Park on the south, the Hudson River on the west and the East River on the east." The recommended tolling program would exempt the FDR Drive from the Brooklyn Bridge to 60th Street from tolling and provide a credit to drivers using already tolled facilities to enter the pricing zone (the Lincoln, Holland, Hugh L. Carey, and Queens-Midtown Tunnels).[5]

Informed by the work of the Fix NYC Advisory Panel, the New York State Legislature created the Metropolitan Transportation Sustainability Advisory Workgroup as part of the fiscal year 2018 New York state budget. The workgroup—which was made up of government officials, transportation professionals, and representatives of business and commuter interest groups—examined actions that State of New York and local governments could take to address regional transportation needs, including reducing traffic congestion and suggesting new sources of funding for the region's public transit system. The panel recommended that congestion pricing be adopted to reduce congestion and generate new revenue to modernize the MTA system, as documented in its December 2018 report.[6] The panel's recommendations informed the MTA Reform and Traffic Mobility Act (Traffic Mobility Act), which was enacted on April 1, 2019, as part of the fiscal year 2020 New York State budget.

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5 *Fix NYC Advisory Panel Report*. January 2018.

6 *Metropolitan Transportation Sustainability Advisory Workgroup Report*. December 2018. https://pfnyc.org/wp-content/uploads/2018/12/2018-12-Metropolitan-Transportation-Sustainability-Advisory-Workgroup-Report.pdf.

Table 2A-1. Concepts Considered for Reducing Congestion in the Manhattan CBD

CONCEPT	PURPOSE	KEY CHARACTERISTICS	RESULT
1. 1973 Transportation Control Plan	To reduce congestion in the Manhattan CBD to meet requirements of the Clean Air Act	Tolls on the East River and Harlem River Bridges	Did not move forward.
2. 2007 PlaNYC Mayor's Plan	To reduce congestion in the Manhattan CBD and provide revenues for MTA capital and operating costs	Passenger vehicles and trucks entering, leaving, and operating within (i.e., intra-zonal) the area of Manhattan south of 86th Street during the business day (weekdays 6 a.m. to 6 p.m.) would pay a daily fee. Emergency vehicles, transit vehicles, taxis and FHVs, and vehicles with handicapped license plates would be exempt. Roads on the periphery (West Side Highway/Route 9A and FDR Drive) would not be included in the zone. Credit provided to vehicles that paid inbound toll at bridges or tunnels. Revenue to be directed to transportation system improvements. This concept was predicted to result in a 6.3% reduction in average VMT in the area south of 86th Street.	The 2008 Traffic Congestion and Mitigation Commission found that the mayor's plan had high capital and operating costs, required a large number of charging stations (each equipped with E-ZPass and license plate recognition monitors, and did not include a charge on taxi and livery trips into and out of the charging zone. Based on this evaluation, the commission recommended a different concept, the Recommended Modified Congestion Pricing Plan (Item 3f in this table) as the concept that best met the goals of the study.
3a. 2008 Traffic Congestion Mitigation Commission Study: Long List of Options	To reduce congestion in the Manhattan Business District with a minimum of at least 6.3% reduction in average VMT in the area south of 86th Street	A range of different approaches to reducing congestion, including telecommuting incentives; increasing the cost of parking in the Manhattan CBD; reducing the use of parking placards by public employees; additional taxi stands to reduce cruising; increasing cab fares and fees charged to cabs; raising tolls or implementation of variable tolls on existing facilities; East River bridge tolls; license plate rationing; mandatory carpooling; creation of High-Occupancy Toll lanes; congestion pricing with a 60th Street northern boundary; congestion pricing with an 86th Street northern boundary; congestion pricing with no intra-zonal charge and no free periphery; congestion pricing with variable charges or extended hours; congestion pricing with an exemption for hybrid vehicles; congestion pricing with a credit for other tolls paid; and various truck restrictions.	After evaluation, the 2008 Traffic Congestion and Mitigation Commission focused on five options for further consideration (Items 2, 3b, 3c, 3d, and 3e in this table). These five options best met the goals of the study, including reducing VMT by at least 6.3% and raising funds for transit investment. Many of the other approaches did not achieve the target VMT reduction or raised other issues of concern.

Table 2A-1. Concepts Considered for Reducing Congestion in the Manhattan Business District (continued)

CONCEPT	PURPOSE	KEY CHARACTERISTICS	RESULT
3b. 2008 Traffic Congestion Mitigation Commission Study: Alternative Congestion Pricing Plan	To reduce congestion in the Manhattan Business District with a minimum of at least 6.3% reduction in average VMT in the area south of 86th Street	Tolls on the East River and Harlem River Bridges; bus and bicycle lanes; reduction in and controls on on-street parking spaces; introduction of vehicle inspections related to emissions	The U.S. Environmental Protection Agency ruled that tolls on the bridges were not necessary given the investments the state and city were making in public transit at that time. The other components of the plan were implemented.
3c. 2008 Traffic Congestion Mitigation Commission Study: East River and Harlem River Toll Plan	To reduce congestion in the Manhattan Business District with a minimum of at least 6.3% reduction in average VMT in the area south of 86th Street	All untolled East River and Harlem River crossings would be subject to inbound and outbound tolls. These tolls would be in effect 24 hours a day, seven days a week and would match the existing toll rates East River crossings.	The 2008 Traffic Congestion and Mitigation Commission found that the concept did not distinguish between drivers who contributed to peak-period congestion and those who did not, failed to address trips starting and ending in Manhattan, would have adverse economic impacts on commercial vehicles and trips between the Bronx and Upper Manhattan, and given its greater impact on traffic between the Bronx and Upper Manhattan, would have a disproportionate impact on a small proportion of low- and moderate-income workers lacking transit alternatives.
3d. 2008 Traffic Congestion Mitigation Commission Study: License Plate Rationing Plan	To reduce congestion in the Manhattan Business District with a minimum of at least 6.3% reduction in average VMT in the area south of 86th Street	License plate rationing would restrict a set of vehicles from entering Manhattan south of 86th Street on certain days based on the last digit of the vehicle's license plate. New York City would ban each vehicle once every five days (i.e., restricting 20% of all vehicles each weekday from 6 a.m. to 6 p.m.).	The 2008 Traffic Congestion and Mitigation Commission found that the concept would not generate revenue, would reduce Port Authority of New York and New Jersey and MTA revenue, and would have to be coupled with a broad-based tax to fund transit improvements.

Table 2A-1. Concepts Considered for Reducing Congestion in the Manhattan Business District (continued)

CONCEPT	PURPOSE	KEY CHARACTERISTICS	RESULT
3e. 2008 Traffic Congestion Mitigation Commission Study: Combination Plan	To reduce congestion in the Manhattan Business District with a minimum of at least 6.3% reduction in average VMT in the area south of 86th Street	The concept provided a series of measures that would increase the cost of on-street and off-street parking in Manhattan south of 60th Street, and would raise the New York City parking tax for garages, eliminate the resident parking tax exemption within the zone, increase meter rates within the zone, and charge an overnight parking fee for all on-street spaces within the zone. The concept also called for reducing by 10,000 the number of government parking placards used to commute to jobs in the zone. To reduce taxi traffic, the concept applied a surcharge on all taxi trips within, into, or out of the area of Manhattan south of 86th Street.	The 2008 Traffic Congestion and Mitigation Commission found that the concept would reduce VMT by only 3.2%.
3f. 2008 Traffic Congestion Mitigation Commission Study: Recommended Modified Congestion Pricing Plan	To reduce congestion in the Manhattan Business District with a minimum of at least 6.3% reduction in average VMT in the area south of 86th Street	Passenger vehicles and trucks entering the area of Manhattan south of 60th Street during the business day (weekdays 6 a.m. to 6 p.m.) would pay a daily fee. A tolling zone boundary at 60th Street rather than 86th Street would lead to many more intra-Manhattan trips being charged the toll. Roads on the periphery (West Side Highway/Route 9A and FDR Drive) were included in the zone. Credit provided to vehicles that paid inbound toll at bridges or tunnels. Also included a package of parking and taxi policies to discourage driving within the zone, including a surcharge on FHVs during certain hours, increased parking meter rates, and elimination of resident parking tax exemption. Revenue to be directed to transportation system improvements.	The 2008 Traffic Congestion and Mitigation Commission recommended this concept that best met the goals of the study, including a 6.8% reduction in VMT. The commission found that this concept would generate $520 million a year in revenue, was less expensive to build and operate than the PlaNYC concept, and did not raise significant regional equity concerns. The recommendation was not enacted by the New York State Legislature.
4. 2015 Move NY Fair Plan proposed by citizens' group known as Move NY	To reduce congestion in the Manhattan CBD and provide revenues for MTA capital and operating costs	This concept modified tolls throughout New York City, including new tolls at 60th Street for vehicles entering the Manhattan CBD, and added a new surcharge on FHVs operating in the Manhattan CBD. Generated revenue would be dedicated to transit and roadway improvements.	Fix NYC Advisory Panel incorporated components into that panel's recommendations (Item 5 in this table).

Table 2A-1. Concepts Considered for Reducing Congestion in the Manhattan Business District (continued)

CONCEPT	PURPOSE	KEY CHARACTERISTICS	RESULT
5. 2018 Fix NYC Advisory Panel Recommendation	To reduce traffic congestion in the Manhattan CBD and provide revenue for MTA capital and operating costs	Fix NYC Advisory Panel reviewed congestion pricing systems in place in London, Singapore, Stockholm, and Milan; evaluated a range of road pricing concepts, including priced managed lanes, conventional tolls, zone-based charging, truck tolling, and adjusted parking surcharges and vehicle registration fees. Fix NYC Advisory Panel recommended a phased congestion reduction plan, including increased enforcement of traffic laws, a surcharge on FHVs in the Manhattan CBD, and a zone pricing program for all vehicles entering the Manhattan CBD south of 60th Street. Daily toll for inbound vehicles entering Monday through Friday, 6 a.m. to 8 p.m. Buses and FHVs to be exempt from the zone charge. FDR Drive to be exempt. Potential implementation of variable pricing schedule.	An FHV surcharge was enacted in 2018. A number of the panel's other recommendations were incorporated into the 2019 MTA Reform and Traffic Mobility Act.
6. 2018 Metropolitan Transportation Sustainability Advisory Workgroup Recommendation	To address regional transportation needs, including excess traffic congestion, and to suggest new sources of sustainable funding for the region's public transit system	Recommended measures included implementing a new congestion pricing zone for the Manhattan CBD with generated revenue to be dedicated to MTA.	Congestion pricing recommendations were incorporated into the 2019 MTA Reform and Traffic Mobility Act.

2007
PlaNYC Mayor's Plan

planYC

A GREENER, GREATER NEW YORK

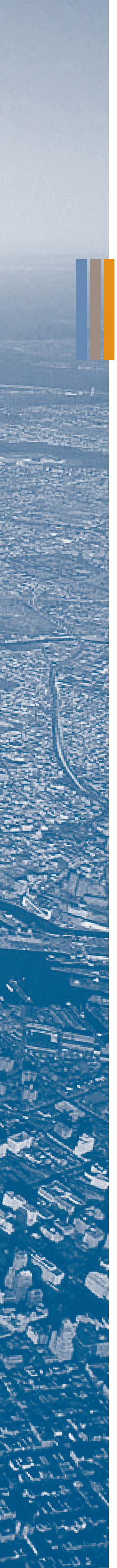
The City of New York
Mayor Michael R. Bloomberg

planYC

A GREENER, GREATER NEW YORK

Introduction

Credit: NYC Economic Development Corporation



New York City

PlaNYC

Thirty years ago, a plan for New York's future would have seemed futile.

The city was focused entirely on solving immediate crises. Government flirted with bankruptcy. Businesses pulled up stakes. Homes were abandoned. Parks were neglected. Neighborhoods collapsed. Subways broke down. Crime spiraled out of control. New York seemed unsafe, undesirable, ungovernable, unsolvable.

Today, the city is stronger than ever.

Transit ridership is at a fifty-year high. Crime is at a forty-year low. We have our best bond rating ever, and the lowest unemployment. A record 44 million tourists came to visit last year. For the first time since World War II the average New Yorker is living longer than the average American. And our population is higher than it has ever been.

Moving to New York has always been an act of optimism. To come here you must have faith in a better future, and courage to seek it out; you must trust the city to give you a chance, and know that you'll take advantage when it does. You must believe in investing in your future with hard work and ingenuity. You must, in short, believe in accepting a challenge.

This Plan is offered in that spirit.

The challenges we face today are very different from those of the 1970s, but they are no less critical. Our population will grow to over nine million by 2030. Much of our physical infrastructure is a century old and showing its age. Even as we have revitalized the five boroughs, the quality of our air, water, and land still suffer. And today we face a new threat with potentially severe implications: global climate change.

This Plan seeks to repel these threats and to extend the gains we've made over the last thirty years. It seeks active solutions rather than reactive fixes. The 1970s taught us that investing in our future is not a luxury, but an imperative. With that in mind, this Plan seeks to secure for our children a city that is even greater than the one we love today.

The time for such forward thinking has arrived. Just five years ago, let alone thirty, confronting these challenges would have been impossible. In the wake of the September 11th attacks, we planned for the next day, not the next decade. But our economic rebound has been faster than anyone imagined. And so today, we have an opportunity to look further. And we have an obligation to do so, if we are to avoid a repeat of the decay and decline of the 1970s.

The moment for facing up to our responsibility for the city's long-term future is now. The city we pass on to our children will be determined in large part by whether we are willing to seize the moment, make the hard decisions, and see them through.

This is not a plan that supplants other City efforts, such as those we are making on crime, poverty, education, or social services. Here we have focused on the physical city, and its possibilities to unleash opportunity. We have examined the tangible barriers to improving our daily lives: housing that is too often out of reach, neighborhoods without enough playgrounds, the aging water and power systems in need of upgrades, congested roads and subways. All are challenges that, if left unaddressed, will inevitably undermine our economy and our quality of life.

We can do better. Together, we can create a greener, greater New York.

Our Challenges

Under that mandate, we have identified three main challenges: growth, an aging infrastructure, and an increasingly precarious environment.

GROWTH

openNYC

New York's population swings have always been shaped by the tension between the allure of a slower paced life elsewhere and the energy and openness that has drawn new residents from across the United States and around the world.

Over the first half of the 20th century, our population swelled every decade, propelled by the consolidation of the five boroughs into a single city, the expansion of the subway, and surges of immigration. As a result of these forces, between 1900 and 1930, the population soared from 3.4 million to 6.9 million people.

By 1950, the number of New Yorkers reached 7.9 million. But after that, the suburban ideal came within the grasp of many post-war New Yorkers. The pull of new, single-family homes in Westchester, Long Island, and New Jersey was so strong that, despite continued domestic in-migration our population stagnated. In the 1970s, rising crime and a plummeting quality of life caused the city to shrink by 800,000 people.

We have spent the past three decades painstakingly restoring our city's quality of life. As recently as 1993, 22% of New Yorkers cited safety and schools as reasons to leave New York. When asked those same questions again in 2006, only 8% of recent movers gave similar answers. And the opportunities that lured immigrants to our city from around the country and around the world continue to do so. Our city's resurgence has enabled New York to burst through its historic population high with 8.2 million people. We are also more diverse than ever; today nearly 60% of New Yorkers are either foreign-born or the children of immigrants.

Barring massive changes to immigration policy or the city's quality of life, by 2010, the Department of City Planning projects that New York will grow by another 200,000 people. By 2030, our population will surge

Growth in New York City

New York will continue growing through 2030, but not all the changes are intuitive. While the city's population will reach a new record, only two boroughs (Staten Island and Queens) will surpass their historic highs.

Our fastest growing population will be residents over the age of 65, while our number of school-age children will remain essentially unchanged. Overall, our residents will average three years older, a result of the baby-boomer generation reaching retirement and lengthening life spans across the city. This means we must concentrate on increasing the number of senior centers and supportive housing as we look ahead.

As a result, while the city's overall projections are instructive, important differences exist between each borough.

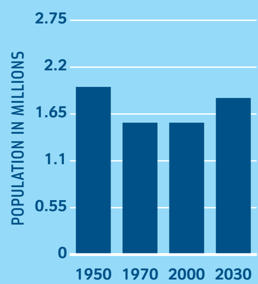
- INDUSTRIAL BUSINESS AREAS
- BOROUGH BUSINESS DISTRICTS
- CENTRAL BUSINESS DISTRICTS

Manhattan

Manhattan's population peaked in 1910, when its 2.33 million residents were piled into tiny apartments with extended relatives, creating densities in the range of 600 to 800 persons per acre. Today, even the most crowded high-rise blocks can claim densities at just one-half that level. As a result, while Manhattan may experience the second-highest growth rate of any borough through 2030, its 1.83 million residents in 2030 will fall far short of its record high. A significant portion of that growth will come from residents over 65, who will increase by nearly 60%.

YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	1.96 MIL	-	37	19.7	8.7
1970	1.54 MIL	-21.5	35	21.7	14.0
2000	1.54 MIL	-0.1	36	17.2	12.2
2030	1.83 MIL	18.8	40	15.2	16.1

Population

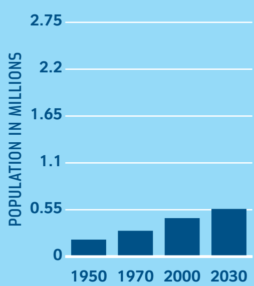


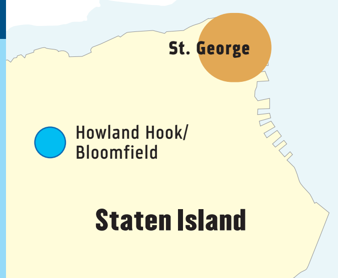
Staten Island

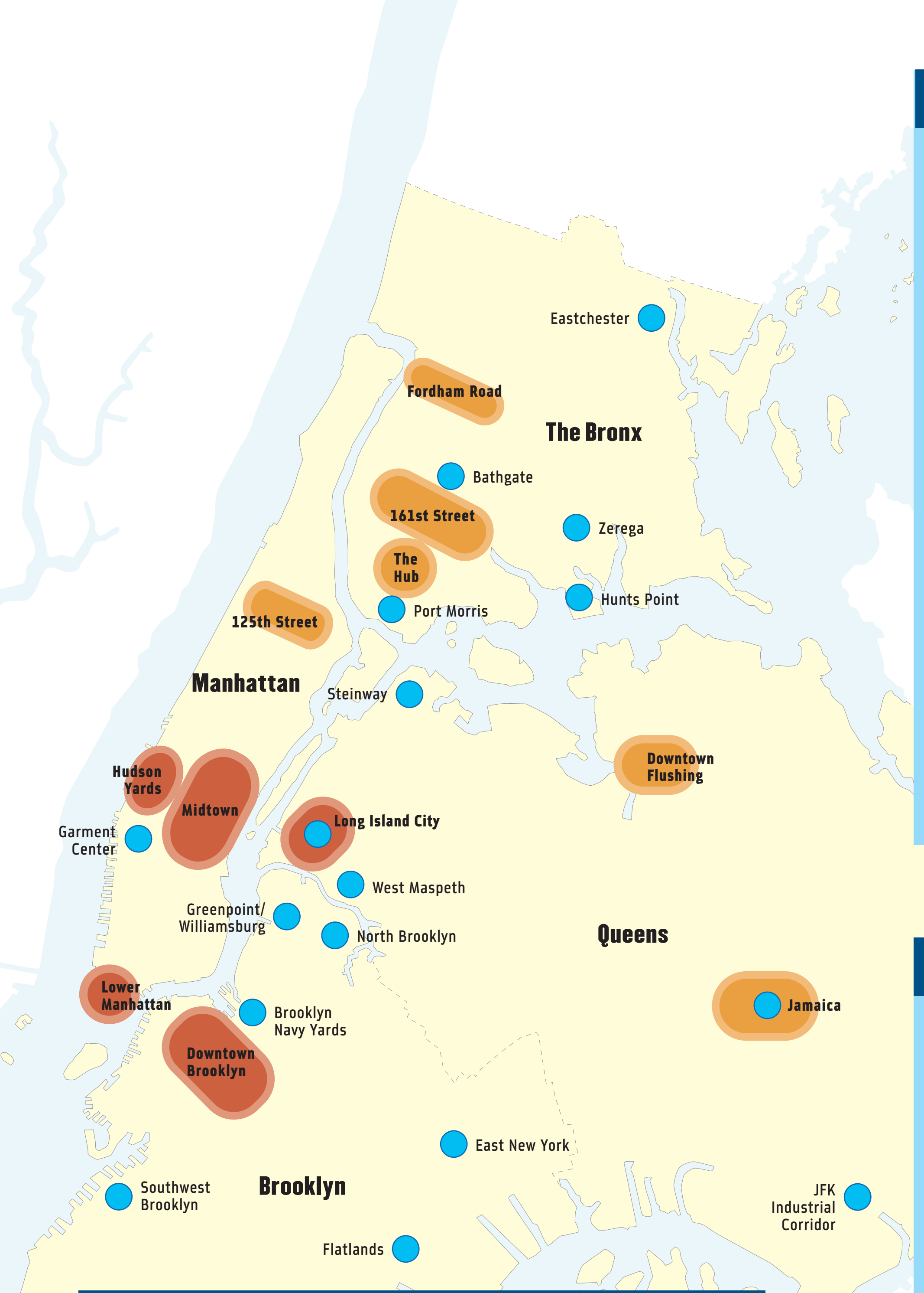
With abundant open space and relatively low density, Staten Island has the smallest population of any borough. But it is the only borough that has experienced growth each decade between 1950 and 2000. This trend will continue, although at a slower pace than between 1970 and 2010. By 2030, the population will reach a historic peak of 552,000 people, a 24.4% increase over 2000. As residents stay longer and settle, the population will age dramatically. In 1970, Staten Island was the city's youngest borough; by 2030, it will be the oldest. These older residents will push the borough's median age to nearly 40 years in 2030, a 12-year increase from 1970.

YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	191,555	-	32	27.9	8.1
1970	295,443	54.2	28	34.4	8.7
2000	443,728	50.2	36	25.4	11.6
2030	551,906	24.4	40	22.0	18.7

Population

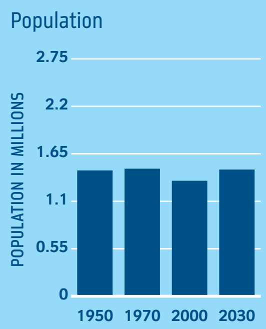






The Bronx

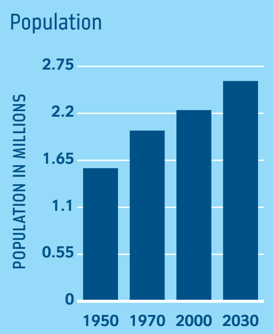
While the population of the Bronx peaked in 1970, the following decade saw disinvestment in housing, rising crime, and the growing appeal of the suburbs. These conditions precipitated a crisis that resulted in the loss of more than 300,000 people. While New York has largely rebounded from the desolation of that decade, the Bronx was most deeply affected. By 2030, the borough is projected to pull almost even with its 1970 historical high of 1.47 million. Higher-than-average birth rates will compensate for the out-migration to other boroughs and the suburbs. Larger families will also help the Bronx remain New York's youngest borough, with a median age of 33 years.



YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	1.45 MIL	-	34	25.6	7.3
1970	1.47 MIL	1.4	30	31.6	11.6
2000	1.33 MIL	-9.4	31	29.9	10.1
2030	1.46 MIL	9.3	33	27.2	11.8

Queens

Over the past 30 years, Queens has captured an ever-increasing share of the city's population. Although Queens comprised just 19.7% of the population in 1950, this number is projected to climb to over 28% by 2030, when 2.57 million of the city's 9.12 million residents will reside in Queens. The consistent growth in Queens will result in a new peak population for the borough by 2030. This growth is fueled by a mix of immigrants from more than 100 countries. As a result, the median age in Queens from 2000 to 2030 is expected to increase by just over three years.

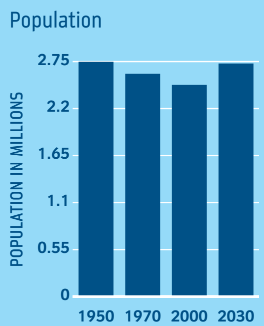


YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	1.55 MIL	-	34	25.5	7.1
1970	1.99 MIL	28.1	36	26.1	12.4
2000	2.23 MIL	12.2	35	22.8	12.7
2030	2.57 MIL	15.1	38	20.5	14.5

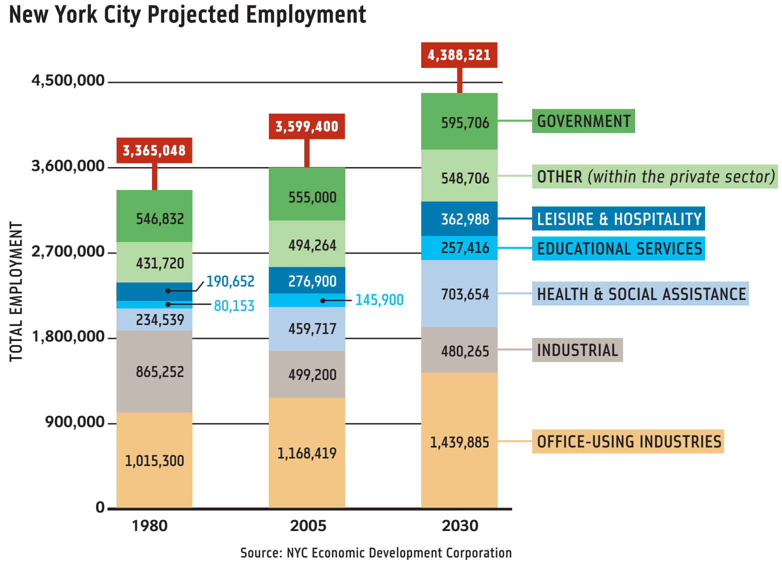
Brooklyn

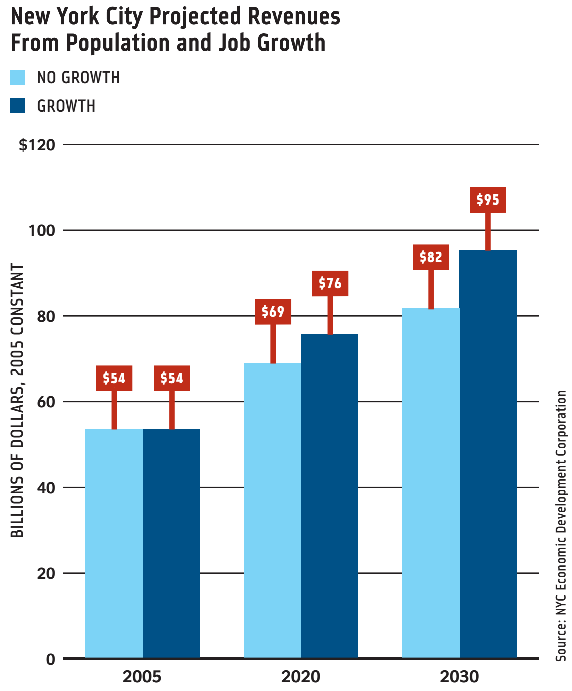
Brooklyn will near its 1950 population peak of 2.74 million, growing 10.3% to reach 2.72 million people. Prior to its merger with Manhattan, Brooklyn was the third largest city in America and continued to grow until 1950. But the Long Island suburbs, the construction of the Verrazano Narrows Bridge to Staten Island, and the devastation of the 1970s drained the borough's population. Now resurgent, Brooklyn will likely remain the city's largest borough in 2030.

YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	2.74 MIL	-	33	26.2	7.4
1970	2.60 MIL	-5.0	30	31.3	11.1
2000	2.47 MIL	-5.3	33	26.8	11.5
2030	2.72 MIL	10.3	37	23.0	15.1



Source: NYC Department of City Planning; NYC Economic Development Corporation





City revenue includes State and Federal grants. Revenue sources per job or person assumed to grow at 1.7% annually (growth rate of average compensation under Social Security Intermediate scenario).

past nine million, the equivalent of adding the entire population of Boston and Miami combined to the five boroughs.

This growth offers great opportunities. Our employment force will grow by 750,000 jobs, with the largest gains among health care and education. New office jobs will generate needs for 60 million square feet of commercial space, which can be filled by the re-emergence of Lower Manhattan and new central business districts in Hudson Yards, Long Island City and Downtown Brooklyn. To protect our industrial economy, which employs nearly half a million people, we have created 18 Industrial Business Areas. *(See chart above: New York City Projected Employment)*

Our third-fastest growing industry will be fueled by the additional visitors we expect. Tourism has nearly doubled in New York since 1991, when 23 million people visited the City; in 2006, the city received 44 million visitors. Even if hotel and airport capacity begins to constrain this growth, we predict we will still exceed 65 million visitors by 2030.

This growth will also result in enormous revenues. The expansion of our tax base will impact our economy accordingly. The additional jobs, tourists, and residents could generate an additional $13 billion annually—money that can be used to help fund some of the initiatives described in the following pages and to provide the services that our residents, businesses, workers, and visitors deserve. *(See chart above: New York City Projected Revenues From Population and Job Growth)*

But the expansion ahead will be fundamentally different than growth over the last 25 years.

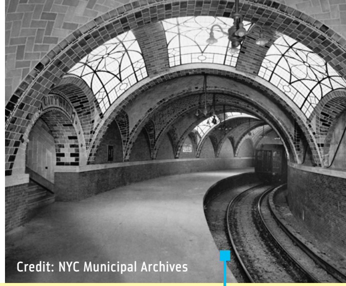
To revive our city, we funneled money into maintenance and restoration, investing in neighborhoods, cleaning and replanting parks, sweeping away the litter that had piled up in our streets and securing our subways. We reclaimed the parts of our city that had been rendered undesirable or unsafe. In short, we have spent the past two decades renewing the capacity bequeathed to us by massive population loss.

But now we have built ourselves back—and we are already starting to feel the pressure. Cleaner, more reliable subways have attracted record numbers of riders, causing crowding on many of our lines. It's not only transit. Growing road congestion costs our region $13 billion every year, according to a recent study. By 2030, virtually every road, subway and rail line will be pushed beyond its capacity limits.

Workers are moving farther and farther out of the city to find affordable housing, pushing our commutes to among the longest in the nation. Neighborhoods are at risk of expanding without providing for the parks and open space that help create healthy communities, not just collections of housing units.

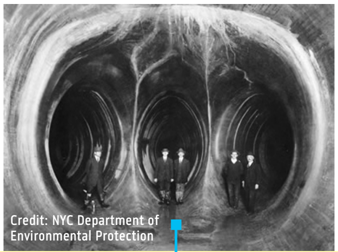
New York City Infrastructure Timeline


Credit: The New York Times Photo Archives


Credit: NYC Municipal Archives

1840 · 1850 · 1860 · 1870 · 1880 · 1890 · 1900

- **1842** Croton Water Supply System opens, the city's first comprehensive water system
- **1882** Thomas Edison switches on the world's first commercial electric light system in Lower Manhattan
- **1883** The Brooklyn Bridge becomes the first bridge across the East River
- **1904** The first subway line begins service in New York City


Credit: NYC Department of Environmental Protection


Credit: NYC Department of Environmental Protection


Credit: Getty Images

1910 · 1920 · 1930 · 1940 · 1950 · 1960 · 1970

- **1917** The city's first water tunnel is completed
- **1920s** Utility companies begin putting New York's electrical grid underground; parts are still in service today
- **1928** Catskill Water Supply System opens
- **1932** The city's last major subway expansion opens; parts of the original signaling system are still used today
- **1936** The city's second water tunnel is completed
- **1944** The Delaware Water Supply System opens; it is the city's last major water supply expansion
- **1964** The Verrazano-Narrows Bridge becomes the last significant bridge built in New York City
- **1970** Work on the city's third water tunnel begins; the second of four stages will be done by 2012

INFRASTRUCTURE

maintainNYC

This growth will place new pressure on an infrastructure system that is already aging beyond reliable limits. New Yorkers pioneered many of the systems that make modern life possible—whether it was Thomas Edison switching on the world's first commercial electric light system in Lower Manhattan, planners plotting out the first modern water network in the 1840s, or thousands of workers, engineers, and architects building the world's largest bridges four times. But our early innovation means that our systems are now among the oldest in America. *(See chart above: New York City Infrastructure Timeline)*

We are a city that runs on electricity, yet some of our power grid dates from the 1920s, and our power plants rely on outmoded, heavily-polluting technology. Our subway system and highway networks are extensive, and heavily-used, yet nearly 3,000 miles of our roads, bridges, and tunnels, and the majority of our subway stations are in need of repair. Our two water tunnels, which provide water to every New York City household, haven't been inspected in more than 70 years. We do not have the redundancy in our system to inspect or make the repairs we need.

We have seen the consequences of inadequate investment in basic services: during the fiscal crises of the 1970s, our streets were pocked with more than one million potholes. By 1982, subway ridership fell to levels not seen since 1917, the result of delayed service and deteriorating cars. Many of the city's bridges faced collapse. The Williamsburg Bridge was taken out of service when engineers discovered that the outer lanes were on the verge of breaking off into the East River. A truck famously plunged through Manhattan's West Side Highway.

We were reminded again during the recent power outage in Queens why reliable infrastructure matters. That's why even as our expansion needs assume a new urgency, we must find ways to maintain and modernize the networks underpinning the city.

ENVIRONMENT

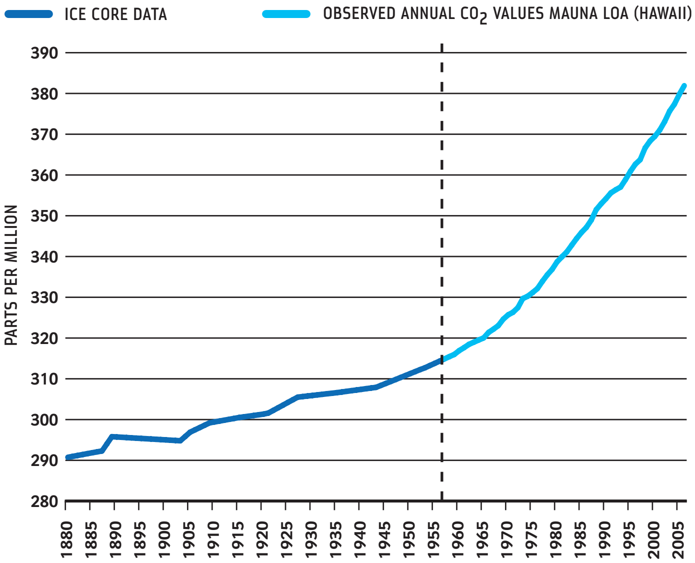
greenNYC

As our population grows and our infrastructure ages, our environment will continue to be at risk.

We have made tremendous gains over the past 25 years in tackling local environmental issues; waters that were unsafe even to touch have become places to boat, fish or swim. Air that could once be seen has become clear.

The Clean Air Act was enacted in 1970, but much of the New York metropolitan area has not reached Federal air quality standards for ozone and soot, and we suffer from one of the worst asthma rates in the United States. The Clean Water Act was passed in 1972, yet 52% of the city's tributaries—the creeks and man-made canals that hug the shoreline and pass through neighborhoods—are still unsafe even for boating. Although we have cleaned hundreds of brownfields across the city, there are still as many as 7,600 acres where a history of contamination hinders development and threatens safety.

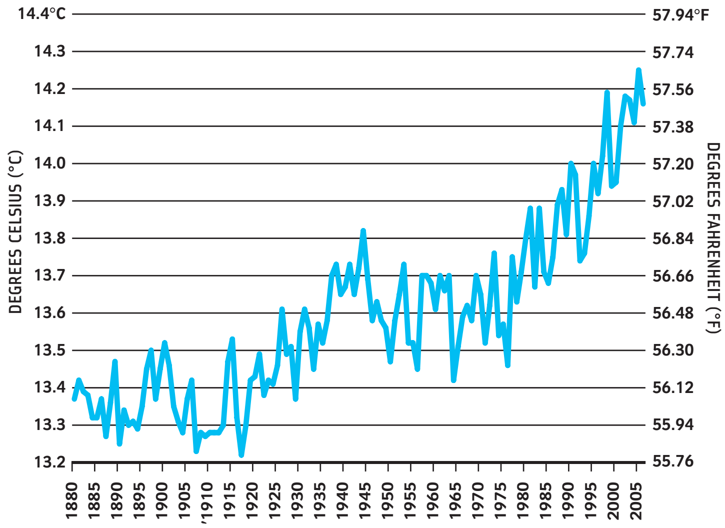
Global Atmospheric CO_2 Concentrations



Source: *Historical CO_2 Record from the Vostok Ice Core:* Laboratoire de Glaciologie et de Géophysique de l'Environnement, Arctic and Antarctic Research Institute.

Historical CO_2 Record from the Siple Station Ice Core: Physics Institute, University of Bern, Switzerland,

Global Average Temperature



Source: Columbia University Center for Climate Systems research based on National Center for Environmental Prediction Reanalysis II

** 5-year averages are plotted*

Climate Change

Cutting across all of these issues is one increasingly urgent challenge: climate change

In February, the Intergovernmental Panel on Climate Change released a report confirming that humans have accelerated the effects of climate change. As a result, the argument has shifted: we are no longer debating the existence of global warming, but what to do about it. *(See chart above: Global Average Temperature)*

It is an issue that spans the entire planet, but New Yorkers are already feeling the effects. As a coastal city, New York is especially vulnerable. Our winters have gotten warmer, the water surrounding our city has started to rise, and storms along the Atlantic seaboard have intensified.

And so we took a close look at the potential impacts of climate change on New York City, and our own responsibility to address it.

A global challenge with local consequences

Global warming and climate change are caused by increasing concentrations of greenhouse gases in our atmosphere. Carbon dioxide (CO_2), the most common greenhouse gas, is emitted from motorized vehicles, power plants, and boilers that burn fossil fuel. It gathers in the atmosphere and acts like panels in a greenhouse, letting the sun's rays through, then trapping the heat close to the earth's surface. *(See chart above: Global Atmospheric CO_2 Concentrations)*

The evidence that climate change is happening is irrefutable. Today there is 30% more CO_2 in the atmosphere than there was at the beginning of the Industrial Revolution. During the same period, global temperatures have risen by nearly two degrees Fahrenheit.

But we don't need global averages to understand how climate change is already affecting our health and future security.

By 2030, local temperatures could rise by two degrees; and our city is affected by rising temperatures more than the rest of the region because urban infrastructure absorbs and retains heat. This phenomenon, known as the "urban heat island effect," means that New York City is often four to seven degrees Fahrenheit warmer than the surrounding suburbs. But it is not only our summers that are getting hotter. In the winter of 2006 to 2007, there was no snow in Central Park until January 12th—the latest snowfall since 1878. *(See chart on facing page: Annual Average Temperature in Central Park, Manhattan)*

We also face the threat of sea level change and intensifying storms. At the Battery in Lower Manhattan, the water in our harbor has risen by more than a foot in the last hundred years, and could climb by five inches or more by 2030. *(See chart on facing page: Annual Average Sea Level at the Battery, Manhattan)*

With almost 600 miles of coastline and over half a million New Yorkers living within our current flood plain, this change is especially dangerous to New York. At our current sea level, we already face the probability of a "hundred-year flood" once every 80 years; this could increase to once in 43 years by the 2020s, and up to once in 19 years by the 2050s. According to one estimate a Category 2 hurricane would inflict more damage on New York than any other American city except Miami.

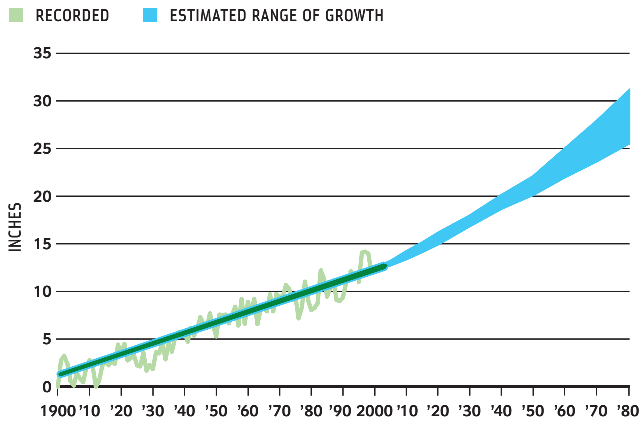
Preventing global warming

Scientists believe that only massive reductions in worldwide greenhouse gas emissions, on the order of 60% to 80% by the middle of the 21st century, will stop the process of global warming.

No city can solve this challenge alone. But New York has a unique ability to help shape a solution. *(See charts on facing page: New York City's Greenhouse Gas Emissions)*

The sheer size of our city means that our contribution to global greenhouse gas emissions is significant. In 2005, New York City was responsible for the emission of 58.3 million metric tons of carbon dioxide equivalent (CO_2e)—roughly 1% of the total carbon emissions of the United States, or an amount roughly equal to that produced by Ireland or Switzerland. This figure has been

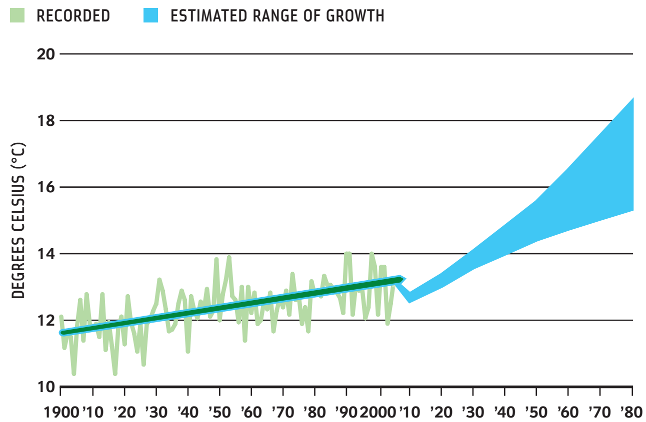
Annual Average Sea Level at the Battery, Manhattan*



Source: Rosenzweig, C., R. Horton, V. Gornitz, and D. C. Major, 2006. Climate Scenarios for the New York City Watershed Region, Technical Report, Columbia University Center for Climate Systems Research

** 1900 sea level used as base*

Annual Average Temperature in Central Park, Manhattan



Source: Rosenzweig, C., R. Horton, V. Gornitz, and D.C. Major, 2006. Climate Scenarios for the New York City Watershed Region, Technical Report, Columbia University Center for Climate Systems Research

growing at nearly 1% per year, the combined impact of both population and economic growth, and the proliferation of electronics and air conditioning. By 2030, without action, our carbon emissions will grow to almost 74 million metric tons

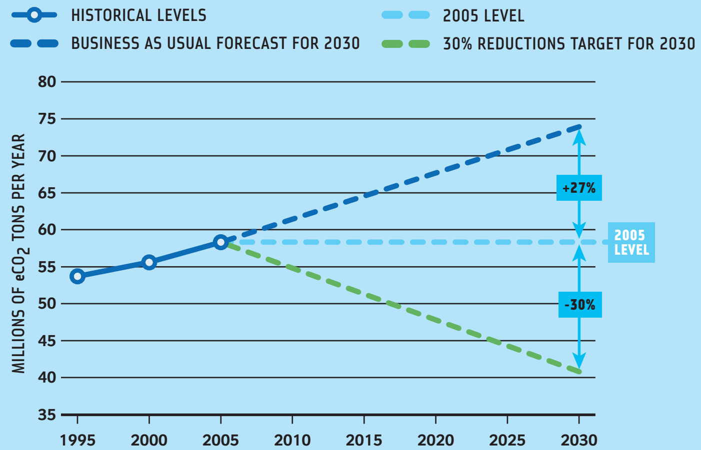
Our carbon comes from many sources, but is mainly affected by three factors. One is the efficiency of the buildings we live in, which determines how much heating fuel, natural gas, and electricity we consume. Another is the way we generate electricity, because inefficient power plants produce far more carbon dioxide than state-of-the-art ones. And a third is transportation, including the amount of driving we do and the truck trips required to haul the freight we need.

But our density, apartment buildings, and reliance on mass transit means we are also one of the most carbon-efficient cities in the United States; New Yorkers produce 71% less CO_2e per capita than the average American. Therefore, choosing to live in New York results in a reduction of greenhouse gases.

Slowing the pace of climate change will require concerted action across the world. But we also cannot afford to wait until others take the lead. Nor should we. New York has always pioneered answers to some of the most pressing problems of the modern age. It is incumbent on us to do so again, and rise to the definitive challenge of the 21st century.

New York City's Greenhouse Gas Emissions

Citywide Emissions



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Emissions Breakdown, 2005

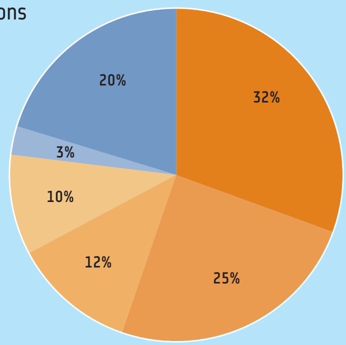
Total = 58.3 million metric tons

BUILDINGS: 79%

- RESIDENTIAL
- COMMERCIAL
- INSTITUTIONAL
- INDUSTRIAL

TRANSPORTATION: 23%

- CARS AND TRUCKS
- TRANSIT



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Figures total to 102% due to carbon absorbtion by waste and independent rounding

OUR PLAN

planYC

This effort began more than a year ago as an attempt to develop a strategy for managing the city's growing needs within a limited amount of land. It quickly became clear that this narrow focus was insufficient. The scale, intricacy, and interdependency of the physical challenges we face required a more holistic approach; choices in one area had unavoidable impacts in another. Each problem in isolation had many possible solutions. But to develop a plan that was not only comprehensive, but also coherent, we realized that we had to think more broadly.

If you seek to solve traffic congestion by building more roads or by expanding mass transit, you make a choice that changes the city. If you care about reducing carbon emissions, that suggests some energy solutions rather than others. If your concern is not only the amount of housing that is produced, but how it impacts neighborhoods and who can afford it, then your recommendations will vary.

That is why in searching for answers, we have wrestled not only with the physical constraints New York will face over two decades, but also with the fundamental values implicit in those policy choices. We have taken as a basic value that economic opportunity can and must come out of growth; that diversity of all kinds can and must be preserved; that a healthy environment is not a luxury good, but a fundamental right essential to creating a city that is fair, healthy, and sustainable.

We have also considered that the world is a different place today than it was half a century ago. Our competition today is no longer only cities like Chicago and Los Angeles—it's also London and Shanghai. Cities around the world are pushing themselves to become more convenient and enjoyable, without sacrificing excitement or energy. In order to compete in the 21st century economy, we must not only keep up with the innovations of others, but surpass them.

We have not done this work alone. The Mayor's Sustainability Advisory Board, composed of some of the city's leading environmental, business, community, and legislative leaders, has helped us at every step. We have worked with scientists and professors at the Earth Institute at Columbia University, New York University, the City University of New York, and elsewhere to understand the policy history, the economics, and the science behind the issues addressed here. And, over three months from December through March, we reached out further.

What kind of city should we become? We posed that question to New York. Over the past three months, we have received thousands of ideas sent by email through our website; we've heard from over a thousand citizens, community leaders and advocates who came to our meetings to express their opinions; we have met with over 100 advocates and community organizations, held 11 Town Hall meetings, and delivered presentations around the city. The input we received suggested new ideas for consideration, shaped our thinking, reordered our priorities.

In all our conversations, one core emerged: the strengths of the city are in concentration, efficiency, density, diversity; in its people, but above all in its unending sense of possibility. We must reinforce these strengths.

The result, we believe, is the most sweeping plan to strengthen New York's urban environment in the city's modern history. Focusing on the five key dimensions of the city's environment—land, air, water, energy, and transportation—**we have developed a plan that can become a model for cities in the 21st century.**

The plan outlined here shows how using our land more efficiently can enable the city to absorb tremendous growth while creating affordable, sustainable housing and open spaces in every neighborhood. It details initiatives to improve the quality of our air across the city, so that every New Yorker can depend on breathing the cleanest air of any big city in America; it specifies the actions we need to take to protect the purity of our water and ensure its reliable supply throughout the city; it proposes a new approach to energy planning in New York, that won't only meet the city's reliability needs, but will improve our air quality and save us billions of dollars every year. Finally, it proposes to transform our transportation network on a scale not seen since the expansion of the subway system in the early 20th century—and fund it.

Each strategy builds on another. For example, encouraging transit-oriented growth is not only a housing strategy; it will also reduce our dependence on automobiles, which in turn alleviates congestion and improves our air quality.

We have also discovered that every smart choice equals one ultimate impact: a reduction in global warming emissions. This is the real fight to preserve and sustain our city, in the most literal sense.

The answers are neither easy nor painless. They will require not only substantial resources but deep reservoirs of will.

In some cases, the key difficulties are administrative; we must achieve a new level of collaboration between City agencies and among our partners in the region. In others, the challenges are legislative. This plan calls for changes at the City, State, and Federal levels—for transportation funding, for energy reform, for a national or state greenhouse gas policy.

Finally, there is the need to pay for what we want. Previous generations of New Yorkers have ignored the reality of financing and have suffered as a result. We cannot make that mistake again. For each of our proposals in this plan, we have described how it will be funded, which in some cases is through the city budget, in other cases through new funding sources. An underlying assumption has been that we should be willing to invest in things that we truly need, and which will pay New Yorkers back many times.

The growth that prompted this effort in the first place will also enable us to pay for many of the answers. By guiding and shaping this growth, we believe it can be harnessed to make a city of 9.1 million people easier, more beautiful, healthier, and more fair than our city of 8.2 million today.

In December, we posed another question to New York: **Will you still love New York in 2030?**

Above all, this report seeks to ensure that the answer to that question is an unequivocal,
Yes.

Land

- **Create homes for almost a million more New Yorkers, while making housing more affordable and sustainable**
- **Ensure that all New Yorkers live within a 10–minute walk of a park**
- **Clean up all contaminated land in New York City**

As virtually every part of our city grows, one piece remains fixed: the supply of land. That's why we must use our space more efficiently, to accommodate growth while preserving, and enhancing, the city's quality of life.

Housing

To meet the needs of a growing population, we'll need 265,000 more housing units by 2030. We have the capacity to accommodate this growth, but without action our city's housing stock won't be as affordable or sustainable as it should be.

That's why we will **expand our supply potential by 300,000 to 500,000 units** to drive down the price of land, while directing growth toward areas served by public transportation. This **transit-oriented development** will be supported by public actions to create new opportunities for housing, such as **ambitious rezonings** in consultation with local communities, **maximizing the efficiency of government-owned sites,** and exploring opportunities with communities to **create new land** by decking over highways and railyards.

We must also pair these actions with targeted affordability strategies like **creative financing,** expanding the use of **inclusionary zoning,** and developing **homeownership programs** for low-income New Yorkers.

By expanding these efforts into the future, we can ensure that new housing production matches our vision of New York as a city of opportunity for all.

Open Space

Although we've added more than 300 acres of parks in the last five years and set in motion much more, two million New Yorkers, including hundreds of thousands of children, live more than 10 minutes from a park.

That's why we will invest in **new recreational facilities** across every borough, **opening hundreds of schoolyards** as local playgrounds, **reclaiming underdeveloped sites** that were designated as parks but never finished, and **expanding usable hours at existing fields** by installing additional lights and turf fields.

We will improve our streets and sidewalks by adding **new greenstreets** and **public plazas in every community** as part of our strategy to create a more inviting public realm.

Brownfields

Our need for land means that we must foster the reuse of sites where previous uses have left behind a legacy of contamination.

That's why we will make existing brownfield cleanup programs faster, more efficient, and more responsive to New York's unique development challenges. We will develop **city-specific remediation guidelines, pilot new time-saving strategies** for testing, and create a **new City brownfields office** to accelerate redevelopment.

We will advocate for **eligibility criteria expansions** for existing State programs, while creating **a new City program** to oversee the remaining sites. We will ask for the State to **release community development grants** and **incentivize developers to partner with local communities so neighborhoods gain** a stronger voice in shaping the direction of their neighborhoods.

But we can't clean up all the contaminated land in the city if we don't know where it is. That's why we will launch a process to **identify contaminated sites.**

To encourage more widespread testing, we will **create a revolving cleanup fund,** funded through a partnership with the private sector.

Our approach to brownfields will be more comprehensive and inclusive than ever before, as we work to ensure that the remnants of our past contribute to a more sustainable future.

Water

- **Open 90% of our waterways for recreation by reducing water pollution and preserving our natural areas**
- **Develop critical backup systems for our aging water network to ensure long-term reliability**

We have two primary water challenges: to ensure the water we drink is pure and reliable, and to ensure that the waterways surrounding our city are clean and available for use by New Yorkers.

Water Network

We have the luxury of an abundant water supply, but our supply system faces challenges. Critical elements such as aqueducts and water tunnels cannot be taken out of service. Development encroaches on the city's watersheds, so our reservoirs will require continued vigilance.

We must ensure the quality of our water at its source by **building a new filtration plant for the Croton System** and continuing our aggressive **watershed protection program** for the Catskill and Delaware systems.

We will create redundancy for the aqueducts that carry the water to the city through a combination of **water conservation measures,** maximizing the use of our existing supplies through **new infrastructure like the New Croton Aqueduct,** and **evaluating new potential water sources,** like groundwater.

Finally, we must be able to repair and modernize our in-city distribution, which means **finishing Water Tunnel No. 3.**

Water Quality

We are one of the world's great waterfront cities, with nearly 600 miles of coastline. Waterfront revitalization has been a guiding principle of the last five years, across all five boroughs.

Now it is time to accelerate the reclamation of the waterways themselves, particularly our most polluted tributaries. We will **upgrade our wastewater treatment infrastructure,** while we implement proven strategies such as **greening our streets, planting trees** and **expanding our Bluebelt network.** We will also **explore other natural solutions** for cleaning our water bodies through a range of pilot programs that will be coordinated by a **new Interagency Best Management Practices Task Force. We will also begin to assess the protection our wetlands receive—our first step toward a broader policy.**

Through these initiatives, we can restore our city's natural ecology and the recreational use of our waterways.

Transportation

- **Improve travel times by adding transit capacity for millions more residents, visitors, and workers**
- **Reach a full "state of good repair" on New York City's roads, subways, and rails for the first time in history**

New York's success has always been driven by the efficiency and scale of its transportation network. But for the last 50 years, New York has underinvested.

Despite dramatic progress, we have not yet achieved a full state of good repair across our transit and road networks. More significantly, virtually all subway routes, river crossings, and commuter rail lines will be pushed beyond their capacity in the coming decades—making transportation our greatest potential barrier to growth.

We are proposing **a sweeping transportation plan** that will enable us to meet our needs through 2030 and beyond. That includes strategies to **improve our transit network,** through **major infrastructure expansions, improved bus service, an expanded ferry system** and the **completion of our bike master plan.** We must also **reduce growing gridlock** on our roads through **better road management** and **congestion pricing,** a proven strategy that charges drivers a daily fee to use the city's densest business district.

We know what must be done. But essential transit expansions have been stalled, in some cases for decades. Today, not a single major expansion project is fully funded—and overall, there is a $30 billion funding gap.

That's why we will seek to create **a new regional financing entity, the SMART Financing Authority,** that will rely on three funding streams: the revenues from congestion pricing and an **unprecedented commitment from New York City** that we will **ask New York State to match.** This authority would **fill the existing funding gap for critical transit expansions and provide one-time grants to achieve a state of good repair,** enabling our region to achieve a new standard of mobility.

Energy

- **Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure**

New Yorkers face rising energy costs, air pollution, and greenhouse gas emissions from a lack of coordinated planning, aging infrastructure, and growth.

This will require a two-pronged strategy to increase our clean supply and lower our consumption despite our growth—something that no city or state has done before.

We will **encourage the addition of new, clean power plants through guaranteed contracts, promote repowerings** of our most inefficient plants, and **build a market for renewable energies** to become a bigger source of energy. This new supply will also enable us to **retire our oldest, most polluting power plants,** cleaning our air and reducing greenhouse gas emissions.

To reduce demand, we will **target our largest energy consumers**—institutional buildings, commercial and industrial buildings, and multi-family residential buildings—and accelerate efficiency upgrades **through a system of incentives, mandates, and challenges. Demand reductions will help all New Yorkers by lowering energy prices.**

Together, these strategies will produce a reliable, affordable, and environmentally sustainable energy network. But there is currently no entity capable of achieving this goal. That's why we will work with the State to create **a New York City Energy Planning Board.**

By managing demand and increasing supply, **New York City's overall power and heating bill will plunge by $2 billion to $4 billion;** the **average New York household will save an estimated $230 every year** by 2015.

The result will be not only a healthier environment, but also a stronger economy.

Air Quality

- **Achieve the cleanest air quality of any big city in America**

Despite recent improvements, New York City still falls short in meeting federal air quality standards. This is most apparent in the persistently high rates of asthma that plague too many neighborhoods.

We will continue **pressuring the State and Federal governments to require reductions** in harmful emissions, while aggressively targeting the local sources we can control. Transportation is responsible for more than 50% of our local air pollution; that's why we **will encourage New Yorkers to shift to mass transit**. In addition we will mandate, promote, or incentivize **fuel efficiency, cleaner fuels, cleaner or upgraded engines, and the installation of anti-idling technology.**

We must also address our other major sources of emissions: buildings and power plants. That means switching to **cleaner fuels for heating** and **retiring polluting plants.**

Our open space initiatives such as **tree plantings** will move us the rest of the way toward achieving the cleanest air of any big city in America.

To track our progress and target our solutions we will also **launch one of the largest local air quality studies in the United States.**

Climate change

- **Reduce our global warming emissions by 30%**

Collectively these initiatives address the greatest challenge of all: global warming. Scientists have predicted that unless greenhouse gas emissions are substantially stemmed by the middle of the century, the impacts of climate change will be irreversible. Coastal cities like New York are especially vulnerable.

Almost every action we take—from turning on the lights to stepping into a car—has an impact on the amount of carbon dioxide (CO_2) released into the atmosphere.

As a result, **our climate change strategy is the sum of all of the initiatives in this plan.** All of PLANYC's strategies—from reducing the number of cars to building cleaner power plants to addressing the inefficiencies of our buildings—will help us to reduce emissions.

And we will also make a difference in the fight against global warming simply by making our city stronger: **By absorbing 900,000 new residents**—instead of having them live elsewhere in the United States—**we can prevent an additional 15.6 million metric tons of greenhouse gases from being released into the atmosphere.**

We will also embark on a long-term effort to develop **a comprehensive climate change adaptation strategy,** to prepare New York for the climate shifts that are already unavoidable.

As virtually every part of our city grows, one piece remains fixed: the supply of land. That's why we must use our space more efficiently to accommodate growth while preserving—and enhancing—the city's quality of life.

We must provide enough housing; but we must not allow the production of units to eclipse other neighborhood needs—the balance of open space, parks, retail, and aesthetics that is essential to a healthy community.

With competing needs and limited land, we must unlock unrealized housing capacity, complete unfinished parks, and direct growth toward transit centers. By being smarter about our land-use strategies, we can realize the promise of an expanding population, while avoiding the pitfalls of unplanned and unbalanced growth

Land

Housing

Create homes for almost a million more New Yorkers, while making housing more affordable and sustainable

Open Space

Ensure that all New Yorkers live within a 10-minute walk of a park

Brownfields

Clean up all contaminated land in New York City

Housing

Credit: Alexander Garvin

Create homes for almost a million more New Yorkers, while making housing more affordable and sustainable

The saloons began appearing on Hunters Point in the 1860s. As travelers emerged from the new Flushing & North Side Rail Road, they stopped in at new restaurants before transferring to ferries that carried them across the East River to the shore of Manhattan.

The use would soon shift. Although commuters began to dwindle when the railroad started providing direct service to Manhattan, by then gas plants, chemical factories, and other types of heavy manufacturing had begun moving in. By the start of the 20th Century, Long Island City had one of the highest concentrations of industry in the country; some 300 companies employed 16,000 workers, making everything from automobiles to chewing gum.

But as manufacturing declined across the city, the factories and gas plants in Hunters Point also began to close. The saloons shut down. The land was stripped of its activity, leaving behind contaminated soil and a degraded creek. And that's how it stayed for decades.

Today, the southern edge of the waterfront sits stark against the Manhattan skyline; an empty stretch of land against the spires of the cityscape. On a day this past winter, the site was covered in crushed rock and debris; huge cement cylinders and tangles of heavy-duty wire rise in piles. But another shift is underway.

Clusters of tall skyscrapers are starting to rise in Queens West; since the first apartment building opened in 1997, developers have built 1,000 units, with more than 4,000 units either planned or underway. The City is slated to transform the remaining land with 5,000 new units—60% of which will be affordable to moderate and middle income New Yorkers. The former commuter outpost and industrial center is becoming the newest neighborhood in New York, just a five-minute ferry or one-stop subway ride from Manhattan.

You can see growth and reclamation across New York. Construction is at record levels. Swaths of decaying industrial land along the waterfront are being reshaped into new neighborhoods, with riverside promenades, parks, and housing. We are re-evaluating our city's land-use patterns at an unprecedented pace, with more than 60 rezonings in total encompassing over 4,500 blocks including the Brooklyn waterfront, Morrisania and Port Morris in the Bronx, and the west side of Manhattan.

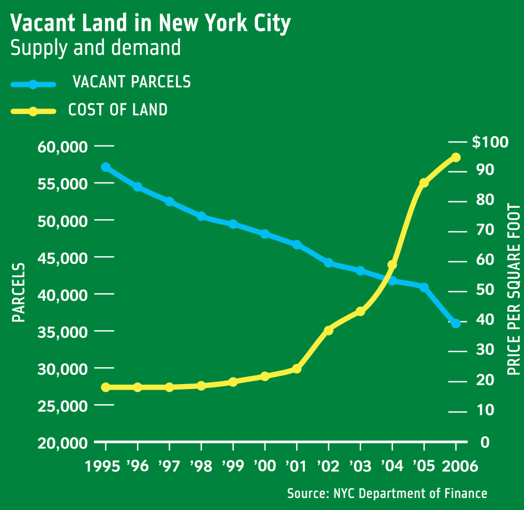
Already, housing for more than 200,000 people is in the pipeline. As we look ahead to 2030, our challenge is to house nearly another 700,000 people between 2010 and 2030.

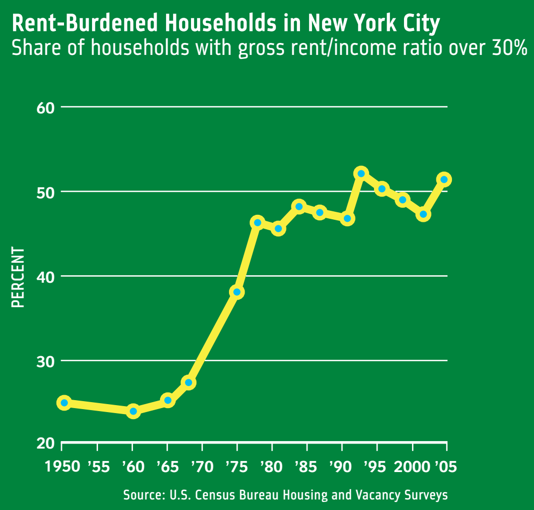
Growth on this scale is not impossible—indeed, we have done it before. In the last 25 years alone, we added nearly 315,000 new units, and more than 1.1 million new residents.

But two lessons from that period of development have emerged that should guide our growth over the next quarter century.

The first lesson is that all growth is not equal.

Queens West, foreground





As our city faces unprecedented levels of population, some fear that change will not enable opportunity, but rather erase the character of communities across the city. That is why we cannot simply create as much capacity as possible; we must carefully consider the kind of city we want to become.

We must ask which neighborhoods would suffer from the additional density and which ones would mature with an infusion of people, jobs, stores and transit. We must weigh the consequences of carbon emissions, air quality, and energy efficiency when we decide the patterns that will shape our city over the coming decades.

For most of the 20th century, New York's rapid growth followed the expansion of the subway system, as mass transit allowed residents of an overcrowded city to disperse to lower-cost land on the edges of the city—while giving them easy access to the jobs concentrated at the center.

We have not always made smart choices since. Between 1970 and 2000, many of our greatest areas of growth have been underserved by transit; many of our most connected urban centers have either lost population or experienced only modest growth.

Meanwhile, development pushed out into parts of the city that depend more heavily on cars. Although spreading housing across New York helped fuel the diversity of neighborhoods and lifestyle choices that distinguish our city, growth in these areas will not stay sustainable. As we face unprecedented levels of population, our growth moving forward must be more transit-oriented; this will stem increasing travel times and congestion on our roads, protect our air quality by avoiding the need for more cars, and reduce our global warming emissions.

In the last five years, we have turned the corner. New Yorkers have begun to shift back toward transit centers, into areas with existing density, and away from places with little ability or will to accommodate newcomers. While less than 70% of New York's population lives within a half-mile of mass transit, 80% of the housing unit capacity created since 2000 is transit-accessible.

Today, New York has an opportunity not only to grow, but to enhance the strengths of the city itself.

We have also learned that just planning for the required number of units will not be enough to assure affordability.

Not long ago, our greatest housing challenge was abandonment. But as our city's resurgence continues to attract record numbers of residents, the most pressing issue we face today is affordability. In 2005, more than half of all New Yorkers paid more than 30% of their income toward rent—among the highest burdens in the nation and a three percent increase from the previous Housing and Vacancy Survey in 2002. According to the Furman Center, the number of apartments affordable to low- and moderate-income New Yorkers shrank by 205,000 units between 2002 and 2005. In a recent poll, more than 64% of people cited housing costs as a major factor in moving out of the city. *(See chart above: Rent-Burdened Households in New York City)*

Low vacancy rates and increasing demand have plagued the city's housing market, providing upward pressure on housing prices. And despite the fact that housing production in 2005 and 2006 represented the highest two-year total for residential building permits since 1965, we still face a significant gap between the supply of housing and our population.

As potential building sites have become scarcer across the city, the land price component of housing costs has risen. And the supply continues to dwindle, helping to drive land prices to new levels. *(See chart above: Vacant Land in New York City)*

But one of the biggest pressures on housing prices has been the diminishing cushion between zoned capacity—the number of units that theoretically could be built according to the zoning code—and built units. As the number of housing units continues to rise, developers have to compete for a shrinking supply of vacant or under-built land.

This means developers pay a "scarcity premium" for the remaining sites, and that premium feeds into the price of new housing. The competition also empowers land owners to hold out for the highest possible price without worrying that developers will be able to find easy, comparable alternatives.

In its early history, New York avoided this problem. New York's zoning code in 1958 provided the potential for 55 million people to live in the city—when we had about 7.8 million residents. In 1961, the city overhauled its zoning ordinance, but it still provided potential for 12 million residents. But since then, despite recent rezonings, our overall capacity has actually decreased—to about 400,000 possible new units on soft sites.

That means we only have space—if every significantly underdeveloped and vacant site was developed to its full potential—to build new housing for 1.3 million more people. But many of the sites will not be developed to their maximum capacity. By 2030, we expect 900,000 more people to arrive. If supply is not created as fast as people arrive, affordability could suffer further.

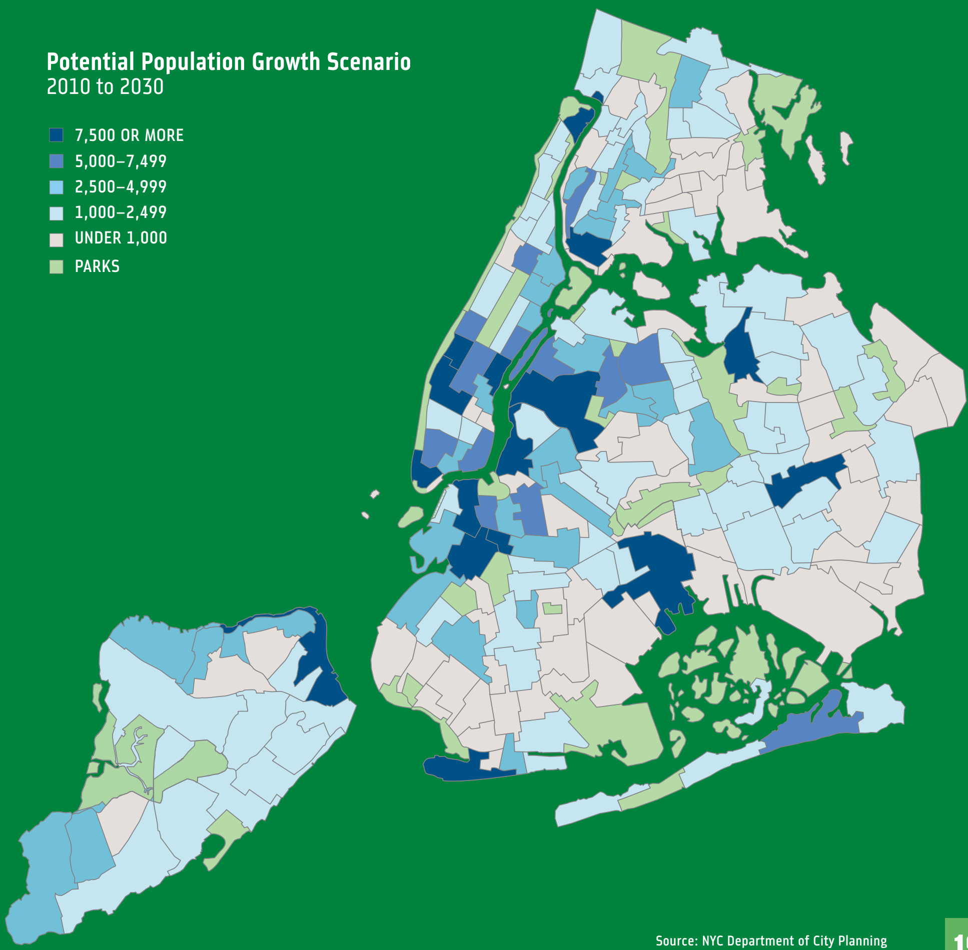
The Mayor's $7.5-billion *New Housing Marketplace Plan,* which will build or preserve 165,000 units for 500,000 people over 10 years, is more than has ever been done before. But it will not be enough through 2030. Housing 500,000 New Yorkers will be an historic achievement; but it must also be the beginning.

Our Plan

This new landscape will require new creativity. Not long ago, our housing strategies revolved around regenerating a market that had all but disappeared from too many New York City's neighborhoods. Our challenge today is to devise new ways to harness—and manage—the demand unleashed by New York's phenomenal success. We must nurture the forces that have infused communities from Fort Greene to Flushing with new energy, immigrants, up-and-comers, emerging families.

That means expanding our supply potential by up to 500,000 units to decrease the gap between housing supply and housing demand that has existed in recent decades. There are certainly other factors that impact housing prices. But of them all, land is the lever that the City holds most firmly. By increasing potential housing opportunities, the pressure to find building sites eases—and with it, prices.

We must also continue to vigorously pursue targeted affordability programs that seek out our most vulnerable populations and provide them with secure homes and needed support.



Source: NYC Department of City Planning

Much of this growth will occur without government intervention. Private owners will continue to submit private zoning applications to change the allowed uses and densities on their sites. Many of the larger opportunities are underway or on the horizon including the former Domino Sugar Factory on the Brooklyn waterfront and the former Con Edison site on Manhattan's east side. These and other private sites already in the planning and review process could contribute to more than 25,000 units of housing capacity, depending on market conditions.

But private rezonings will not be enough. That is why government must take the lead in ensuring sustainable growth in housing by continuing to work with communities on rezonings and maximizing the use of government land to create new housing opportunities. We must also be thinking more creatively about how to solve our housing needs into the future. That means exploring opportunities to create new sources of land by decking over infrastructure like highways and railyards —and in some cases building new infrastructure like subway extensions to make development more feasible. *(See map above: Potential Population Growth Scenario; see map on following page: Potential Additional Capacity For Residential Growth)*

This will help stabilize our market and provide broader affordability. But we must supplement this effort with targeted affordability programs that build on our ambitious efforts.

Taken together, these policies will not only accommodate 900,000 New Yorkers, but also create a more equitable, healthier, and sustainable city. The map above is a vision of what our city can become. In this scenario, 95% of the new capacity would be created within a half-mile of mass transit, reaffirming the urban values of efficiency, mobility, and environmental responsibility.

Our plan for housing:

Continue publicly-initiated rezonings

1 Pursue transit-oriented development
2 Reclaim underutilized waterfronts
3 Increase transit options to spur development

Create new housing on public land

4 Expand co-locations with government agencies
5 Adapt outdated buildings to new uses

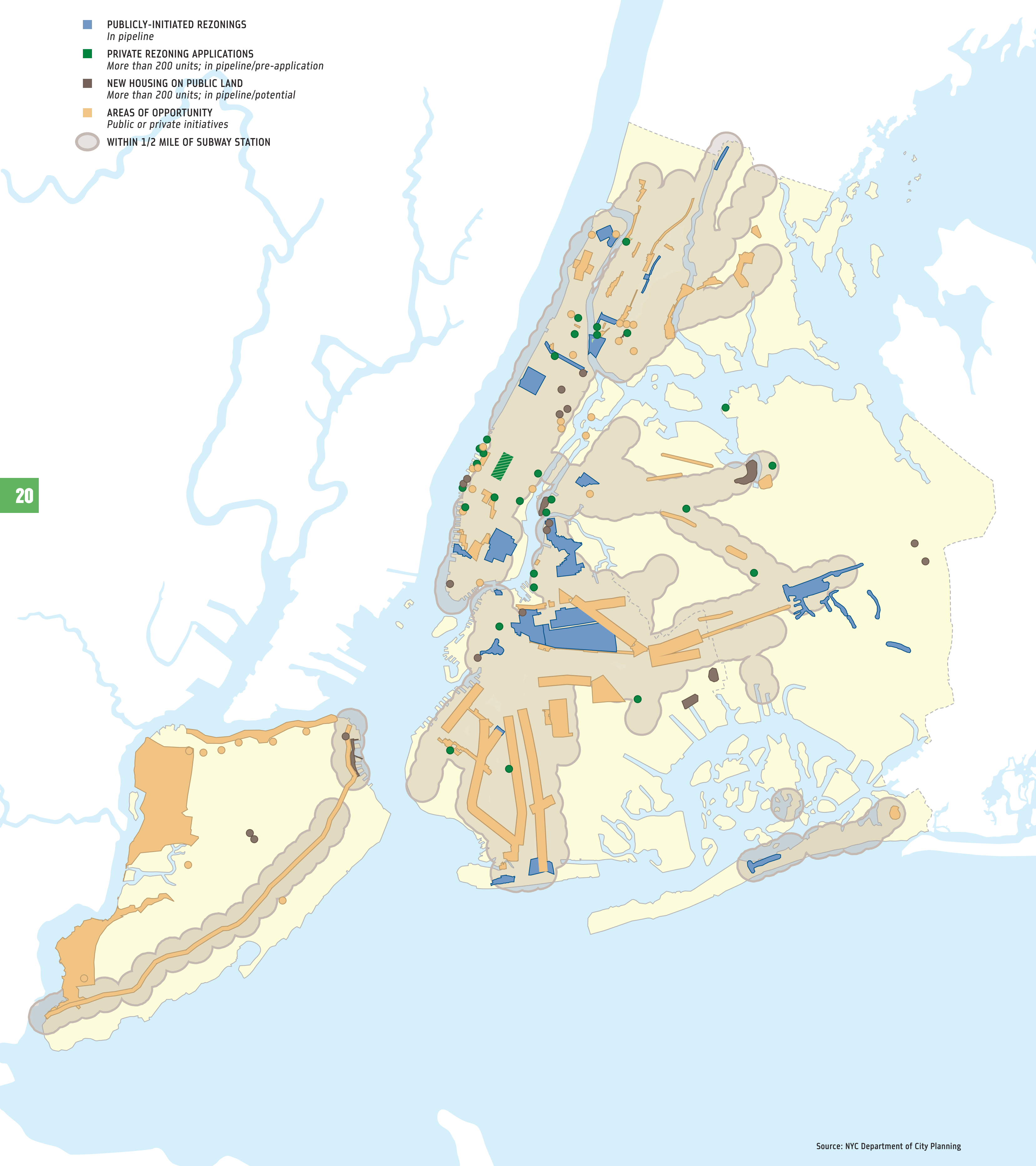
Explore additional areas of opportunity

6 Develop underused areas to knit neighborhoods together
7 Capture the potential of transportation infrastructure investments
8 Deck over railyards, rail lines, and highways

Expand targeted affordability programs

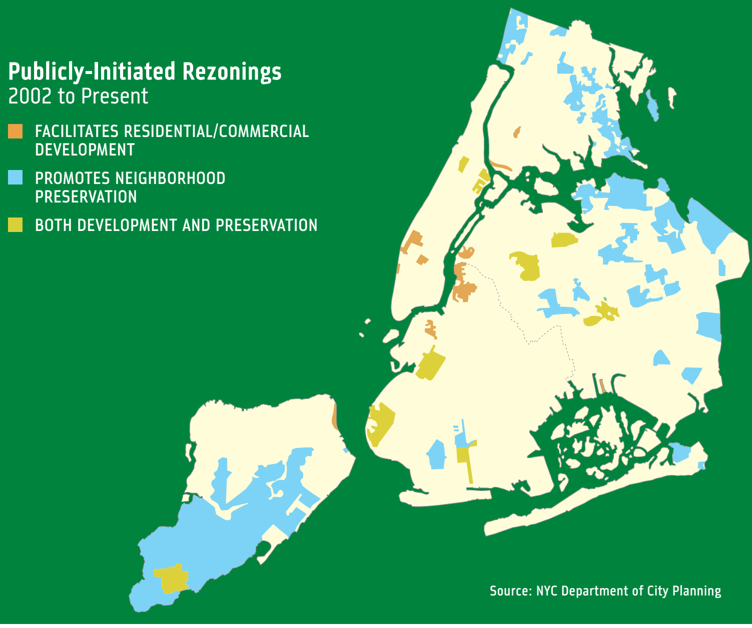
9 Develop new financing strategies
10 Expand inclusionary zoning
11 Encourage homeownership
12 Preserve the existing stock of affordable housing throughout New York City

Potential Additional Capacity for Residential Growth



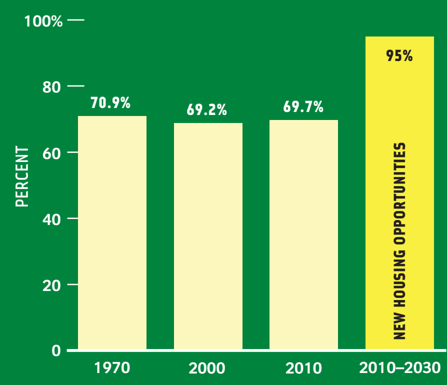
Source: NYC Department of City Planning

Publicly-Initiated Rezonings
2002 to Present



Source: NYC Department of City Planning

Transit-Accessible Population in New York City
People living within 1/2 mile of a subway



Source: NYC Department of City Planning

Continue publicly-initiated rezonings

Just 15 years ago, the waterfronts of Williamsburg and Greenpoint were areas left behind. Much of the activity slowly ebbed away after the loss of manufacturing industries along the East River. By 2000, these waterfronts and nearby neighborhoods were a mix of remaining housing, vacant and contaminated waterfront lots, and abandoned industrial buildings that had begun to be reclaimed by a new generation of Brooklynites for housing, art spaces, and craft industries.

Across New York, stretches of land—once teeming with life, action, activity, commerce—sat largely abandoned. As factories and ports closed down after World War II, the land stayed cut off from communities, the piers vacant, the old buildings empty. Our economy had evolved. Our land use did not.

But recently, that has begun to change.

In 2002, the City announced a plan to rezone the Greenpoint-Williamsburg waterfront, replacing the empty manufacturing sites with a mixture of housing, business and open space. The plan adopted in 2005 is expected to produce about 10,000 new housing units—a third of them affordable. Already, over 2,000 units have received permits, the first pieces of the waterfront esplanade are under construction, and the park is scheduled to break ground in 2009.

Greenpoint-Williamsburg has been part of one of the biggest transformations of the city landscape since the rezoning of 1961. In the past five years, nearly 4,500 blocks have been rezoned, with many more in the pipeline. *(See map above: Publicly-Initiated Rezonings)*

The City has set in motion plans to turn about 300 acres of railyards, auto repair shops, and parking lots in the Midtown Manhattan area known as Hudson Yards into a mixed-use commercial, residential, and hospitality district. The West Chelsea initiative is supporting the area's concentration of arts uses and promoting the transformation of aging factories and deteriorating streets into new residential and commercial spaces. Anchored by the conversion of an abandoned rail line into a world-class elevated park, the rezoning is reshaping one of the city's most distinctive and rapidly growing neighborhoods.

Along the way we have sought to ensure that every neighborhood's history and character is protected to preserve what attracted residents in the first place. Each block deserves its own unique consideration. For example, preserving the historic brownstone character of side streets was a primary goal of the recent rezonings in Park Slope and South Park Slope, but the City paired this with an upzoning of Fourth Avenue to promote density where additional bulk and height was appropriate.

Moving ahead, we will continue to ensure that the essential character of the city's communities remains intact as we seek out three main types of opportunities for public rezonings: continuing to direct growth toward areas with strong transit access; reclaiming underused or inaccessible areas of our waterfront; and exploring opportunities to spur growth through the addition of transit, as our subways did more than a century ago.

All of these rezonings together will create the potential for between 54,000 and 80,400 units of housing.

INITIATIVE 1

Pursue transit-oriented development

We will use upcoming rezonings to direct growth toward areas with strong transit access

Central to the City's rezoning strategy is identifying primary avenues and boulevards near transportation hubs whose width and access to transit enable them to support additional density. With easy access to multiple transportation options, these sites can accommodate increased residential development without straining the existing transportation infrastructure. *(See chart above: Transit-Accessible Population in New York City)*

Downtown Jamaica is one such example. There, the J, Z, and E lines and the AirTrain connect the Long Island Rail Road's local station to JFK airport, making it an important gateway for new arrivals to the city. As a result, Downtown Jamaica is a major transit hub, with more than 95,000 riders passing through the area's six subway stops each day. This concentration of transit means that thousands more residents and businesses could grow with modest investments in infrastructure—and without forcing an increased reliance on automobiles.

But much of the current zoning in Jamaica has been unchanged since 1961. This outdated zoning, and its restrictions on density, is one of the major obstacles to Jamaica's current and future economic potential. That's why the City is now engaging community stakeholders, neighborhood residents, and local elected officials in a public review process for the Jamaica Plan, which will build on the strengths of the area to promote sustainable growth. It is among the largest rezoning efforts in the city's history.

There are other examples across New York. In Coney Island, the newly rebuilt Stillwell Avenue subway station is the genesis and terminus of several train lines in Brooklyn including the D, Q, N, and F trains. The Coney Island Strategic Plan will promote growth around this transit center, enhancing the area's historic attractions, while increasing affordable housing on vacant City-owned land.

INITIATIVE 2

Reclaim underutilized waterfronts

We will continue restoring underused or vacant waterfront land across the city

Although it once supported a flourishing shipping and industrial center, the city's waterfront has experienced a decline in such uses in the past 60 years. Today, New York City's 578-mile waterfront offers one of the city's greatest opportunities for residential development. Already, more than 60 miles of waterfront land is being reclaimed. But the City is evaluating a number of additional ambitious projects that will achieve similar goals as the Greenpoint-Williamsburg rezoning.

The land surrounding the Gowanus Canal in Brooklyn, once a thriving industrial waterway, is already evolving into a mixed-use neighborhood. Because the demand for industrial uses has decreased, a land-use study of the area can provide opportunities for residential development while preserving the neighborhood's existing character and remaining industrial businesses. Similarly, the Astoria waterfront in Queens presents an opportunity to extend residential uses through the creation of new housing while providing better access to the waterfront.

INITIATIVE 3

Increase transit options to spur development

We will use transit extensions to spark growth as the subways did more than a century ago

Today more than 2.5 million New Yorkers live more than half a mile from a subway stop. In these neighborhoods, the lack of transit has led to higher concentrations of drivers—contributing to congestion, air pollution, and global warming emissions; meanwhile, in many cases their development potential has never been realized.

Thousands of Bronx residents used to live along the elevated subway on Third Avenue before it was torn down decades ago. Today, many of the tenements that provided customers for that El are gone. If apartment buildings replaced the underutilized lots that remain, it could produce enough riders to justify installing more mass transit service.

But the lack of transit has prevented this development from occurring. By improving bus service along Webster Avenue, we can better connect residents to the subway system and the regional retail center at the area's main commercial center, the Hub, improve the quality of life for residents, and attract new investment in housing.

As one moves to the outer edges of the city, transit options become scarcer. By providing more neighborhoods with more travel choices, we will dramatically expand usable land within New York.

Create new housing on public land

As New York's population drained away during the 1970s, up to 30,000 units of housing were abandoned every year; Hunts Point and Morrisania alone lost over 60% of their population. But population loss was not limited to the South Bronx: 43 of the city's 59 community districts lost residents during this same time period.

As the abandonment spread and landlords walked away from their sites rather than maintaining them, the City became the "owner of last resort." Between 1976 and 1979, the City increased the stock of housing it managed by forty times, from 2,500 to 100,000 vacant and occupied units. By 1979, the City was managing the same amount of housing that currently exists in Hartford and New Haven combined.

Since then, we have systematically transferred sites to private developers or sold land to produce more affordable units for New Yorkers. And almost 30 years later, we have virtually no land left. In August 2005, the City issued the last four major RFPs for City-owned land taken *in rem* through tax foreclosure.

That means our ability to supply land for new affordable housing opportunities has diminished, even as the need has grown. As a result, we must be more creative and efficient than ever in leveraging the land we have left.

INITIATIVE 4

Expand co-locations with government agencies

We will pursue partnerships with City and State agencies throughout the city

Although the City's supply of vacant or underused land is nearly gone, the City owns 43,000 acres for municipal purposes. Much of this land is fully developed for government operations, but significant opportunities exist for housing to co-exist with the current use—from libraries to schools to parking lots.

We will work with government agencies located in the city to maximize these "co-location" opportunities by assembling an inventory of sites and evaluating their potential as viable sites. Already, we are moving ahead with a partnership between the City's Department of Housing Preservation and Development (HPD) and the City's Department of Transportation to generate up to 1,100 new residential units on municipal parking lots, while replacing all or most of the current parking.

In Astoria, Queens, fenced-off pavement on 29th Street served as a municipal parking lot—despite the neighborhood's increasing urgency for senior housing. By 2009, the surface-level parking lot will be replaced by a new 15-story building, with an adjacent two-level subterranean parking garage for the public. The facility will be designed to reflect the needs of an aging Astoria population, offering 184 units of housing for seniors, commercial space for on-site medical offices, and open space. A senior center will be open to the community in addition to residents. Topping off the multi-use building will be a green roof —sustaining not just the community's seniors, but the environment in which they live.

This partnership recognized the potential for achieving simultaneous goals on City-owned land: building affordable housing while preserving the supply of affordable parking spaces. The City will seek to form equally productive alliances with other government agencies and departments in its search for additional land for housing.

We will continue our partnership with the New York City Housing Authority (NYCHA) to build 6,000 new affordable units

When NYCHA first began building housing projects across New York in the 1930s, the design of public housing and its integration into the urban landscape differed from our understanding today. The buildings rose as tall towers surrounded by open space, set back from the street and without access to stores or retail. Built into the project were dozens, sometimes hundreds of parking spaces for residents, reflecting the automobile-centered focus of the mid-twentieth century.

These spaces are now lightly used—leaving stretches of the developments sitting as vacant concrete. That's why in 2004, NYCHA signed an agreement with HPD to begin targeting some of these empty areas for new housing. On the west side of Manhattan, 98 underutilized parking spaces were scattered across three separate sites. As part of the Hudson Yards rezoning, these areas will now be redeveloped to provide 438 units of affordable housing.

By 2013, we will develop 6,000 new affordable units through this partnership, including sites in East New York and East Harlem.

Additional opportunities exist to co-locate housing with other functions on government-owned sites. Near Surf Avenue in Coney Island, the Economic Development Corporation is partnering with HPD to create 152 units of housing integrated with a 40,000 square foot community center. Other examples of possible co-locations include schools, libraries, and supermarkets.

INITIATIVE 5

Adapt outdated buildings to new uses

We will seek to adapt unused schools, hospitals, and other outdated municipal sites for productive use as new housing

Across the city, dozens of sites are no longer appropriate for their original intended use; but can be reclaimed for a new purpose. Whether it is redeveloping abandoned warehouses or transforming closed hospitals—like the landmarked Sea View nurses' residence that will become a new housing project for seniors—we can preserve some of our most beautiful buildings while meeting the city's most critical housing needs.

As we move ahead over the next two decades, we must continue searching for other opportunities in underused schools, hospitals, and office buildings. Where appropriate we will partner with the Landmarks Preservation Commission to save this irreplaceable architecture and restore its place as an integral part of our evolving city. We can also rethink these buildings to meet some of our city's unique needs; P.S. 109 is currently being converted into artists' housing and studios. By working with HPD and the Department of Cultural Affairs to open new affordable spaces for artists, we can not only preserve our physical city but also its essential creative spirit. *(See case study: Re-imagining P.S. 109)*

CASE STUDY

Re-imagining P.S. 109

The castle-like P.S. 109 once housed elementary school children from around its East Harlem neighborhood. In 1996, when the Department of Education witnessed a decline in the area's school-age population they closed the school, slating it for demolition three years later.

That's when East Harlem community groups stepped in, seeking to preserve the historic structure, with its slotted roofs and gargoyles intact. They won; and demolition plans were dropped.

But in the years following the decision, P.S. 109 sat abandoned. Surrounding school districts were only at 74% capacity; another school was not needed. That's when Artspace, a Minneapolis-based developer of art housing, and El Barrio's Operation Fightback, a community and housing advocacy organization in East Harlem, approached the City. They asked for the chance to turn the building into affordable housing for neighborhood artists.

Artspace and Operation Fightback are now on their way to converting P.S. 109 into 64 combined living and studio art spaces as part of a $28.8 million renovation project.

The entire building will be affordable and residents from the East Harlem community, including local artists, will be given preference for 50% of the buildings units.

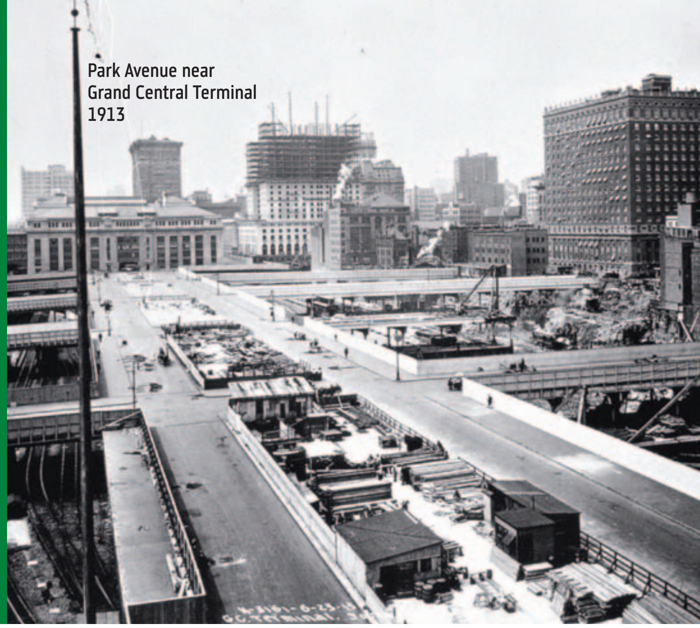
"The building wasn't being utilized, and now we're keeping it as a community center," said Gus Rosado, executive director of El Barrio's Operation Fightback.

Plans include a public space for arts education, and a gallery on the first floor.

"Real estate values in the area are going through the roof, and artists are getting squeezed out—they're the first to go, because they can't find space to practice their craft," Rosado said. "This gives them that opportunity, and it's affordable."

Creation of Park Avenue

At the start of the 20th century, the railyards around Grand Central Terminal had created an area that was dangerous and unusable. The City covered the tracks, hoping to attract new development around the rail terminal. By 1930, new buildings occupied every site that had been created.



Park Avenue near Grand Central Terminal 1913

Explore additional areas of opportunity

We have also looked further into the future, well beyond current initiatives.

We have identified a number of areas of opportunity that bear investigation over the coming decades for their potential for new capacity. The areas have been selected because they promote our principles of sustainability, transit-oriented development, and walkability. Opportunities have been identified in every borough and collectively represent our largest area of potential growth—up to nearly 350,000 new housing units.

The development of these areas, and others still to be identified, will ultimately be decisions of new administrations and should only be adopted by working with communities, property owners and other stakeholders. Together they will face the challenge of creating plans that support existing communities while accommodating growth and recognizing environmental, infrastructure, and economic concerns. But based on our recent period of historic growth, we believe these initiatives have the potential to anchor new developments, while improving quality of life for New Yorkers.

Across the city, there are other examples of discrepancies between existing infrastructure and investment or strong communities located next to marginal areas. These include portions of Atlantic Avenue in Brooklyn, the Broadway corridor in Upper Manhattan, and the Third Avenue corridor in the Bronx.

Future studies may conclude that the uses in some of these areas are impractical for one or more reasons. Other locations are likely to be identified in the future. We will continue working with communities to identify opportunities for growth that strengthens neighborhoods, and all of New York.

INITIATIVE 6

Develop underused areas to knit neighborhoods together

We will continue to identify underutilized areas across the city that are well-served by transit and other infrastructure

Throughout the city, there are areas that fail to take advantage of their significant existing infrastructure. New York City can accommodate part of our growing population by rethinking the uses in these areas.

Working together with communities, we can create places where people want to work and live. We have identified a number of locations to explore, including the Broadway Junction area of Brooklyn, where three subway lines and the Long Island Rail Road converge. But the zoning capacity has never matched this area's potential. By recognizing this neighborhood's ability to absorb responsible growth, we could create capacity for thousands of new housing units.

INITIATIVE 7

Capture the potential of transportation infrastructure investments

We will examine the potential of major infrastructure expansions to spur growth in new neighborhoods

Because so much of the transit system is already strained, investment in transit infrastructure is a key component of accommodating growth.

Once New Yorkers were crowded into neighborhoods like the Lower East Side at densities that approximate conditions in some of the world's most congested cities. By extending the city's subway system out into the then-open land of the so-called outer boroughs, we opened up new land for development, reduced overcrowding in Manhattan, and provided a diversity of living conditions throughout the city. While the city has very little open land remaining for future growth, it can incorporate the principle of using infrastructure investment to support future development.

The City is already pursuing this strategy in the Hudson Yards area of Manhattan where it's investing $3 billion in extending the subway's 7 line and building new parks and streets. These investments will support about 100,000 jobs and more than 13,000 apartments in the immediate area and indirectly support employment for another 100,000 people, all in a location that is more transit-oriented than could be provided in any other city in the United States.

Similarly, creating a direct link between Long Island and Lower Manhattan will ensure that the nation's fourth largest business district remains a premier business location and will help attract users for the rebuilt World Trade Center site. But it can be much more than that. If we can find a way to connect it to the Second Avenue Subway, which we believe can be done, we can provide new and improved connections between Brooklyn and Manhattan. This will support both residential and commercial growth in both boroughs. And by extending this to Jamaica, we can provide a unique mass transit alternative for peripheral travel between Brooklyn and Queens and support both residential and commercial growth in Jamaica.

Park Avenue near Grand Central Terminal 1930s

Expansion of Zoned Housing Capacity

	LARGE PRIVATE APPLICATIONS	PUBLICLY-INITIATED REZONINGS	NEW HOUSING ON PUBLIC LAND	AREAS OF OPPORTUNITY
TIME FRAME	2007–2030	2007–2009	2007–2013	2010–2030
Bronx	1,900	5,200–11,500	2,800	68,000–104,000
Brooklyn	4,500-5,000	11,200–25,300	8,600–10,700	86,000–174,000
Manhattan	13,800–14,500	11,100–15,600	7,100–8,100	18,000–22,000
Queens	5,500–6,200	25,400–26,900	9,500–19,000	29,000–39,000
Staten Island	700	1,100	1,400	7,600
SUBTOTAL	26,400–28,300	54,000–80,400	29,400–42,000	208,600–346,600
TOTAL				318,400–497,300

Source: NYC Department of City Planning

INITIATIVE 8

Deck over railyards, rail lines, and highways

We will explore opportunities to create new land by constructing decks over transportation infrastructure

Throughout the city, in all five boroughs, highway and rail infrastructure is essential to life in the city. But for the most part, they are places where communities stop; where neighborhood is divided from neighborhood. This need not be so. *(See photos above: Creation of Park Avenue)*

Exposed railyards, highways, and rail lines that cleave neighborhoods apart have periodically been built over to open up surrounding land for development—most notably along Park Avenue in Midtown. Just a few blocks west sits Caemmerer Yards in the Hudson Yards area, which will be decked over for housing, offices, a cultural center and public open space. There are numerous opportunities to reknit the city's neighborhoods together.

As our search for land becomes more pressing in the coming decades, we must be prepared to work with communities to explore the potential of these sites.

Probably, the most frequently cited opportunity to use existing infrastructure sites more creatively is the Sunnyside Yards in Long Island City, Queens. With transit access nearby, and new commuter rail access planned as part of the East Side Access project, it has often been looked to as a potential development site. The open railyards span nearly 200 acres; developing even the first section could create hundreds of housing units with stores, schools, playing fields, and parks.

The site could also include an intermodal transportation facility at the intersection for seven subway lines, the Long Island Rail Road, and Amtrak. Residents could walk directly and safely to the shopping on Steinway Street in Astoria; residents in Long Island City could commute from an LIRR station within their neighborhood and children from the surrounding communities could play on new ballfields. By developing the site, the City could create an entirely new neighborhood, connect long-separated communities, eliminate the noise and blight of an exposed railyard, and provide a transportation hub for anyone traveling to or from Queens and Long Island.

To be sure, any such development would be complicated. It is an active and essential rail yard that cannot be disrupted, and additional infrastructure construction as part of the East Side Access project is now underway. As a major portal to Manhattan, the area already suffers from traffic congestion. On the other hand, it offers an exceptional opportunity to expand the existing Dutch Kills and Hunters Point neighborhoods, to provide for new places of employment, and to connect the areas east and west of the yards that are now crossed by only a few streets.

Other examples of possible platform projects are the former railroad space adjoining the Staten Island Ferry that could be used to connect the St. George neighborhood to its waterfront, and the 36th Street Rail Yards on the southern edge of the Green Wood Cemetery in Brooklyn. Building on a platform over it could result in substantial new units of housing.

Exposed highways offer a similar opportunity. One such site is over the Brooklyn-Queens Expressway (BQE) between Carroll Gardens and Cobble Hill also in Brooklyn. Just south of Atlantic Avenue, the BQE dips into a depressed section of roadway bordered on either side by Hicks Street. Continuing straight through to the entrance to the Brooklyn Battery Tunnel, this sunken highway divides Cobble Hill and Carroll Gardens from the river and the community along Columbia Street.

A platform could be constructed over the below-grade section of the BQE to create nine new blocks of housing while reconnecting two neighborhoods. Another example of a disruptive highway that could potentially be covered over includes the Gowanus Expressway.

Some of these areas may be better suited than others for future development due to their accessibility to rail and mass transit, and the physical configuration of the sites. Given market conditions, some may not be able to support development for many years while others may make economic sense sooner. We know that the one-size-fits-all approach of earlier eras will not work. Building communities requires a carefully tailored approach to local conditions and needs that can only be developed with local input. We will begin the process of working with communities, the agencies that operate these facilities, and other stakeholders to sort through these complicated issues. *(See table above: Expansion of Zoned Housing Capacity)*

CASE STUDY

Abandonment to Affordability

Marina Ortiz can remember when she was a girl before her family left East Harlem.

They were not alone. During the 1970s, roughly 360,000 housing units were abandoned across New York. Harlem alone lost 100,000 people between 1950 and 1980. By 1985, the City owned nearly 60% of properties in the neighborhood.

Then Mayor Ed Koch launched a 10-year housing plan to reinvigorate fading neighborhoods. The plan produced or rehabilitated 155,000 units across the city between 1987 and 1996, catalyzing the revitalization of thousands of blocks, from the South Bronx to East New York.

Ortiz, 48, moved back to the neighborhood as soon as she could. But at a January PLANYC meeting held in Harlem, she came to express a new concern.

She likes it here, she said. She wants to stay. The waterfront is a few steps away, and in the other direction sits Central Park. Every summer there are cultural events, arts fairs, concerts, and festivals. She walks to work every morning.

But safer streets have attracted a series of new residents. Already, people she knows are being forced to move in with relatives, friends, and handfuls of strangers—or move out altogether.

Ortiz looked around the room, at the assembled city staff and fellow residents and raised her hand. "Over the next 25 years," she asked, "where are we supposed to go?"

It is a question being asked across New York.

Our challenge has shifted from abandonment to affordability. That's why in 2006, the City announced the expanded $7.5 billion *New Housing Marketplace Plan* which will build and preserve 165,000 affordable units by 2013. In 2006, HPD and the Housing Development Corporation financed more than 17,000 affordable units across the city including more than 140 affordable units in East Harlem.

"I think housing development has been the greatest reason for the more positive changes in East Harlem," Ortiz said. But there must also be "relief for the people who are living here, who want to move out of public housing and advance to the next level."

Expand targeted affordability programs

New York's recent boom in housing permits is already shrinking the gap between housing supply and demand.

But to truly address the challenge of affordability, we must pair these actions with targeted strategies to make sure that these new housing sources are available to the full spectrum of New Yorkers. Some income groups have found themselves priced out of the private market—but unable to benefit from the City's affordable housing programs because their incomes are too high. To maintain a diverse workforce and a vibrant city, we must reach out to these groups and ensure that the City's programs address the broadest range of housing needs.

To this end, we expanded our *New Housing Marketplace Plan* in 2006 to create and preserve 165,000 units of housing by 2013. HPD anticipates that 68% of the units will be affordable to households earning less than 80% of 2005 Area Median Income (which is approximately $50,000 for a family of four or $35,000 for a single person) and the remaining 32% of units will serve moderate and middle-income New York families.

But even though this plan is the most ambitious in American history, we know we will need to continue pushing for new options through 2030. *(See case study above: Abandonment to Affordabilty)*

INITIATIVE 9

Develop new financing strategies

We will continue to pursue creative financing strategies to reach new income brackets

Under the expanded 10-year *New Housing Marketplace Plan,* the City will create 92,000 new units of housing. But just like other cities across the country, New York City struggles to provide housing to a range of incomes. As a result of the existing resources available to create housing, HPD programs have traditionally targeted populations earning between $20,000 and $40,000 per year.

By enhancing our existing middle income programs and committing additional capital funding to develop a new Middle Class Housing Initiative, 22,000 units will be targeted toward New Yorkers earning between $50,000 and $145,000 per year for a family of four.

In addition, the New York City Housing Trust Fund will utilize approximately $70 million of Battery Park City Authority revenues to target households earning below $20,000 and households earning between $42,540 and $56,700.

Finally, the $200 million New York City Acquisition Fund will be used as early stage capital to acquire privately-owned land and buildings that will enable the construction and preservation of 30,000 units of affordable housing.

All three programs provide new sources of funding to meet the housing needs of populations that have been underserved by City programs in the past.

INITIATIVE 10

Expand inclusionary zoning

We will seek opportunities to expand the use of inclusionary zoning, harnessing the private market to create economically-integrated communities

When the Department of City Planning (DCP) approached the rezoning of Maspeth-Woodside, Queens, it wanted to preserve the neighborhood's rows of single-family houses settled along quiet, residential blocks. But along Queens Boulevard, the wideness of the street was not matched by the scale of the housing and shopping opportunities. So, in addition to acting to preserve the character of the interior blocks, DCP opened up the broader boulevards to a mix of affordable units and private market development. But this rezoning was different: the Maspeth/Woodside rezoning included the first inclusionary zoning program ever in Queens.

Inclusionary zoning enables developers to build larger buildings in exchange for dedicating a percentage of their units to affordable housing, either onsite or within a short distance. Traditionally, this strategy has been leveraged across Manhattan and emerging areas of Brooklyn, where the pace of development and surging demand has attracted record numbers of building permits. Developers have been eager to incorporate more units, and in exchange, create more affordable housing for neighborhoods, fulfilling the promise of the city—people from every background living side-by-side in a single neighborhood. Now that kind of demand is spreading across all of New York.

Already, we have incorporated inclusionary zoning provisions in Hudson Yards and West Chelsea on the west side of Manhattan and in Greenpoint-Williamsburg and South Park Slope in Brooklyn. Many other rezonings incorporating inclusionary zoning have been completed or are underway, including in Fort Greene and the Lower East Side. We must continue to maximize this strategy as we evaluate possible new rezonings to ensure that not only is more housing produced, but also that it is more affordable.

INITIATIVE 11

Encourage homeownership

We will continue to develop programs to encourage homeownership, emphasizing affordable apartments over single-family homes

Most people consider homeownership one of the foundations of the American dream. In New York City, the homeownership rate is the highest it has been since we began collecting information on homeownership in 1965: currently 33% of New Yorkers own their own homes. While this is an all-time high for the city, we will continue to encourage homeownership so that more New Yorkers can build equity and savings instead of spending money on rent that they will never recoup.

For those who do leap into the homeownership market, their choices have been constrained by the available supply. Smaller houses, including two-family and three-family homes, have traditionally provided the first opportunity for renters to become homeowners across New York City.

But in a strong real estate market, opportunities for the development of larger, affordable co-operative and condominium buildings have increased—and in some cases been introduced for the first time—into neighborhoods across the city. From Harlem to the South Bronx, new opportunities for the empowerment of homeownership are emerging, without fostering a suburbanized pattern of growth.

In the coming decades, we will continue to build on a range of financing programs and partnerships that encourage homeownership. Today, low-income New York City residents living in overcrowded or substandard housing conditions in Harlem, Queens or Brooklyn can qualify for financing through HPD programs, such as Habitat for Humanity, towards the purchase of a home. For New Yorkers who don't have enough money saved for their down payment and closing costs, HPD's HomeFirst Down Payment Assistance program provides qualified home buyers with up to 6% of the home's purchase price.

In addition, we are continuing to partner with the Nehemiah program, a collaboration between HPD and a consortium of community-based churches in Brooklyn that over the past 15 years has constructed nearly 3,000 single-family homes in East New York and Brownsville. Under the Neighborhood Homes Program, HPD conveys occupied one- to four-family buildings to community-based not-for-profit organizations for rehabilitation and eventual sale to owner-occupants.

INITIATIVE 12

Preserve the existing stock of affordable housing throughout New York City

We will continue to develop programs to preserve the existing affordable housing that so many New Yorkers depend upon today

As we focus on developing affordable housing, we must not forget that a considerable stock of affordable housing already exists in New York. One particular stock of affordable housing that is at risk is the government-assisted stock. A significant number of New Yorkers rely on 250,000 units of affordable housing provided by the Mitchell-Lama program, the Low-Income Housing Tax Credit Program, and HUD-financed properties. These units represent an important long-term source of affordable housing for low and moderate-income New Yorkers. But, many of the original affordability restrictions set by the government to restrict rents on properties are now expiring, and in New York City's strong real estate market, owners are tempted to convert their buildings to market-rate. At the same time, some of these buildings have fallen into disrepair and need help improving housing conditions for their tenants.

To date, HPD has worked with partners to preserve these units using strategies catered to each building or group of buildings. One example of this is HPD's work with the U.S. Department of Housing and Urban Development (HUD) to preserve their properties. In this case, HPD has arranged the successful transfer of more than 1,000 units from HUD's foreclosure pipeline to responsible new owners. But there are thousands more units we need to preserve. Over the coming years, we will work to create a comprehensive strategy to preserve these units with the goal of providing incentives to owners to keep their buildings affordable or to transfer them to responsible ownership. As the housing market in New York continues to evolve, the City is committed to adapting its preservation strategies to ensure we save this valuable stock of affordable housing. In fact, preserving 37,000 of these units is an explicit goal of the *New Housing Marketplace Plan*.

Conclusion

We have seen the shift that can occur over 25 years. Since 1980, the city's housing crisis completely reversed, from abandonment to affordability. Each question has been equally urgent.

We recognize that the strategies discussed here—rezonings, maximizing affordability on public land, looking at new areas of opportunity, developing innovative financing programs, expanding the use of inclusionary zoning, and supporting home ownership—will have to be adjusted as the market changes, and new approaches may need to be added. Our efforts must reflect the dynamism of New York and its growing population if we are to be successful in addressing the city's housing needs. We must be prepared to respond with creativity and compassion as newer challenges emerge.

The mixture of residents will determine, more than anything else, the kind of city we become. By expanding supply possibilities to create healthier market conditions, we can continue ensuring that new housing production matches our vision of New York as a city of opportunity for all. The building blocks are mixed-income communities.

But this principle will not change: If New York loses its socioeconomic diversity, its greatest asset will be lost. We can—and must—do better.

Open Space

Credit: Vincent Laforet/The New York Times

We must ensure that all New Yorkers live within a 10-minute walk of a park.

In 1652, Dutch traders began settling farming villages just east of Manhattan—including one they named Vlackebos, meaning “wooded plain.” The area, with its dense forests and flat terrain, would eventually become known as Flatbush, and it remained in its natural state for the better part of three centuries. But, in the 1920s, the new Interborough Rapid Transit linked Flatbush to the rest of the city, sparking new developments that began welcoming successive generations of immigrants. As with the Dutch traders, these newcomers built homes and roads, only more quickly and densely. Riding through East Flatbush today, there are still trees that line its quiet, residential sidewalks. But the area’s open space is virtually gone.

Flatbush is not alone. Through much of the 20th century, in too many neighborhoods, the population grew faster than the rate of new park development, even as the City built one of the largest urban park systems in the United States—29,000 acres in all. The challenge today is not only to add new parkland, which is critical to the city’s quality of life, but to expand access to parks and open space in communities where they have been scarce for decades. *(See case study on following page: New York City’s Three Great Ages of Parks Development)*

Over the last five years, the City has added more than 300 acres of new parkland, much of it by reclaiming stretches of the waterfront that were abandoned by industry decades ago. Yet because of our population density, the city has fewer acres of green space per person than almost any other major American city. And as the city’s population continues to grow, and as competition from housing, office space, and other uses intensify, the need to create new parks and open space will increase.

Bryant Park, Manhattan

CASE STUDY

New York City's Three Great Ages of Parks Development

It was predicted to become a "great beer-garden for the lowest denizens of the city."

Instead, Central Park heralded the first of three great ages of parks development in New York's history.

Despite these predictions by *The New York Herald,* by 1863, Central Park was attracting 4 million visitors annually from every social class. Frederick Law Olmsted never doubted that the elegantly wild parks he had visited in Europe would appeal to both wealthy New World tycoons as well as the hardscrabble strivers who were streaming into New York City by the hundreds of thousands. A man of strong ideals, Olmsted almost single-handedly convinced a skeptical nation that common space must be equally accessible to all citizens.

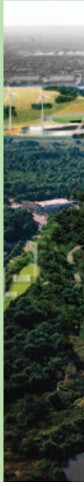
Buoyed by the triumph of Central Park, Olmsted and his partner Calvert Vaux quickly set about co-designing iconic New York City public spaces, including Prospect Park, Riverside Park, Eastern Parkway, and Ocean Parkway. All told, the two landscape pioneers helped create over 1,900 acres of New York City parkland.

Robert Moses unofficially inaugurated the second great age of parks in August of 1929, when, as Long Island State Parks Commissioner, he opened Jones Beach State Park, which attracted 350,000 visitors in its first month of operation alone. Between 1934 and 1960, park acreage increased from 14,000 acres to 34,600 acres. Moses took full advantage of New Deal funding in deploying an army of workers that at one point reached 84,000 people to develop 15 outdoor swimming pools, 17 miles of beaches, and 84 miles of parkways.

But by 1980, the funding, staffing, and quality of our parks had dwindled, leaving behind barren, unkempt spaces. The turnaround began in 1981, when Mayor Ed Koch announced a 10-year capital plan that proposed a $750 million commitment to rebuild our system. That program helped spur the third great period of parks developments in the city.

Over the past five years, we have already added more than 300 acres of parkland. New York City is currently home to more than 1,800 parks, playgrounds and recreation facilities across the five boroughs.

With the egalitarian principles of Olmsted and Vaux as our inspiration, we will make public space easily accessible to every New Yorker—as we launch the most ambitious parks program in half a century.



Left: Central Park
Credit: NYC Department of Records/Municipal Archives

Above Right: Orchard Beach
Credit: NYC Department of Parks & Recreation

Below Right: Rendering of Plans for Fresh Kills
Credit: NYC Department of City Planning

The current standard for park space in New York is 1.5 acres per thousand people. For playgrounds it is 1,250 children per playground. In contrast, East Flatbush's 56,000 residents have access to a total of 4.8 acres of open space, or 0.09 acres per thousand people. The neighborhood's 12,000 children share three neighborhood playgrounds. More than half the population, or 29,000 people, lives farther than a quarter-mile from publicly available open space.

New Yorkers love their parks—and are eager to use them. In a recent survey, 82% of New Yorkers cited open spaces as one of their most cherished city assets. But those assets are increasingly crowded. With population growth expected to continue, and as greater competition for land from housing, offices, schools, municipal uses, and other priorities intensifies across the city, the open space ratio is expected to fall even further. Today, 97 out of 188 neighborhoods have more than 1,250 children per playground. Based on current trends, by 2030, 59 neighborhoods will have less than 1.5 acres of open space per 1,000 residents.

Expanding access to parks is also important for public health. Today, the city's obesity rate among children is 24%, almost 10% above the national average. In 2000, children in New York City were almost twice as likely to be hospitalized for asthma as children in the U.S. as a whole. Expanding access to open space is not a panacea for these health problems, but it can be part of the solution. In the interest of public health and environmental justice, we have to do better.

New Yorkers are clamoring for more opportunities to enjoy parks, and maintaining and expanding our quality of life requires us to answer that need.

By developing a comprehensive, neighborhood-by-neighborhood approach, we can ensure that every child and every adult has open space to relax and play.

Source: NYC Department of Parks & Recreation

Our Plan

When opportunities arise to create new parks we should continue to seize them—as we have by reclaiming Fresh Kills from its languishing status as a 2,300-acre former landfill, re-imagining the East River Waterfront, and Governors Island as part of a new Harbor District, building a new 20-acre waterfront park along Sunset Park's Bush Terminal Piers, transforming the Elmhurst gas tanks site into six new acres of park space, and setting in motion over the last five years the creation of nearly 2,700 acres of parkland—the largest expansion of our system since the New Deal.

But even that will not be sufficient for every neighborhood as we move forward. The need for new parkland must be balanced with the need for additional housing, schools, and transit access, and the available land for these critical priorities is getting scarcer. As a result, we cannot fully solve the challenge by buying more land and converting it into parks. New approaches are needed, strategies that cleverly evolve and co-locate uses on the land we already have. This idea is the core of our Open Space program.

We have developed three main approaches to ensure that nearly every New Yorker lives within a 10-minute walk of a park by 2030. First, we will upgrade land already designated as play space or parkland and make it available to new audiences. Second, we will expand usable hours at our current, high-quality sites. And third, we propose re-conceptualizing our streets and sidewalks as public spaces that can foster the connections that create vibrant communities.

The collective result of these policies will create over 800 acres of upgraded parkland and open space across virtually every neighborhood. Combined with other transformative park projects already being advanced, the total number of acres newly planned, acquired, developed, or opened will total nearly 4,000. No longer will some residents have access to recreation and space for relaxation, while others do not. By 2030, virtually every New Yorker across the city will live within a 10-minute walk of a park. *(See map above: All Park Initiatives)*

Our plan for open space:

Make existing sites available to more New Yorkers

1. Open schoolyards across the city as public playgrounds
2. Increase options for competitive athletics
3. Complete underdeveloped destination parks

Expand usable hours at existing sites

4. Provide more multi-purpose fields
5. Install new lighting

Re-imagine the public realm

6. Create or enhance a public plaza in every community
7. Green the cityscape

Inventory of Schoolyards-to-Playgrounds

CATEGORY	PLANNED IMPROVEMENTS	NUMBER OF PLAYGROUNDS	CHILDREN SERVED
Category I (Can be opened immediately)	No improvements required	69	86,250
Category II (New equipment required)	Depending on the needs of the school and the community, each site will receive playground improvements, including: • Painting and sealing pavement • Upgrading or adding sports equipment • Installing fitness and/or playground equipment • Planting street trees and landscaping	150	187,500
Category III (Capital improvements required)	These sites would benefit from all of the improvements of the Category II sites. In addition, they will undergo: • Repaving damaged asphalt • New fencing and safety improvements	71	88,750
TOTAL		**290**	**362,500**

Source: NYC Department of Parks & Recreation

CASE STUDY

History of Jointly Operated Playgrounds

Even on a cold January day, the Fort Hamilton High School playground was alive with five and six-year-old kids drawing games on the pavement with colored chalk. After school hours, the playground stays open for the Bay Ridge community, as does Fort Hamilton High's track, football fields, and basketball courts. Mid-winter soccer games and pick-up basketball after school are the norm.

When it opened in 1938, Fort Hamilton's Jointly Operated Playground (JOP) was the first of its kind—a collaboration between the Department of Parks & Recreation (DPR) and the Department of Education (DOE). Then, like today, New York City was looking for a way to maximize the use of its existing resources and provide cost-effective recreational space.

Today, there are 269 JOPs open for public use. But they are the exception—81% of schoolyards are closed to the public after the last bell of the school day.

Even though the JOP program is a sensible use of city resources, it has been stymied by administrative hurdles. Since 1938, JOPs have been considered designated parkland, which restricts how the land can be used. Without the flexibility to meet the potential needs of the schools, the City was concerned that expanding the program would further inhibit school expansions.

That's why we will apply the original JOP program principles to a workable, new administrative model. The DOE and the School Construction Authority will retain control of their property, and will be responsible for capital construction, maintenance and security.

For children like Sasha, a six-year-old playing in scattered snow in the Fort Hamilton JOP after school hours, all that matters is having a space in which to play. Now, he and more than 300,000 children across the city will have more playgrounds to choose from.

Make existing sites available to more New Yorkers

Hundreds of playgrounds, dozens of high-quality competition fields, and acres of open space exist in every borough. But in too many cases, they are used only a few hours a day. Schoolyards, high school fields, and open parkland are resources that can be maximized for the benefit of every community.

INITIATIVE 1

Open schoolyards across the city as public playgrounds

We will open schoolyards as playgrounds in every neighborhood

Although East Flatbush lacks traditional sources of open space, opportunities to create greener streets and active playgrounds exist. *(See case study: History of Jointly Operated Playgrounds)*

On a recent afternoon, the tall metal gates of P.S. 135 were open long after classes had ended, revealing a large schoolyard encircled by a silver chain-link fence. More than 20 teenagers were gathered, some playing, others looping their fingers through the links in the fence, peering in and awaiting their turn. The rest of the space sat empty and unused.

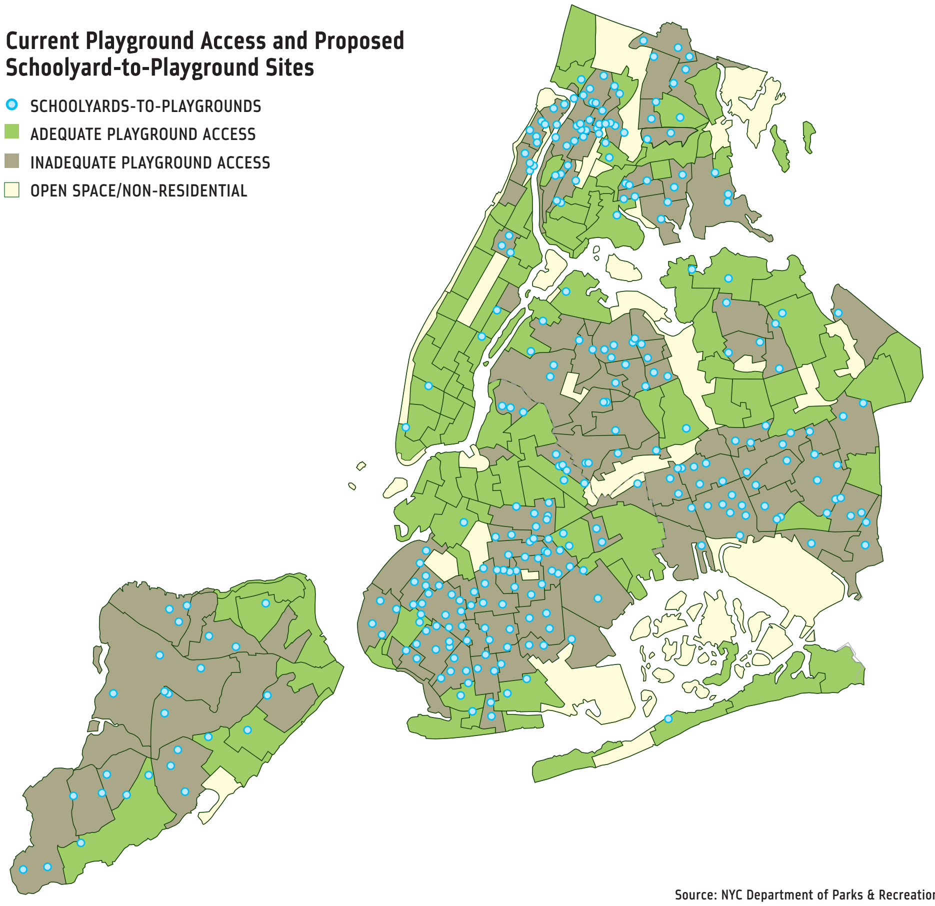
There are four schoolyards in the neighborhood that are currently underutilized. Some lock their gates when the school day ends. Others offer minimal equipment to the community. These school yards, some of which are closed all summer, every weekend, and every evening, offer the best opportunity for turning an existing, underused space into a vital community resource.

Of the 290 underutilized schoolyards in neighborhoods that lack open space, 69 of them could be opened tomorrow; simply unlocking the gates will open an equipped, playground—a long overdue solution. The other sites would require new investments—such as play equipment, greenery, or asphalt sports fields—to make them attractive as play space. Some of these sites could be opened as early as 2008. *(See table above: Inventory of Schoolyards-to-Playgrounds)*

These playgrounds could provide proper play space for more than 360,000 children by 2030. But expanded access would not be the only benefit. In 2000, there were 97 neighborhoods with more than the accepted standard of 1,250 children per playground; in fact, on average these underserved neighborhoods have almost 2,100 children for each playground. By opening these playgrounds that number would drop to 1,260 children per playground. *(See map on facing page: Current Playground Access and Proposed Schoolyard-to-Playground Sites)*

These new playgrounds will offer children something more than the asphalt expanses that often serve as schoolyards today. Although each site will be evaluated individually, modest investments could turn faded concrete courts into an outdoor exercise center; a junior soccer field, or a walking/jogging course. Trees could bring life and greenery into the playgrounds.

Current Playground Access and Proposed Schoolyard-to-Playground Sites



Source: NYC Department of Parks & Recreation

INITIATIVE 2

Increase options for competitive athletics

We will make high-quality competition fields available to teams across the city

Often the fiercest competition among sports teams in New York City can be finding a place to play. We will increase options for competitive athletes by making high-quality competition fields available to teams across the city.

In recent years we have developed a stock of first-class fields that can be made available to more teams with proper coordination. For example, the "Take the Field" program, a public-private partnership that rebuilds outdoor athletic facilities at public schools, has already created 43 high-quality sports field complexes at high schools in every borough. Altogether, the program has built 36 soccer fields, 35 baseball fields, 35 tracks, and 22 tennis complexes—some of which can be made available to wider use with proper coordination.

Existing fields are currently being used both by school teams and a limited number of community teams. We will work with sports teams and community-based groups to open the sites to new audiences and maintain underused fields.

INITIATIVE 3

Complete underdeveloped destination parks

We will fulfill the potential of at least one major underdeveloped park site in every borough

The most tantalizing opportunity lies in the 500 acres of underdeveloped parkland and underutilized facilities.

New York's park system is built on a foundation of regional and large parks. These parks are the greatest attractions in the system, providing a full range of experiences—athletic, cultural, educational, and relaxing—for every resident in the city. As New York grows, these parks will continue to attract even larger numbers of users. To maintain the quality of the park system, New York will need to create new regional and large park destinations.

We've identified eight sites across the city—at least one in every borough—that were once envisioned as spectacular resources for the surrounding region. All have yet to reach their potential.

One is a former reservoir. Several are located along highways, with few access options. One site lies within a nature preserve, but could safely be developed.

Together, these sites will become regional destinations. For each one, we will engage in a planning effort with the surrounding community to develop green spaces, outdoor recreational centers with opportunities for all ages, and sports facilities—such as for soccer and cricket—that reflect the shifting recreation interests of today's New Yorkers. *(See map on following page: Destination Parks)*

Dreier-Offerman Park (Calvert Vaux Park), Brooklyn

Dreier-Offerman Park, in the Bensonhurst neighborhood of south Brooklyn, was planned as a regional park eight times the size of Bryant Park. But many of the playing fields at this 77-acre park were built by individual community organizations with limited resources and little coordinated planning. By 2013, this park will finally reach its potential, becoming the center for competitive soccer and baseball for all of south Brooklyn.

Fort Washington Park, Manhattan

The 160-acre site already offers tennis courts, baseball diamonds, and scenic walking paths along the Hudson. But cars driving by the Henry Hudson Parkway separate this long, narrow park from the rest of the city—and there is only one main entrance along a mile-and-a-half long stretch. Fortunately, the State Department of Transportation has funded plans to improve access to Fort Washington Park. That will provide an opportunity to maximize use of the space by building a new soccer and volleyball facility for Upper Manhattan. Greenway improvements will also be implemented throughout the park.

Highland Park, Queens

The former Ridgewood Reservoir is nestled within the broader expanse of Highland Park. Built in 1856 on a natural basin, the reservoir was used until 1959 and served as a backup water supply for Brooklyn and Queens until 1989. Today its three basins are overgrown. Two of the three basins will be set aside as a nature preserve, while the largest will be transformed into a 60-acre active recreation center.

McCarren Park, Brooklyn

Opened in 1936, then closed in 1984 due to the deterioration of its systems, McCarren Pool will finally be rebuilt as both an outdoor Olympic-size pool and a year-round recreation center serving the people of north Brooklyn.

Ocean Breeze Park, Staten Island

Ocean Breeze is a 110-acre park that used to be part of an adjacent hospital campus. Most of the park is sand dunes and wetland and

Destination Parks

MANHATTAN
Highbridge Park
36 acres

Proposed Improvements: restore bridge with repairs to the brick walkway and stone and steel arches. creating a pedestrian and bike connection between Manhattan and the Bronx

MANHATTAN
Fort Washington Park
160 acres

Proposed Improvements: improve access across Henry Hudson Parkway, build new soccer and volleyball facility, and create greenway improvements

BROOKLYN
McCarren Park, 36 acres

Proposed Improvements: rebuild the McCarren Park pool as an Olympic-size pool and a year-round recreation center

STATEN ISLAND
Ocean Breeze, 110 acres

Proposed Improvements: develop soccer fields, baseball fields, and the city's third indoor track facility

BROOKLYN
Dreier-Offerman Park
77 acres

Proposed Improvements: develop competitive soccer and baseball center

THE BRONX
Soundview Park, 212 acres

Proposed Improvements: undertake environmental improvements, including salt marsh restoration, construct a new athletic fields and facilities

QUEENS
Highland Park, 60 acres

Proposed Improvements: set aside two of three basins as a nature preserve and new active recreation center

QUEENS
Rockaway Beach 44.5 acres

Proposed Improvements: re-establish amenities along the boardwalk for beach visitors

Source: NYC Department of Parks & Recreation

BROOKLYN
Bushwick Inlet Park

Bushwick Inlet Park is an example of a regional park already underway. It will transform formerly industrial land into a 28-acre waterfront park set against the Manhattan skyline. A two-mile waterfront esplanade will wind along the Greenpoint-Williamsburg shoreline, opening up on recreational turf ball field, gardens, and boat launches that enhance the site's dramatic views and riverfront location.

Above: Bushwick Inlet Park before
Credit: NYC Department of Parks & Recreation

Below: Bushwick Inlet Park after
Credit: NYC Department of Parks & Recreation

must remain in its natural state. But there is a large parcel of approximately 10 acres where active recreational activities can take place. Ocean Breeze is our single best opportunity on Staten Island to create much-needed major athletic facilities, including soccer fields, baseball fields, and the city's third indoor track.

Soundview Park, Bronx

Soundview Park was built on a landfill in the South Bronx. Today the 212-acre park offers the surrounding community six grass baseball fields, one cricket pitch, one track, a playground, and a soccer field. Even with those facilities, we can do more. There are 93 acres that could provide additional recreational space for the underserved and growing South Bronx community. New athletic fields will be accompanied by environmental improvements, including the restoration of a salt marsh.

The High Bridge, Bronx and Manhattan

The High Bridge is the oldest remaining bridge in New York City. First opened in 1848, the 1200-foot-long, 116-foot tall High Bridge walkway was closed to regular public use around 1970. Standing majestically over the Harlem River, this restored bridge will provide Bronx residents with new access to the parks of the northern Manhattan greenbelt, including the Highbridge pool and recreation center. The bridge will also provide an important greenway link for all New Yorkers.

Rockaway Park, Queens

More than 35 years ago, the bungalow colonies and amusement parks of the Arverne section of the Rockaway Peninsula were demolished to make way for an urban renewal project that never materialized. The amenities along the boardwalk, such as public comfort stations, have deteriorated. Now major developments in the area, such as the Arverne-by-the-Sea project, are under construction and will soon attract a large, vibrant residential community. This project will provide beachfront facilities to serve these new residents, as well as visitors from all over the city.

Expand usable hours at existing sites

Taken together, the three strategies described above will put hundreds of thousands of additional New Yorkers within a 10-minute walk of a park. But even where facilities and open spaces exist, demand for them far outstrips supply. In certain seasons, and after sundown, some of these facilities are largely unusable. Still others are limited by design to a narrow set of uses, and stay empty too much of the time. To better meet the growing demand for recreational space, we must maximize the use of our existing assets and equip them to most fully meet the needs of New Yorkers.

INITIATIVE 4

Provide more multi-purpose fields

We will convert asphalt sites into multi-use turf fields

During the period when the parks system was last expanded, we constructed our parks to address the interests of the time, including baseball diamonds and basketball courts. But the majority of new additions at that time were multi-purpose asphalt fields that could accommodate a range of games. Since then, our city has changed; we must change as well, in order to meet the demands of a growing and diverse population that plays a wide range of sports.

Today we do not have enough grass fields to accommodate the growing demand for soccer fields, and those we have are quickly worn by intensive use. Other games like field hockey, cricket, and rugby have also emerged as major recreational interests for New Yorkers. To meet the demand, we will accelerate the conversion of at least two dozen asphalt multi-purpose fields to synthetic turf. These turf fields can host a greater range of games, including contact sports, and can better absorb frequent and intensive use. At the same time, we will use the most advanced design and technology to make these fields as environmentally-friendly as possible.

INITIATIVE 5

Install new lighting

We will maximize time on our existing turf fields by installing additional lights for nighttime use

Across the city, dozens of high-quality fields are rendered all but unusable after the sun sets. By placing additional lights around our athletic fields, we can allow people to play longer into the evening at a fraction of what a new field would cost. The best candidates for lighting are synthetic turf fields because they are durable enough to withstand additional use. Today, there are 36 such sites located throughout the five boroughs.

These new lights could provide an additional two hours of competitive use for each field during the summer, and an additional four hours during the spring and fall.

Re-imagine the public realm

New Yorkers frequently see sidewalks as the means to an end. We really do walk faster than other people; travel to another city and the fact—in the form of a meandering pedestrian just in front of you—will be inescapable.

But there are also many among us who have bought a slice of pizza and wished to eat it outdoors when the weather was warm; or bought a book and had nowhere to read outside until getting home; or just wanted to sit down for a moment and watch the street life of our city.

Moreover, whether it's walking to the car, or out of the subway or bus, or down the street on the way to school or shopping, each of our trips begins and ends as a pedestrian. That's why it is important to enhance the pedestrian experience on our streets and sidewalks.

There is no formula for the perfect New York City block. But neighborhoods with trees are generally more pleasant and beautiful than those without; sidewalks that encourage walking, with room for strollers, and gawkers, and go-getters, are more interesting and enjoyable than narrow strips of concrete. Our plan for open space will help bring to life the unique beauty of each of our neighborhoods.

Just as we have begun to re-imagine the waterfront from a set of dilapidated docks and warehouses into a resource for emerging neighborhoods and families, we must similarly turn our attention to the most commonly shared spaces among us. That means creating new plazas in every community where sidewalks in commercial areas allow for more neighborhood life, and where empty spaces could be converted into public plazas. It means filling out the remaining barren streets with trees that will add shade, color, cleaner air and higher property values; and it means encouraging an active, vibrant public realm as essential to the life of our city.

Willoughby Street before
Credit: NYC Department of Transporation

Willoughby Street after
Credit: NYC Department of Transporation

INITIATIVE 6

Create or enhance a public plaza in every community

We will create or enhance at least one public plaza in every community

Even before the City's Department of Transportation (DOT) finished the Willoughby Street Plaza in Downtown Brooklyn, people started to gather at the colorful collection of chairs, tables, umbrellas, and planters. The plaza soon transformed a stretch of roadway primarily used for parking into an inviting and attractive open space adjacent to shops and cafes. *(See case study: WIlloughby Street)*

Each of the city's 59 Community Boards contains at least one opportunity to transform underutilized street space into a successful plaza, as envisioned by Jane Jacobs and others, flanked by a mix of workers, residents, and stores that attract flows of people throughout the day; broad exposure to sunlight; buildings in scale with the open space.

Approximately 31 plaza projects are currently underway or planned to be completed by 2009. While the city already has many existing successful plazas, until now project selection has depended largely on funding and convenience. Starting this year, we will add a new process to the selection criteria: community initiative and need.

DOT will work with other agencies to identify additional sites and opportunities, prioritizing the neighborhoods with the lowest ratio of open space to population.

We will reach out to those communities to discuss potential sites and opportunities. The scale and design of these plazas will vary

CASE STUDY

Willoughby Street

During jury duty in 2005, a City Department of Transportation (DOT) Deputy Commissioner looked out of the courthouse window and noticed that the jagged area formed by Willoughby Street and the east of Adams service road was filled with illegally parked cars and little traffic.

The stretch of road in Downtown Brooklyn was adjacent to both the busy Jay Street-Borough Hall subway station and the bustling Fulton Street shopping area—but it was unused by either pedestrians or traffic.

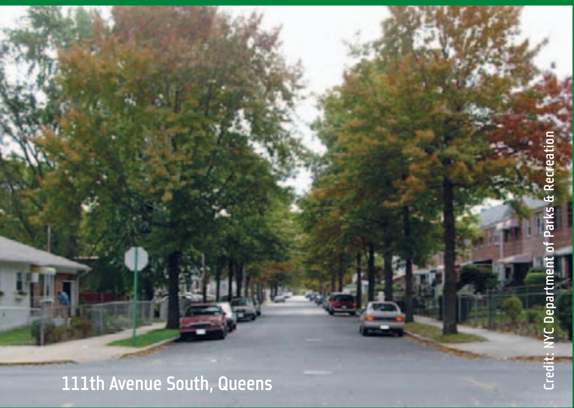
In 2006, DOT decided to reclaim the underused road space as a new public plaza. Before it had even been completed, people had already started to gather at the colorful collection of chairs, tables, umbrellas and planters that replaced the curved stretch of empty roadway. And it cost less than $100,000.

The success prompted the City to begin work on a $1.4 million buildout of the plaza, which will connect to the Fulton Street Mall.

By enhancing the Downtown Brooklyn walking environment, the plaza will encourage area workers to patronize local businesses. It will improve pedestrian safety by reducing crossing distances and slowing vehicles. The landscaped public space will also help the environment by filtering the air.

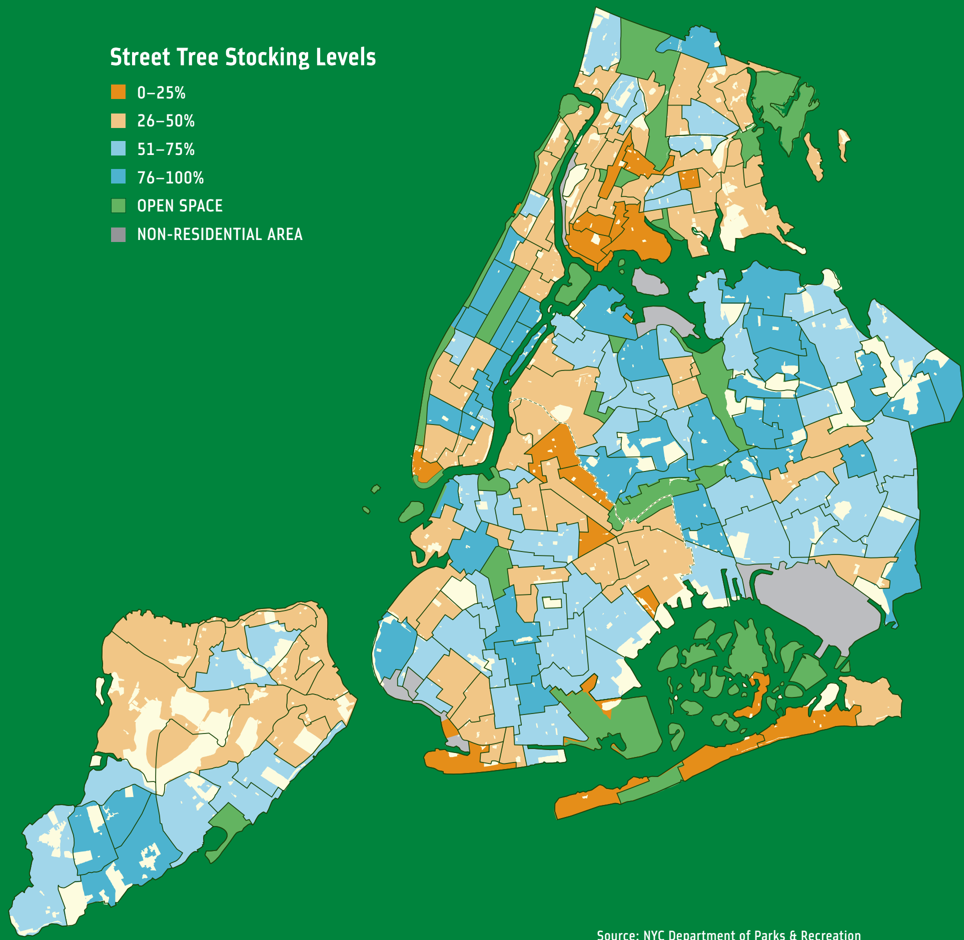
The project will result in approximately 7,000 square feet of new pedestrian space—room for a tired shopper to rest her feet and sip a cup of coffee.

Remington Street, Queens



111th Avenue South, Queens

Two streets in South Jamaica, Queens



Source: NYC Department of Parks & Recreation

widely, just as the scale and design of the city's neighborhoods vary widely. Four new or enhanced plaza spaces will be completed per year until every community board has at least one. In every case, the communities will be consulted on sites and how the space is designed, constructed, and programmed.

INITIATIVE 7

Green the cityscape

We will beautify our public realm to improve the experience of every pedestrian

In 1902, the Municipal Art Society encouraged residents of Brooklyn Heights to beautify their neighborhood by planting sidewalk trees, installing flower-filled window boxes, and creating mini-gardens of potted plants on their stoops. Called *Block Beautiful,* this private initiative led to the adoption of the first sidewalk tree planting program.

In truth, we have always known that trees beautify neighborhoods; but in the late 1980s, scientists began to quantify the benefits of urban trees. Today, an impressive and growing body of knowledge recognizes trees as assets to a city's economic and environmental health. City trees cool summer air temperatures, reduce air pollution, conserve energy, and reduce storm water runoff.

We will fill every available street tree opportunity in New York City

In the past decade, the Department of Parks & Recreation has planted more than 122,000 curbside trees of more than 30 different varieties. Current plantings fill 74% of the existing space for street trees. We will undertake an aggressive campaign to plant trees wherever possible, in order to fully capitalize on tree opportunities across the city. Our goal is to raise the street stocking level from 74% to 100% as part of our overall goal of planting one million more trees by 2030. To achieve this, we will plant approximately 23,000 additional trees annually. *(See map above: Street Tree Stocking Levels)*

We will expand the Greenstreets program

In addition to tree planting, we will expand Greenstreets, a program that has successfully transformed thousands of acres of unused road space into green space since its inception in 1996. Over the next 10 years, we will undertake 40 new Greenstreets projects every planting season, bringing the total number of Greenstreets projects to 3,000 by 2017.

Conclusion

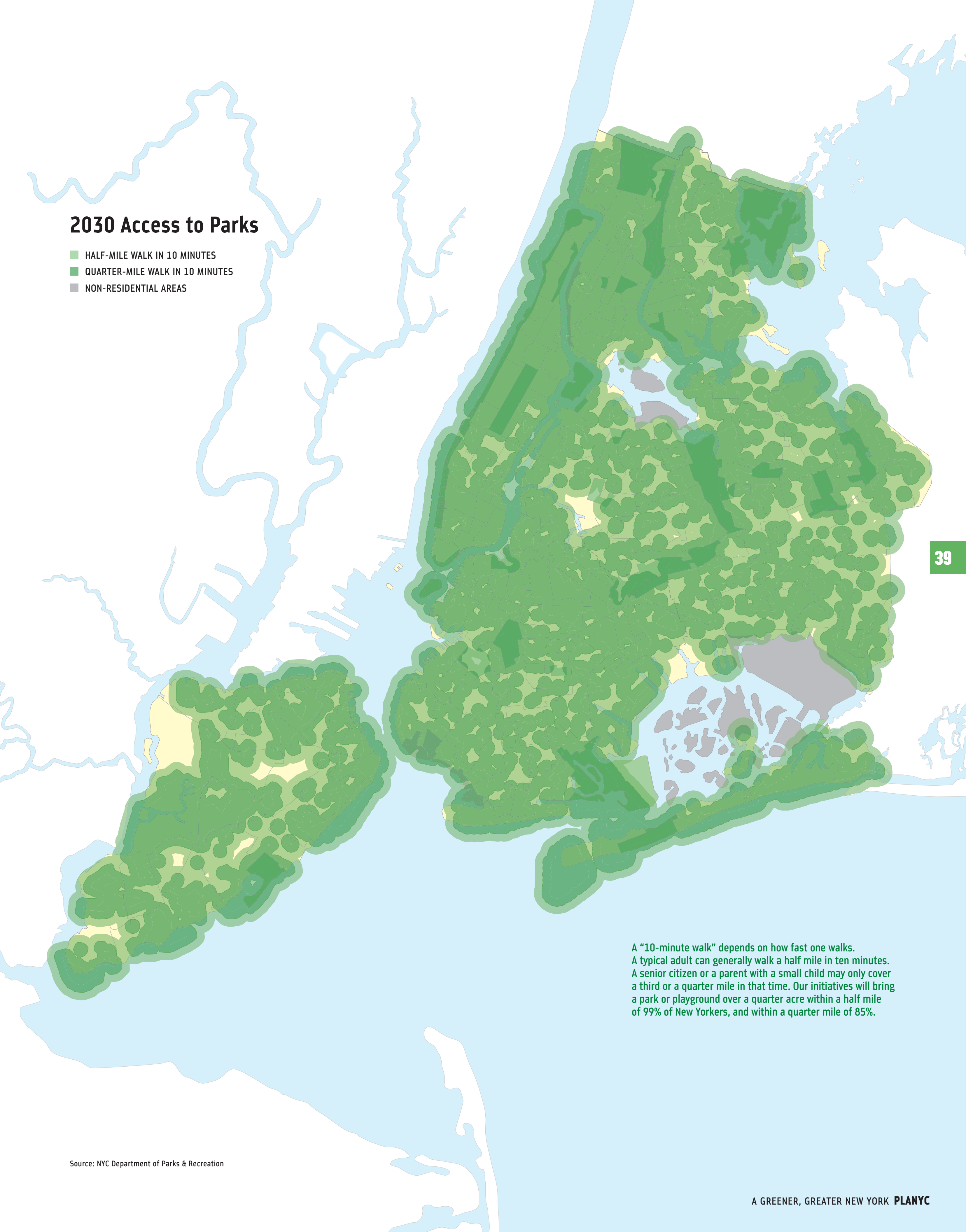
Throughout this chapter, we have defined parks as publicly-accessible open space that offers New Yorkers possibilities for either active recreation or relaxation and enjoyment. No park smaller than a quarter acre has been considered to meet this standard.

We have also considered the question of access. For a typical New Yorker, a 10-minute walk is a half mile. But this is a goal for all ages, and so we've also assessed open space opportunities within a quarter mile, recognizing the different pace set by parents walking with small children and seniors. *(See map on facing page: 2030 Access to Parks)*

As a result of the initiatives outlined here, we can expand opportunities for virtually every New Yorker within the next 10 years, building on the substantial progress from the last five.

With our projected population growth and increasing competition for land, new open space will become more difficult to find. That is why we will be even more vigilant about using what we already have more efficiently—even as we continue to search aggressively for available parkland. Through shared usage and new facilities on existing sites, we will substantially increase open space for New Yorkers to enjoy their parks.

Together, we will create an active, healthier, more beautiful public realm for all New Yorkers across our city.



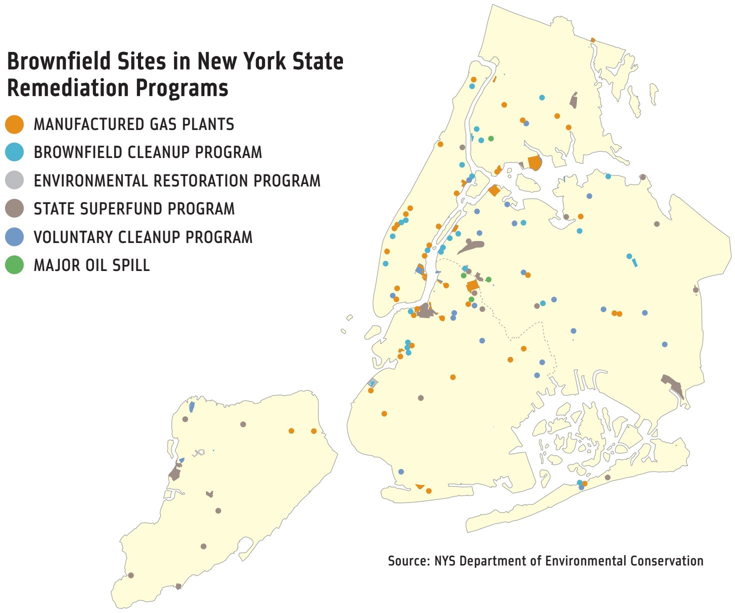
A "10-minute walk" depends on how fast one walks. A typical adult can generally walk a half mile in ten minutes. A senior citizen or a parent with a small child may only cover a third or a quarter mile in that time. Our initiatives will bring a park or playground over a quarter acre within a half mile of 99% of New Yorkers, and within a quarter mile of 85%.

Source: NYC Department of Parks & Recreation

Brownfields

Credit: NYC Department of City Planning

Clean up all contaminated land in New York City



Source: NYS Department of Environmental Conservation

Public Place, Brooklyn

Today, the 5.5-acre brownfield known as Public Place is anything but open to the public. A tall fence encircles the site, separating it from the surrounding community and blocking access to the Gowanus Canal. Dense under-brush has spread over piles of dumped garbage, an old building foundation, and a rusting dump truck. The only active corner is used by a concrete production facility.

Adjacent to the growing neighborhood of Carroll Gardens, framed by the rising ridge of brownstone Brooklyn, and within walking distance of the subway, the area's potential is unquestionable. As the largest City-owned site in the neighborhood, the lot could be reclaimed as housing and open space. But while the surrounding areas have flourished, Public Place has stubbornly remained vacant for decades, despite repeated requests by the local community to restore the land for active use.

Starting in the 1860s, the Brooklyn Union Gas company operated a manufactured gas plant on the site for a century—leaving coal tar waste and other chemicals behind. Since the plant closed in the 1960s, the pollution has sunk as far as 150 feet underground, seeping into, under, and across the canal.

As early as 1970, the community identified Public Place as a redevelopment opportunity—but for the next three decades, nothing happened. Since KeySpan signed a voluntary clean-up agreement in 2002, the process has accelerated—but it has still taken four years just to complete the analysis of contamination on-site, explore the range of possible uses, and negotiate responsibility for the steady flow of toxins leaking into the Gowanus Canal.

Agreement on a remediation design will take another year and the cleanup itself will last one more. By 2008—nearly 40 years after first being identified—the redevelopment of Public Place can begin.

As our need for space grows while our supply of land remains fixed, we must use our existing stock of land more efficiently. Brownfields represent one of our greatest opportunities. All five boroughs contain sites where previous uses have left behind contamination. There might have been a factory that turned coal into natural gas; a dry cleaner that used hazardous chemicals; or a gas station that left behind gasoline in the soil. In some cases, the confirmed presence of these dangers has stalled development; in others, just the fear of pollution has prevented the land from being used more effectively. All together, as many as 7,600 acres across the city may suffer from contamination—an area over eight times the size of Central Park.

The presence of brownfields is most acutely felt in low-income communities where contaminated sites can be concentrated. For years, environmental justice advocates have championed the need for strengthened brownfield remediation programs for years, particularly ones that address community needs.

With enough investment and oversight, even the most contaminated land can be cleaned up for safe use. Barretto Point Park in the South Bronx is built on a site once contaminated by an asphalt plant and a sand and gravel facility. Schaefer Landing, once a manufactured gas plant, sugar refinery and brewery, is now the site of 350 units of housing on the Brooklyn waterfront. And the Shops at Atlas Park in Queens was once a toy factory site that tainted the surrounding soils and groundwater by pouring chemicals down its drains. *(See case study on following page: Schaefer Landing)*

CASE STUDY

Schaefer Landing

For 16-year-old Gabriella Lazzaro, a nascent photographer eager for subjects, the Williamsburg waterfront always held a certain beauty. Lazzaro lives a block from the river, but just a few years ago, her mother Nora wouldn't let her walk through the area after dark.

"Imagine vacant land where people took to dumping garbage—that was Schaefer Landing—overgrown weeds, and all kinds of things moving around in there," said Nora Reissig-Lazzaro, who moved her family to Williamsburg 15 years ago. "It wasn't an area you'd want to walk by alone, night or day."

Schaefer Landing, named after the brewery that operated on the site between 1918 and 1976, has a long history of manufacturing uses. At various times the site housed a sugar refinery and a gas plant. After the decline of the manufacturing sector in the area during the 1970s and after brewery operations ceased, the site fell into default and became one of thousands of sites that was acquired by the City through *in rem* proceedings.

Above: Schaefer Landing, during demolition
Below: Schaefer Landing, today

Source: NYC Department of Housing Preservation and Development; Kent Waterfront Associates LLC

In an effort to remove the blight created by the vacant 1.7-acre site, in 2001, the City decided to rezone the site from manufacturing to residential. They intended to produce affordable housing and reclaim the waterfront. But due to the site's previous uses and the deteriorating bulkhead, it was classified a brownfield.

Recognizing how the site could be a catalyst for the entire area, the City and State created a partnership with like-minded developers to create not just an apartment complex, but an amenity for the neighborhood.

Today Schaefer Landing includes 12,000 square feet of commercial space and 350 units of housing, including 140 affordable units. It contributes the first built piece of a public esplanade along the Williamsburg waterfront. It also provides water taxi service, increasing transit for the growing neighborhood of South Williamsburg to Lower Manhattan.

Now, Gabriella Lazzaro leaves the dinner table and heads to the waterfront esplanade. "I take photos of the Manhattan lights, I walk my dog, and listen to my music," she said,"It's great."

Existing State programs

The programs regulating and encouraging this redevelopment have mainly been at the State and Federal levels. Today, there are nearly 270 sites covering more than 1,900 acres enrolled in the State's brownfields oversight programs, in all five boroughs. *(See map on previous page: Brownfield Sites in New York State Remediation Programs; see case study on facing page: Brownfield Redevelopment History; see graphic on facing page: Timeline of Brownfield Policy Development).*

But despite the scale of enrollment, these programs can be costly and time consuming.

Frequently, sites must undergo testing and analysis before being accepted. This process, known as "phase II environmental site assessment," requires that teams take multiple soil, vapor, and groundwater samples from the site, send them for testing—and then wait for results to determine if more testing will be required. As a result, even just applying for admission into the program can take a year or more.

Once sites have been accepted, the complexity of our development history means that the State's remediation guidelines rarely apply neatly to city sites. As a result, the details of each cleanup must be negotiated with two State agencies in a process that can take years. In this complicated back-and-forth of sampling, soil analysis, and negotiation, a sophisticated, large-scale developer might succeed; a small-scale developer will be at a distinct disadvantage.

More pressures are being caused by today's strong real estate market: the demand on State agencies is growing, with limited resources to handle the increasing caseload of applications.

Sites not in programs

But the sites facing these challenges are already part of a State program; it is likely that they will be returned to productive use. In contrast, the sites not in State programs—roughly 5,700 of the estimated 7,600 acres—have no guarantee of ever getting cleaned up.

Some of these sites have attempted to enter the State cleanup program, but have been prevented because of the State's restrictive eligibility criteria. It is not likely that sites with low levels of contamination or types of pollutants common to New York City, such as some of the fill material used in the early 20th century, will be admitted into the State's Brownfield Cleanup Program (BCP) when the site is redeveloped.

In other cases, many sites are rejected due to a lack of available funding. The current program was designed to encourage development as well as cleanups; therefore, not only do incentives cover the remediation costs, they also contribute toward the actual construction. In New York City, where projects are generally denser, higher, and more expensive than the rest of the state, a small number of sites has consumed a disproportionate amount of funding. As a result, the State has been forced to restrict the number of entrants into the program.

Still others are eligible, but their owners believe that entering current programs will lengthen the time and cost of redevelopment. As a result, the developers have undertaken testing and cleanups without government oversight, accepting the risk that this cleanup might not be sufficient. These "at risk" cleanups pose little safety risk if they are done correctly, but they will only take place on those sites where the value of the site far exceeds the cleanup cost.

Community input

The challenges facing brownfield owners often make them eager to find any economically feasible uses for their sites, whether or not they conform to the vision of the local community. In our current situation, landlords often find that their financial interests dictate development plans that minimize cleanup requirements, time, and costs. Accordingly, they may choose new uses for the land, like parking lots, that do not require high cleanup standards—but also do not reflect community needs or desires.

This mismatch of uses has become an environmental justice issue because brownfields are often concentrated in low-income neighborhoods that find the new develop-

Timeline of Brownfield Policy Development

FEDERAL | STATE | CITY

- **1979** (Federal): Love Canal becomes a national issue and highlights the risks of toxic chemicals to public health
- **1980** (Federal): Congress passes Superfund legislation, making site owners liable for cleanup of chemically contaminated sites
- **1988** (State): Minnesota adopts nation's first voluntary program to clean brownfields
- **1994** (City): City expands E designation for lots with potential hazardous material issues
- **1994** (State): New York State begins to address brownfield redevelopment through introduction of voluntary cleanup program
- **2002** (City): City increases enforcement of E designation, requiring developers to address hazardous materials before City will issue building permits
- **2002** (Federal): Congress amends Superfund, shielding developers from Superfund liability when they acquire land contaminated by others
- **2003** (State): State adopts new cleanup laws, including Brownfield Cleanup Program, tying significant tax credits to participation in program
- **2006** (City): Mayor unveils PLANYC, citing the remediation of contaminated land as a goal for long-term sustainability
- **2007** (State): In his State of the State address, Governor Spitzer calls for reform of State brownfield program

1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009

Source: NYC Mayor's Office of Environmental Coordination

ment around them occurring outside of public processes and without a forum to voice their visions. Existing State law makes it possible for such neighborhoods to undertake community plans, called Brownfield Opportunity Areas (BOA) programs, and the City has supported many of these community-based applications.

But the State's process for releasing BOA funds to communities is cumbersome, and has already delayed some grant-winners by more than three years. Even more importantly, incentives do not exist for landowners to participate in community planning—and since local input does not always align with the development plan, few do so voluntarily. As a result, the BOA process has delivered far less than it could.

Understanding the scope of the problem

Under current conditions and with existing programs, it is difficult to know whether New York City's contaminated land will be developed by 2030, or ever.

We don't even know how many acres of brownfields exist in the city. Previous estimates have counted 4,000 acres of brownfields—including the 1,900 acres already in State cleanup programs. But this analysis was limited to vacant sites in manufacturing areas; it did not include potentially contaminated sites that are underutilized (but not vacant) or located in former manufacturing areas. Including those sites, the number could rise as high as 7,600 acres.

Many of these sites are languishing since our current laws actually discourage owners from understanding the extent of the contamination on their land. As long as there is no confirmed contamination, they are not responsible; but if testing reveals pollution, they could become liable for the cleanup—whether they caused the damage or not.

One thing is clear: if we are to accommodate our need for housing, jobs, and open space, the challenge of cleaning up our brownfields cannot be ignored.

CASE STUDY

Brownfield Redevelopment History

In the winter of 1979, officials near Niagara Falls discovered chemicals leaking into a school's basement from an underground lagoon. The Love Canal incident quickly became a national issue. The fear of health impacts prompted Congress to authorize the Superfund program in 1980, forcing property owners to clean up the worst waste sites regardless of fault. New York and other states followed by passing their own Superfund laws. Ironically, few sites were cleaned over the next decade, largely because the law required complete cleanups regardless of risk. As a result, potential liability prompted owners to shield themselves by pulling their land from the market.

This lack of activity prompted states to experiment with shaving the harsh edges off Superfund liability for less contaminated sites. Brownfield policies were born, and the states led the way. In 1994, New York State created a voluntary cleanup program. In 2003, the State passed legislation that created the present mix of programs, while allowing owners to base their cleanup on the future use of land, and remove only contamination that imperils public health. These risk-based cleanups have made owners more willing to remediate.

Today, significant State and City brownfield programs include:

State programs:

- **Inactive Hazardous Waste (State Superfund) Program:** State Department of Environmental Conservation (DEC) designates and remediates the most contaminated sites in New York, known as Class II sites.
- **Voluntary Cleanup Program:** Voluntary parties clean up brownfield sites under DEC supervision and upon completion receive a liability release.
- **Brownfield Cleanup Program (BCP):** In 2003, expanded brownfields legislation enabled State to add tax credits to a voluntary cleanup program, resulting in fewer sites enrolled. This new program was known as the Brownfields Cleanup Program.
- **Environmental Restoration Program:** Participating municipalities must perform Superfund cleanups of publicly-owned sites and upon completion receive State reimbursement for 90% of their costs, as well as indemnification.
- **Spill Program (petroleum):** DEC requires immediate reporting of all petroleum spills to DEC. The Spill Program addresses thousands of sites each year with limited DEC oversight and reasonable transactions costs.
- **Manufactured Gas Plant (MGP) Program:** DEC cleans up former energy facilities where coal and oil were converted into gas. Today, utilities are responsible for MGP sites which often have left behind significant deposits of coal tar.

City programs:

- **E Program:** Upon rezoning of a manufacturing area to residential use, the Department of City Planning places an E designation on lots where historic information suggests hazardous material may exist. A developer cannot build on an E-designated site until it satisfies the City's Department of Environmental Protection that the conditions that prompted the E designation have been satisfactorily addressed.

Our Plan

Our growing need to maximize the efficiency of every piece of land means that we must foster the redevelopment of brownfields on a large scale, in ways that conform to citywide and neighborhood needs.

Protecting the health of New Yorkers must be our primary concern. But there are opportunities to streamline existing programs to make them more efficient and responsive to the unique challenges posed by redevelopment in New York City. That means accelerating the testing process and reducing the length of negotiations by establishing city-specific remediation guidelines. We will create a City office to serve as a resource for the State, in-city developers, and communities interested in planning brownfield redevelopment for their neighborhoods. This office will also assist community organizations with brownfield redevelopment programs.

As these programs become faster and more effective, we must work with the State to increase the number of eligible participants. We will recommend restructuring State tax incentives to encourage broader participation and also expanding the definition of sites that can be included. For others, we will create a City program that provides oversight and certification for successful cleanups, based on remediation guidelines we will seek to develop in consultation with the State.

For too long, communities have been left out of the process of reshaping their neighborhoods. That's why we will advocate for the State to simplify the process for releasing grant funding to BOA recipients, and create incentives for developers to partner with local communities on brownfield restoration projects, increasing the likelihood that community visions will be acheived.

Finally, we cannot clean up all the contaminated land in our city unless we know where it is. That's why we will develop a database of historic uses across New York City and develop insurance for landowners who are willing to test and remediate their sites, protecting them against debilitating liability. We will also protect our right to chase responsible parties and hold them accountable, where possible.

Current brownfield laws work towards these goals. But in their current form, they have proven insufficient to the challenge in New York City. In partnership with the State, we will take action now to ensure that New Yorkers not only enjoy a clean environment, but also more opportunities to live, play, and work in a vibrant, growing city.

Our plan for brownfields:

Make existing brownfield programs faster and more efficient

1 Adopt on-site testing to streamline the cleanup process
2 Create remediation guidelines for New York City cleanups
3 Establish a City office to promote brownfield planning and redevelopment

Expand enrollment into streamlined programs

4 Expand participation in the current State Brownfield Cleanup Program (BCP)
5 Create a City program to oversee all additional cleanups
6 Provide incentives to lower costs of remediation

Encourage greater community involvement in brownfield redevelopment

7 Encourage the State to release community-based redevelopment grants
8 Provide incentives to participate in Brownfield Opportunity Area (BOA) planning
9 Launch outreach effort to educate communities about brownfield redevelopment

Identify remaining sites for cleanups

10 Create a database of historic uses across New York City to identify potential brownfields
11 Limit liability of property owners who seek to redevelop brownfields

Make existing brownfield programs faster and more efficient

State programs are currently overseeing the remediation of over 1,900 contaminated acres across New York City. But the programs still remain cumbersome, costly, and time-consuming. As a result, the first task for increasing the redevelopment of brownfields is to streamline the existing process, as the Governor has already committed.

As State programs, change will require State leadership, but because New York City comprises such a significant proportion of the State's brownfields, the City can and should also play a role.

INITIATIVE 1

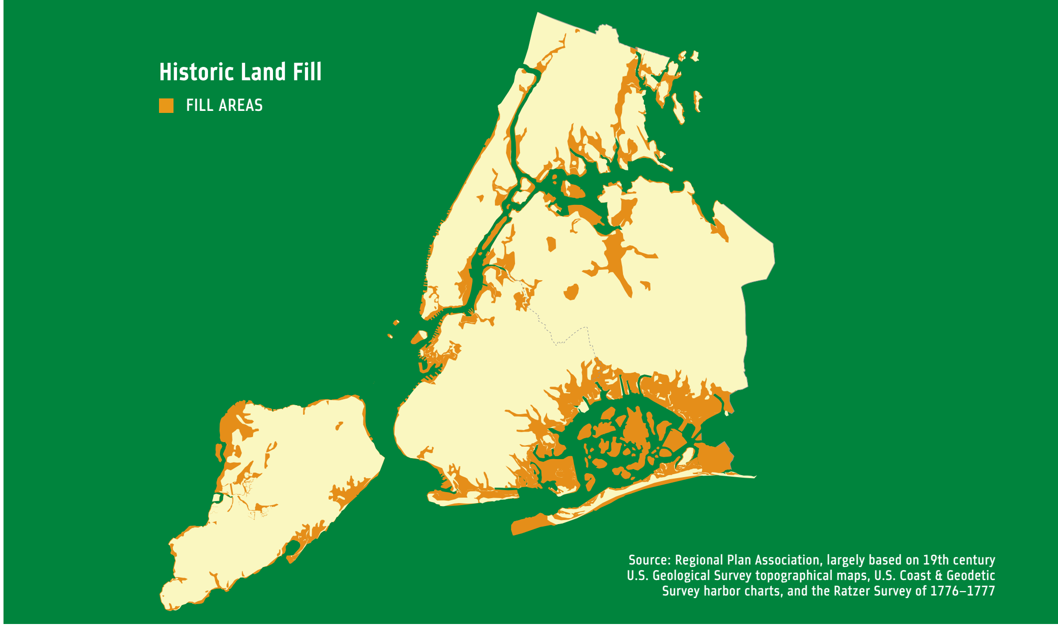
Adopt on-site testing to streamline the cleanup process

We will pilot the "Triad" program on two sites

Today, determining the level of contamination on a brownfield is a time-consuming process that involves taking multiple soil and groundwater samples, sending them in for analysis, and waiting for the State to respond—with the possibility that additional samples will be required. This back-and-forth can continue indefinitely, causing significant delays.

The Federal Environmental Protection Agency (EPA) is now using an alternative approach. Known as "Triad," the approach assembles an on-site team including representatives of the owners and regulators. The scientists who analyze the soil samples work nearby or in an onsite laboratory. Together, the team conducts a comprehensive assessment of the site, reviews lab results, and reaches agreement on findings without long delays. This more extensive investigation means that Triad costs more than current site investigations—but can shave months off the testing and remediation phases. As a result, the EPA has found that Triad can cut testing and remediation costs by 30% or more.

The City and State will each pilot the Triad approach at one site this year. The City site is at Melrose Commons in the Bronx; the State



site is the former BCF Oil site in East Williamsburg. Pending the success of these pilots, the City will employ the Triad approach on all major City-sponsored remediation projects; the City will also work with the State to promote the approach on privately-held sites.

INITIATIVE 2

Create remediation guidelines for New York City cleanups

We will analyze New York City's soil and develop a set of standard cleanup remedies appropriate for the city

New soil standards adopted by the State in 2006 significantly reduced the uncertainty around what cleanup measures were required—mostly for land outside New York City. Developed mainly for upstate and suburban conditions, the guidelines can be unreasonable in an urban environment. For example, the standards require cleanups that ensure drinkable groundwater, though only a small area of the city uses groundwater for drinking. These standards are based on rural soil conditions, which have not been affected by the centuries of development that has occurred on urban soil. As a result, the cleanup plans for most in-city sites are developed through a case-by-case negotiation, causing substantial delays. *(See case study on page 47: Atlantic Terrace)*

While unique scenarios will always arise, we will develop a set of remediation guidelines for the city's most common situations. We will work with State agencies to study our urban soil to document the level of metals and other contaminants found across the five boroughs. This data, which has never been collected, would allow the creation of remedies that protect the health of the public and are tailored to New York City

Finally, we will seek to revise current cleanup standards and policies affecting many New York City brownfields, including:

- **Historic fill:** In the 19th and 20th centuries, debris and incinerator ash was used to fill in many building sites; it may be present in 20% of the city's land and, since the material was unregulated, much of it may contain some contaminants. While much of it does not pose a public health risk, sites with fill should be eligible for regulatory oversight when redeveloped. When placed under a proper cover, the material can be recycled and safely reused as below-grade material at other construction sites. *(See map above: Historic Land Fill)*
- **Contaminated vapors:** On some sites, contaminated vapors rise up out of the soil or ground water, frequently requiring costly blower systems or extensive indoor air quality testing. In some cases it may be appropriate to employ systems using natural winds and temperature changes to affect air flows where they can provide the same level of protection for lower levels of cost, energy consumption, and noise.
- **Groundwater:** The State requirement to clean up groundwater to drinkable standards makes sense in communities that rely on groundwater for their water supply, but not for most parts of New York City, where the drinking water comes from upstate reservoirs. Standards must be developed that recognize that most parts of New York City do not drink groundwater.
- **Dredged sand:** Brownfield sites require significant amounts of clean fill to replace whatever contaminated soil is removed, often at high cost. But some materials—such as sand and other material dredged from New York Harbor—could be used instead at a cost as low as $5 per cubic yard; in contrast, clean fill from land sources can cost as much as $40 per cubic yard. Regulations should promote the use of this cheaper fill citywide.

INITIATIVE 3

Establish a City office to promote brownfield planning and redevelopment

We will create a new City office to increase resources dedicated to brownfield planning, testing, and cleanups

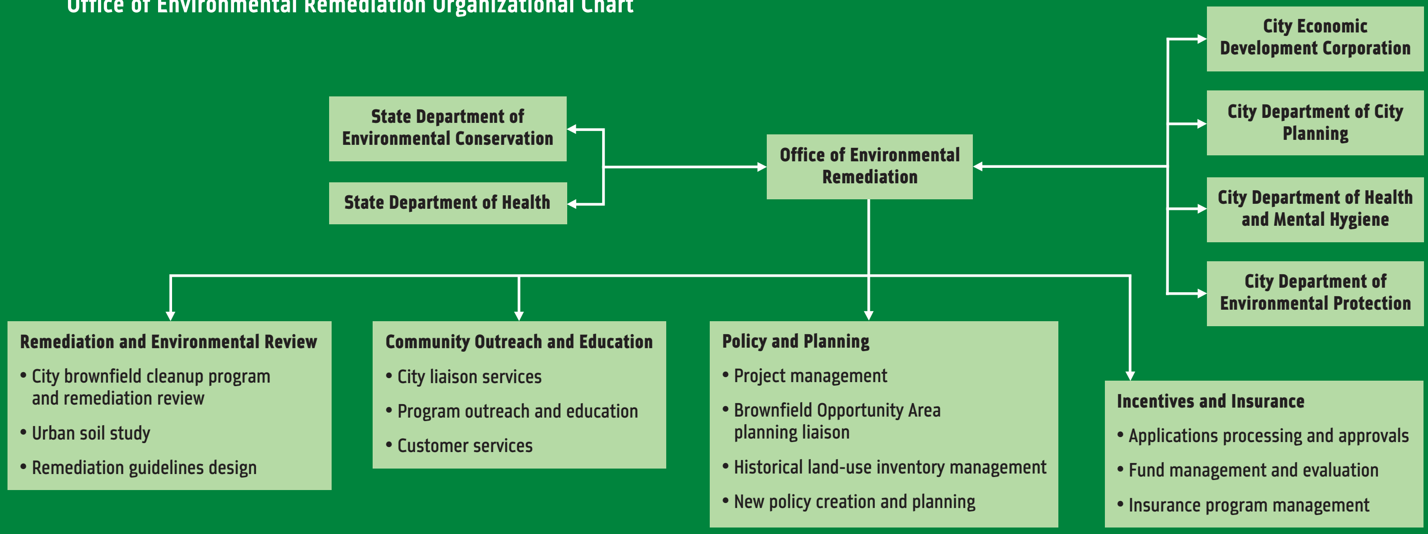
We can do more to assist all parties in their brownfield efforts. The increasing brownfield-related requests are outpacing the staffing levels at both the City and State. There is a need to increase resources to communities wanting to address brownfield redevelopment in their neighborhoods. Further, the City's few brownfield-dedicated staff are spread across multiple agencies.

We will consolidate the City's existing brownfields staff into a new department. This new office won't simply assist the State's staff; it will offer an expanded set of services including planning, outreach, project management and public support. Additionally, the office will execute remediations under the City's jurisdiction and apply for State and Federal grants.

The office will provide a new level of "customer service" to communities and developers, helping them navigate the complicated process of remediating brownfields.

The State's role will remain central. To reduce the time for State review of remedies, we will urge the State to increase the staff of the Department of Environmental Coordination (DEC), DOH, and the Department of State, the three agencies with oversight of brownfield programs. In addition, we will work with DEC and DOH to form partnerships so that joint reviews can streamline State and City processes further. *(See chart on following page: Office of Environmental Remediation Organizational Chart)*

Office of Environmental Remediation Organizational Chart



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Expand enrollment into streamlined programs

Existing programs are only as effective as the number of private owners of brownfields who are able—or choose—to participate. That is why we must identify ways to broaden eligibility and encourage participation, so that as many sites as possible can use incentives to begin productive redevelopment.

INITIATIVE 4

Expand participation in the current State Brownfield Cleanup Program (BCP)

We will ask the State to redistribute BCP tax credits to relieve budgetary pressures, and begin covering New York City-specific contamination

Currently, many sites are ineligible due to definitions and rules that restrict the BCP's value to New York City; in addition, an overly generous set of tax credits continually exhausts State brownfield funds, creating a winner-take-all situation where the lucky few landowners in the program make attractive profits, while other eligible projects are kept out, to a large extent for budgetary reasons.

The BCP should include as many sites as possible: all eligible sites should be virtually guaranteed enrollment, and the eligibility definitions should be broad enough to include all sites that require financial incentives for redevelopment. As a result, we will ask the State to:

- **Amend the brownfields tax credit program to provide less-rich credits, but to more sites.** The BCP currently provides tax credits to developers based not just on cleanup costs but on the cost of the new building construction. Due to their high density, New York City projects can create nearly unlimited exposure for the State, limiting the number of projects that can be accepted into the program statewide. This incentive may not need to be so generous. We will ask the State to restructure the credits, directing a higher percentage toward remediation and placing caps on the redevelopment credits. As a result, more sites can be enrolled in the program without exceeding its budget.
- **Return Class II inactive hazardous waste sites to eligibility.** Class II sites mainly include former industrial or manufacturing facilities—such as a former metal-plating factory—that have been contaminated for years, often for decades. There are 28 of these sites in New York City, covering 345 acres. With very high clean-up costs due to serious contamination, these sites are often the ones least likely ever to be remediated without public incentives. They were eligible for the BCP for a brief period—from 2003 to 2005—and should be given permanent eligibility.
- **Include moderately contaminated sites.** The way the BCP is structured, some sites fall into a middle-ground trap: they are contaminated enough to require a clean up, but may not be contaminated enough to qualify for the BCP. Included in this category are the historic fill sites that are most common in New York City. We will work with the State to include such sites, because it is still a public priority to get these sites back into productive use.

INITIATIVE 5

Create a City program to oversee all additional cleanups

We will create a City-sponsored program to provide oversight of cleanups for any sites not enrolled in other programs

The BCP's tax credits are attractive to for-profit developers, but in many cases are not actually the most important service provided by the program. For some developers, a Certificate of Completion (COC)—which limits their liability for contamination discovered in the future—is of greater value than the tax credits. Non-profits, including many developers of affordable housing, are not even eligible for the tax credits—but their lenders often want some sort of government certification that a clean up has been performed to an acceptable safety standard. Today, however, a private party who voluntarily remediates a site cannot obtain a COC without going through the full BCP.

To fill this need, the City will advance State legislation to allow for the creation of an alternative City program that does not offer tax credits, but instead enables a streamlined certification process. This program would use City staff to review and approve cleanup plans under the new City remediation guidelines. Following successful models being used in other states, this program will also allow licensed environmental professionals to certify compliance on low risk remediations with relevant remediation standards and guidance with more limited governmental oversight than is currently required under the BCP. The integrity of this program will be enforced through frequent audits. Upon completion of a satisfactory cleanup, the City will issue

Atlantic Terrace
Credit: NYC Department of Housing Preservation and Development

a City COC. The City will work with the State and, where necessary, advance legislation to ensure that a City COC is honored by State regulators and provides the same liability relief as the BCP.

INITIATIVE 6

Provide incentives to lower costs of remediation

We will dedicate $15 million to capitalize a fund to support brownfield redevelopment

Although a City brownfield program will increase oversight for remediation projects, many sites will still require financial assistance to begin redevelopment. That's why the City will provide $15 million to a public-private revolving fund. The Remediation Fund will provide below-market rates to developers of contaminated land. These incentives will be directed toward remediation and related costs, including testing and environmental insurance.

The City will partner with private institutions to raise 70% of the Fund's total capital. Because of the risk involved with lending against contaminated property, current interest rates are often greater than 13%. By using City capital in a revolving fund, the interest rate can be much lower, reducing the costs of remediation and testing.

Encourage greater community involvement in brownfield redevelopment

Brownfields are frequently concentrated in former manufacturing areas, many with large concentrations of low-income New Yorkers. From Sunset Park to the South Bronx, environmental justice advocates have launched a variety of community planning efforts aimed at reclaiming brownfield sites for local priorities and needs. But as growth surges across the city and begins to reach these areas, residents must be given greater voices in shaping their communities. That means incorporating amenities such as healthy, open spaces, community centers, and affordable housing, as land values and rents continue to rise.

That's why we will work with the State and local organizations to incorporate community perspectives more fully into brownfield redevelopment projects.

INITIATIVE 7

Encourage the State to release community-based redevelopment grants

We will advocate for the State to reform the Brownfield Opportunity Area (BOA) program and release planning grant funds to community groups

The Brownfield Opportunity Area program (BOA) provides approximately $8 million per year to help communities with large concentrations of brownfields develop visions for how underutilized land in their neighborhoods could be redeveloped to strengthen

CASE STUDY

Atlantic Terrace

When the non-profit Fifth Avenue Committee (FAC) gained custody of an empty lot in Fort Greene, it had an impressive goal in mind. It would make its project, Atlantic Terrace, the first LEED Gold certified affordable housing in Brooklyn.

But for FAC, getting green hasn't been easy. The lot had previously been the site of gas stations and manufacturing businesses. Though seven gas tanks had been removed, they had leaked. This, in addition to the fill used to level the site, meant that Atlantic Terrace had to be a remediation project before an affordable housing development.

"The contamination added bureaucratic complexity, cost, and time to the project. We could have started construction months ago," said Michelle de la Uz, Executive Director of FAC. In fact, by participating in the State's Brownfield Cleanup Program, FAC expects to lose at least six months.

And while FAC is eager to benefit from the tax credits and liability protection offered by the State BCP, it fears the costs of delay. So although the State admitted Atlantic Terrace into the BCP program, FAC is electing not to participate. In the absence of alternatives, FAC will conduct its cleanup without State assistance. By the time FAC is finished, the site will be safe to residents and neighbors, but with potentially significant liability.

This is where a City-sponsored BCP program could play a key role. The City BCP program would allow an alternative for sites like Atlantic Terrace. The City will offer expedited review and oversight that, upon satisfactory remediation, could, with State approval, result in a City approval letter providing liability relief similar to that offered by State programs. The City's BCP program will also make sites like Atlantic Terrace eligible for City programs.

"A program like that would have given us a clear path very early on in Atlantic Terrace's conception," said de la Uz. "That certainly would have helped."

existing or proposed community plans. Between 2004 and 2006, the State awarded 10 BOA grants to local organizations in the city and received nine more City-supported applications. *(See map on previous page: Brownfield Opportunity Areas)*

One of the recipients, the Bronx Council for Environmental Quality (BCEQ), sought to revitalize a seven-mile sliver of land between the Harlem River and the Major Deegan expressway. Spanning 159 acres across 45 sites in the neighborhood, every site in the study area is considered potentially contaminated because each is located downhill from dense urban development and adjacent to railroad tracks. Currently, 33 of these sites are also considered underused.

The BCEQ plan will expand access to the waterfront, creating new parkland curving alongside the river, a restored shoreline and natural habitat, and stronger links with the surrounding areas.

But the progress on this plan—and 18 others—has ground to a halt because of a cumbersome process for delivering the grant money. Since 2005, no grants have been issued at all, despite a backlog of City-supported initiatives. To get BOAs back on track again, the City will request that the State modify its requirements in order to deliver funding to program grantees more quickly. The City also will work with the State to ensure the provision of funding to implement BOA plans, so that community initiatives are more likely to come to life.

INITIATIVE 8

Provide incentives to participate in Brownfields Opportunity Area (BOA) planning

We will advocate for financial incentives for developments constructed in coordination with a BOA

There is currently no incentive for private developers who own property within a BOA to work with the community's redevelopment plan. Often community groups have a limited ability to acquire and remediate sites on their own. Therefore, community-based brownfield redevelopment often requires the participation of site owners and developers in order to have any tangible impact.

When each side works together, projects can be designed that meet the needs both of the landowner and the community; for example, the redevelopment of the Rheingold Brewery in Bushwick was done as a partnership between the community, the Bluestone Organization, and the City's Department of Housing Preservation and Development. It included 300 affordable housing units and won a Phoenix Award for Excellence in brownfield redevelopment.

But, in many cases, landlords note that community-based planning can add further delay to the already-lengthy process of brownfield redevelopment. Although the BOA legislation currently states that projects consistent with BOA plans be given "preference and priority" for incentives, the State has not defined the nature of the preference and no project has benefited.

We will advocate for the State to encourage these partnerships more strongly by creating a financial incentive for plans that reflect BOA guidelines. This incentive would provide a measurable reason for developers to factor community interests into their development plans, maximizing potential coordination opportunities.

INITIATIVE 9

Launch outreach effort to educate communities about brownfield redevelopment

We will educate and provide technical assistance to communities, private developers, and City agencies to promote brownfield redevelopment

Even at its simplest, brownfield remediation is very confusing. Whole industries exist to coordinate the numerous stakeholders in brownfield redevelopments. Lawyers, environmental consultants, lenders, insurance brokers, and Federal, State, and local regulators usually have some part to play in most brownfield transactions, creating tens or hundreds of thousands of dollars in soft costs alone. Though these services are expensive, they are also essential to help maximize the potential benefits of existing programs.

Through its new Office of Environmental Remediation, the City will provide the information, technical assistance, and training necessary to assist less-sophisticated developers and encourage effective community involvement and planning.

The effort will include the creation and continual updating of a brownfields information website to provide information on resources available for site investigation and cleanup. The office will also act as a liaison to DEC, assist in reviewing legal agreements and permitting applications, track sites and progress, create a "toolkit" for interested community groups, and hold workshops for community groups and City agency staff. The group will also actively promote applications to the State BOA program, as well as provide a City liaison to all City projects.

Identify remaining sites for cleanups

Outside of sites enrolled in State programs, and areas that have been rezoned from manufacturing to residential use or awarded redevelopment grants, the City does not have a way of knowing how many brownfields exist or where they might be. This lack of full information prevents the City from being more proactive in promoting remediation. Further, it imposes the full costs of determining dangerous historic uses on the landowner.

INITIATIVE 10

Create a database of historic uses across New York City to identify potential brownfields

We will conduct a historic use assessment for all sites in order to measure long-term progress towards goals

We will create a "historical use database" to assemble information that will help inform our awareness of potential contamination. This will include two types of research. First, we will gather information from a variety of sources, including environmental releases, databases, historic maps, telephone, and finance records. Second, we will ask Community Boards in their annual Community Needs Assessments to include an assessment of local vacant or underused lots that might be brownfields and consider them in light of other community needs.

We will use the information to identify potential priority areas and provide a baseline set of information that local groups can use to create community-based brownfield redevelopment plans. It would also allow us to track our progress toward the goal of cleaning up and re-using all of our contaminated land.

INITIATIVE 11

Limit liability of property owners who seek to redevelop brownfields

We will create an insurance program and legal protections to limit the liability of developers willing to clean up land they did not pollute

In most cases, brownfields are no longer owned by the person or company who caused the contamination in the soil. But if a developer cleans up land and builds on it, under current State law the developer becomes liable for any harm that might remain, and for the potential costs of any future remediation. For sites that make it into the BCP, and complete it successfully, the State limits these costs and risks to the site owner; but the uncertainty of gaining entrance to that program still leaves many developers fearful that proposing redevelopment, or even just testing their land for contaminants, could leave them vulnerable. As a result, some properties linger either as vacant sites or with obsolete uses, reducing neighborhood quality of life.

To reduce this exposure, landowners are increasingly purchasing brownfields liability insurance that helps protect them against undiscovered contamination and unexpected cleanup costs. But such insurance is currently only available after contamination levels have been tested and confirmed, which is already an expensive and time-consuming task.

In order to get more landowners to consider redevelopment and embark on initial testing, we will work with private insurers to develop insurance policies—with a $10 million City contribution—that will protect landowners before any testing has been done. While such insurance would not cover the full costs of a clean up, it could protect the landowner against the worst possible scenarios and encourage redevelopment planning. This will be of particular value to those developers—like affordable housing builders and small-scale developers—whose access to capital is limited, and who cannot afford to cover the initial stages of a cleanup effort without receiving the benefit of State tax credits.

We will also seek the passage of a new State law that would protect new purchasers from liability for unknown contaminants in land they purchase for redevelopment. Currently, if a purchaser buys land that turns out to be contaminated, the purchaser can be held liable for cleanup costs even in excess of the land's value, whether or not the responsible polluter can be found and made to pay. This makes buyers afraid of certain sites. This exemption, similar to a clause in existing Federal law, would reduce the liability of those who buy land to clean it up, encouraging more developers to generate plans for more sites.

Conclusion

It took over 20 years for the State, the City, and KeySpan, Brooklyn Union Gas's successor, to begin the cleanup of Public Place. But today, they are partnering to accelerate its full integration into a new vision for one of the fastest-growing areas in Brooklyn. The savings from this coordinated planning can be reinvested into amenities like more public space and affordable housing, fulfilling the promise that an abandoned, contaminated lot can be transformed into a true public place.

But this level of partnership is not yet the case at dozens of sites across the city. Thousands of potentially contaminated acres are scattered in all five boroughs—land that could be re-envisioned to meet our city's infrastructure, manufacturing and community needs. Only in the last two decades has New York City begun to deal with the legacy of contamination left behind by its industrial past. We must accelerate this effort.

That's why we will work to improve the efficiency of existing State programs through the application of dedicated City resources, and supplement them with the creation of new programs. With greater community involvement and a more aggressive effort to identify sites requiring cleanups, we will ensure all of New York City's brownfields are recaptured so that they can contribute to our land challenges ahead.

Our water system was an engineering marvel when it was created in the early 19th century. But today growth around our reservoirs and the age of our infrastructure make it more and more challenging to maintain the quality and reliability of our supply.

We must also confront the legacy of our industrial past, which treated New York's waterways as a delivery system, rather than as a source of recreation or a vital ecological habitat. Today, our combined sewer system too often renders our waterways unusable.

These two water challenges—ensuring the water we drink is clean and available, and that the waterways surrounding our city are open to New Yorkers—will require continued investment. That's why we will build critical backup systems for our water network infrastructure, continue to upgrade our wastewater treatment facilities, and explore the potential of more natural solutions to cleanse and filter our waterways.

Water

Water Quality

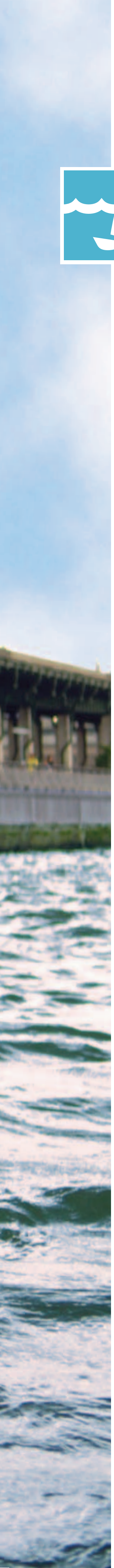
Open 90% of our waterways
to recreation by preserving natural
areas and reducing pollution

Water Network

Develop critical backup systems
for our aging water network to ensure
long-term reliability

Water Quality

Credit: NYC Economic Development Corporation



Open 90% of our waterways to recreation by preserving natural areas and reducing pollution

The opaque two-and-a-half mile twisting Gowanus Canal is part of New York folklore, a gritty piece of city history.

"When I first moved in 11 years ago, it smelled nasty," said John Creech, 44, who lives in the area.

The stench came from a century and a half of sewage and industrial pollutants settling to the bottom of the canal and decomposing. Built in the 19th century to usher Brooklyn into the industrial era, the Gowanus quickly became the nation's busiest commercial waterway. After World War I, six million tons of cargo annually were produced and trafficked through the canal. The resulting industrial contaminants, storm water runoff, and other oil-slicked pollutants—particularly ink—gave the Gowanus its nickname, "Lavender Lake."

Today, more than 154 million gallons of fresh water are pumped into the canal per day, helping to oxygenate the waterway and support aquatic life. But thousands of gallons of sewage still discharge during rainstorms and decades worth of toxic sediment still sits along the bottom.

For more than two centuries, New Yorkers used waterways as garbage bins, dumping waste into the rivers that rushed by their houses. By the industrial age, our attitude remained largely unchanged: waterways were a means to achieving an end, whether convenience or commerce. Oil refineries, factories, and ships rose along the riverbanks and their waste products were often deposited in the water. As manufacturing declined after World War II, the waterfront withered along with it. For decades, stretches of riverfront sat largely abandoned while pollution seeped deeper into the soils and surrounding water.

In 1972, the Clean Water Act established ambitious new pollution regulations, with the goal of making every water body in the country safe for active recreation. Since then, the City has dedicated $35 billion to improving the quality of our waterways.

In dry weather, virtually all of New York City's sewage is treated. During storm events, the added volume of storm water results in Combined Sewer Overflows, or CSOs. CSOs still occur during heavy storms, but the number of these events have dropped dramatically. New infrastructure upgrades have enabled us to capture more of the overflow, increasing our capture rate from 30% to 70% since 1980.

Today, our rivers are experiencing a renaissance. Every year, dozens of races are held in the Harbor which is cleaner than it's been in decades. There are fishing stations set up along the piers of Queens West, kayaking along the Hudson, and plans for canoeing at the new Brooklyn Bridge Park. *(See maps on following page: Tributary Water Quality)*

Kayakers on the Hudson River

Source: NYC Department of Environmental Protection; Hydroqual

As we accelerate the reclamation of former industrial land along the riverbanks, with more than 60 miles of waterfront development underway, the need to improve water quality itself has become more important than ever.

There are two primary areas that require attention. First, significant parts of the harbor estuary, including the Hudson and East Rivers, are periodically forced to close for swimming as a result of heavy rains and resulting CSO events.

Our second, more intractable problem is the series of man-made canals, like the Gowanus, that were designed largely to ease ships more deeply into the city. The majority of these tributaries are embedded within neighborhoods before coming to a dead end. Without a flow of water, they lack the natural currents that would flush out pollutants. Oils, sewage, and toxins simply sink to the bottom, where they have been piling up for decades. Today, more than 52% of these canals and creeks are unavailable for public recreation because their contamination levels are too high.

The problem of CSOs can largely be traced to the original design of our sewer system: 60% of our network captures rain water and sewage in the same pipe. During dry weather, treatment plants can easily handle all of the city's waste. In heavy rain events, our treatment plants can double their dry weather capacity, but that is sometimes not enough to avoid CSOs. The extra flow—which is 90% storm water—is released, untreated, into the surrounding water. These CSOs are sometimes caused by as little as a tenth of an inch of hard rain. This phenomenon is not unique to New York City. Municipalities throughout the United States, particularly the older communities of the Northeast and Midwest, are served by combined sewer systems. However, the City recognizes the need for substantial improvements and requires creative solutions. *(See map on facing page: Wastewater Drainage Areas and Combined Sewer Overflow Locations)*

Although our water quality has improved over the past few decades, progress has started to slow as conditions across the city change. Natural areas and permeable surfaces absorb storm water and help prevent even more sewage from pouring into our waterways. But these areas are disappearing rapidly. Over the last century, the city's wetlands shrank by almost 90%. Even in the last 25 years, we lost more than 9,000 acres of permeable surfaces. *(See map on facing page: Vegetative Cover Change)*

To account for this shifting landscape and to continue making progress toward our goal, we must be more ambitious in our approach to reducing CSO discharges.

Today we capture 70% of CSOs before they enter the surrounding waterways, but other cities are doing better. Boston and Chicago, for instance, have been able to approach rates of 90%. To begin closing this gap we must complete large capital improvements that will expand the capacity of our treatment plants and sewers.

Perhaps even more importantly, we must also prevent water from entering our combined sewer system in the first place. That means pursuing proven water retention and diversion strategies, while piloting a range of promising solutions, often called Best Management Practices (BMPs), that harness natural processes to retain, detain or cleanse the water. These BMPs tend to be less expensive and help achieve multiple environmental ends. For example, trees absorb water, but they also cleanse the air, create a more welcoming public realm, and help reduce global warming emissions.

By overcoming the institutional barriers that have prevented the implementation of BMPs to date and rigorously assessing their performance in the city, we can prioritize sound investments in the coming decades.

Our Plan

We are one of the world's great waterfront cities: a series of islands and archipelagos, with nearly 600 miles of waterfront. But we are just beginning to rediscover our waterways as a source of recreation and inspiration.

To fulfill their potential, we must address the waterways themselves, particularly our most polluted tributaries.

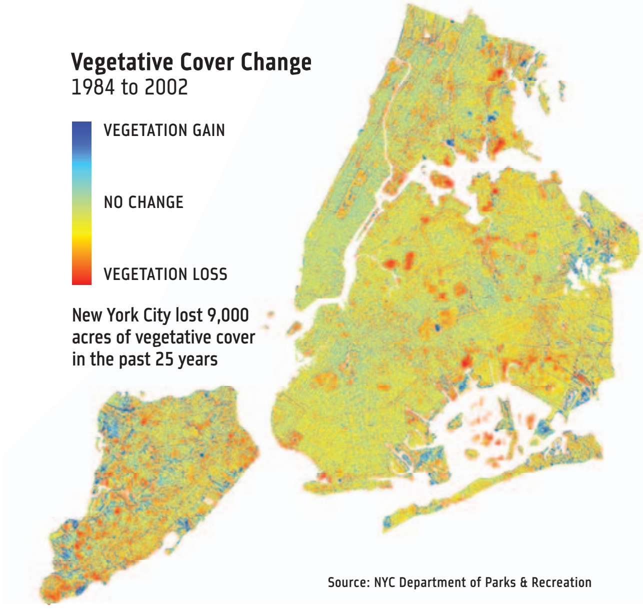
Achieving our goal will require a balance between infrastructure solutions and more natural strategies.

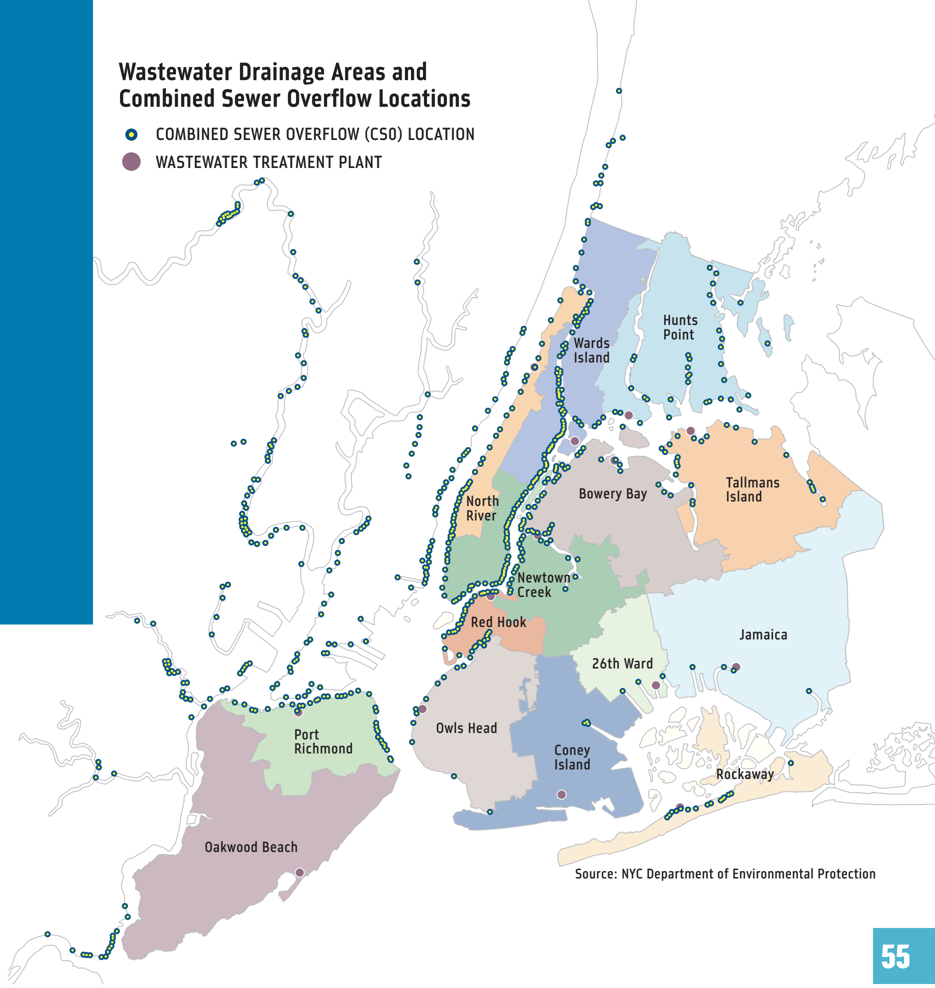
That's why we will upgrade our wastewater treatment facilities, while integrating separated storm sewers into new development projects like Hudson Yards. We will also expand efforts to harness our environment as a natural water filter. That includes expanding our pioneering Bluebelt system, adding nearly one million more trees, and landscaping our streets.

But today we have an opportunity to go even further—we will not only plant trees, but pay more attention to the design of the pit they are planted in to maximize its ability to absorb water. We won't just increase plantings along streets, but study the design of the surrounding median and sidewalk so that it can collect and store water more easily.

These BMP strategies are not fully proven in New Yok City—but their potential could be enormous. A new Inter-agency Best Management Practices Task Force will explore the possibilities for incorporating these initiatives into various planning processes, starting with a range of pilot programs.

Through the initiatives outlined below, we will improve public access to our tributaries from 48% to over 90%; and we will ensure that our larger water bodies are less susceptible to storm-generated pollution. As BMPs and other resources take effect, we will increasingly be able to use some of our waterways for swimming as well.





These policies are expected to improve the CSO capture rate to more than 75% as well as decrease bacterial levels and increase dissolved oxygen—a key indicator of aquatic health. That will ensure that over 90% of the city's tributaries, and 98% of our waterways are open for recreational use.

By making smart choices in the coming decades, we can restore our city's natural ecology and recreational use of our waterways.

Our plan for water quality:

Continue implementing infrastructure upgrades

1 Develop and implement Long-Term Control Plans
2 Expand wet weather capacity at treatment plants

Pursue proven solutions to prevent stormwater from entering the system

3 Increase use of High Level Storm Sewers (HLSS)
4 Capture the benefits of our open space plan
5 Expand the Bluebelt program

Expand, track, and analyze new Best Management Practices (BMPs) on a broad scale

6 Form an interagency BMP Task Force
7 Pilot promising BMPs
8 Require greening of parking lots
9 Provide incentives for green roofs
10 Protect wetlands

Continue implementing infrastructure upgrades

In the 35 years since the Clean Water Act was passed by Congress, we have had the opportunity to evaluate the success rates of a range of infrastructure solutions. The impacts of pumping stations, wastewater treatment plants, and larger storage tanks have all been measured and quantified.

The successes are well-documented across the nation. Here in New York, before 1972, the Hudson River contained bacteria 170 times the safe limit; today it hosts swimming races around Manhattan. In its industrial years, Ohio's Cuyahoga River actually caught fire 10 times. But by 1998, 60% of American lakes, rivers, and shorelines were considered clean enough for swimming and fishing.

As knowledge has improved, the Federal government has adapted its legislation to target one of the last remaining areas for improvement. Today, the greatest obstacle to enhanced water quality is the overflow of untreated sewage into our waterways during rain storms. That's why in December 2000, Congress adopted an amendment to the Clean Water Act requiring municipalities to develop a Long-Term Control Plan (LTCP) to mitigate the impacts of CSOs.

CASE STUDY
Nitrogen

In addition to Combined Sewer Overflows (CSOs), pollutants from brownfields and storm water runoff, there is one more challenge to maintain the quality of our waterways: nitrogen. Discharges from wastewater treatment plants have been identified as a factor in recurring water quality problems in western Long Island Sound and Jamaica Bay.

As a result, State regulators restricted nitrogen levels in the wastewater plant effluent for these waters. Although nitrogen levels don't impact our ability to use the waterways recreationally, nitrogen—and its host compound ammonia—deplete dissolved oxygen in the receiving waters, inhibiting fish habitation.

Traditional nitrogen removal processes require large, capital upgrades and high operating costs. To avoid these costs, the City's Department of Environmental Protection (DEP) will explore and pilot several emerging technologies, which will supplement existing infrastructure and allow for the cost-effective removal of nitrogen. Examples of the technologies DEP will pilot include SHARON, ARP, and Biolysis "O."

- SHARON is a more energy-efficient nitrogen removal process compared to traditional methods
- ARP use ion filters to remove nitrogen
- Biolysis "O" uses ozone to destroy bacteria that produce nitrogen

These pilots, along with a Harbor Estuary Study led by the U.S. Environmental Protection Agency, will inform DEP's future efforts to remove nitrogen from wastewater.

INITIATIVE 1

Develop and implement Long-Term Control Plans

We will complete Long-Term Control Plans for all 14 New York City Watersheds, as required by law

In the upcoming months, we will submit the Waterbody/Watershed (WB/WS) Plans for 18 waterbodies to the State's Department of Environmental Conservation (DEC), detailing strategies for CSO reduction. These plans will rely on proven infrastructure upgrades to expand the capacity of our wastewater treatment plants, by constructing holding tanks, and optimizing our sewer infrastructure. The WB/WS plans will be integrated into the 14 watershed-specific Long-Term Control Plans (LTCP) also mandated by DEC.

Already, the City's Department of Environmental Protection (DEP) has begun some of these improvements; today, all of our plants are equipped to handle twice the volume of flows that would occur on a normal day of dry weather. Other strategies will include aeration, which involves pumping oxygen into waterways to encourage aquatic life; destratification facilities, which churn areas of water to ensure that oxygen is being evenly distributed; sewer optimization, which maximizes the amount of wastewater conveyed to the treatment plant; force mains, which divert CSOs from tributaries with no natural flushing systems into larger water bodies that can assimilate the sewage more easily; and dredging, which will begin to remove decades of bio-solids that have settled onto the bottom of our rivers and tributaries.

Preliminary projections estimate that the implementation of the LTCPs will result in an increase in CSOs captured from approximately 70% to 75%. In addition, the plan will specify other enhancements, including reducing floating debris such as bottles, bags, and other trash through netting facilities.

INITIATIVE 2

Expand wet weather capacity at treatment plants

We will reduce CSO discharges by more than 185 mgd during rainstorms

In addition to upgrading our treatment facilities to reliably comply with existing and emerging regulatory requirements, we are also maximizing the volume of water these treatment plants can process during storms. *(See case study: Nitrogen)*

Currently, all treatment facilities are required to treat twice the amount of flows that would occur on a normal day without rain. But at Newtown Creek, the 26th Ward, and Jamaica Waste Water Treatment Plants, we will be expanding the wet weather capacity. This should reduce the CSO discharges in these sewersheds by more than 185 million gallons per day (mgd) during rainstorms.

Pursue proven solutions to prevent water from entering system

We cannot rely solely on hard and centralized infrastructure upgrades to improve the quality of our waterways. In addition to working to capture more CSOs at the "end of the pipe," after it has already entered our system, we have also begun pursuing a range of proven strategies to keep storm water from entering our combined sewer system at all.

INITIATIVE 3

Increase use of High Level Storm Sewers (HLSS)

We will convert combined sewers into HLSS and integrate HLSS into major new developments, as appropriate

High Level Storm Sewers (HLSS) are one strategy for alleviating pressure on the combined sewer system and limiting CSO events. HLSS are designed to capture 50% of the rainfall, before it enters our pipes, and divert it directly into the waterways through permitted outlets, reducing the volume of flows that pass through the treatment plants and the combined sewer system. In addition, they alleviate street flooding in problematic areas.

CASE STUDY
Hudson Yards

Today, the long swath of Manhattan's Far West Side has a coarse, industrial feel. Stretches of empty streets border open railyards. There is almost no green space.

The recent rezoning of Hudson Yards will transform the area into one of the most dynamic neighborhoods in New York, with 24 million square feet of office, hotel and retail space, and 13,500 units of housing. The expansion of the 7 line will connect midtown to a reconceived convention center, spurring the reclamation of 300 underused acres in the heart of Manhattan.

By 2025, the population of Hudson Yards will more than double. Under a traditional development scenario, the project would bring new jobs, tax revenues and reinvigorated public space, but also generate 43.5 million gallons of Combined Sewer Overflows (CSOs) per year.

That's why the City has developed a comprehensive strategy to absorb growth while protecting the environment.

With each new development, New York City is required to reevaluate our sewer system accordingly. But in Hudson Yards, we won't simply be adding seven new sewers to the 6,700 miles already snaking through the city.


Hudson Yards Redevelopment Area

Credit: Hudson Yards Development Corporation

Five of the seven new sewers will be High Level Storm Sewers (HLSS) which can reduce the amount of storm water entering the system by 50%.

Before storm water even reaches the sewers, it will loiter on the buildings themselves. Specially designed drainage systems will release the water in spurts, through regulated downspouts that control the flow of water.

And as a third defense against CSOs, Hudson Yards plans include at least 66 acres of green, open space on rooftops and in parks. A green roof has the potential to reduce annual runoff by 50%.

These strategies will significantly limit, and possibly eliminate, CSOs generated from Hudson Yards. In employing such environmentally responsible strategies, New York City can simultaneously grow, as we need to, and protect our resources, as we must.

But we cannot simply install these separated sewers at every site. Since they require a separate pipe and outlet to a waterbody, this strategy is only cost-effective for developments near the water's edge.

Therefore, the City will analyze each site carefully on a case-by-case basis to determine the appropriateness of this strategy. One area that is clearly a good candidate is the Hudson Yards area. Other developments that may also be appropriate for HLSS or for the complete separation of their sewer infrastructure include the Bronx Terminal Market, Queens West development, Gateway Estates in Brooklyn, and the Columbia University expansion in Manhattanville. *(See case study above: Hudson Yards)*

INITIATIVE 4

Capture the benefits of our open space plan

We will expand the amount of green, permeable surfaces across the city to reduce storm water runoff

Green spaces act as natural storm water capture and retention devices. The 9,000 acres of vegetative cover lost between 1984 and 2002 could have absorbed, according to an analysis by the U.S. Forest Service and the City's Department of Parks & Recreation (DPR), 243 million gallons for every inch of rain. Trees capture rainfall on their leaves and branches and take up water through their roots, and release significant volumes to the air through evaporation. In all, the DPR estimates that city street trees capture 870 million gallons of stormwater each year. At least four million gallons of water are absorbed by soil around street trees during each storm event.

Over the next 25 years, we will undertake 40 new Greenstreets projects every planting season, bringing the citywide total to more than 3,000 by 2030. A one-acre Greenstreet can hold about 55,000 gallons of storm water. The existing total acreage of Greenstreets sites in New York City is almost 164 acres, which translates into nine million gallon capacity citywide. With an additional 40 new Greenstreet projects, covering 75 acres, the capacity to hold stormwater will increase by four million gallons.

In addition to increasing stormwater storage through Greenstreets, we will increase the number of trees in the city by one million. New designs for the tree pits could significantly increase this capacity as well.

INITIATIVE 5

Expand the Bluebelt program

We will expand the Bluebelt in Staten Island and other boroughs, where possible

In many areas of Staten Island, development preceded the full build-out of the sewer system. For example, some residents of South Richmond still rely on on-site septic systems for sanitary waste disposal. During periods of rain, several areas in this region routinely experience localized flooding and septic tank failures. To address these concerns, in 1997, the DEP created the Staten Island Bluebelt as a natural solution. *(See case study on following page: Reshaping the Urban Environment)*

Nearly 36% of Staten Island's precipitation drains into the current Bluebelt system which covers nearly 10,000 acres. Over the next 25 years, we will seek to add an additional 4,000 acres in the borough, spread across South Beach, New Creek, and Oakwood Beach.

To date, the Bluebelt program has saved the City an estimated $80 million in infrastructure costs, and it has also saved homeowners money in flood damage. In addition, property values in the immediate vicinity of the completed Bluebelt drainage corridors have consistently appreciated, enhancing the city's tax

CASE STUDY

Reshaping the Urban Environment

A New York City planner pioneered the Bluebelt system—more than a century ago.

Nearly three decades after designing Central Park, Frederick Law Olmsted submitted an application to Boston's City Council for the Fens portion of the Emerald Necklace, a collection of waterfront parks circling the Charles River.

It was not an obvious site for new public space. Malodorous fumes from a steady influx of sewage wafted into the surrounding communities. Frequent flooding sent waste and water spilling out of the rivers and into the surrounding land.

Olmsted had been retained to design a park; he ended by pioneering a revolutionary approach to waste management. Arranging wetlands and plants to create storage basins, he concealed a network of retention ponds, drainage systems, and natural filtering within a beautiful, sprawling wilderness of bridle paths, park drives, and boating along the waterways.

By preserving the natural environment, providing a recreational resource, and preventing sewage and flooding from impairing the quality of Boston's waterways, Olmsted integrated ecological and sanitary benefits within a stunning public resource.

Those are principles underpinning New York's Bluebelt system, which spans nearly 10,000 acres in Staten Island

The Bluebelt program is designed to leverage the natural drainage corridors including streams, ponds, and other wetland areas to convey, treat, and detain stormwater prior to its release into the harbor.

To enhance these natural functions, the Department of Environmental Protection has reshaped the natural environment to become a more effective holding tank; reengineering a wetland in the shape of a snake to slow down water flow; planting vegetation to absorb and filter impurities out of the water system; and positioning rocks so that the water bubbles over it, thereby adding air into the streams.

By 2030, we will expand this system approach into other boroughs, striking Olmsted's balance between parkland and environmental benefits.

base. The program has demonstrated that wetland preservation can be economically prudent and environmentally responsible. In 2005, the EPA recognized the leadership of the Bluebelt by awarding it an Environmental Quality Award.

Our ability to replicate this process across the city is limited due to our dense development. However, we do plan to expand the use of Bluebelts outside of Staten Island, where possible:

- **Udalls' Cove and Brookville Boulevard West:** We will install basins to catch storm water from the surrounding neighborhoods in Queens before it travels into Little Neck Bay and Jamaica Bay.
- **Springfield Lake:** We will dredge this 3.5-acre lake, located within Springfield Park in southeast Queens, and enhance it with new tidal marshes and other drainage-related improvements. This will solve ongoing flooding problems, while decreasing algae blooms in the lake and improving water quality in Jamaica Bay.
- **Baisley Pond:** This is a 40-acre freshwater pond in south Jamaica, Queens. This project will solve flooding problems and improve ground water conditions by incorporating natural water retention and filtering strategies.

The City will also assess opportunities in Van Cortland Park, Oakland Ravine, Sailor Snug Harbor, Riverdale Park, Seton Falls Park, and Alder Brook in Riverdale in the Bronx.

Expand, track, and analyze new Best Management Practices (BMPs) on a broad scale

Greenstreets and Bluebelts have proven results; their effectiveness has been tracked and monitored across the city. But a range of emerging strategies that enhance the ecological environment while naturally cleansing our waterways have begun to be tested and installed across the United States. Cities from Seattle to Chicago have begun integrating these softer solutions on a broad scale into their planning and development, with exceptional results.

Within New York City, financial, informational, and institutional barriers have hindered our ability to experiment with these best practices. Our dense environment has also made spaces difficult to identify. But the opportunities are there.

Long-Line Mussel Farm
Valbodalen, Lysekil, Sweden

INITIATIVE 6

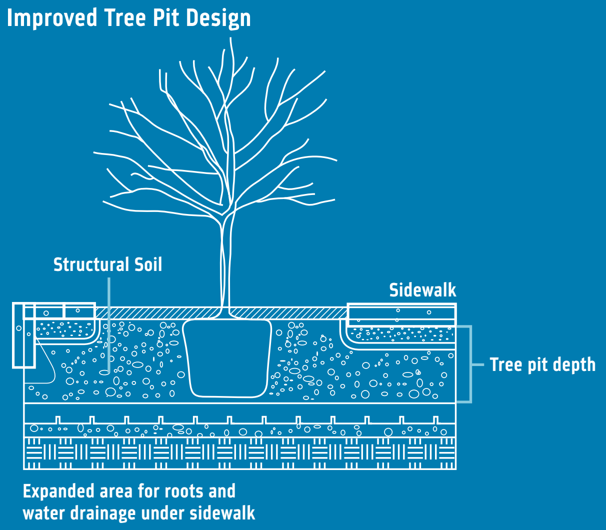
Form an interagency BMP Task Force

We will make the reduction of CSO volumes and other environmental issues a priority for all relevant City agencies

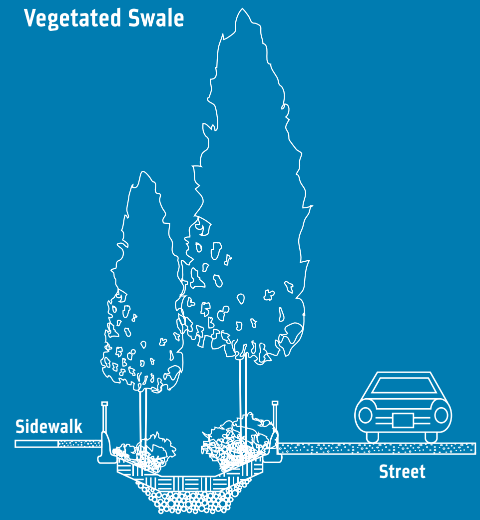
Multiple agencies, including but not limited to the Departments of Transportation, Parks & Recreation, Buildings, and City Planning are responsible for infrastructure or development that has direct impacts on pollution in our waterways. But water quality is seldom considered during the decisions and activities these agencies undertake on a daily basis. Every time the City plants a tree, a contractor builds a house, or an agency constructs a road, there is little opportunity or incentive to integrate water quality measures. This has created barriers to our ability to assess and develop comprehensive policies for the deployment of BMPs on a citywide basis.

That's why we will establish the New York City Interagency BMP Task Force which will bring together all relevant City agencies to analyze ways to incorporate BMPs into the design and construction of projects. This year, the Task Force will pilot three of the most promising BMPs followed by a series of additional pilots across New York and measure the results. After 18 months, the Task Force will announce a plan to integrate the most successful BMPs on a larger scale. The recommendations of this plan will not only reduce CSO volumes, they will also help cool the city and reduce construction and demolition waste creation by City agencies.


Credit: Pia Norling



Source: NYC Department of Environmental Protection



Source: NYC Department of Environmental Protection

The focus will be on greening the public right-of-way, developing BMPs on City-owned land, improving environmental performance of open space, and creating strategies to promote BMPs on private development.

The Task Force and its working groups will be coordinated by the Office of Long-Term Planning and Sustainability with participation from the Departments of Environmental Protection, Design and Construction, Transportation, Citywide Administrative Services, Parks & Recreation, Health and Mental Hygiene, City Planning, and Buildings, and the Office of Management and Budget.

The Task Force also will create a set of performance metrics to be published annually. Possible metrics include market penetration of BMPs on private development, acres of permeable surfaces, storm water capture rates, and improvement in water quality such as reductions in fecal-coliform levels and increases in dissolved oxygen. It will develop a process to monitor, assess, and report agency and BMP performance, as well as a process to reevaluate and modify the report every two years.

INITIATIVE 7

Pilot promising BMPs

We will immediately pilot various BMPs to monitor and assess their performance in New York City neighborhoods

The Task Force will begin by piloting the following three BMPs, selected for their feasibility and proven effectiveness in other programs across the United States:

- Create a mollusk habitat pilot program
- Plant trees with improved pit design
- Create vegetated ditches (swales) along highways

Within the next two years, the City will also pilot other BMPs, including developing storm water BMPs for ballfields along the Bronx River, using vacant public property to create urban storm water systems that offer greater infiltration and protect wildlife habitat. We will also study the treatment and capture of storm water from large parking lots using vegetation and infiltration through pilots in the Jamaica Bay Watershed.

We will introduce 20 cubic meters of ribbed mussel beds

When Henry Hudson first sailed through New York's Harbor, half the world's oysters were alive beneath him. Approximately 350 square miles of oyster beds lined the surrounding harbor estuary, removing impurities from our water free of charge. At one time, oyster trade supported the city's early mercantile economy. But over-harvesting and raw sewage led to the loss of the oyster population by the early 20th century. While scattered populations of oysters and other mollusks, including mussels, can be found in the city's harbor estuary, there are no longer enough to significantly improve the city's water quality. The loss of mollusks has resulted in the loss of one of nature's finest filtration systems.

To once again reap the benefits of these natural bio-filters, the City will create a habitat and reintroduce 20 cubic meters of ribbed mussel beds. Ribbed mussels present little safety risk because they are not eaten. Through this pilot, we will test the capability of mollusks to improve the water quality of our tributaries around combined sewer overflow outlets. Our first location will be Hendrix Creek, a tributary to Jamaica Bay, which is located next to the 26th Ward Wastewater Treatment Plant, at a cost of $600,000. *(See photo on facing page: Long-Line Mussel Farm)*

According to the Gaia Institute, 20 cubic meters of ribbed mussels should be able to filter all the effluent, 65 mgd, from the 26th Ward Wastewater Treatment Plant. But because this premise has not been tested recently in New York City, we can't confirm that this level of performance is possible. Therefore, we will test the solution in order to determine whether or not it should be expanded.

The study will evaluate to what extent mollusks can grow in our waterways, the mollusks densities necessary to address urban pollution and nutrient problems, and the costs associated with achieving various levels of water quality improvement. The demonstration habitat will be monitored, documented, and replicated as appropriate.

We will plant trees with improved pit designs

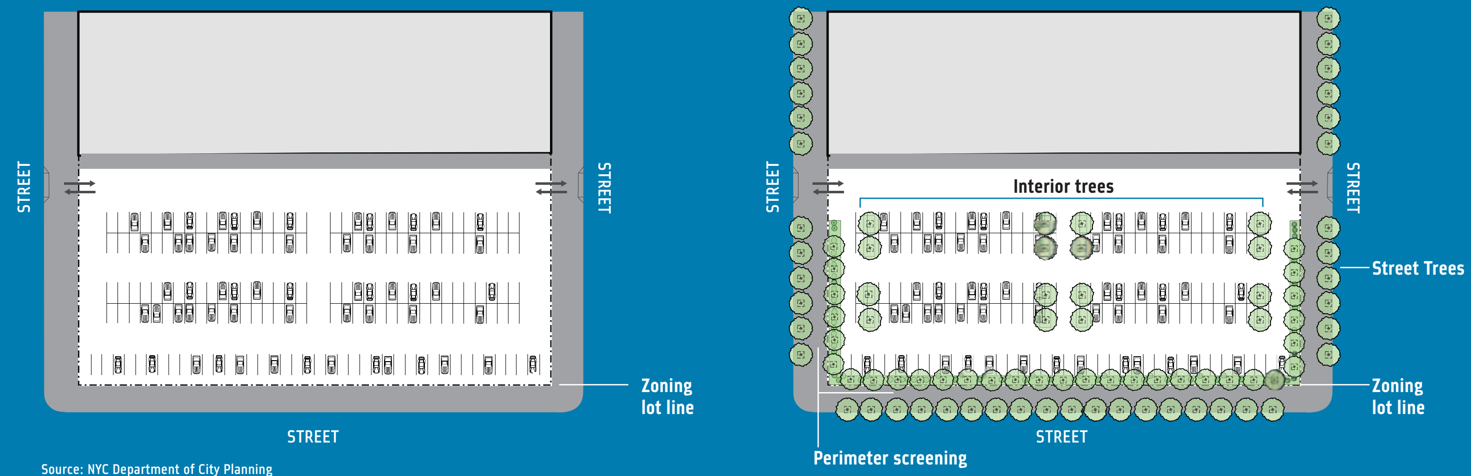
New York City street trees are often planted in small confined pits—commonly four feet by four feet square and 20 feet apart—with densely packed soil. These characteristics restrict roots, blocking their ability to absorb oxygen, nutrients, and water. In addition, these confined pits limit the amount of storm water that can be captured. *(See illustration above: Improved Tree Pit Design)*.

Trees planted in cramped pits can either die or damage the sidewalk as they grow. Improving the design and size of the tree pit will confer the dual benefits of improving the chances for the tree's survival and retaining storm water.

Installing underground storage areas and using structured soils will expand the volume of storm water captured by these redesigned pits. Structured soils have more air space and can be used in trenches between trees, under sidewalks or under porous pavement.

Greening Standards for Parking Lots
Under current zoning

Under proposed zoning



Source: NYC Department of City Planning

DEP, in partnership with the Gaia Institute and DPR, will pilot in the Jamaica Bay watershed five enhanced tree pits with below-grade water catchments to increase storm water infiltration. The pilot program will include three years of monitoring and data collection with annual reports and a final project summary of findings. If successful, this technology will be recommended for widespread application during future sidewalk and road reconstruction.

We will create vegetated ditches (swales) along parkways

Vegetated ditches (called swales) are linear, dry ditches designed to receive runoff and slowly move rain to an outfall point along our waterways, absorbing water along the way. They are especially effective when located adjacent to parking lots, streets, parkways or highways or when used as a median. In addition to storing direct rainfall and reducing storm water volumes entering the combined sewer system, swales provide natural cleansing of runoff through the soil and vegetation. *(See illustration on previous page: Vegetated Swale)*

But there are challenges associated with swale construction, including finding enough space given the city's density. Nevertheless, incorporating swales into the redesign of roadways may prove less expensive than constructing traditional piped drainage systems. For example, Seattle's pilot Street Edge Alternatives Project (SEA Streets) is designed to provide drainage that more closely mimics the natural landscape instead of traditional piped systems. Two years of monitoring show that SEA Streets has reduced the total volume of storm water from the street by 99%.

INITIATIVE 8

Require greening of parking lots

We will modify the zoning resolution to include design guidelines for off-street parking lots for commercial and community facilities

Much of the urban landscape is impervious, including buildings, roads, and parking lots: this means water cannot trickle back into the ground, but instead flows off the hard surfaces into our sewers, putting additional strain on our infrastructure. As described above, there are strategies for reducing this runoff, such as tree plantings, other landscaping projects, porous pavement technology, and underground water storage. (*See renderings: Greening Standards for Parking Lots)*

The addition of trees and landscaping to parking lots offer a feasible and cost-effective means for the private sector to work with the City in curbing storm water runoff and potentially decreasing CSO events. Increased landscaping, along with storm water detention and retention, could slow down the rate at which water enters the sewer system; that will enable New York's combined sewer system to treat a higher percentage of storm water. Vegetated and gravel buffer strips along the edge of landscaped areas or surrounding detention infrastructure can also help filter pollutants from water.

The City will modify the zoning resolution to require perimeter landscaping of commercial and community facility parking lots over 6,000 square feet as well as street tree planting on the adjacent sidewalks. Parking lots over 12,000 square feet would also be required to provide a specified number of canopy trees in planting islands within each lot. The intention of this proposal is to reduce the eyesore of large asphalt expanses while more effectively managing storm water runoff and helping to cool the air.

In addition to the zoning modification, the City will analyze the costs and benefits of integrating additional BMP's into parking lots. From these findings, we will create appropriate policy to improve storm water capture and storage for parking lots as part of the New York City Interagency BMP Plan.

INITIATIVE 9

Provide incentives for green roofs

We will encourage the installation of green roofs through a new incentive program

A green roof partially or completely covers a building roof with plants. It can be a tended roof garden or a more self-maintaining ecology. Similar to swales and tree pits, green roofs can reduce the volume of runoff by absorbing or storing water, and other natural processes, in addition to cooling the air. According to a recent study by Riverkeeper, a 40-square-foot green roof could result in 810 gallons of storm water captured per roof per year. If each installation cost $1,000 then a $100,000 dollar investment could lead to over 81,000 gallons of stormwater captured. *(See illustration on facing page: Components of a Typical Greenroof)*

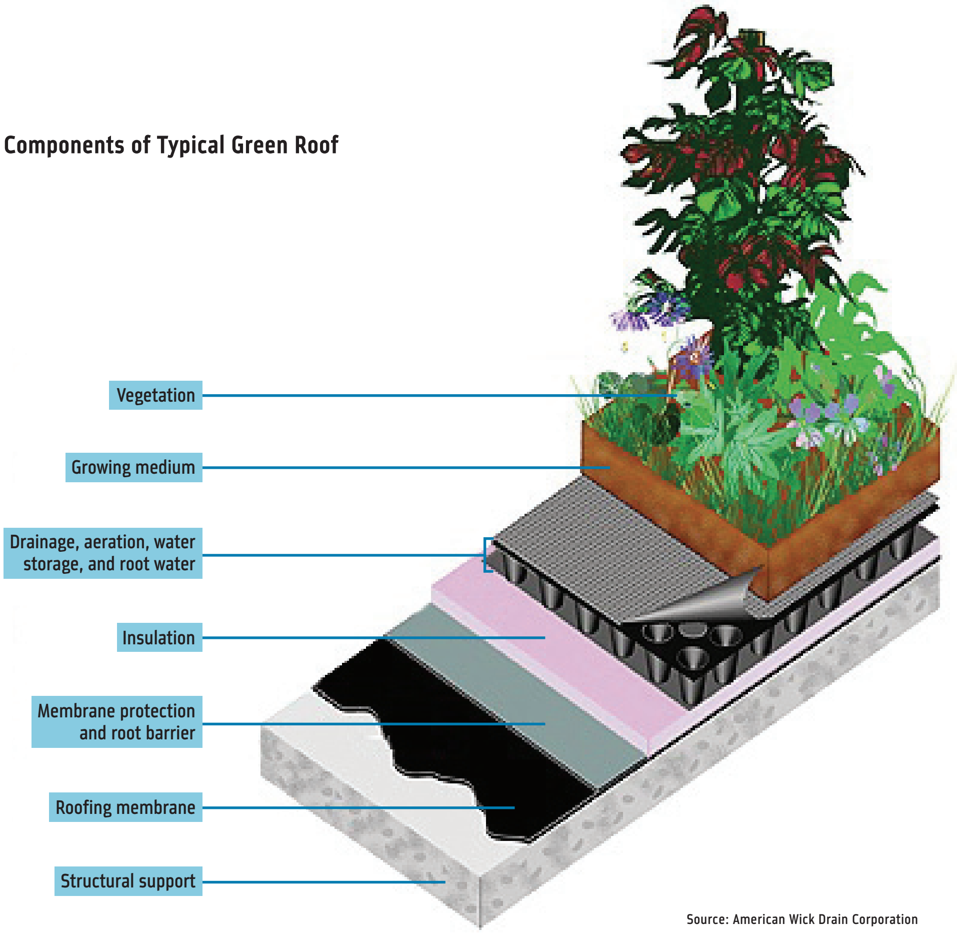
The City is developing four residential and two commercial pilots to analyze the potential cumulative benefits of green roofs on the city's combined sewer system. The expected cost for each is $100,000 for design and $1.3 million for construction and equipment.

In order to achieve direct CSO benefits, a large number of green roofs would be required within a concentrated area—an expensive undertaking. Therefore, incentives are necessary to off-set some of these costs.

The City currently provides incentives for the private development of two BMPs through DEP's Comprehensive Water Reuse Program. This program offers buildings that install "blackwater" or "greywater" systems a 25% discount off their water and sewer charges. "Blackwater" systems capture and treat sanitary wastewater and recycle it within the building for non-potable use. "Greywater" systems capture used water from washing machines, dishwashers, and showers and reuse that water for toilets or other non-potable applications.

Starting in 2007, the City will begin providing incentives for green roofs, as well. New York City will support the installation of extensive green roofs by enacting a property tax abatement to off-set 35% of the installation cost of a green roof. The pilot incentive will sunset in five years, when it will be reassessed for extension and inclusion of other technologies.

Components of Typical Green Roof



Source: American Wick Drain Corporation

INITIATIVE 10

Protect wetlands

We will assess the vulnerability of existing wetlands and identify additional policies to protect and manage them

Wetlands play an important role in maintaining and even improving our water quality. They filter and absorb pollutants from storm water runoff, lower high levels of nutrients, such as nitrogen and phosphorus, and trap silt and other fine matter to reduce cloudiness in local waterways. In addition to water quality improvements, they provide flood protection, erosion buffers, important wildlife habitat, public enjoyment, and they sequester CO_2. But we have lost 86% of our wetlands in the last century. Some of this loss is due to environmental change, such as rising sea level; but the majority of it was due to development.

To further wetlands protection in New York City, in 2005 the City Council sponsored, and Mayor Bloomberg signed Local Law 83 which formed the Wetlands Transfer Task Force to assess available City-owned properties that contain wetlands. By September 30, 2007, the Task Force is required to submit its conclusions and recommendations to the Mayor and Council Speaker on the feasibility of transferring such wetlands to the Department of Parks & Recreation and to other agencies that can protect them against loss.

State regulations provide a framework for local governments to adopt their own freshwater wetland protections, in order to strengthen the New York State Freshwater Wetlands Act. Many other municipalities also regulate their tidal wetlands.

We will launch a study to identify gaps, or areas not effectively addressed under existing Federal and State laws. Specifically, we will assess where existing regulations fall short of protecting New York City's remaining wetlands. This assessment will be the first step in the development of a comprehensive policy to protect and manage wetlands in the city.

Conclusion

In the coming decades we must challenge ourselves to creatively reclaim our waterways for public use. In Gowanus, the Pump Station will be upgraded to move 50% more water to the closest treatment plant; a new force main will move the CSO overflow directly to the treatment plant, instead of traveling a more circuitous route; a modernized flushing tunnel will be able to process 40% more water, enabling the tunnel to bring more dissolved oxygen to the canal's water, encouraging the growth of aquatic life.

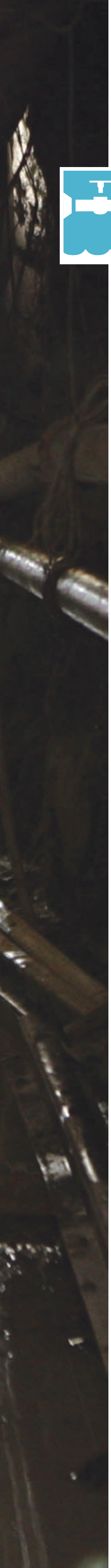
By applying a range of strategies to water bodies across the city, we can reclaim them for New Yorkers. It would not be the first time.

In the 1860s, the City opened 15 pools along Manhattan's waterfront, all open to flowing river water. Despite the pools' popularity, the presence of raw sewage in the waterways soon caused them to be closed. With the city's waters now cleaner than at any time in half a century, it is time to revive ideas like these in a 21st century form.

That means exploring possibilities such as creating permanent pools along our rivers. The structures could be supported by piers, which in turn, could be designed as habitat for mollusks and other life forms, enriching the ecology of the waters and cleansing them. This balance between ecology, recreation, and water quality will underpin our efforts as we continue reclaiming our waterways for the next generation of New Yorkers.

Water Network

Credit: Ozier Muhammad/
The New York Times



Develop critical backup systems for our aging water network to ensure long-term reliability

In 1835, a fire engulfed Lower Manhattan for 24 hours. With the rivers frozen, more than 700 buildings burned to the ground.

The blaze made the need for a new water supply inescapable. New Yorkers accelerated construction of the original Croton System, which would open eight years later. Over the following decades, we added two more watersheds, determined not to make the same mistake again. But though our supply has continued to stay ahead of our population growth, today we face a new challenge.

Growth is no longer our greatest risk. New Yorkers use 1.1 billion gallons a day (bgd), but we are far from reaching the system's capacity. In fact, in the 1980s, our system supplied as much as 1.6 bgd. At our current usage rate, and as citywide conservation efforts continue to succeed, 900,000 more people would only raise our total to a still-manageable 1.3 bgd.

But though we have the luxury of a strong water supply, our supply *system* faces serious challenges. The majority of our network was constructed before World War II. While our two water tunnels are constructed in bedrock and expected to provide water service well into the future, neither has been closely examined since opening more than 70 years ago. And as development encroaches on the city's watersheds, protecting our reservoirs will require continued vigilance.

In order to continue providing reliable water to New York City residents and an additional one million people upstate, we face three fundamental questions: How can we continue to protect the quality of our water supply, ensure it arrives safely to the city, and then deliver it reliably to residents? *(See map on following page: New York City Watershed System)*

New York City's water supply

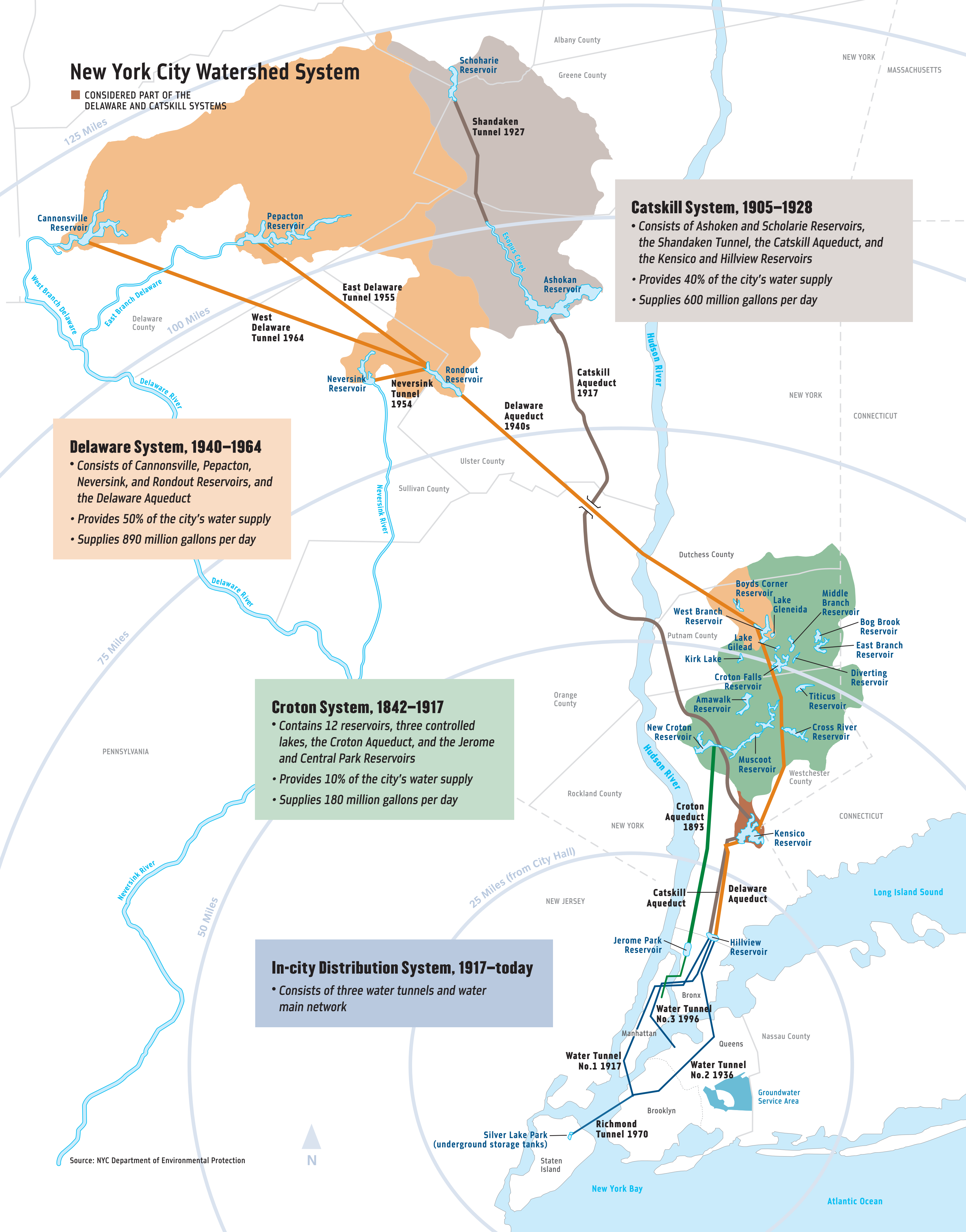
Fresh water is a relatively recent phenomenon for the city.

In the early 1800s, the only freshwater supply in New York City was a single, fouled lake in Lower Manhattan where New Yorkers washed clothes, disposed of waste, and dumped dead animals. The only other sources were 250 public wells sunk along streets traveled by horses, hogs, and other livestock. Water quality remained a serious public health problem for decades, as contaminated water contributed to cholera epidemics and other outbreaks that killed thousands.

In 1837, construction began on the Croton Water Aqueduct System, which brought fresh water from the Croton River through the Bronx and across the Harlem River to what is now the Great Lawn in Central Park. There a reservoir was built to supply water to homes across the city.

Over the next century, the city added two more upstate watersheds and constructed viaducts, creating the world's largest municipal water system. Today, our three watersheds sprawl across 2,000 square miles and contain 19 reservoirs and three controlled lakes, with a storage capacity of 550 billion gallons.

City Water Tunnel No. 3


New York City Watershed System
CONSIDERED PART OF THE
DELAWARE AND CATSKILL SYSTEMS
Catskill System, 1905–1928
• Consists of Ashoken and Scholarie Reservoirs, the Shandaken Tunnel, the Catskill Aqueduct, and the Kensico and Hillview Reservoirs
• Provides 40% of the city's water supply
• Supplies 600 million gallons per day
Delaware System, 1940–1964
• Consists of Cannonsville, Pepacton, Neversink, and Rondout Reservoirs, and the Delaware Aqueduct
• Provides 50% of the city's water supply
• Supplies 890 million gallons per day
Croton System, 1842–1917
• Contains 12 reservoirs, three controlled lakes, the Croton Aqueduct, and the Jerome and Central Park Reservoirs
• Provides 10% of the city's water supply
• Supplies 180 million gallons per day
In-city Distribution System, 1917–today
• Consists of three water tunnels and water main network
125 Miles
100 Miles
75 Miles
50 Miles
25 Miles (from City Hall)
Albany County
Greene County
NEW YORK
MASSACHUSETTS
Schoharie Reservoir
Shandaken Tunnel 1927
Cannonsville Reservoir
Pepacton Reservoir
Esopus Creek
Ashokan Reservoir
East Delaware Tunnel 1955
West Delaware Tunnel 1964
West Branch Delaware
East Branch Delaware
Delaware County
Neversink Reservoir
Neversink Tunnel 1954
Rondout Reservoir
Catskill Aqueduct 1917
Delaware Aqueduct 1940s
Hudson River
NEW YORK
CONNECTICUT
Delaware River
Ulster County
Sullivan County
Neversink River
Dutchess County
Boyds Corner Reservoir
Lake Gleneida
Middle Branch Reservoir
West Branch Reservoir
Bog Brook Reservoir
Putnam County
Lake Gilead
East Branch Reservoir
Kirk Lake
Diverting Reservoir
Croton Falls Reservoir
Titicus Reservoir
Amawalk Reservoir
Orange County
New Croton Reservoir
Cross River Reservoir
Muscoot Reservoir
PENNSYLVANIA
Westchester County
Rockland County
Hudson River
Croton Aqueduct 1893
CONNECTICUT
NEW YORK
Kensico Reservoir
Long Island Sound
NEW JERSEY
Catskill Aqueduct
Delaware Aqueduct
Jerome Park Reservoir
Hillview Reservoir
Bronx
Water Tunnel No.3 1996
Manhattan
Queens
Nassau County
Water Tunnel No.1 1917
Water Tunnel No.2 1936
Groundwater Service Area
Brooklyn
Richmond Tunnel 1970
Silver Lake Park (underground storage tanks)
Staten Island
N
Source: NYC Department of Environmental Protection
New York Bay
Atlantic Ocean

Protecting the quality of our water

Conditions in our watersheds have changed since we completed our major infrastructure in the 1960s and our strategies for protecting the purity of our water must evolve accordingly.

When construction on the Croton system began, about 95,000 people lived in the surrounding farmlands of Westchester and Putnam Counties. In the last 170 years, that number has increased to over one million. With population growth has come a resulting rise in fertilizer, sewage, and road salt, all of which run into the reservoirs. Moreover, stricter regulations have made achieving health standards harder than ever before; nonetheless, the City continues to meet and even exceed stringent Federal water quality standards.

Development has been less extensive west of the Hudson River, around the Catskill and Delaware watersheds. With natural systems protecting the purity of the water, the Catskill and Delaware systems remain unfiltered; of the 7,400 surface water supply systems in the United States, only 90 achieve this distinction—and only four other large cities.

Nevertheless, the Catskill Mountains are steep and the soil is clay. During and after extreme storms, when the natural settling in the reservoirs is insufficient to ensure that the water meets standards, we have responded by adding alum to the water, a chemical which bonds with the dust and dirt particles to remove them from the drinking water. In recent years, these storms have been increasing—a pattern that may only get worse as our climate becomes more volatile.

Getting the water to the city

Today, three main aqueducts carry water from our reservoirs toward the city—and the largest one is stable, but leaking. An estimated 15 to 36 million gallons per day (mgd) of water is being lost from the Delaware Aqueduct, or 4% of its daily volume peak flows. According to the professional engineering firm retained by DEP along with its own investigation, there is little immediate risk of failure of the tunnel. But to perform the repair work, the tunnel may need to be shut down and drained. That will make it necessary to increase reliance on other water supplies, and to implement stringent measures to encourage conservation. Under an extended shutdown of the aqueduct, water quality in the remaining reservoirs could potentially suffer as storage volumes are drawn down.

Distributing water within New York City

After the aqueducts carry the water near the city limits, two tunnels distribute it across New York City. Water Tunnel No. 1 was completed in 1917 and supplies most of Manhattan; Water Tunnel No. 2 opened in 1936, and serves the rest of the city. There is no back up for either, meaning we cannot shut them off to undertake any repairs.

Since 1970, we have been building Water Tunnel No.3; the second of four phases is scheduled to open in 2009. But this will only create a backup system for a section of the city. In order to achieve full redundancy, we must commit ourselves to complete the tunnel's final two stages.

Our Plan

We must be vigilant in order to minimize the impact of development on the Croton System, and preserve the natural filters of our Catskill and Delaware Watersheds to avoid expensive and energy-intensive filtration plants. By intensifying efforts to protect the water at its source, we can maintain the high standards New York City residents have enjoyed for 150 years.

We will create redundancy across our system so that we can begin repairing our aging tunnels and aqueducts—and be ready for any unusual weather shifts that result from climate change. We must generate a balanced strategy for reducing demand and for maintaining our most essential infrastructure.

Our plan for the water network:

Ensure the quality of our drinking water

1. Continue the Watershed Protection Program
2. Construct an ultraviolet disinfection plant for the Catskill and Delaware systems
3. Build the Croton Filtration Plant

Create redundancy for aqueducts to New York City

4. Launch a major new water conservation effort
5. Maximize existing facilities
6. Evaluate new water sources

Modernize in-city distribution

7. Complete Water Tunnel No. 3
8. Complete a backup tunnel to Staten Island
9. Accelerate upgrades to water main infrastructure

Ensure the quality of our drinking water

The health, welfare, and economic well-being of New Yorkers are all intrinsically linked to the quality of our drinking water. The City has taken aggressive steps to preserve our water quality, including planning for the building of a major water filtration plant in the Bronx for the Croton Reservoir system, and purchasing almost 80,000 acres to protect our watersheds from development. As a result, the Catskill and Delaware Watersheds provide some of the country's purest water.

But looking ahead, our reservoirs will require increasingly ambitious efforts to protect against threats such as development. To address those challenges, we have embarked on an aggressive program to preserve the quality of our drinking water.

WEST OF HUDSON
CATSKILL AND DELAWARE WATERSHEDS

INITIATIVE 1

Continue the Watershed Protection Program

We will aggressively protect our watersheds as we seek to maintain a Filtration Avoidance Determination for the Catskill and Delaware Water Supplies

Today, New York is one of only five major cities in the United States without a filtration plant processing its drinking water supply. Although the 1986 Safe Drinking Water Act mandated such facilities, New York—along with Boston, Portland, San Francisco, and Seattle—received a special waiver, known as a Filtration Avoidance Determination (FAD).

Since 1993, this waiver has been re-evaluated every five years; the Federal government issued New York City a draft 10-year FAD on April 12, 2007. In order to maintain our status—and meet more stringent Federal standards —we must continue to aggressively protect the purity of our water supply.

That is why we have developed a $462 million Watershed Protection Program that will target the biggest potential threats and enlist the help of the surrounding towns, workers, and residents.

The city owns nearly 114,000 acres within the watersheds, of which 74,000 are open to the public. Over the next decade, DEP will seek to purchase an additional 60,000 to 75,000 acres in key locations to protect even more of the land along the reservoirs.

Privately-owned forests and farms cover two-thirds of the watershed land area, which means the City must work with foresters to establish sustainable forest management plans and to ensure the overall health of these important buffers for the city's water supply. Already, we have worked with 560 landowners covering 100,000 acres to develop long-term forestry programs that we will implement in the coming years. Much of the developed land in the region is also filled with working farms; we will continue partnering with farmers to prevent fertilizers and manure from washing into the waterways.

We will also continue to work with local communities to repair an estimated 300 residential septic systems per year, and install new wastewater treatment systems in a number of communities. Finally, we must address the growing problem of turbidity that occurs during heavy storms and explore possible infrastructure changes to prevent sediment from entering our supply system.

We know that protection efforts can do more than preserve water quality—they can improve it. For example, prior to the enhancement of the city's watershed protection programs in the 1990s, the Cannonsville Reservoir suffered from massive algae blooms that frequently made the water undrinkable. Today, nutrient loading into Cannonsville has been reduced by 40%, reducing algae blooms and making Cannonsville a reliable source of drinking water. But we have to do more.

The Watershed Protection Program is costly. But compared to the costs of constructing and operating a filtration plant, as well as the environmental impacts of the additional energy and chemicals required by filtration, it is the most sustainable choice for New York.

INITIATIVE 2

Construct an ultraviolet disinfection plant for the Catskill and Delaware Systems

We will construct an ultraviolet disinfection facility to destroy disease-causing organisms in our upstate watershed

Although the Delaware and Catskill Water Supplies are not filtered, the EPA still requires us to treat the water with chlorine as an additional layer of protection. The chlorine kills tiny organisms and prevents the spread of waterborne diseases. But one pathogen, known as Cryptosporidium, has always been able to evade this treatment. This microscopic parasite is encased by a shell that enables it to survive outside of a body—and resist chlorine-based disinfectants. When it is ingested by humans or animals, it can lodge in an intestine and cause cryptosporidiosis, a diarrheal disease.

We will open the world's largest ultraviolet disinfection facility in 2012. The plant will use ultraviolet light to destroy the pathogens' abilities to reproduce. Because this is a physical process rather than a chemical one, there are no harmful impacts on humans or aquatic life. This plant will also enable us to scale back the use of chlorine pumped into the water, limiting the amount of disinfection by-products that are created.

The ultraviolet disinfection plant will be located at a 153-acre property in the towns of Mount Pleasant and Greenburgh in Westchester County. It will have the capacity to treat 2,020 mgd from the Catskill and Delaware systems.

CASE STUDY

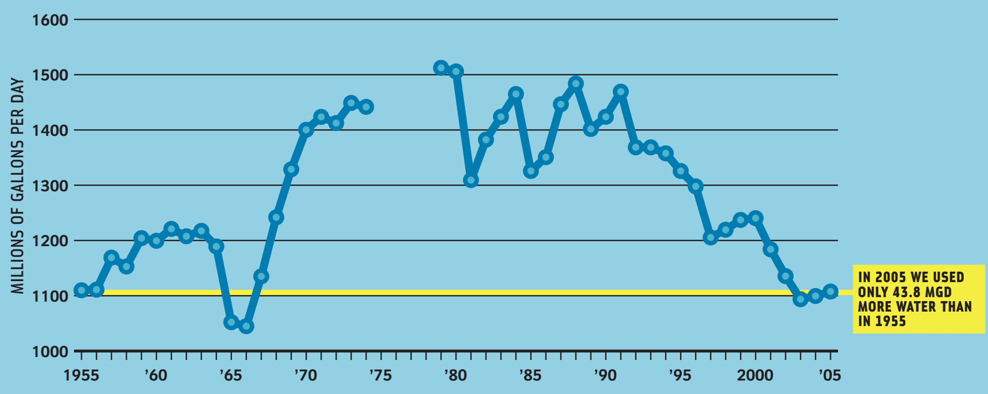
Toilet Replacement Program

The Delaware Watershed has prompted conservation efforts before. In 1949 and 1950, the City was hurrying to complete the system when a dry spell struck. The city announced "thirsty Thursdays," during which residents were encouraged not to shower or drink tap water. Volunteers known as "water conservation commanders" visited homes searching for leaky faucets and circulating gin replaced water at a Tiffany's window display.

But the City's most successful water conservation program came after a Federal law required that new toilets use only 1.6 gallons of water per flush. In 1994, the City launched the world's largest toilet replacement program, offering incentives for owners to retire their old toilets, which could use up to five gallons a flush. Shower heads and faucets were exchanged for low-flow fixtures at the same time.

When the program ended in 1997, more than 1.3 million toilets had been replaced across the city for $290 million—with projected savings of $350 million. The replacement project sliced the city's average water consumption by 70 to 90 million gallons of water per day (mgd), and decreased water usage by 37% in participating apartment buildings.

New York City Average Daily Water Consumption



Source: NYC Department of Environmental Protection

A decade later, technology for toilet efficiency and water conservation has advanced. When the program first launched, Robert Bellini, the owner of Varsity Plumbing and Heating in Queens, tested 150 models that met the efficiency standard. He only recommended four.

"Just because the toilet met minimum requirements didn't mean it flushed well," said Bellini.

The new standard models don't clog or require double-flushing like the first series of efficient toilets, saving up to four gallons. That's why starting in 2008, the Department of Environmental Protection will launch a new conservation program to reduce daily usage by up to 60 mgd. But this time the program will extend beyond toilets, including incentives for buildings and laundromats to replace their most inefficient washing machines.

"A new program could mean even more savings this time around," Bellini said. "The technology has benefited now from experience, time. New York City could benefit greatly from a second program at this point."

EAST OF HUDSON
CROTON WATERSHED

INITIATIVE 3

Build the Croton Filtration Plant

We will construct a water filtration plant to protect the Croton supply

The Croton system is the smallest and oldest of the city's watersheds, supplying on average about 10% of the city's needs and upwards of 30% during droughts. When the Croton system was constructed in the 1830s, the surrounding area was mainly rural. But over the past 50 years, suburbanization has spread through Westchester and Putnam counties.

Since the Croton system opened, one million people have moved into land around the watershed, paving over fields, wetlands, and forests. The resulting impacts of development have caused negative aesthetic impacts on the water leading to occasional seasonal shutdowns.

To meet the requirements of the Safe Drinking Water Act, DEP was ordered to build a filtration plant for the Croton Watershed.

The Croton filtration plant—the city's first—will be constructed within the Mosholu Golf Course in Van Cortlandt Park in the Norwood section of the Bronx by 2012. It will have the capacity to filter 290 mgd of water, and will also feature the City's largest green roof for public year-round recreational use.

Create redundancy for aqueducts to New York City

The Delaware Water Supply has historically provided about 50% of the city's water supply needs and the Delaware Aqueduct is the only way to transport this supply to the city. Although it is not in danger of immediate failure, we must prepare for an extensive repair period that may require shutting the aqueduct down. During any such period, it would be necessary for the city to increase reliance on its other water supplies, and to implement more stringent measures to encourage conservation and decrease demand.

INITIATIVE 4

Launch a major new water conservation effort

We will implement a water conservation program to reduce citywide consumption by 60 mgd

In 1994, DEP launched a Toilet Rebate Program that provided incentives to all property owners to replace older toilets and shower heads with modern, more efficient models. *(See case study above: Toilet Replacement Program)*

Over the past decade, technology has improved even more dramatically. Where the original efficient toilets could save up to 3.5 gallons per flush, the newest models can conserve up to four gallons. One-gallon urinals were considered "best technology" during the 1990s but today half-gallon urinals are mainstream, one-pint urinals are on the market and non-flush urinals are available.

Starting in 2008, we will launch additional rebate programs for toilets, urinals, and high-efficiency washing machines in laundromats and apartment building laundry rooms to lower water usage in the city by 5%. This program will save approximately 60 mgd and $34 million is already budgeted.

Other projects such as water-efficient industrial equipment, water-saving dishwashers and ice machines for the food service industry, water audits, early leak detection, and gray water reuse and recycling are also being evaluated. Between 1990 and 2005, the City identified and repaired leaks that save 15.8 mgd.

INITIATIVE 5

Maximize existing facilities

We will expand our supply potential through increased efficiency

Restore groundwater use in Jamaica, Queens

In 1996, DEP bought the Jamaica Water Supply system, which at its peak supplied 65 mgd to southeast Queens. Pumps extracted groundwater and distributed it across the borough in contrast to our upstate system which relies on gravity 95% of the time. Another difference was flavor: the ground water tasted different from our upstate supply.

Today, only one mgd from this system is circulated throughout southeast Queens, primarily because of the ample supply of cheaper surface water available from upstate. But while groundwater is far more expensive to clean and distribute, it has several advantages. The supply is constant and not subject to drought. Expanding this water source will diversify our supply, providing important redundancy. That is why DEP will begin upgrading the groundwater system in southeast Queens and begin construction on an enhanced treatment plant between 2011 and 2012. By 2016, the Jamaica system will provide an additional 10 mgd.

New Croton Aqueduct

As discussed above, the construction of the Croton Filtration Plant, as well as improvements to the New Croton Aqueduct, will ensure the safe and reliable delivery of up to 290 mgd of water from the Croton water supply system.

Alternative connections to the reservoir for emergency use

Today, the New Croton Aqueduct is the only way to bring water from the Croton Watershed into the city. But the Delaware Aqueduct passes directly through the Croton Watershed; strong pumps could force the water into the Delaware Aqueduct below the point of the leak described earlier.

Although we currently have hydraulic pumps in place, they lose three gallons of water for every gallon successfully transferred. Upgrading these pumps to more efficient models will enable us to convey 125 mgd of Croton Water through the Delaware Aqueduct. We expect these new pumps to be operational by 2011 and cost $62 million.

INITIATIVE 6

Evaluate new water sources

We will evaluate 39 projects to meet the shortfall needs of the city if a prolonged shutdown of the Delaware Aqueduct is required

The additional supply described above will bring us only part of the way toward covering the shortfall if the Delaware Aqueduct is shut down.

That is why since 2004, DEP has identified a broad range of possible solutions that could fill the gap. By summer 2007, we will finalize a short list of projects for piloting and design, based on the capital, maintenance, and operations costs, the schedule, and the City's authority to implement without State legislation.

Below is a sampling of proposals under consideration:

Groundwater

Coursing underneath New York are three giant aquifers of water that were trapped hundreds of thousands of years ago within the earth's crust. Some of this water can be extracted and used as an additional clean supply source.

DEP could rehabilitate 26 existing wells throughout Brooklyn and Queens and construct an additional 12 wells to tap into the Magothy Aquifer, which runs under Queens. To meet water quality standards, DEP would construct six centralized treatment facilities using the finest available treatment technology.

Reusing water

Today, millions of gallons of water in the city are wasted every day. By targeting these sources with the appropriate cleaning processes, we could generate a new reliable source of so-called "grey water" for New York. Those strategies include recovering treated water from the Red Hook Wastewater Treatment Plant for steam, toilets or air conditioning.

Our subway tunnels provide another opportunity. Because tunnels are dug so deeply under the ground, there is constant seepage from the surrounding groundwater. Every day, pumping stations throughout the system push out approximately 25 million gallons of water and dump it into the rivers. The City will seek to partner with the Metropolitan Transportation Authority to capture and collect these streams, clean this water, and pump it into our distribution system.

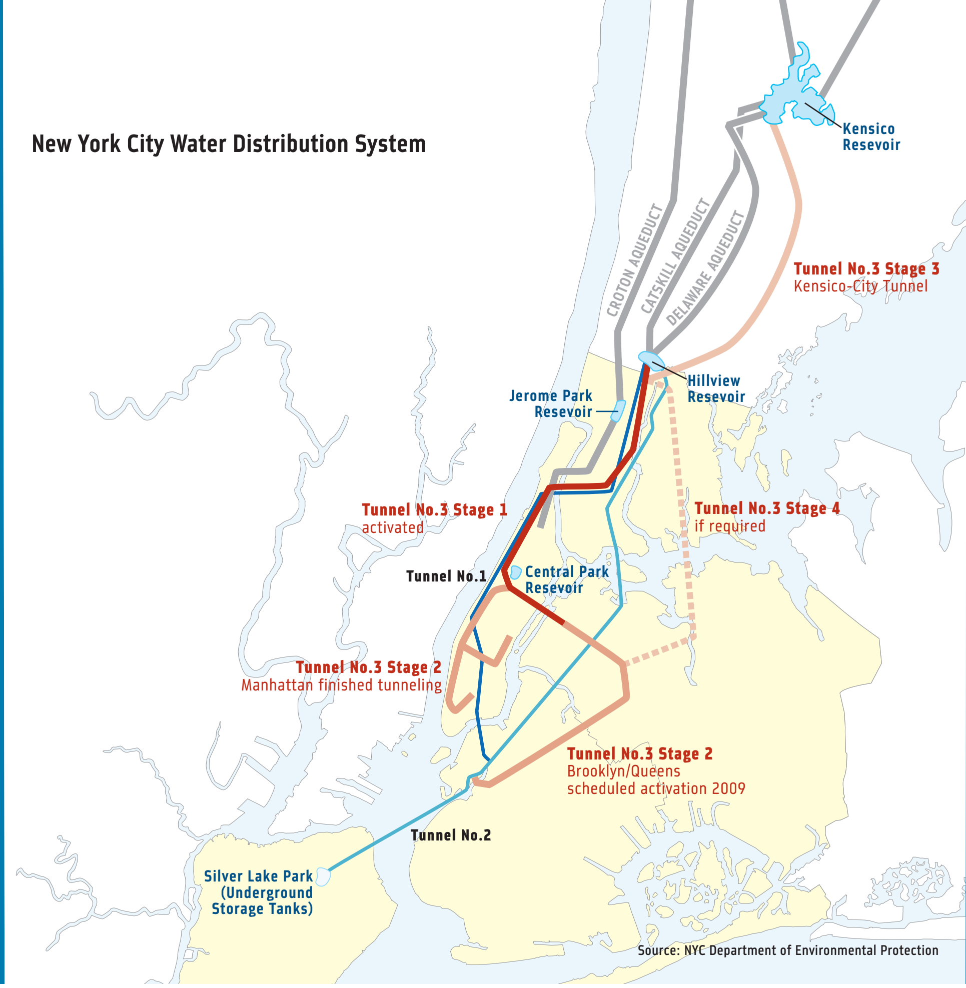
New infrastructure

A new aqueduct connecting the Rondout Reservoir with the West Branch Reservoir across the Hudson River would completely meet the city's water demand if the Delaware Aqueduct was required to be shut for repair. This new 45-mile section would run parallel to the Delaware Aqueduct and into the Croton Watershed, providing a second means of carrying water from the Delaware System into the city.

We could also expand the capacity of the Catskill Aqueduct to 660 mgd, a 10% increase, by pressurizing sections of the tunnel to improve water velocity.

Regional interconnections

Another strategy to secure the city's water supply could be new interconnections across the region. By running pipes between New Jersey, Connecticut or Long Island and the city, each state would gain critical backup systems in case of an emergency.



Modernize in-city distribution

Some of the oldest parts of our system are the tunnels, water mains, and pipes that carry water to the homes of New Yorkers. More than 1,000 miles of water pipes—out of 6,700—are already more than a century old. Our two water tunnels were built in 1917 and 1936 and they each serve distinct parts of the city.

In order to conduct maintenance, we must develop ways to distribute water across the city when the tunnels are out of service. Once they are shut down, we must be prepared for a lengthy rehabilitation period. We will need to design and build equipment especially for this reconstruction.

In order to provide the necessary window, we must complete Water Tunnel No. 3 to provide full redundancy for the system. We must also continue to aggressively upgrade and replace aging street mains. *(See map: New York City Water Distribution System)*

INITIATIVE 7

Complete Water Tunnel No. 3

We will complete construction of Stage 2 and begin repairing Water Tunnel No. 1

Construction on Water Tunnel No. 3, the largest and most expensive capital project in the city's history, began in 1970. The 60-mile tunnel was designed in four stages, beginning at the Hillview reservoir in Yonkers, traveling through the Bronx, moving south to the tip of Manhattan and then on to Brooklyn and Queens.

Stage 1, which serves northern Manhattan and parts of the Bronx, was projected to cost $238 million and be completed within eight years. It finally opened in 1998—at a cost of a billion dollars. *(See case study on following page: Water Tunnel No. 3)*

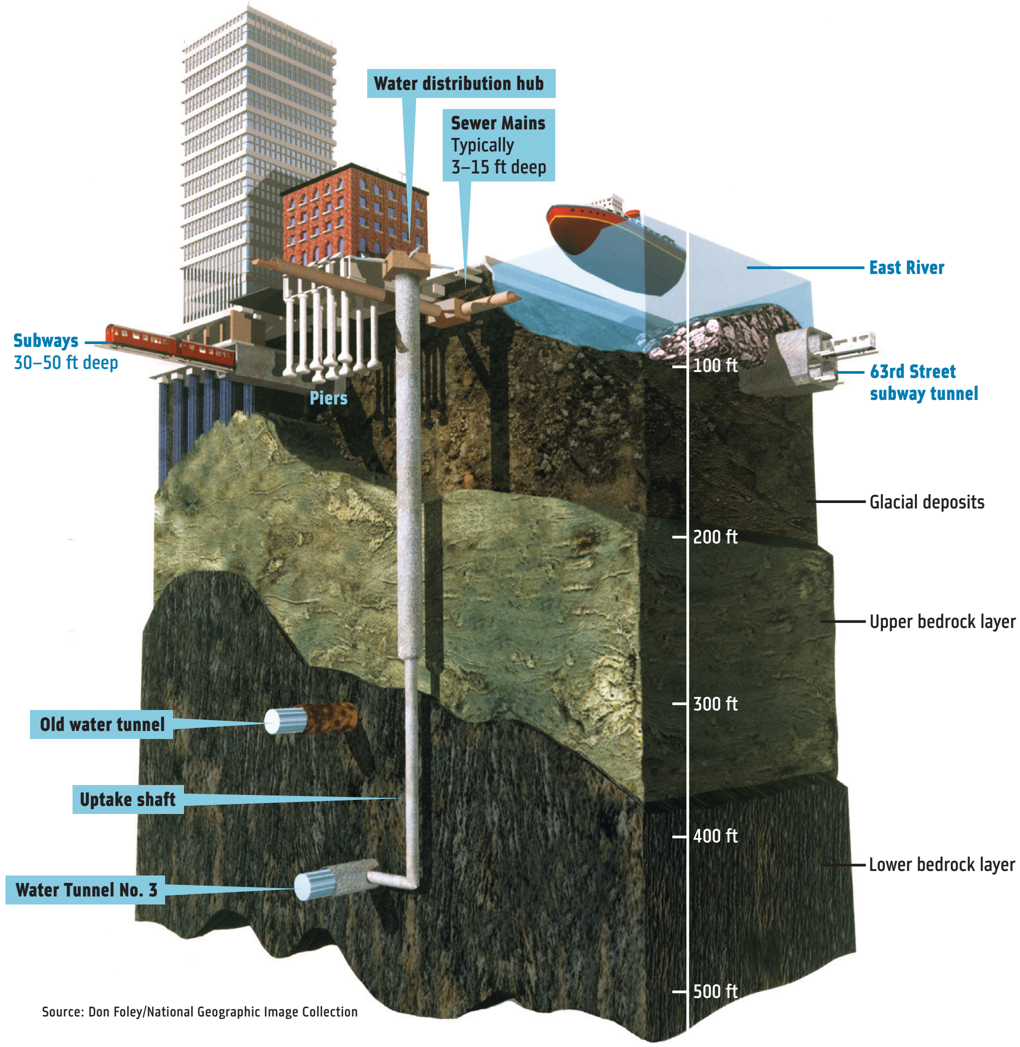
Stage 2 is currently under construction in Brooklyn, Queens, and Manhattan and will begin delivering water in two stages: the Brooklyn/Queens leg will open in 2009, with the Manhattan leg following in 2012. Although Stage 2 will not provide full redundancy for the in-city distribution, its completion will enable Water Tunnel No. 1 to be shut down for repairs, which are estimated to cost $365 million.

We will complete Stages 3 and 4 of Water Tunnel No. 3

The third stage of the water tunnel, also known as the Kensico-City Tunnel (KCT), will extend from the Kensico Reservoir to the valve chamber in the Bronx. This 16-mile section, currently in the planning stage will provide critical redundancy between the Kensico and Hillview reservoirs. Although this stage is estimated to cost between $4 and $6 billion, just $239 million is currently included in the 10-year plan.

Stage 4 of Water Tunnel No. 3 will be 14 miles long and run from the valve chamber in the Bronx under the East River into Queens. It will provide more distribution in Queens and provide full coverage during the eventual shutdown and repair of Water Tunnel No. 2

Cross Section of Underground Infrastructure with Water Tunnel No. 3



Source: Don Foley/National Geographic Image Collection

CASE STUDY

Water Tunnel No. 3

In 1970, the City broke ground on the most expensive construction project in its history. It quickly became larger.

Originally projected to cost $1.5 billion and take 16 years to complete, Water Tunnel No. 3 will ultimately cost more than $6 billion and have taken more than half a century to build.

Much of that pace has to do with the enormity of the project. The tunnel, which will be 60 miles long when completed, has engaged more than 5,000 workers and cost the lives of 24 men. It will be formed by approximately three million cubic yards of concrete. As it snakes through the subterranean city, the tunnel will plunge up to 800 feet underground and rise to a depth of less than 150 feet at its highest points.

But there is another reason that the tunnel's construction has been delayed. In the early 1970s, the City suspended work after mounting bills, cost overruns, and contract disputes. During the fiscal crisis of the 1970s, construction of the tunnel stopped completely.

Progress continued through the succeeding decades. But in 2002, the City declared its commitment to completing the tunnel.

Even through the economic downturn after September 11th, that commitment has remained resolute. Over the past five years, nearly $2.6 billion has been earmarked to propel the project to completion.

In addition to providing essential redundancy for our in-city distribution network, the tunnel has also been designed to improve the ease of repairs. In the original tunnel, valves controlling the water supply were located within the tunnel. Unlike those inaccessible bronze models, the new valves will be crafted out of stainless steel and centralized in large underground chambers.

Average Annual Water Rate
For a single family household, 2006

Source: NYC Water Board

INITIATIVE 8

Complete a backup tunnel to Staten Island

We will replace water pipelines connecting Staten Island to Water Tunnel No. 2

Staten Island is currently served by the five-mile-long Richmond Tunnel, which connects the borough to Water Tunnel No. 2. Completed in 1970, the Richmond Tunnel tripled carrying capacity to Staten Island, increasing its water supply from 100 to 300 mgd.

Currently, two pipelines embedded into a trench in the Harbor provide redundancy for this tunnel. But by the end of 2007, the Army Corps of Engineers will be dredging the bottom of the waterway to create a deeper shipping channel—dislodging this backup system.

DEP will partner with the Army Corps to build a new 72-inch water main that will replace the pipes, ensuring a continued reliable water supply for Staten Island.

INITIATIVE 9

Accelerate upgrades to water main infrastructure

We will increase replacement rate to over 80 miles annually

Once it leaves our in-city tunnels, water travels through 6,700 miles of water mains to reach our homes, over 1,000 of which were installed over a century ago. These aging pipes require constant repair and continual upgrades. We are currently replacing 60 miles of water mains annually.

At our current pace of replacing 1% of our infrastructure every year, a full upgrade will take a century to complete. Over the next decade, we will accelerate the pace of upgrades to over 80 miles annually. In addition, we will spend approximately $575 million to link Stage 2 of Water Tunnel No. 3 with the water main distribution system. Over 10 miles of new trunk water mains will be installed in Manhattan for this purpose.

Conclusion

The initiatives described above are essential. But they are not inexpensive. Each will take years to complete, and in some cases, decades. And they are massive, sprawling across hundreds of miles and involving thousands of workers, residents, and even communities. That is the price we must pay for continuing to have a reliable source of water—something New Yorkers have only truly been able to count on for the last century.

By investing in these critical backup systems, and making more efficient use of existing resources, we will ensure New Yorkers enjoy a reliable water supply into the next century. *(See chart above: Average Annual Water Rate)*

Transportation has always been the key to unlocking New York's potential. From our origins as a port city to the completion of the Erie Canal, from the construction of the Brooklyn Bridge to the creation of the subway system, New York's growth has always depended on the efficiency and scale of its transportation network. But for the last 50 years, we have underinvested in our most critical network: transit.

While we have made progress in the last two decades in maintaining and improving our existing infrastructure, we still need billions of dollars more to reach a full state of good repair. More significantly, almost all of our subway routes, river crossings, and commuter rail lines will be pushed beyond their limits by 2030.

Transportation is the greatest single barrier to achieving our region's growth potential. Only by strengthening our transit—which uses less land and creates less pollution than autos—can we meet this challenge, and provide a quality trip to those who drive. Our transportation plan will enable us to improve travel times across the region and achieve the funding necessary to meet our transportation needs through 2030 and beyond.

Transportation

Congestion

Improve travel times by adding transit capacity for millions more residents, visitors, and workers

State of Good Repair

Reach a full "state of good repair" on New York City's roads, subways, and rails for the first time in history

Transportation

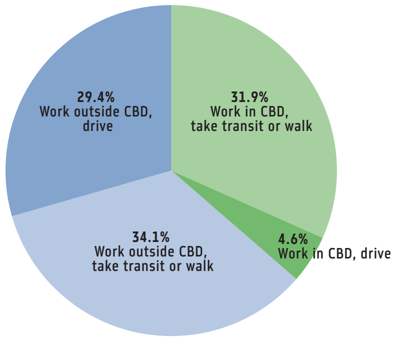
Credit: ©2006 Getty Images

Times Square, Manhattan

Improve travel times by adding transit capacity for millions more residents, visitors, and workers

Reach a full "state of good repair" on New York City's roads, subways, and rails for the first time in history

How New Yorkers Get to Work



Source: U.S. Census Bureau (2000)

CBD = Manhattan Central Business District

The lack of transit for Bryan and his neighbors in southeast Queens is not a new problem. As early as 1929, planners proposed to extend the subway to the area. But despite widespread agreement that it was necessary, the plan was halted because funding could not be found.

It is a story that has been repeated again and again in New York. Inadequate investment in the basic maintenance of our roads and transit system intensified until the 1970s when the entire network fell apart. A truck plunged through a hole in the West Side Highway. Track fires were common occurrences. Bridges were closed for fear they'd collapse.

In 1981, the Metropolitan Transportation Authority (MTA) halted all new transit expansion until the existing system could be restored. The City made a similar commitment to repave and reclaim its road network. And that has been the focus of transportation investment for the past 25 years: rebuilding, but not expansion.

The improvements are undeniable. In 1981, trains broke down every 6,600 miles; today they run for more than 140,000 miles. The MTA has made great progress in providing cleaner, safer stations, and implementing new technology such as the MetroCard. Our road network has also improved, although the quality of our streets has fallen below the levels achieved in 1999. The City's bridges have done better since the days when they were regularly closed for emergency repairs: in 2005 only four of the City's 787 bridges were deemed to be in poor condition, down from 48 as recently as 1996.

Bryan Block rises at 6:30 am. By 8:00 am he is waiting at his local bus stop in Cambria Heights, Queens, watching for the bus to arrive. It lumbers to the Parsons/Archer subway station, where Block takes an E train that will be packed well before it reaches Manhattan.

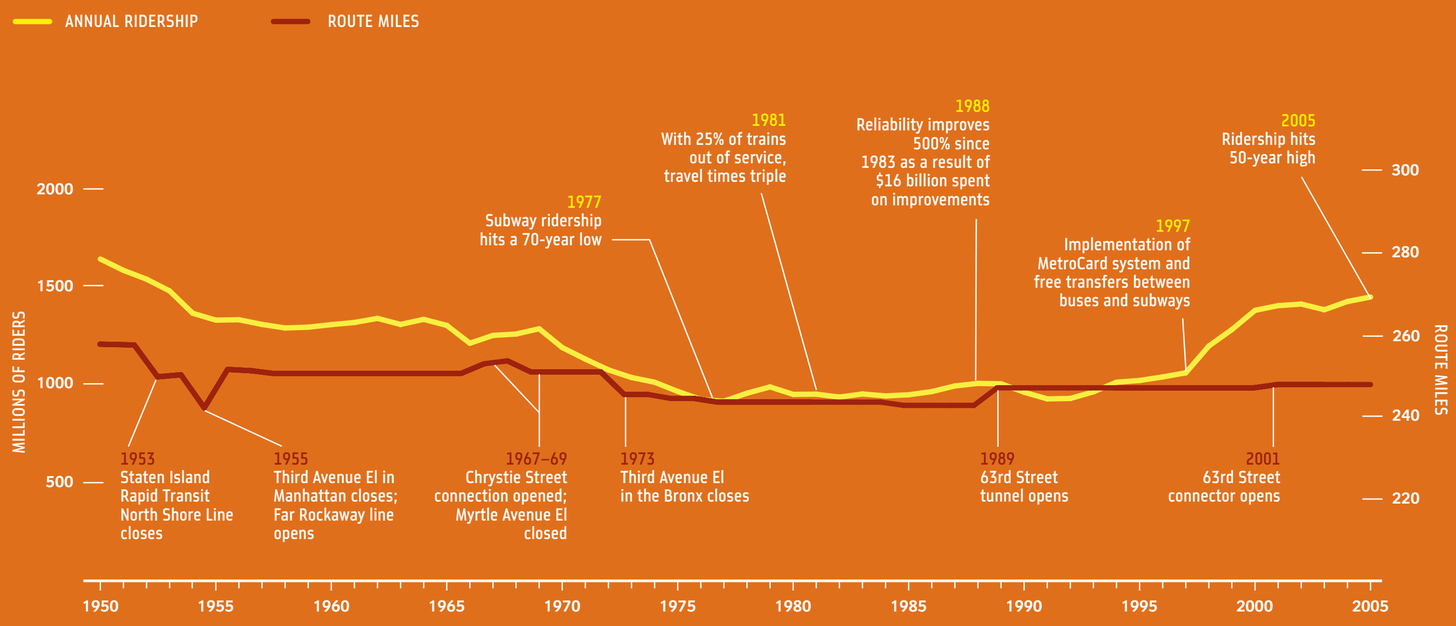
By the time he reaches his office in Midtown Manhattan, his trip has taken an hour and a half. It used to be called a "two-fare zone." Now it's just too long.

"It's tiresome," said the 50-year old Block, who has been traveling from Cambria Heights into Manhattan for more than 20 years. "By the time I get to work I am fatigued. By the time I get home I am fatigued. If you live in Manhattan you can just jump on the IRT, my co-workers can walk to work, they can take a bus down Fifth Avenue, a bus up from the Village. They don't understand. Once you live in southeast Queens and have to get to Manhattan you're tired when you get to work."

Block loves southeast Queens and the shared work ethic that binds together the neighborhood's cross-section of professions, from doctors to teachers to city workers. He has to remind himself of this on his way to work, especially during the wintertime. "It's cold, you're wet, you're freezing, you're angry, you're frustrated and you have to stand there and wait.

"You have no recourse," he said. "No choice."

New York City Subway Ridership and Route Miles



Note: Route miles are non-directional; i.e., the distance from terminal to terminal. Several lines may share the same route.

Source: NYC Mayor's Office of Long-Term Planning and Sustainability; Robert Olmsted; Brian J. Cudahy

And yet, there is much more to be done. Today, more than half our stations are awaiting repairs; and 40% of our network's signal systems are obsolete, preventing new services like displays showing the arrival time of the next train. Altogether, we are more than $15 billion short of achieving a full state of good repair on our transit and road networks.

But with population, jobs, and tourism all at record levels, our challenge is no longer simply maintaining the system—we also face an urgent need to expand it. In 2006, ridership on our subways soared to the highest levels since 1952—but during that time the subway network actually shrank by eight route miles. *(See chart above: New York City Subway Ridership and Route Miles)*

Failure to invest adequately in our transit system has had negative consequences for nearly all New Yorkers. Too many don't have access to mass transit; those who do find their trains increasingly crowded. Nearly half of our subway routes experience congestion at key times or are at capacity today.

It isn't just city residents who suffer. Over 70% of all Long Islanders who commute into Manhattan take the Long Island Rail Road (LIRR), but the tunnels into the city have reached their capacity.

Auto use has risen alongside transit use. In 1981, when subway service was at its lowpoint, 31% of all people traveling to Manhattan's Central Business District (CBD) arrived by car. In 2006, with the quality of subway service at modern-day record levels, that figure has remained essentially unchanged.

While only 4.6% of working New Yorkers commute to Manhattan by car, the congestion they fight through has increased. Rush hour has slowly stretched out over the past two decades, as people have started leaving earlier and arriving home later. This is true for drivers across the region, with local traffic on roads like the Hutchinson River Parkway, the Long Island Expressway, and Interstate 95 competing with cars heading for Manhattan. By 2030, rush hour conditions could extend to 12 hours every day.

It isn't just Manhattan-bound commuters who face the consequences of increasing road congestion—nearly seven times as many New Yorkers drive to jobs outside of Manhattan as to it. These commuters often have fewer transit alternatives, but face the same challenge of escalating traffic. *(See chart on previous page: How New Yorkers Get to Work)*

With every travel mode congested, it should come as no surprise that New Yorkers experience the longest commutes in the nation. Of all large counties in the United States, 13 of the 25 with the longest commute times are in the New York area. The four worst nationwide are Queens, Staten Island, the Bronx, and Brooklyn. *(See chart on page 78: Average Travel Time to Work)*

Road congestion costs all of us money—in higher store prices, because freight deliveries take longer; in higher costs for services and repairs, because delays mean repairmen visit fewer clients each day; in taxi fares, in wasted fuel, in lost revenue. One recent study estimated that traffic jams cost the New York City area $13 billion every year.

And there are other consequences as well. Snarled traffic slows bus service. Emergency vehicles lose valuable response time. Finally, cars and trucks contribute 20% of the City's global warming emissions and a large part of the ozone—a serious pollutant that can cause respiratory illnesses like asthma—in our air.

By 2030, nearly a million more residents, 750,000 new jobs, and millions more visitors will put our system under new pressures. The increasing congestion, and the resulting economic costs, will reverberate throughout the region. *(See map on page 78: Demand for Travel into Manhattan's Central Business District)*

We know what must be done. There is general agreement on the strategy necessary to achieve the level of mobility our city and region need. We must finish repairing our roads and transit system **and** invest to provide more and better mass transit options. We must also proactively embrace strategies to reduce congestion on the city's streets.

The problem is that we do not have the resources to fund our needs. Although we

Second Avenue Subway

Credit: Neal Boenzi/The New York Times

Second Avenue Subway groundbreaking in 1972. From left to right: Percy E. Sutton, Manhattan borough president; Senator Jacob J. Javits; John A. Volpe, United States Secretary of Transportation; Governor Nelson A. Rockefeller; and Mayor John V. Lindsay.

Second Avenue Subway currently under construction

Credit: Metropolitan Transportation Authority

know that the projects will prevent crippling congestion, collectively they face a monumental funding gap. As a result, improved transit will require new sources of funding.

The greatest factor in determining the success of our city in the 21st century may be whether we can summon the collective will to generate the funds necessary to meet the transportation demands of the future. New York City is prepared to make an extraordinary commitment to ensure that we do.

Our Plan

We benefit today from the foresight of past generations of New Yorkers: the street grid, laid out in 1811 for a city of a million at a time when New York only had a 100,000 residents; Central Park, built at a time when few lived above 23rd Street; a water system constructed with the capacity to last for centuries; and the subway system that reshaped the city.

But we seldom think about the fact that those New Yorkers made the decision not only to do those things, but to pay for them as well. In all of those cases, New Yorkers argued over who should pay what, but ultimately settled on financing approaches based on the principle that those who benefited should contribute.

We face a similar challenge today. The recent groundbreaking ceremony for the Second Avenue Subway marked the third time that same project has been started. Each time, New Yorkers were confident the project would be completed; the Second and Third Avenue Els were even dismantled in anticipation of the new route. But each time, the project stalled for lack of funds. This experience ought to have taught us one thing: If we don't know exactly where funding will come from, it's a good indication that we may not get what we want. *(See photos above: Second Avenue Subway)*

Building the new transit we—and our entire region—need and achieving a full state of good repair will require over $50 billion.

Only $13.4 billion is already committed to these projects; we can reasonably expect another $6.3 billion from Federal sources. That means that if we want to see those projects built, the region will have to raise an additional $31 billion between now and 2030. That is why we seek to work with the State to create a new regional partnership, the Sustainable Mobility And Regional Transportation (SMART) Financing Authority. The SMART Authority's mandate will be to provide funding necessary to complete nearly every critical transportation project—and finally bring the full system into a state of good repair.

The Authority would have three dedicated revenue streams: the proceeds from congestion pricing; an unprecedented City investment; and a corresponding contribution from the State, all exclusively dedicated to funding improvements to the regional transportation network.

These dedicated revenue streams would support bond issues to ensure that our most critical projects are not delayed by a lack of funding. Over time, they would also generate enough excess revenues to launch a new wave of projects to improve mobility across the region even more.

The SMART Financing Authority would be governed by an independent and experienced board appointed by the City and State to incorporate a wide range of perspectives about transportation priorities for the region. It would not operate or build anything, but rather would invest in projects proposed by other transportation agencies. It would then monitor those investments, assuring accountability.

In addition to accelerating major transit expansions, we must also aggressively reduce congestion on the city's streets. Citywide, road travel is growing faster than population. Managing our roads better to improve traffic flow will help, but it won't be enough.

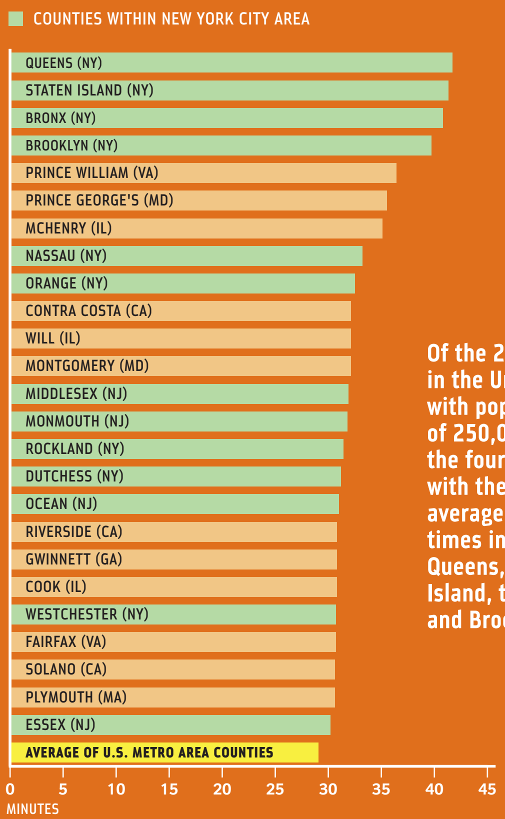
The time has come for New York to try congestion pricing: a carefully-designed charge for drivers in part of Manhattan during business hours. This solution is bold. It is also proven. Cities around the world have shown that congestion pricing can reduce congestion and speed travel times with no significant negative impact on economic activity.

Congestion pricing has three primary benefits. First, it has been proven to reduce congestion and improve travel times. Second, it would generate revenues dedicated to the SMART Authority, which would fund significant expansions and upgrades in transit across the city and the region. In the short-term, the focus would be on neighborhoods with limited mass transit options and high concentrations of drivers. But by reinvesting the proceeds in mass transit, nearly all New Yorkers can benefit, especially the 95% of New Yorkers who do **not drive** to jobs in Manhattan.

By encouraging mode shifting from private automobiles, it will stem the amount of pollution spewed from tailpipes on city streets, helping us meet our goals of reducing greenhouse gas emissions and achieving the cleanest air of any big city.

The potential benefits of congestion pricing are tremendous. And there is no reason we cannot turn the system off if we do not like it. That's why we propose to pilot congestion pricing for a period of three years. We expect a combination of Federal and private dollars could fully cover the initial investment. After three years, we will know whether it really works for New York.

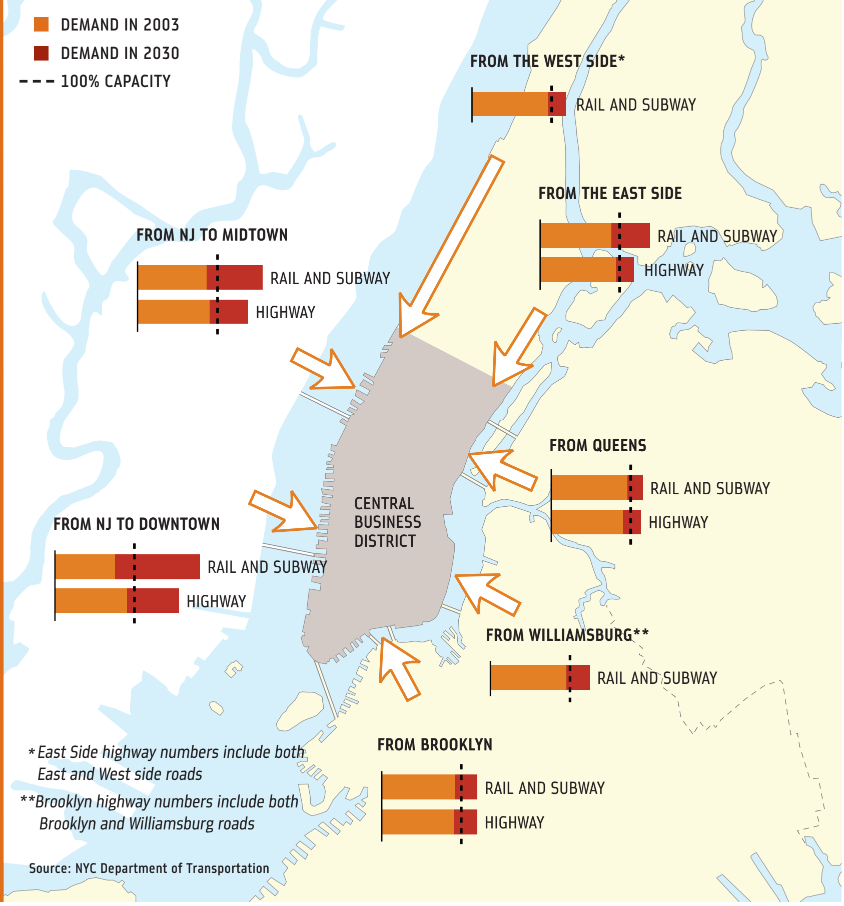
Average Travel Time to Work



Of the 231 counties in the United States with populations of 250,000 or more, the four counties with the longest average commute times in 2003 were Queens, Staten Island, the Bronx, and Brooklyn

Source: U.S. Census Bureau, 2003 American Community Survey

Demand for Travel into Manhattan's Central Business District



*East Side highway numbers include both East and West side roads

**Brooklyn highway numbers include both Brooklyn and Williamsburg roads

Source: NYC Department of Transportation

By aggressively combating congestion, finding new sources of funding, and making smart choices about priorities for the coming decades, we can reach a state of good repair on our roads, rails, and subways for the first time ever, while expanding our transportation system to improve travel times and convenience for New Yorkers. *(See map on facing page: Transit Capacity Expansions)*

Mass Transit

Despite being the most transit-oriented city in the United States, when it comes to transit ridership, we still lag behind our strongest global competitors. Cities like London, Singapore, and Tokyo have recognized that providing more mass transit options creates a cleaner, healthier, more efficient urban environment—and have invested accordingly.

We must keep pace. That's why we have developed a mix of short-term and long-term solutions that will improve transit throughout the city. The result will be new or improved public transportation options for virtually every New Yorker. *(See chart on page 80: Public Transit Usage Per Capita)*

Our plan for transportation:

Build and expand transit infrastructure

1 Increase capacity on key congested routes
2 Provide new commuter rail access to Manhattan
3 Expand transit access to underserved areas

Improve transit service on existing infastructure

4 Improve and expand bus service
5 Improve local commuter rail service
6 Improve access to existing transit
7 Address congested areas around the city

Promote other sustainable modes

8 Expand ferry service
9 Promote cycling

Improve traffic flow by reducing congestion

10 Pilot congestion pricing
11 Manage roads more efficiently
12 Strengthen enforcement of traffic violations
13 Facilitate freight movements

Achieve a state of good repair on our roads and transit system

14 Close the Metropolitan Transportation Authority's state of good repair gap
15 Reach a state of good repair on the city's roads and bridges

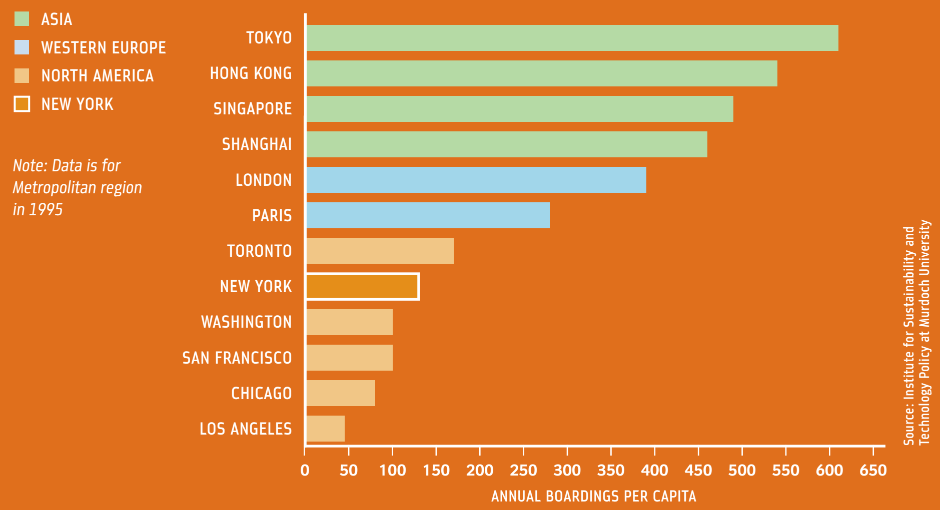
Develop new funding sources

16 Establish a new regional transit financing authority

Transit Capacity Expansions

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Public Transit Usage Per Capita



Build and expand transit infrastructure

Today, more people take the 4, 5, 6 trains every day than ride the entire Washington, D.C. Metro. The Lexington Avenue line is the most heavily used subway line in the country. Crowding not only makes the trip unpleasant; delays caused by people entering and exiting cars actually result in fewer trains running during rush hour.

For decades, planners have known the answer. The Second Avenue Subway was proposed in the 1920s to provide relief for the Lexington Avenue line and to replace elevated trains. The new subway line is one of 11 major transit projects that would help solve the region's transit congestion problem.

Some, like the Second Avenue Subway, will increase capacity on already clogged routes. Others, like East Side Access, will expand commuter rail options. Several will provide access to growing, but inaccessible communities. The rest will just make life for riders more pleasant. All share one thing: they are not fully funded.

In most cases, some funding is available, from Federal and other sources. But they are all missing the last set of contributions necessary for completion. We may have broken the ground for the Second Avenue Subway—but there is still a significant funding gap for the first of four phases. While the entire project is designed to travel from Harlem to Lower Manhattan, we are still nearly a billion dollars short of the funds needed to build just from 96th Street to 63rd Street.

Overall, the remaining funding gap for just these 11 projects is nearly $21 billion. If we can fill this gap and realize these plans, we will prevent the transit and traffic congestion that threatens to choke our economy in the coming decades.

INITIATIVE 1

Increase capacity on key congested routes

We will seek to fund five projects that eliminate major capacity constraints

Five key projects will ease congestion on some of our most clogged routes into Manhattan—all of which will be pressed beyond their capacity by 2030 unless we act.

The **Second Avenue Subway** is one of our most urgent needs, for a wide range of travelers: workers from the Bronx, local travelers from the Upper East Side, commuters changing trains to get from Westchester to Wall Street. Its construction will be a massive undertaking and cost billions, but we cannot let funding run out on this critical project a third time. *(See case study on facing page: Yorkville, Manhattan)*

The addition of a **third track on the Long Island Rail Road (LIRR) Main Line** will enable the LIRR to run more trains, use its fleet better, and provide more service at local stations in Queens. It will especially serve reverse commuters, who live in New York City but work in Nassau County. Today, nearly 270,000 New York City workers commute to jobs outside city limits, up by 10% since 1990. Facilitating reverse commuting helps New York City residents expand their career options and suburban businesses broaden their worker pool.

Two projects will increase capacity for commuters west of the Hudson. **Access to the Region's Core (ARC)** will create a second trans-Hudson tunnel for New Jersey Transit (NJT), doubling the number of trains NJT can run into Manhattan and enabling direct service to New York on several lines for the first time. These and other Penn Station commuters will be able to get closer to the emerging Hudson Yards neighborhood through the **Moynihan Station Project**. The station will also restore a grand entrance to the west side of Manhattan.

Even more New Jersey commuters arrive by bus than by train—making the Express Bus Lane through the Lincoln Tunnel one of the region's most important assets. The Port Authority's plan for a second dedicated **Express Bus Lane** through the Lincoln Tunnel will allow expanded service for communities not on the NJT rail network.

INITIATIVE 2

Provide new commuter rail access to Manhattan

We will seek to expand options for rail commuters

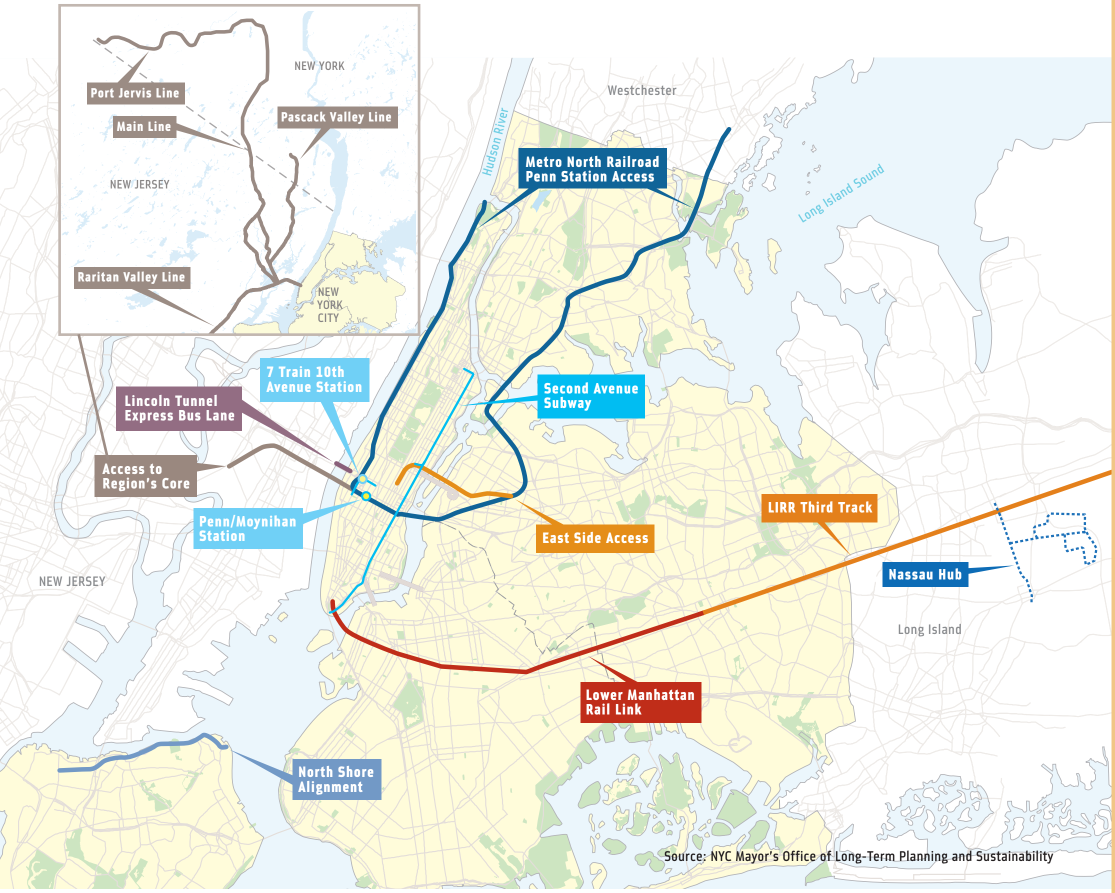
Today's commuter rail service is excellent, but increasingly strained. Rising ridership has meant more crowded rail lines. For thousands of commuters, their trains do not even take them where they need to go. Nearly half of all LIRR riders work on the East Side, but are dropped off every morning at Penn Station; 23% of Metro North riders have jobs on the West Side, but arrive daily in Grand Central Terminal. Traveling across town lengthens their daily commute—and takes up additional subways, buses, and street space. *(See map on facing page: New and Expanded Transit Infrastructure; see commuter profile on page 85: Co-op City to Lower Manhattan)*

Finally, rail lines that run through the Bronx and Queens do not provide as much service to residents as they could, in part because the trains can't fit more riders. Three projects will address these issues.

East Side Access was first planned in the 1960s to offer LIRR riders better access to Grand Central. Its construction will free up track space for **Metro North service to Penn Station**. Combined, these projects will reduce subway crowding and provide most commuters with two Midtown rail options. *(See commuter profile on page 82: Bayside, Queens to Manhattan's East Side)*

They would also improve service to Queens and the Bronx. Additional tracks will allow for a station at Sunnyside Yards (serving Long Island City), and make it easier for additional trains to serve stations in eastern Queens. Metro North will also be able to extend service to new stations—providing residents of

New and Expanded Transit Infrastructure



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Co-op City and Hunts Point with fast, direct rides, and helping to reduce auto commuting to job centers in West Harlem.

Long Islanders who work in Midtown are more likely to take the train than those who work in Lower Manhattan or downtown Brooklyn. Those who drive contribute to traffic delays in Brooklyn and Nassau County. Those who do take the train have to transfer to subways to get to their jobs. Further, the lack of good airport access hinders the competitiveness of both areas for job growth. By connecting Jamaica, Brooklyn, and Lower Manhattan, the **Lower Manhattan Rail Link** will address all of these challenges.

INITIATIVE 3

Expand transit access to underserved areas

We will seek to provide transit to new and emerging neighborhoods

Two areas of the city offer immediate opportunities to add new transit options where none currently exist. The 5.1-mile **Staten Island North Shore Alignment**—an abandoned railline linking directly to St. George and the Ferry Terminal—has been unused since 1953. A study will examine the potential for either rail or a dedicated road for buses to give the area its first rapid transit service in two generations.

The second area of opportunity is on Manhattan's West Side: as the 7 train is extended to reach the Javits Center, it will pass through an area that is growing fast but lacks transit. A new **10th Avenue Subway Station** will meet a strong, emerging need at West 41st Street.

But transit-oriented development isn't limited to the city: developing transit hubs around suburban railroad stations can achieve a similar purpose. One such project, the **Nassau County Hub**, envisions a transit loop connecting LIRR stations and several existing and emerging employment centers in Mineola, Hempstead, and Garden City. Serving local riders, inbound commuters, and reverse commuters, the project will help reduce congestion on Long Island and create opportunities for the entire region.

These three projects should only be the beginning of a new era of rapid transit planning in New York. We will work with the MTA to review other potential transit expansions in the city, and we will support other regional efforts to explore local and longer-distance opportunities.

COMMUTER PROFILE
Yorkville, Manhattan

Crammed into the uncomfortable intimacy of New York City's morning rush, passengers on the Lexington Express train play the subway version of Twister to keep from falling. Riders squeeze into spaces between elbows and handbags, breathing in smells of the passengers pressed against them.

Jocelyn Torio confronts this crowd combat every morning.

"A train passes me by once or twice a week and I get stuck waiting on the platform," she said. "They are just too crowded for me to fight my way in."

The 4 and 5 lines start high in the Bronx, extend through Harlem, down to the tip of Lower Manhattan and then through Brooklyn.

There are few other mass transit options for reaching Manhattan's east side; Torio experimented with the bus down Second Avenue from her apartment at 83rd Street to her office on 26th Street and Park Avenue.

"I even got a seat, but it just takes so much time," Torio said.

As early as 1929, planners have known that a Second Avenue Subway was a big part of the solution. But lack of funding has stalled the project for decades.

A Second Avenue Subway would shorten Torio's commute to work and alleviate rush-hour traffic on East Side subways and buses. But the subway won't be her only new choice. By 2009, one of the city's five new Bus Rapid Transit (BRT) lines will be implemented on First and Second Avenue, giving commuters the option of a bus that zooms downtown in its own lane, bringing with it a 22% increase in travel-time savings.

"There's definitely a need for a new way to handle the increasing population." Torio said. "Having that Second Avenue subway line would just make everyone's commute much easier."

COMMUTER PROFILE
Bayside, Queens to Manhattan's East Side

Karin Werner has given up on Bayside. Although the Bayside Long Island Rail Road (LIRR) station is closest to her house in Queens, she drives an extra few minutes to the Auburndale stop instead.

"I never got a seat, and there were always eight to ten of us stuck standing in the middle of the car," she said. "I will not take Bayside in the morning."

When she gets off the train, she is in the wrong place. That's because Werner is one of the nearly 45% of all LIRR commuters who work on Manhattan's East Side, but are dropped off at Penn Station every morning.

The extra 25 minutes spent trekking across town means that she has to leave her house at 6:15 every morning. She's tried driving, but afternoon traffic often leaves Werner sitting in gridlock. And inevitable parking prices make costs prohibitive.

But her transit choices today are not much more cost-effective; she pays over $150 for a LIRR monthly pass and $76 for a monthly MetroCard.

By 2012, Werner's ride could be transformed. The LIRR's East Side Access project would bring east side commuters directly into Grand Central Terminal.

She'll have a seat, and she'll keep it all the way to Grand Central—just like she'll keep that $76 in her pocket.

"So it's not just the 25 minutes," she said. "Though being able to sleep in a little longer would be great."

Improve transit service on existing infrastructure

While these longer-term projects are crucial, transit improvements do not have to wait for major new construction. Through targeted near-term investments and closer partnerships between the city and the MTA, we can improve transit options for all New Yorkers in just a few years.

These improvements are especially important for neighborhoods where subway access requires a long walk or a bus transfer. Almost 30% of New Yorkers live more than a half mile from a subway station. And in 22 areas across New York, the lack of good transit access has led to concentrations of Manhattan-bound commuters who drive.

We have many measures at our disposal to meet the needs of these neighborhoods. We can improve the speed and reliability of our bus network; make better use of existing rail systems like the LIRR; and create better connections to—and among—transit services. Taken together, these steps can provide significant service improvements without major capital investments, and usually without increasing operating costs.

The key barriers to these improvements have been largely organizational. We need to work in closer cooperation with the MTA to develop detailed implementation and financing plans for these improvements. *(See map on page 86: Near-Term Improvements to Transit Service; see table on page 86: Potential Improvements for 22 Neighborhoods with Concentrations of Manhattan-bound Drivers)*

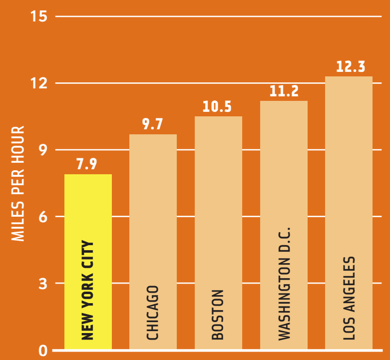
INITIATIVE 4

Improve and expand bus service

We will work pursue a variety of strategies to improve and expand bus service

New York City has the highest bus ridership in the United States, but the slowest buses. As the city grows and vehicles compete for the same road, more riders board buses, causing buses to operate at even slower speeds. Between 2002 and 2006 alone, bus speeds across the city slowed by 4%. *(See chart above: Bus Speeds)*

Bus Speeds
2004



Source: Federal Transit Administration, National Transit Database: revenue bus miles/revenue bus hours

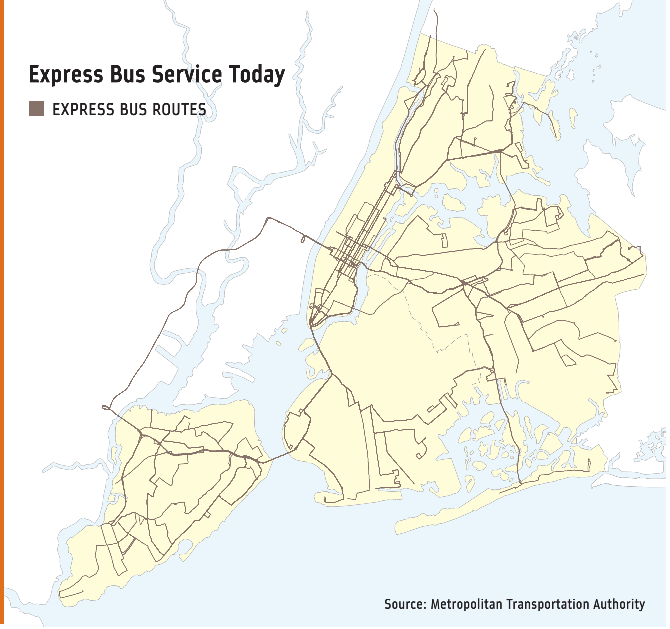
Because traffic routinely delays buses, travelers are often stranded at bus stops with no way to gauge whether to keep waiting or move on. Even on the best days, every rider has experienced the feeling of watching a bus pull away seconds before reaching the stop, knowing that the posted schedule may not be any guide to when the next one will arrive.

Yet buses retain enormous appeal. They offer flexibility that subways cannot match; the capital costs to start a bus service are small compared with rail transit; and they can be up and running in months, not years. With new technology already in use by the MTA, they are environmentally friendly. Many senior citizens, and others, prefer the bus to the subway to avoid climbing stairs. And buses are the most efficient use of our limited road space: one bus takes the same amount of road space as two cars, but can carry 70 people.

The key is to improve speeds and reliability. Cities around the world have begun embracing the benefits of bus travel while addressing the issues that have traditionally undercut buses' effectiveness. Dedicating bus lanes, and enforcing their exclusive use, is an important step. Another strategy is Bus Rapid Transit (BRT), an overall approach that has been implemented in cities around the world. BRT uses dedicated bus lanes, fewer stops, timesaving technologies, and additional efficiency measures to make bus travel fast, reliable, and effective. *(See case study on facing page: Bus Rapid Transit Around the World)*

We will initiate and expand Bus Rapid Transit

Within two years, New York City and the MTA will launch five BRT routes, one in each borough. We will incorporate many of the most successful proven features from domestic and international systems, including establishing dedicated bus lanes with bright, distinctive signage. The lanes will be marked with red paint to distinguish them from regular traffic



Source: Metropolitan Transportation Authority

Congestion Impacts on Express Bus Service

The MTA's system of express buses is designed to provide direct service to Manhattan for neighborhoods at the ends of subway lines or without subway access. Over 100,000 New Yorkers ride these buses every business day. Like any road vehicle, they suffer from congestion. One of the longest runs, X22 from Tottenville, Staten Island, to Midtown, takes an hour and 17 minutes at its earliest departure, but an hour and 44 minutes at the height of rush hour—a loss of 27 minutes each morning for its riders, and an increase in operating costs of over 25% due to fuel, driver time, and wear and tear on brakes and other components.

lanes, and their exclusive use by buses will be enforced rigorously. To strengthen our enforcement ability, we will seek the approval of the State Legislature to use cameras to issue fines to drivers who violate these lanes. *(See photo: New York City Bus Rapid Transit Stop)*

BRT service will run along the same routes as traditional buses; but, more buses will run along the routes, and stops will be spaced farther apart than local service, with stations every 10 to 15 blocks. (By contrast, regular buses often stop every two to three blocks.) Electronic message boards will provide riders with real-time updates on arrival times. As illustrated below, the savings in terms of travel times will be significant.

FIVE INITIAL BRT ROUTES

ROUTE	DAILY CORRIDOR RIDERS*	DAILY BRT RIDERS*	TRAVEL TIME IMPROVEMENTS (% FASTER)**
First and Second Avenue (Manhattan)	27,100	12,900	22%
Fordham Road/Pelham Parkway (Bronx)	14,700	7,000	8%
Nostrand Avenue (Brooklyn)	20,000	5,300	20%
Merrick Boulevard (Queens)	21,800	2,600	16%
Hylan Boulevard (Staten Island)	4,700	2,800	22%

*Includes other buses that will also benefit from bus lanes
**End to end travel time savings compared to existing local service
Source: NYC Department of Transportation; Metropolitan Transportation Authority

By 2014, we will expand BRT service by at least five additional routes. We will also implement new technologies, including giving BRT vehicles signal priority—which means traffic lights recognize approaching buses and either turn or stay green so that the buses remain on schedule. We are already working with the MTA to test this technology on Victory Boulevard on Staten Island.

Where possible, we will build sidewalk extensions that allow buses to stop without pulling over to the curb—and provide more waiting room for riders who might otherwise impede passing pedestrians. (These are being installed in Lower Manhattan this year.) We are also investigating ways to allow passengers to board and exit buses more quickly. Potential ideas include electronic smart cards and letting passengers pay their fares before boarding buses. If successful, all of these technologies could be implemented system-wide, not only on BRT routes. *(See commuter profile on following page: Staten Island to Brooklyn)*

We will dedicate Bus/High Occupancy Vehicle (HOV) lanes on the East River bridges

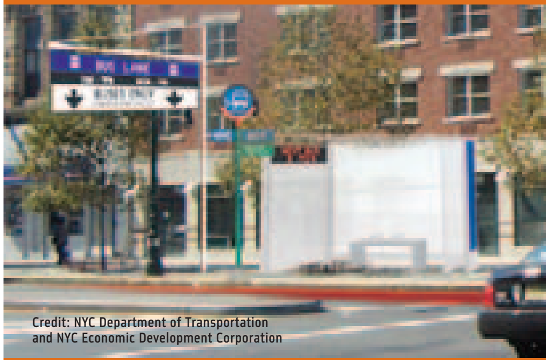
As neighborhoods in Brooklyn and Queens grow, congestion on some subway lines across the East River worsens. Crowding is felt most acutely at the stations nearest Manhattan, where rush hour riders are increasingly forced to let packed trains go by before finding one they can squeeze into. That's why bus service across the river would be an attractive alternative for many of these riders.

We will create new or improved bus lanes on the Manhattan, Williamsburg, and Queensboro Bridges to allow the MTA to expand local service to and from Manhattan. These lanes could also serve express buses and carpoolers. We will work with the MTA to identify the bus routes that will benefit most from these lanes, and particularly alleviate crowding on the E train, L train, and 7 train.

We will explore other improvements to bus service

Further opportunities to improve bus service across the system exist. Many of the technologies that will be used for BRT—traffic light priority, electronic message boards, bus bulbs—could be used by regular buses as well. Opportunities besides the East River Bridges may exist where dedicated bus lanes could significantly improve service. Adjustments to service patterns—skip-stop

New York City Bus Rapid Transit Stop rendering



Credit: NYC Department of Transportation and NYC Economic Development Corporation

CASE STUDY

Bus Rapid Transit Around the World

It was in the mornings that Ottawa's Bus Rapid Transit (BRT) system really made the difference for Andrew Harder.

"I don't know how I would've gotten to work," said Harder. "Because of BRT, I didn't have to get up at 5 am."

BRT gives commuters the option of taking mass transit to work, without the sacrifices that bus riders sometimes make to turtle-paced traffic.

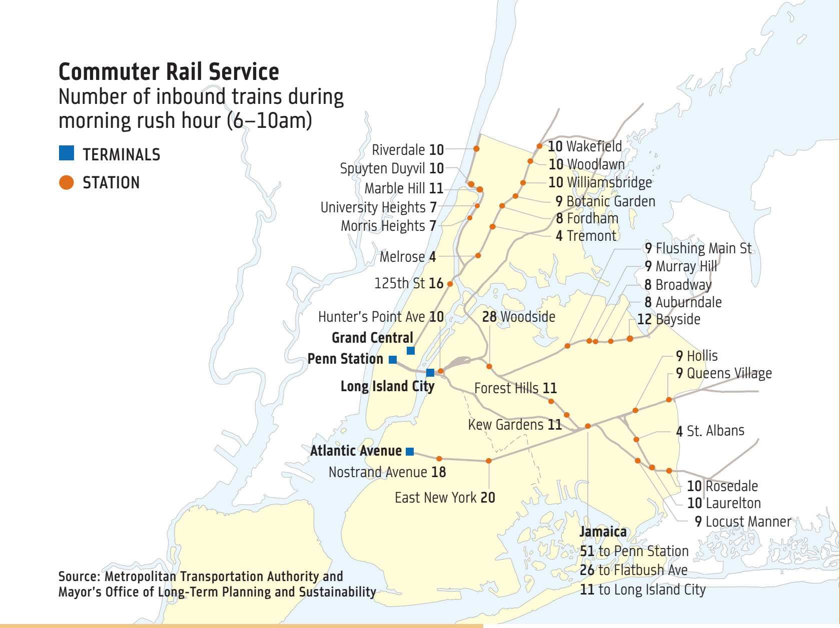
Over the last two decades, Bus Rapid Transit has become a popular tool, used by cities like Bogota, Boston, Sydney, Jakarta, Miami and Seattle to alleviate congestion. Today, Miami's BRT system shuttles around 18,000 passengers each day. Seattle's BRT serves 46,000 weekday commuters, and Boston gives 4,500 commuters a ride during morning rush hour.

Since 1983, Ottawa has installed 28 stations and nearly 20 miles of exclusive busways—the most extensive system in North America. The 900-bus fleet carries more than 200,000 riders every day.

BRT buses frequently receive priority at traffic signals, allowing them to travel through intersections without delay. In Ottawa, message boards at select passenger stations give riders updates on when to expect the next bus, a system that New York City will be adopting for its first five BRT routes, which launch in 2007.

Off-vehicle fare collection is another improvement New York City is exploring. In Curitiba, Brazil—which pioneered BRT routes in 1974—features like these reduce waiting time at the station by at least 20 seconds per stop.

"It's a lot like riding the subway," Harder said. "But with fewer stops, and sunlight."



COMMUTER PROFILE
Staten Island to Brooklyn

Tony Licciardello laughs when asked how long he has commuted from his home in New Dorp, Staten Island, to his job as a court officer in Downtown Brooklyn.

"Oh, a long time," he says. "At least 20 years."

In that time, Licciardello has gotten his daily drive down to a science—one based on the desire to avoid the complex subway and bus route commute that links his borough to Brooklyn.

There is currently no direct transit option to shuttle the more than 2,600 New Dorp residents who commute outside Staten Island every day. Today, if Licciardello wants to leave his car at home, he has to take a local bus to the Staten Island Ferry, which drops him in Lower Manhattan, and then take the subway or bus to Brooklyn. The trip would take 90 minutes—and add an entire borough to his commute.

He opts for his car's relative ease over transfers and inevitable wait times—even though the travel time is roughly the same. But if there was a simpler transit route, Licciardello would leave his car, ending his constant search for parking and cutting down gas costs.

He will be getting the choice soon. A new Bus Rapid Transit (BRT) option from Hylan Boulevard in Staten Island—set to launch in 2007—will provide Licciardello with direct service to the subway—and shave 15 minutes off his commute time. Congestion pricing would give Licciardello a faster drive, too, removing some of the Manhattan-bound traffic that he battles with each day.

"Now it's just more convenient for me to drive," Licciardello said. "But I would definitely take public transit instead—even if it took a little bit longer."

Express Bus service, for example, or stopping some Express Buses in Downtown Brooklyn—might also increase ridership and help to reduce congestion. Changes in traffic patterns, signal timing or street alignment might eliminate "hot spots" where buses routinely get delayed. Because they rely on City-owned streets, good bus service requires close cooperation between the City and the MTA. The City will invite the MTA to work with it to identify a wide range of opportunities, big and small, where joint efforts might provide better transit service. *(See map on previous page: Express Bus Service Today)*

INITIATIVE 5

Improve local commuter rail service

We will seek to expand local use of Metro-North and Long Island Rail Road (LIRR) stations

For some neighborhoods in the Bronx, Brooklyn, and Queens, commuter rail is the best transit option. But local service at many of these stations is infrequent, and commuter rail costs even more even than express buses—especially if a transit transfer is necessary. Of the 33 commuter stations in the city, 15 do not have rush-hour service frequencies comparable to local stations in suburban counties. *(See map above: Commuter Rail Service)*

Capacity constraints drive some of this shortage; in some cases, expanding service will only be feasible after new projects such as East Side Access are complete. At others, higher ridership can come from improved connection from local buses. We will seek to work with the MTA to identify innovative ways that commuter rail service can serve Queens, Brooklyn and the Bronx.

INITIATIVE 6

Improve access to existing transit

We will facilitate access to subways and bus stops citywide

Every transit trip requires the passenger to get to the subway station or bus stop. But in many cases across the city, that can be almost as difficult as the journey itself.

Three main challenges prevent transit stops from being used to their full capacity: subway stations where the sidewalks are congested; bus stops where riders have to wait in the street under elevated rail structures; and bus stops along city streets that lack sidewalks. By making it easier for people to reach and use our existing transit system, we can encourage a broader mode shift in every borough.

All over New York are sites that require simple improvements to make existing transit options more accessible. For example, in the burgeoning neighborhood of Williamsburg, commuters increasingly ride bicycles to the L train. Today the line of bikes at the Bedford Avenue subway station stretches down the block, spilling across the narrow sidewalk. To relieve this condition, we will remove parking spaces, expand the sidewalk, and install more bicycle racks.

After evaluating all 468 subway stations, we have identified 24 areas in Brooklyn, Queens, and the Bronx that are not yet equipped to handle the rise in sidewalk congestion. These sites were selected in 2000, and work is underway to complete all of them by 2019.

In 42 other sites across the city, bus stops are tucked under elevated structures near subway stops. The columns interfere with traffic patterns especially when combined with high volumes of pedestrians. Buses cannot weave through the columns to reach the curb, which forces waiting riders to step into traffic to see if a bus is approaching. When the bus arrives, boarding frequently takes place on the street. To date, we have built raised islands that serve as bus stops at four locations. By 2021, we will complete work at all 42 locations. These upgrades can also include sidewalk extensions to make it easier to get to the stop.

In other cases, there is no sidewalk to the bus at all. For example, at Staten Island's Hylan Boulevard and Fairlawn Avenue, dozens of adults and school children need to cross the road daily to walk to school, work, or the bus stop, but there is no sidewalk along the eastern side of the road leading to the crosswalk or the bus stop.

The Sidewalks to Buses initiative focuses on providing sidewalks, crosswalks, bus waiting areas, and other pedestrian safety improvements to improve access at these locations. Priority will be given to areas where pedestrians are exposed to high-speed or high-volume traffic on their way to and from bus stops. On average, each location will require a quarter mile of sidewalk to provide a safe route. We plan to complete work at up to 15 different stops each year.

TRANSIT ACCESS INITIATIVE

INITIATIVE	LOCATIONS	COMPLETED/ UNDERWAY
Subway/Sidewalk Interface	24	2
Bus stops under Els	Up to 42	4
Sidewalks to Buses	2 pilots identified	0
TOTAL	**68**	**6**

Source: NYC Department of Transportation

INITIATIVE 7

Address congested areas around the city

We will develop congestion management plans for outer borough growth corridors

The vast majority of trips made in New York are not to Manhattan; even among commuters, nearly twice as many outer borough residents work outside of Manhattan as inside—1.56 million versus 841,000. As neighborhoods across the city grow, we must develop targeted plans to diffuse congestion across the city.

The main commercial stretch along Brooklyn's Church Avenue is one such area. This vibrant commercial district attracts shoppers arriving by car and transit, as well as local truck traffic. Double parking causes even more delays between Coney Island Avenue and Utica Avenue, and the B35 bus is slowed by traffic, encouraging more to drive rather than take transit.

We have identified nine corridors that experience this kind of road and transit congestion:

- Fordham Road (Bronx)
- White Plains Road (Bronx)
- Church Avenue (Brooklyn)
- Nostrand Avenue (Brooklyn)
- West 96th Street (Manhattan)
- West 181st Street (Manhattan)
- Northern Boulevard (Queens)
- Woodhaven Boulevard (Queens)
- Amboy Road (Staten Island)

Over the next two years, we will undertake an intensive study of each area, evaluating traffic congestion, truck traffic, pedestrian mobility, transit service, and current and future land use potential. When each study is finished, we will work with affected communities to complete customized plans that reduce traffic congestion, improve air quality, provide a safer environment for vehicular and pedestrian traffic, and improve quality of life.

Actions under consideration will include new bus, pedestrian and bicycle enhancements, changes to the road design, modification to parking rules to free up curb space, and technological upgrades like computerized signaling systems to facilitate traffic flow. Broader improvements, such as taxi or for-hire vehicle stands, increased transit service, and targeted traffic enforcement, could also be part of the solutions.

We will also identify broader congestion "Growth Areas" across the city, potentially spanning entire neighborhoods, and develop neighborhood-specific strategies using many of the same tools.

Promote other sustainable modes

Despite our dependence on subway, bus, and commuter rail service, opportunities exist to expand the use of two other modes of transportation: ferries and bicycles. Today only 55,000 people reach Manhattan island by ferry daily. And although many New Yorkers own bicycles, most consider cycling to be recreational, not a mode of transportation. As a result, we will work to expand ferry service and integrate it into the transit system, and promote broader bicycle use across the city.

For different reasons, bikes and ferries are highly sustainable modes of transportation. Ferries require little infrastructure and make use of space that is already there—our waterways. With modern engines and pollution control equipment, they can also be low-polluting forms of transportation. Nothing is as low-polluting as the human-powered bicycle, which can give many New Yorkers an alternative to the auto for short trips and a way to get exercise as well.

COMMUTER PROFILE

Co-op City to Lower Manhattan

Oscar Alvarado spends at least 720 hours—the equivalent of one month every year—commuting.

On weekday mornings, he leaves his apartment in Co-op City and boards the QBx1 bus, which takes him to the Pelham Bay station. From there, he rides the 6 train to 125th street, where Alvarado waits for the 4 or 5 train. Almost every morning, he lets one train go by—it's always too packed—and gets on the next, which takes him to Lower Manhattan.

"But I'd rather wait than get to work rumpled and frustrated," he said. "I don't get how other people push into the car like that."

In Co-op City, a neighborhood of 50,000 people living in 15,000 apartments, transportation is a serious topic. On any given morning, almost 14,000 people who work in Manhattan, like Alvarado, pour out of the Co-op City complexes and onto crowded local and express buses.

"The whole community here is a little isolated—and transportation improvements are really important," said Oscar Alvarado, climbing onto the bus.

Alvarado has lived in Co-op City for eight years, and his commute to work is 90 minutes each way. He has tried driving in, but the prospect of finding parking around his office in Lower Manhattan is too daunting. He has also tried commuting by express bus, but the ride only brings him to 23rd street.

"And then, I'd have to get off the express bus and walk to the 6 train, anyway," he said. "It's not an easy transfer, and not really a viable alternative."

Alvarado's voice perks up, though, when he is asked about the possibility of a new Metro North line. By 2013, Metro North trains could leave from Co-op City, a quick shuttle ride from Alvarado's home. With the new service, it would take commuters just 30 minutes to glide into Penn Station from Co-op City. Riding Metro North would cut Alvarado's commute time by a third. The project is relatively low-cost for rail transit—under $2 billion—but it cannot happen until the LIRR's East Side Access project frees up space in Penn Station.

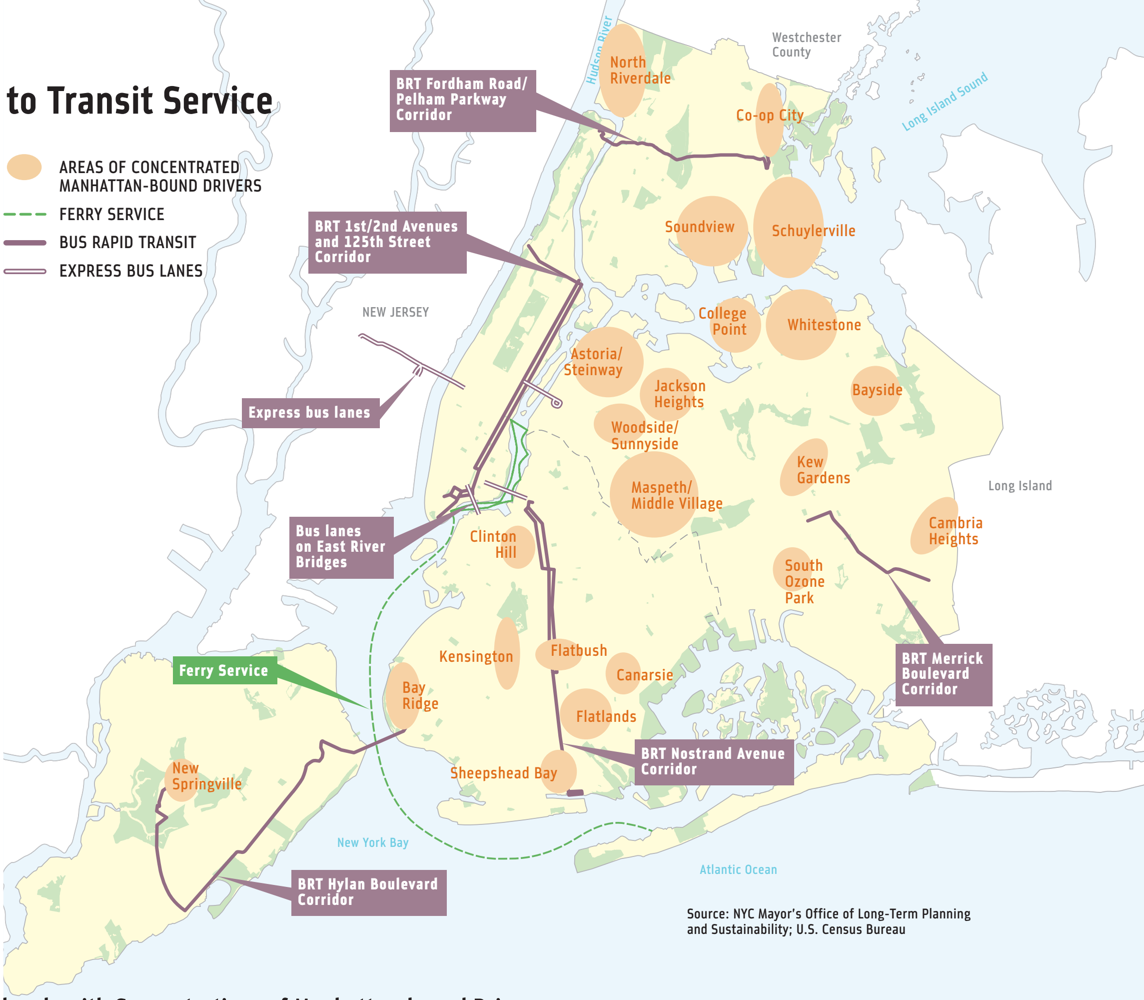
"Going straight to Penn Station, right near all the lines that take me to work, would be just like a regular transfer," Alvarado said. "And it would be quicker, and more comfortable. That would be a major improvement."

Near-Term Improvements to Transit Service

In all New York City neighborhoods, a majority of Manhattan-bound commuters take transit. But the areas shown in this map have higher concentrations of drivers to Manhattan than any other parts of the city. Many of these areas do not have rail transit service; others have subway or rail service that does not meet all residents' needs. With only slight enhancements to the system more people in these areas would choose transit over driving. These enhancements would emphasize connections to the subway or commuter rail system where feasible; minimize transfers; improve reliability; and use existing bus routes and corridors where possible.

Intermodal connections improve the timing or the location of bus stops to make an existing two-seat ride more convenient. **Rerouting existing bus routes** can bring buses closer to potential riders or make routes more direct. **Bus prioritization** can change traffic lights when buses approach to speed bus travel. **Improving subway and rail station access** can cut walking distances or make entrances easier to navigate. On some routes, **bus frequency** is too low for the potential demand and could be increased; on others, frequency is sufficient to allow **skip-stop** or **limited-stop service** that would cut travel times. **New bus routes** would increase options within the system—but are the most expensive of these short-term measures. In addition, many of these neighborhoods will benefit from **other projects** outlined in this plan, ranging from new commuter rail service to BRT.

The table below outlines which of these strategies we would recommend for each neighborhood.



Potential Improvements for 22 Neighborhoods with Concentrations of Manhattan-bound Drivers

NEIGHBORHOOD		INTERMODAL CONNECTION	RE-ROUTING OF EXISTING BUS ROUTE	BUS PRIORITIZA-TION	SUBWAY AND RAIL STATION ACCESS	INCREASE BUS FREQUENCY	SKIP STOPS/ LIMITED STOPS	NEW BUS ROUTE	OTHER PROJECTS
BRONX	Co-op City	●							Metro-North to Penn Station; BRT
	North Riverdale	●							Metro-North to Penn Station
	Schuylerville	●		●					
	Soundview	●		●	●				
BROOKLYN	Bay Ridge		●	●			●		
	Canarsie	●	●			●			Nostrand BRT
	Clinton Hill	●			●				Bus Lane on Manhattan Bridge
	Flatbush	●		●					Nostrand BRT
	Flatlands	●		●		●	●		
	Kensington				●				
	Sheepshead Bay				●				Nostrand BRT
QUEENS	Bayside	●	●			●			LIRR East Side Access
	Cambria Heights	●	●	●					Merrick Blvd BRT
	College Point	●		●				●	
	Jackson Heights	●	●		●	●	●	●	Bus Lane on Queensboro Bridge
	Kew Gardens	●	●	●					LIRR East Side Access
	Maspeth / Middle Village / Ridgewood		●		●				
	South Ozone Park	●	●	●	●				
	Astoria / Steinway		●	●	●				Bus Lane on Queensboro Bridge
	Whitestone		●						
	Woodside / Sunnyside	●						●	LIRR East Side Access
STATEN ISLAND	New Springville							●	Hylan Blvd BRT

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

INITIATIVE 8

Expand ferry service

We will seek to expand service and improve integration with the city's existing mass transit system

Along Newtown Creek, which separates Brooklyn and Queens, the transformation of New York's waterfront is clear. To the north, apartment buildings are rising and land is being cleared for thousands of additional units of housing at Queens West, many of which will be affordable to middle-income families. To the south sit the low-lying factories and warehouses of Williamsburg and Greenpoint, which are being converted into a waterfront esplanade, parks, and housing.

Across the city, more than 60 miles of largely-abandoned waterfront land is being reclaimed for recreation and new communities. But some of these neighborhoods lack the basic transportation infrastructure required for sustainable growth. In some areas, the nearest subway stop is more than three-quarters of a mile away. Where there is service, the trains and buses are increasingly crowded as growing numbers of commuters use stations closest to Manhattan.

Ferries and water taxis can help solve both of these problems. In addition, ferries have proven that they can provide critical backup transportation for the city during emergencies, as they did on 9/11 and during the 2003 blackout.

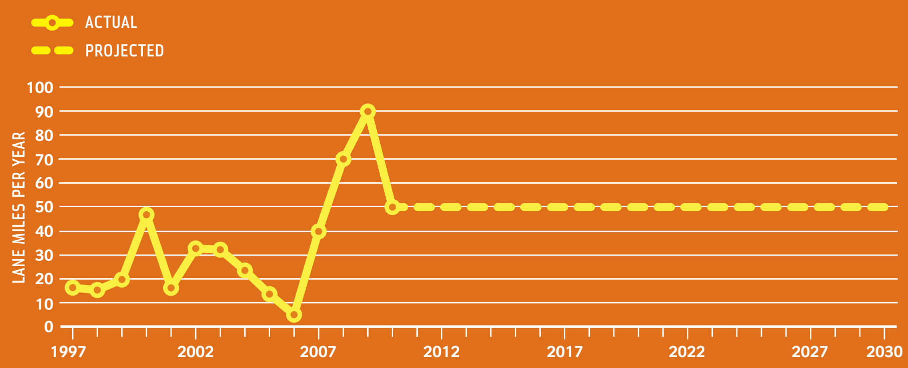
That's why we will seek to expand ferry service to emerging neighborhoods across the city and seamlessly integrate it into the city's transportation network.

The City will seek to initiate a new privately-operated ferry system along the East River that will connect developing areas of Brooklyn and Queens with Midtown and Lower Manhattan. This new service would connect ferry landings at Queens West, Greenpoint and North and South Williamsburg, with landings at Pier 11 (Wall Street) and East 34th Street in Manhattan. In addition, we will seek to pilot service between Manhattan and the Rockaways in Queens. Other parts of the city where ferry service may make sense—such as southern Queens, the south shore of Staten Island, and the Bronx—will be evaluated based on potential ridership and financial flexibility.

Ferry service is most effective when it connects riders with land-based transit bringing them close to their inland destinations. That is why we will work with the MTA to extend bus routes to ferry docks from Midtown. We will also explore the possibility of using BRT or other fast service on crosstown routes for more efficient connections, especially across 34th Street and 42nd Street.

Finally, for ferries to be considered an effective component of the city's mass transit system, they must be treated that way. That is why ferry passengers must be able to use their MetroCards for ferries and the connecting bus service. We will work with the MTA and the ferry companies to achieve this intergration.

Bike Lane Construction



Source: NYC Department of Transportation

INITIATIVE 9

Promote cycling

We will pursue strategies to encourage the growth of cycling across the city

Cycling also offers an environmentally-friendly and space-efficient way to travel around the city. Other cities have embraced cycling as emission-free, low-cost travel mode that promotes a healthy lifestyle—and one that New Yorkers are increasingly embracing. Cycling in the city is estimated to have increased 75% from 2000 to 2006. But there is still plenty of room to grow; less than 1% of New Yorkers commute to work by bicycle. *(See case study: Cycling Emerges Around U.S.)*

We will complete the city's 1,800-mile bike master plan

In order to reduce traffic and reach our clean air and greenhouse gas reduction goals, New Yorkers should be given the option of reaching their jobs and major city destinations through cycling. That is why we will dramatically accelerate the implementation of the City's 1,800-mile bike lane master plan, to ensure that the entire system is in place before 2030. *(See chart above: Bike Lane Construction)*

CASE STUDY

Cycling Emerges Around U.S.

When Brean Martin needs a ride across Chicago, he plops his bike on a rack between a bus's headlights.

"Now, every bus has carriers," said Martin. "I get the feeling it helps bus drivers be more careful about bikers on the road."

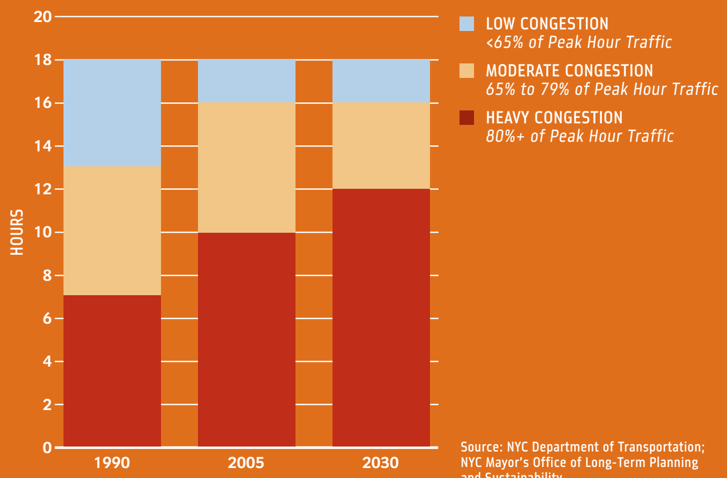
Cities across the nation are looking to the two-wheeler as a key to creating sustainable, enjoyable public transportation. They're planning miles of bike paths, starting public bicycle programs, and zeroing in on safety measures. Seattle, Portland, and Boulder have instituted major networks. Baltimore and Philadelphia are on the road to better biking, too.

By 2015, Chicago wants at least 5% of all trips less than five miles to be on bicycle. The city has discovered that shifting trips to bikes can become a congestion management strategy. It has already installed more than 160 miles of bike lanes throughout the city.

Brean Martin thinks car congestion has already lightened up.

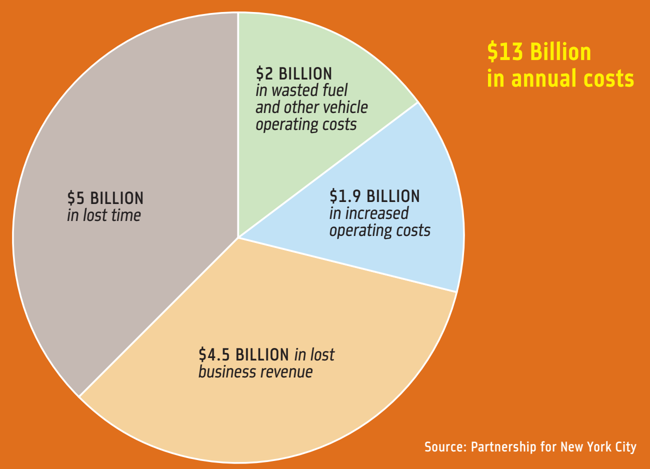
"It used to be that I'd go flying on my bike through dead-stopped traffic," said Martin. "Now, the cars actually move."

Hours of Congestion



Source: NYC Department of Transportation; NYC Mayor's Office of Long-Term Planning and Sustainability

Annual Cost of Congestion to the New York Region



Source: Partnership for New York City

The plan includes 504 miles of separated bike paths (Class 1 facilities) and 1,296 miles of striped bicycle lanes or markings reminding drivers and cyclists to share the road (Class 2 and 3). To date, only 420 miles have been constructed.

We will complete Phase 1 of the plan in 2009, which will add 200 lane miles in targeted areas across the city—with the first 40 finished by June 2007.

We will prioritize areas with high demand, building connections between existing portions of the network, and strengthening access to parks through special bike paths known as greenways. These greenways not only offer their own recreational benefits such as biking, skating, and walking throughout our city's park system; they can also open up new areas of parkland.

Phase 2 and beyond will complete the remaining bike lanes, resulting in 1,800 total lane miles of bicycle facilities in New York City.

BIKE MASTER PLAN STATUS

LANE MILES	CLASS 1	CLASS 2	CLASS 3	TOTAL
Built	200	176	44	420
Planned for 2030	42	1,076		1,380
TOTAL	**504**	**1,296**		**1,800**

Source: NYC Department of Transportation

We will facilitate cycling

In addition to implementing the master plan, we must provide support for city cyclists and encourage New Yorkers to explore this form of transportation. That means improving public education on the benefits of cycling and on safety issues, increasing necessary bicycling infrastructure such as bike racks and lockers, and improving observation of traffic and bicycling laws.

Cyclists often point out that their main concern is having safe places to store their bikes. To solve this problem, the City's Department of Transportation (DOT) will continue the CITYRACKS program by installing 1,200 additional on-street bicycle racks throughout the City by 2009, and commit to that level of installation until every neighborhood has adequate bike parking. We will also pursue legislation to require that large commercial buildings make provision for bicycle storage either on site or reasonably nearby.

Improve traffic flow by reducing congestion

The city's quality of life and economic prosperity depend on a transportation system that can meet demand. That means we must use our streets more efficiently if we are to absorb millions of new residents, workers, and tourists.

To achieve this goal, we will expand proven strategies to smooth traffic flows; and we will encourage commuters to shift from their cars onto an improved transit system, while providing better service for those who choose to continue to drive. *(See charts above: Hours of Congestion and Annual Cost of Congestion to the New York Region)*

INITIATIVE 10

Pilot congestion pricing

We will seek to use pricing to manage traffic in the Central Business District (CBD)

Over the last 30 years, even significant improvements in our subway system have not substantially changed the way New Yorkers get to Manhattan. Despite enhancements in safety, efficiency, and aesthetics, the percentage of drivers has remained essentially unchanged.

On a given workday, the Manhattan CBD is home to nearly 2 million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Cars compete for the road with buses, trucks pedestrians, cyclists and taxis. Vehicles trapped in traffic spew pollution into the air, putting the health of those living near congested roads at risk; and the resulting jams cost the region more than $13 billion dollars every year. As our population grows by another 900,000 people, we add more than 20 million visitors annually, and 750,000 new jobs—many concentrated in the CBD—the consequences of congestion will become ever more severe.

The strategy that has emerged around the world as the most effective tactic to this gridlock is congestion pricing, a system that charges drivers a fee for entering a city's center. London, Stockholm, and Singapore all employ congestion pricing. Here in the United States, the U.S. Department of Transportation has also encouraged cities to undertake market-based congestion reduction initiatives. *(See case study on facing page: London Congestion Pricing)*

In every case where it has been implemented, congestion pricing has been successful at reducing traffic both within the "congestion zone" and outside it, speeding bus service, decreasing delivery times, improving air quality, and cutting greenhouse gas emissions, **with no material impact on the economy**, including retail activity in the zone in which the charge applies.

Key to the success of congestion pricing in those cities—and the widespread acceptance of initially reluctant businesses and residents—is the fact that congestion pricing is only one part of an overall commitment to increase investment in mass transit.

That is what we propose for New York. We believe a thoughtfully designed congestion pricing program should be part of a solution to the regional and city-wide transportation gridlock we will be facing. Its proceeds would be dedicated to funding billions of dollars of transportation improvements, including immediate enhancements to some of New York's least transit accessible communities. *(See following page: New York City's Congestion Pricing Plan)*

Summarized below is an illustrative example of how congestion pricing could be implemented and its impact. The details would have to be determined through a collaborative process between the City and the State, because State legislation would be needed to enable the City to impose a fee and give the City the right to fine violators. State law could authorize the City to define the pricing area, the amount of the charge, the hours it would apply, and the fines for failure to pay, or it could specify those details in the legislation. The legislation would also need to specify the type of environmental review that would be necessary.

Given its successful track record in other major global cities, we seek to pilot congestion pricing in New York for a test period of three years. The best way to predict whether it will work—and whether the benefits outweight the inconveniences—is to try it. Further, we believe that a pilot could be undertaken with no outlay of City or State funds, but leveraging Federal and private dollars.

Operating congestion pricing

Passenger vehicles entering or leaving Manhattan below 86th Street during the business day (weekdays 6 am to 6 pm)—with the exception of the FDR Drive, the West Side Highway, and West Street—would pay an $8 daily fee. Trucks would pay $21. Autos that drive only within "the Zone" would pay half price. The charge would apply to all vehicles, except emergency vehicles, those with handicapped license plates, taxis, and for-hire vehicles (radio cars).

Vehicles using E-Z Pass that travel through MTA or Port Authority (PA) tolled crossings on the same day would pay only the difference between their MTA or PA tolls and the congestion charge, so that drivers don't have an incentive to detour across free bridges. Because roads on the periphery of Manhattan will not be in the Zone, trips around the Zone (for example, from Harlem to Brooklyn) would not be charged.

Payment would involve no toll gates or waiting areas. The technological backbone of the system would be E-Z Pass, which relies on high-speed sensors, and is used by more than 70% of New York area drivers. The charge would appear on drivers' E-Z Pass statements.

For those drivers without E-Z Pass, their license plates would be checked automatically by cameras mounted on traffic light poles, with payment options available through Internet, the telephone, or at participating retail outlets. Drivers would have two days to pay the charge.

Impact of congestion pricing

The main benefit of congestion pricing would be reduced traffic congestion. Traffic within the Zone would decrease 6.3%. Speeds are projected to increase 7.2%. The impact would also be felt in the other boroughs, since the number of cars passing through other neighborhoods on their way to Manhattan will decline. This is especially the case on key thoroughfares leading to bridges, including Flatbush Avenue in Brooklyn and Queens Boulevard in Long Island City. (One study suggested that 43% of all traffic in downtown Brooklyn and 57% of rush-hour traffic in Long Island City is bound for Manhattan). Overall, travel speeds in all four boroughs would get better due to congestion pricing in Manhattan.

The 4.6% of New York City residents who drive to work in the Zone would pay a daily charge less than the cost of commuting by Express Bus, and they would have a faster commute than today. Everyone who drives, especially in Manhattan, would experience the benefits of reduced traffic and higher speeds. Workers and companies whose income depends on providing services in Manhattan would be more productive. A plumber who currently spends a quarter of his day sitting in his van in Midtown traffic traveling from site to site would be able to do more work every day—increasing his income far more than the $8 fee he pays. Delivery firms would have fewer packages delayed. Buses would run faster. Taxi drivers would carry more fares in a shift. These benefits would lower costs of doing business in the city, and benefit all New Yorkers.

The implementation of short-term improvements would be essential to the success of any congestion pricing program and to the transit infrastructure described earlier in this chapter, including: bus rapid transit, improved express bus service, dedicated bus lanes on bridges, and new ferry service, especially to areas of the city that lack convenient mass transit access to Manhattan today. In many cases, these improvements would be put in place prior to implementation of congestion pricing.

CASE STUDY

London Congestion Pricing

In 2000, headlines often compared the speeds of central London traffic to Victorian horse-and-buggies. And so did Londoners.

"Some days, it took me almost an hour to drive six miles from home to work in the morning," said Gregory Phillips, an architect who works in the city's West End.

But when Mayor Ken Livingstone introduced an internationally proven congestion-mitigation strategy he was named the city's "Deadliest Enemy" by the London *Daily Telegraph.*

The strategy was congestion pricing—a plan to charge drivers a daily fee for the use of London's busiest roads during business hours.

Opponents of the congestion charge argued the charge would "strangle retailers" in the area. More than half of Londoners believed that the fee would make no difference in traffic patterns at all. Westminster City Council called on the High Court to order a full-scale public inquiry into the program, and more than 60% of the city's population stood against the idea.

Despite the skepticism, in February 2003, London began charging cars £5 ($10) to access central London's most congested streets.

Traffic delays in London have plunged substantially—by 30%. Road speeds have increased 19% from the introduction of congestion pricing. A feared drop in retail spending never materialized.

Since the program started, more than $360 million has been funneled into expansions and improvements of mass transportation—improvements that are attracting more Londoners to public transit. Bus ridership has increased 30% during peak periods The extra road space has been reshaped into stunning public spaces like the new plaza at Trafalgar Square.

Now, Gregory Phillips rides his bicycle to work. "Since the introduction of the congestion charge, I find that I cycle in almost every day, and I love it," he said.

In fact, Phillips said, his commute has actually become much quicker. "If I'm cycling, I can get into the office in 35 minutes."

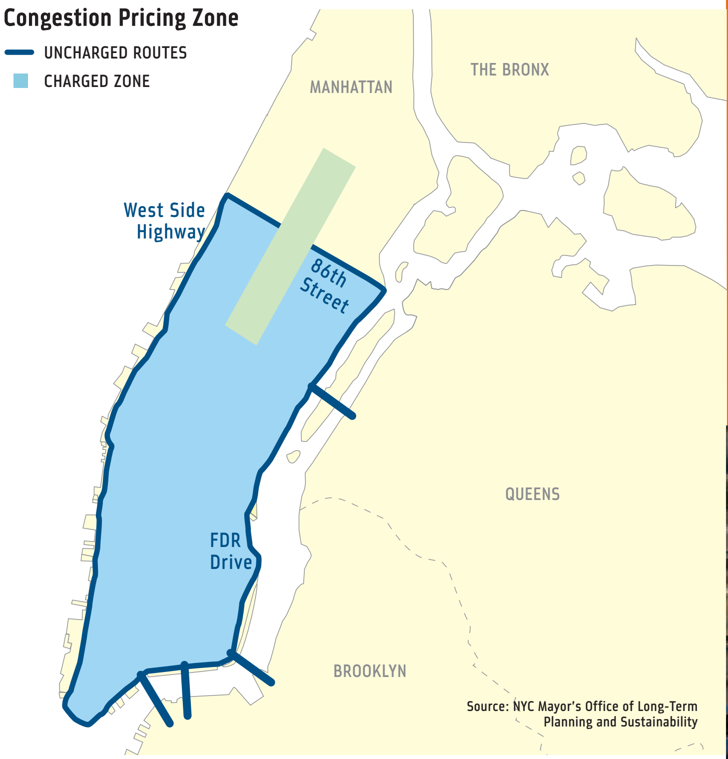
Now that's an improvement.

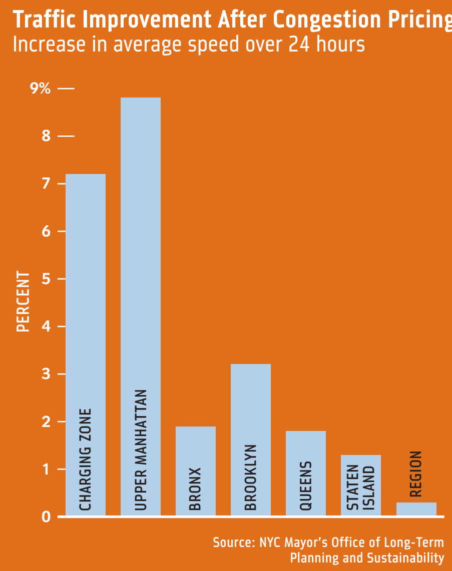
CHANGE IN TRAFFIC WITHIN LONDON'S CHARGING ZONE AFTER CONGESTION PRICING

Automobiles	−34%
Heavy trucks	−7%
Vans	−5%
Buses	+21%
Taxis	+22%
Bicycles	+28%
ALL VEHICLES	**−12%**

Source: Transport for London

New York City's Congestion Pricing Plan





Congestion on Lexington Avenue in Midtown, Manhattan
Credit: Robert Caplin/The New York Times

CONGESTION PRICING FEATURES	
Zone boundaries	Manhattan below 86th Street, except • West Street and West Side Highway • FDR Drive • Battery Park Underpass • Queensboro, Williamsburg, Manhattan andBrooklyn Bridges and their approaches.
Hours	6 am–6 pm, Monday–Friday (no charges on weekends)
Charges: autos	$8 daily charge to enter, leave, and move within the zone during charging hours $4 daily charge for travel only within the zone during charging hours
Charges: trucks	$21 daily charge to enter, leave, and move within the zone during charging hours $5.50 daily charge for travel only within the zone during charging hours
Trips bypassing the Zone	Drivers do not pay unless they enter the zone. For example, driving from Brooklyn to the Bronx on the Brooklyn Bridge and FDR Drive would still be free
Toll rebates for E-Z Pass users	E-Z Pass users paying bridge and tunnel tolls to enter the zone will be credited the amount of their round-trip tolls that day, up to $8. For example, an E-Z Pass driver who now uses the Battery Tunnel to enter and leave Manhattan will pay no additional charge, because the current round-trip toll they pay is already $8
Exemptions	No charges for: • Handicapped license plates • Emergency vehicles and transit buses • Yellow taxis and livery cabs
Collection technology	At-speed E-Z Pass readers will allow fee collection without slowing vehicles down. Vehicles not equipped with E-Z Pass will be recorded by cameras and drivers can pay the fee by phone, internet or at participating retailers within 48 hours.
Revenues	All net revenues will be dedicated 100% to transportation investments through the SMART Financing Authority
Operating entity	NYC Department of Transportation will control the system, which will be built and maintained by a contractor yet to be selected

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Over time, more and more commuters would benefit from the longer-term investments in mass transit, 50% of which would be funded by the nearly $400 million net revenues of congestion pricing in its first full year.

Although areas near the congestion pricing zone should experience reductions in traffic due to fewer drivers passing through on their way to the Zone, we would work with local communities if it seems that they would be impacted by drivers seeking to avoid the congestion pricing charge. Possible solutions include parking permits for residential neighborhoods and an expansion of the Muni meter program in commercial areas.

Overall, 94,000 travelers are projected to take advantage of new and improved transit choices, achieving the city's first significant mode shift in decades. Only 1.4% are expected not to take the trip into the Zone at all because of the congestion charge. The majority of these will travel instead to destinations in Upper Manhattan and the outer boroughs, helping businesses in those areas. As a result, the overall economic impact of the congestion charge is expected to be neutral to positive, consistent with the experience of cities where congestion pricing is in operation.

INITIATIVE 11

Manage roads more efficiently

We will increase the use of Muni meters within the city and develop an integrated traffic management system for our regional transportation network

We will expand the use of Muni meters

Muni meters, first introduced in New York in 1996, offer numerous advantages compared to traditional single-space parking meters. For drivers, they increase parking capacity by allowing cars to park closer together. They also enable the city to improve traffic flow by charging vehicles progressively higher fees for longer stays, encouraging shorter stays and more turnover. This increased turnover reduces double-parking and cuts the amount of time drivers spend "cruising" for a parking space. The meters also allow for more flexible payment options, accepting coin, credit card or city parking cards, and they create more sidewalk space for pedestrians—one Muni meter can replace up to six single space meters.

While Muni meters are currently only in use in certain areas, DOT will introduce them in business districts across the city, completing installation in all possible locations by 2011.

We will create an integrated traffic management system

The region's congestion problems are compounded by inefficiencies and lack of coordination among agencies and travelers. Poorly timed signals can cause backups, and drivers are often not alerted to traffic jams until they are actually sitting in them.

That's why the City has launched a five-year plan to unify and expand the information systems on our transportation network and enhance coordination throughout the region. Although we have utilized Intelligent Transportation Systems (ITS) for years through the use of cameras and electronic signage on highways, the real benefits can only be achieved when the information is centralized and coordinated.

Also in 2008, the New York Police Department, New York State Department of Transportation and the City's DOT will open the Joint Transportation Management Center, in Long Island City, which will enhance our ability to track and coordinate responses to traffic incidents.

But coordination is only the beginning; significant improvements require significant investments in technology. We will continue technological upgrades. By 2009, we will electronically control the timing on more than 70% of the city's traffic signals, allowing us to respond in real-time to emerging traffic conditions; by 2012, all of the city's highways will be equipped with ITS technologies.

Expanded technology and coordination will improve our ability to respond to traffic incidents, manage traffic congestion, and deliver information to drivers in real time.

INITIATIVE 12

Strengthen enforcement of traffic violations

We will improve our ability to enforce traffic laws

The number of vehicles is not the only contributor to congestion. Drivers who violate traffic laws make congestion worse. While the City undertakes focused efforts to increase enforcement, we must make broader, more systematic changes to enhance enforcement. We will undertake two initiatives and advocate for State action on a third to ensure that many drivers do not suffer from unnecessary congestion due to the illegal behavior of a few.

We will expand the number of Traffic Enforcement Agents

There are an estimated 800 intersections around New York City—in all five boroughs—where the presence of traffic enforcement agents (TEA) will be beneficial—not as ticket writers, but as traffic directors. The NYPD currently has approximately 500 "level 2" traffic enforcement agents whose main role is to direct traffic. But on any given day, the majority wind up not controlling the flow at busy intersections, but ensuring the movement of traffic around construction sites and other disruptions. To provide the coverage that will keep traffic moving, the NYPD will increase the force of level 2 TEAs by 100 agents this year, to be followed by further increases in the future.

We will enable all TEAs to issue blocking-the-box tickets

A major cause of true gridlock is drivers choosing to "block the box"—to cross an intersection even if there is no room on the other side. But writing a "blocking-the-box" ticket is currently a state-regulated moving violation, which may only be issued by police officers and selected traffic enforcement agents. We will seek to create a new parking violation that will allow both police officers and all TEAs to write block-the-box tickets faster, which will encourage more vigilant ticketing of violators.

We will expand the use of traffic enforcement cameras

Along with blocking the box, another significant cause of congestion—and a major safety hazard—is the running of red lights. Currently, New York State law allows the City to use only 100 red light cameras among the city's 12,000 signalized intersections. Further, cameras are not allowed to be used for speeding violations.

To improve the flow of traffic and to improve safety on our streets, we will seek state authorization to expand the use of red light cameras dramatically, and to begin using them to enforce speeding laws. We will also use the cameras more effectively, by rotating them around the city, so that drivers will not be able to predict where they are located. In this way, we will change driver behavior and at the same time minimize the chance that drivers will cause accidents by stopping short at the last minute in order to avoid receiving a summons.

INITIATIVE 13

Facilitate freight movements

We will work to expand options for freight movements

One of the major ways that New Yorkers bear the costs—economic, health, and social—of congestion is in the movement of freight. Delays to deliveries increase the cost of the goods sold in New York stores. Congestion—and inconsistent tolling policies—lead trucks to take circuitous routes through neighborhoods. Deliveries require curbside space, and when trucks can't find it they often cause more congestion, either by cruising for a space or by double parking. Congestion is even threatening the status of John F. Kennedy International Airport (JFK) as one of the nation's leading airfreight hubs—and the airport is one of the largest employers in Queens. Still, for the vast majority of deliveries to New York businesses and homes, trucks are the only viable option, even in the long term.

The City and its regional partners are undertaking several efforts to improve freight access across the region. In some cases, capacity would be added; more often, we would be attempting to manage the capacity we have more wisely, for the benefit of the truckers and the neighborhoods they drive through. For example, the results of the DOT's Truck Route Study will improve the overall management of truck traffic in New York City leading to improved efficiency of truck traffic, while at the same time working to keep non-essential truck traffic out of residential neighborhoods. Muni-meters will create curbside space to allow truckers to make deliveries more easily. Better traffic management and information will speed up all types of traffic. Congestion pricing will apply to trucks, but will also create an incentive for night time deliveries and eliminate the practice of trucks passing through Brooklyn and Manhattan to avoid the one-way tolls on the Verrazano-Narrows Bridge.

Two additional initiatives will be specifically focused on freight movement, but will also have benefits for other travelers.

We will improve access to JFK

Congestion en route to JFK is bad and getting worse, making the city less convenient and business-friendly. It also reduces the airport's competitiveness: in the last decade, JFK has been losing cargo business to airports outside the region, primarily due to delays and congestion on the road leading to the airport.

In June 2006, the City, in partnership with the Port Authority, created a private/public task force focusing on improving roadway access to JFK for passengers, employees and cargo. It has recently issued several short-term recommendations. These include: marketing the Cross Island Parkway as alternative to the Van Wyck Expressway for non-commercial vehicles; improvements to the Van Wyck Expressway; allowing 53' trailer access to JFK; and providing a southern route to JFK for commercial vehicles. We will pursue these recommendations, and explore the long term solutions the task force recommends in the future.

We will explore High-Occupancy Truck Toll (HOTT) Lanes

Around the world and in several states, truck traffic has been accelerated by the creation of new lanes dedicated to trucks, which pay for themselves through tolls charged for traveling on these lanes. In many cases, high-occupancy vehicles are allowed access for free, and in some, those driving alone can choose to pay a variable toll to travel on them. Thus, they are referred to as "HOTT" Lanes—for High-Occupancy Truck Toll.

On several of New York City's main highways, the opportunity exists to explore this concept, using medians and in some cases service roads for additional lanes. Key bottlenecks where trucks encounter—and cause—congestion include the Cross-Bronx Expressway, the Staten Island Expressway, the Van Wyck, and the Brooklyn-Queens Expressway.

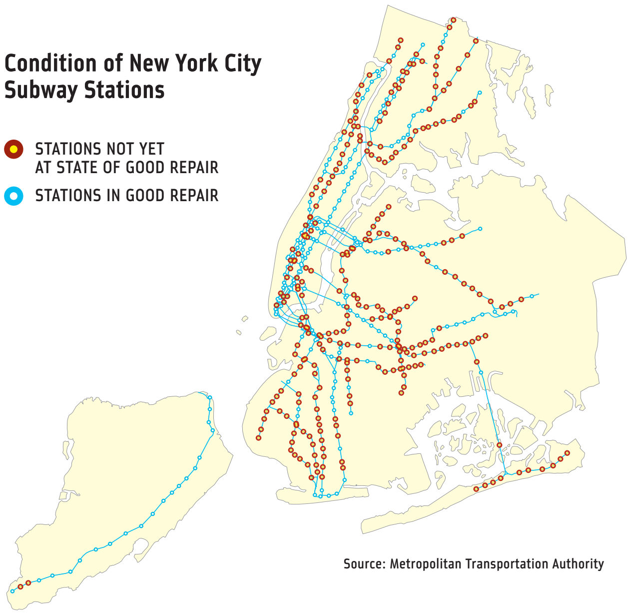
The City will work with and support the New York State Department of Transportation (NYSDOT), which controls these roads, to explore these self-financing lanes.

Achieve a state of good repair on our roads and transit system

We have come a long way toward improving the condition of our aging and fragile transportation network. But we must not forget that we have not achieved the state of good repair on our roads, subways, and rail network that we have sought for 30 years. In fact, the need for additional capital is serious, if largely unseen. *(See map on facing page: Condition of New York City Subway Stations)*

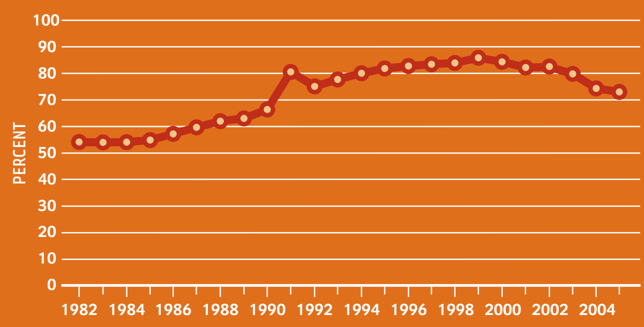
That's why, even as we meet our new expansion needs, we must continue to vigilantly pursue a state of good repair—and preserve the progress that has been made. Doing so will not only prevent the breakdowns that cause crippling delays, but also contribute to our complementary goal of increasing capacity and improving travel times.

Condition of New York City Subway Stations



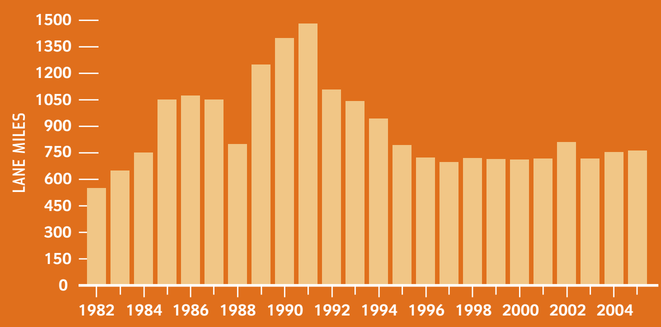
Source: Metropolitan Transportation Authority

Lane Miles in Good Repair in New York City



Source: NYC Department of Transportation

Lane Miles Resurfaced Per Year in New York City



Source: NYC Department of Transportation

INITIATIVE 14

Close the Metropolitan Transportation Authority's state of good repair gap

We will seek a grant from the SMART Authority to cover the MTA's funding gap

In 1981, the MTA halted all expansion projects until the transit system could be brought back into a state of good repair. The goal was to restore all system components so that they could start being upgraded on a normal replacement schedule—before they started to fail. The next year, the MTA launched its first five-year capital plan—an attempt to establish long-term priorities for renewing our deteriorated transit system. Since that decision, New York's transit network has undergone a renaissance. The dedication of the MTA's leadership and staff have made it one of the core components of New York City's recovery.

But even with the progress that has been made, the MTA system is still nearly $15 billion away from a state of good repair, only $5.5 billion of which has a dedicated source of funding—leaving a gap of $9.5 billion that will begin in 2010. More than 60% of our subway stations remain in disrepair. Fan plants, which remove smoke from tunnels during fires and other emergencies, won't be fully upgraded until at least 2028. Almost half of our tunnel lighting does not meet current lighting safety standards, or have additional power sources to stay on in case of a blackout. Last October, there were 514 weekday train delays due to "signal trouble."

Obsolete equipment has capacity consequences as well; older signal technology allows fewer trains to be run safely on the same track than modern systems. Modernizing these could dramatically improve service on crowded lines such as the E train. The MTA has invested $288 million to test its first computerized signaling system on the L line—including electronic messaging boards alerting passengers of train arriving times—but we are billions away from modernizing the full system.

The challenge is that the MTA is chronically under-funded. Every five years, it develops a capital plan and then has to ask the State for the funding sources to cover the costs. We believe that achieving good repair is as fundamental as expanding the system, and will seek to have the SMART Authority provide the MTA with a one-time grant to cover its unfunded need to achieve a full state of good repair.

INITIATIVE 15

Reach a state of good repair on the city's roads and bridges

We will seek a grant from the SMART Authority to fund accelerated capital repairs and upgrades

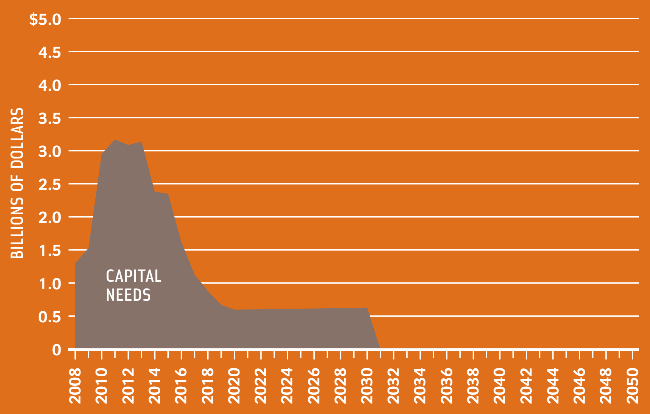
During the 1970's fiscal crisis, the City's road resurfacing efforts virtually stopped. Repaving was limited to our principal arterials, which received a lower quality of resurfacing than would be acceptable today. New layers of asphalt were simply laid over the older, damaged sections and sealed up. Each new layer caused the road level to rise closer to the curb. To avoid having streets at the same level as the sidewalks, repairs were simply avoided longer.

As the city's budget crisis eased, New York restored funding for street repair. Using new equipment, as well as additional personnel and private contractors, resurfacing increased through 1991, and the roads steadily improved. *(See chart above: Lane Miles Resurfaced Per Year in New York City)*

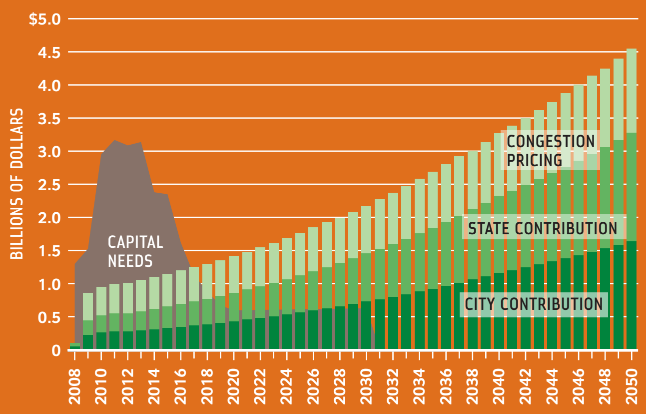
But since then, the average yearly resurfacing has fallen back below what was needed to maintain the quality of the city's streets. To keep pace with the wear of daily travel, we must resurface approximately 1,000 lane

How the SMART Financing Authority Would Fund Regional Transportation Projects

Expenditures



Expenditures and revenues



miles of its roads per year. In the past 15 years we have averaged only 800 lane miles. This under-investment has resulted in a consistent decline in street assessment ratings, to a current low, where only 69.9% of our streets are rated "good" or better. *(See chart on previous page: Lane Miles in Good Repair in New York City)*

We will reverse this trend by increasing the City's street resurfacing output with a limited SMART grant paid out over 20 years.

We will also seek to improve our efficiency by increasing the use of recycled asphalt pavement (RAP). With RAP the City takes the asphalt that is about to be removed and recycles it as fresh asphalt. RAP has the potential to replace as much as 50% of the new material we use for asphalt. In addition to reducing our waste disposal needs, this will cut down on truck trips and on the need for new aggregate and asphalt cement.

The City has done a better job at maintaining the 787 City-owned bridges and tunnels that connect the five boroughs. After the Williamsburg Bridge was closed in 1988 for emergency repairs, the City began a significant rehabilitation program and is in the process of completing all deferred maintenance. But with more traffic every year, the City's bridges require significant periodic capital upgrades and replacement. We will not substitute that work for routine maintenance, but we will seek a SMART Fund grant to provide enough capital to allow the needed, but costly upgrades necessary to keep our bridges safe.

Develop new funding sources

There is wide agreement on a series of projects that would bring mobility to our city. But despite impressive recent funding commitments, none of them has actually secured enough financing to be completed. For all the projects outlined in this plan, the combined budget gap is $30.9 billion. And the longer it takes to fund these projects, the higher the costs—so the combined budget gap will grow. *(See chart on facing page: Projects Financed through the SMART Fund; see maps on page 96: Rail and Subway Conditions)*

Good planning is not enough to secure the future of our city; we must be willing to identify, organize, and raise the financing that is required to build the things we need. To that end, we will work to create a dedicated, regional fund to finance our needed transportation infrastructure, tapping new sources of revenue as well as dedicated commitments from existing sources.

INITIATIVE 16

Establish a new regional transit financing authority

We will seek to create a SMART Financing Authority to advance new projects and achieve a state of good repair

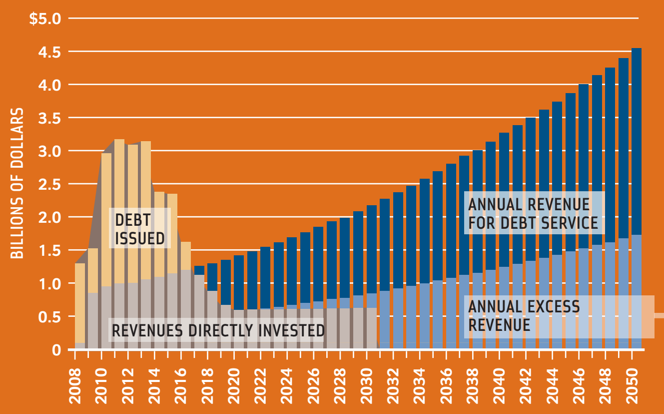
We will seek to work with the State to establish the Sustainable Mobility and Regional Transportation (SMART) Financing Authority, which would serve as a transportation infrastructure bank for the region. This authority would be funded through dedicated revenue streams that could be bonded against to advance critical capital expansions that improve connections between the city and the surrounding region. *(See charts above: How the SMART Financing Authority Would Fund Regional Transportation Projects)*

Revenues

For two generations, our inability to raise sufficient funds for transportation investments has undermined the mobility of our region. That is why we must tap new sources of funding if we are to make our goals a reality. Further, that funding responsibility must be borne equitably.

All of these projects serve New York City in some way, so the City must share in funding them. Virtually all of them—even those wholly within the five boroughs—serve the region's commuters as well, and so non-city residents should also contribute. That is why we will seek to partner with the State to establish three dedicated revenue streams that split the contributions evenly between city and non-city resident commuters.

Financing Capital Plan Through 2050*



*Note: Debt fully paid off in 2050.

Additional projects eligible for SMART Fund financing include:

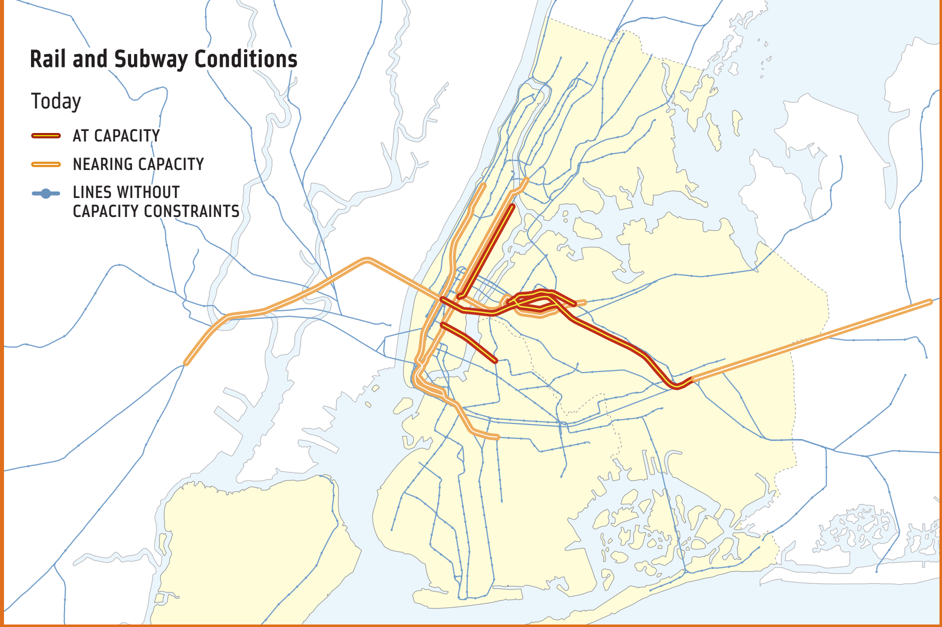
- Improvements and extensions to the region's subway, light rail, and commuter rail networks
- Improved local transit systems serving transportation centers and business districts in the city and the region
- Improved transit access to the region's airports
- Enhanced, high-speed intercity rail services

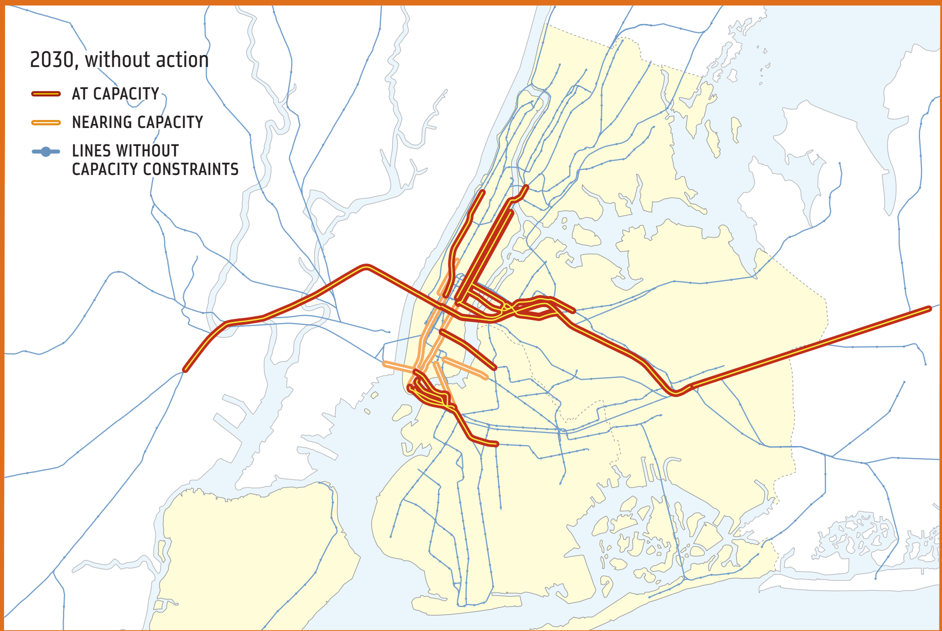
Source: NYC Mayor's Office of Long-Term Planning and Sustainability

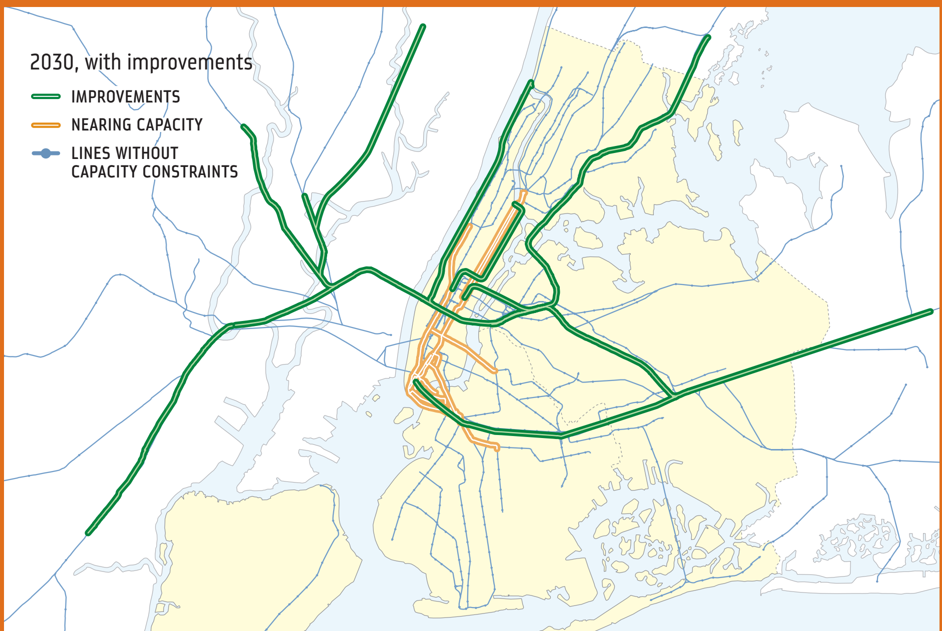
Projects Financed Through the SMART Fund

PROJECTS	TOTAL PROJECT COST (DOLLARS IN MILLIONS)	CONSTRUCTION		EXISTING FUNDING		GAP COVERED BY SMART FUND
		START	END	AVAILABLE	EXPECTED	
7 Train - 10th Avenue Station	$450	2013	2017		$225	$225
Access to the Region's Core	$7,381	2009	2016	$2,580	$1,111	$3,691
Bicycle Lanes	$23	2008	2030		$12	$12
BRT: First Five Routes	$438	2008	2014	$ 60	$159	$219
BRT: Five Additional Routes	$527	2010	2016		$264	$264
Congestion Pricing	$224	2009	2009			$224
East River Bus/HOV Capacity	$43	2009	2010		$21	$21
East Side Access	$6,350	2007	2013	$4,382		$1,968
Express Bus Lane to Lincoln Tunnel	$1,300	2010	2011	$100	$550	$650
Ferry Service	$40	2011	2013		$20	$20
LIRR Third Track	$770	2010	2013	$416		$354
Lower Manhattan Rail Link	$7,500	2010	2015	$2,960	$790	$3,750
MNR Penn Station Access (Hudson Line)	$455	2012	2013		$228	$228
MNR Penn Station Access (New Haven Line)	$357	2012	2013		$178	$178
Nassau County Hub	$738	2010	2013		$369	$369
North Shore Alignment	$350	2012	2016		$175	$175
Penn / Moynihan Station	$1,000	2008	2015		$500	$500
Second Avenue Subway (Phase 1)	$3,838	2007	2013	$2,864		$974
Second Avenue Subway (Phase 2)	$3,400	2011	2018		$1,700	$1,700
State of Good Repair (MTA)	$13,681	2010	2030			$13,681
State of Good Repair (NYC Roads & Bridges)	$1,722	2009	2029			$1,722
TOTAL FIRST PRIORITY PROJECTS	**$50,222**			**$13,362**	**$6,302**	**$30,925**

Note: Costs are nominal, year of construction. Where available, agency's year-of-construction estimates are used. Otherwise, annual construction industry inflation estimates used. Existing funding includes Federal, state, local, and agency funding; "expected" is based on reasonable expectation based on past trends. Second Avenue Subway Phase 1 estimate assumes receipt of Federal Full Funding agreement. MTA SGR estimate based on unfunded remaining state of good repair gap after current MTA Capital Plan.







City and State Contributions

The City proposes a matching partnership with the State. The City will commit $220 million to the SMART Authority in an annual payment starting in 2008, rising to $275 million in 2012 and increasing at the growth rate of the City's personal income tax thereafter.

The City contribution will be contingent on the State matching these funds. To ensure that the SMART Financing Authority is able to issue bonds against these revenues, both commitments must be enshrined in law. The State could determine any source of funds for this contribution.

Congestion Pricing

Congestion pricing is projected to generate net revenues of $380 million in the first year of operation, increasing to over $900 million by 2030. Based on traffic patterns, roughly half the revenues from congestion pricing would be paid by New York City residents, and the other half by non-city residents.

Investment criteria

Regional, state, and city transportation agencies would apply for funding for specific projects. These projects would be evaluated by a board of directors with representatives from around the region and appointment criteria to ensure a balanced and impartial perspective. The board would be supported by a professional staff that would analyze funding requests, undertake independent assessments of regional transportation needs, and develop financing structures for selected projects. Once a project has been chosen, the SMART Authority would monitor its progress to ensure that investments are being spent efficiently and as promised.

Although regional priorities may change over time, the SMART Authority will only provide support to two broad categories of projects:

Expansions or improvements to our regional transit system

Meeting the following criteria:

- **Capital investment** to expand or improve transit infrastructure in the New York City Metropolitan region, with all projects needing to provide either direct or indirect service to New York City
- **Ready-to-go projects** that have received all required legislative, local, and environmental approvals
- **At least 50% funded** so as to use the SMART Fund to provide a match to local, State, agency, and Federal funding already in place

Achieving a state of good repair on city streets and the transit system

A series of one-time block grants would be awarded to the MTA and the City's DOT to achieve a state of good repair as the need was identified in 2005. These grants would be conditional on the agency's certification each year that it is replacing infrastructure on a normal cycle and conducting preventative maintenance at a level to prevent a relapse into disrepair.

Financing

The series of urgent capital projects—such as Second Avenue Subway, East Side Access, and ARC—are sufficiently far along in their planning and construction that the need for investments over the next several years will exceed even the revenues projected here. To provide the resources needed *when* they are needed, the SMART Authority would issue debt secured by its three revenue streams. Based on extensive modeling, not only should we be able to meet all of our identified needs, but there would also be excess funding available. Beginning in 2022, this could be used for the final phases of the Second Avenue Subway and a next wave of regional projects, such as subway extensions and expansions, commuter rail lines, and providing transit on a new Tappan Zee Bridge.

Governance

With its revenues split between City and State sources, the SMART Financing Authority should be governed by a Board that is similarly evenly split. Further, to ensure the independence of the Board, the enabling legislation should state that Board members must not be government employees; that membership terms should be staggered; and that expertise in finance, planning or transportation be a prerequisite for membership.

Implementation

Multiple legislative actions will be required in order to establish the SMART Financing Authority. The State Finance Law must be amended to establish the entity and empower it to issue debt and allocate funding to regional projects. In order to bond against future revenues, a dedicated funding source must be secured. That means the identified revenue streams must be protected to the extent possible by State law and bond covenants.

Conclusion

We can accept increasing congestion and the damage it will inflict on our economy and quality of life. Or we can act to reshape our transportation network and ensure that New York maintain its position as the world's premier city. That means providing every New Yorker, visitor, and worker with transportation that is as attractive, efficient, and sustainable as possible.

As a result of the policies outlined above, New Yorkers like Bryan Block will experience reduced travel times, more comfort, and more reliable rides, whether they are going to work, going shopping, attending cultural events, or visiting family and friends. By accelerating long-delayed projects, implementing smart, short-term improvements, and embracing a new set of transportation priorities, New York can achieve a new standard of mobility.

New Yorkers face rising energy costs and carbon emissions from an ineffective market, aging infrastructure, inefficient buildings, and growing needs.

That's why we must make smart investments in clean power and energy-saving technologies to reduce our electricity and heating bills by billions of dollars, while slashing our greenhouse gas emissions by nearly 27 million metric tons every year.

Energy

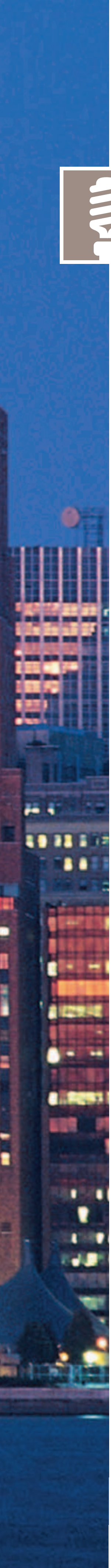
Energy

Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure

Energy

Credit: NYC Economic Development Corporation

Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure



New York City skyline

On July 17, 2006, the electric cables began to fail. As the lights started flickering off, the residents of western Queens began alerting Con Edison that a blackout had begun.

Over the next nine days, Con Edison recorded these calls to assess the scope of the outages—because there was no automated way to find out. Finally, their employees drove through the streets of western Queens and counted the number of buildings without lights to estimate how many customers had been affected.

Although we have the most reliable energy network in the United States, the recent Queens power outages betrayed the weaknesses in our aging grid. Less familiar, though, are the risks revealed over the rest of the summer.

Ten days after the blackout, a third multi-day heat wave gripped the city, with temperatures reaching as high as 102º. Although institutions and large companies began extinguishing lights, raising air conditioning temperatures, and shutting down elevators, there was no systematic way to slow the skyrocketing demand. Con Edison customer representatives, police officers and members of the City's Office of Emergency Management began knocking on doors across the city. The Real Estate Board of New York began emailing many of its 12,000 members. Newspapers, radio stations, and local news networks carried announcements. All urged New Yorkers to slow down their energy use. It wasn't enough.

On August 1-2, the city set two consecutive records for electricity demand, topping the previous record set a year earlier. To prevent a blackout, businesses began switching to backup diesel generators that spewed pollutants into the air. Our dirtiest and least efficient power plants were turned on, making our air quality unhealthy for people with heart or lung disease, the elderly, and children. And since these aging plants are more expensive to run, the city's electricity prices—already among the highest in the nation—soared by 500% that day.

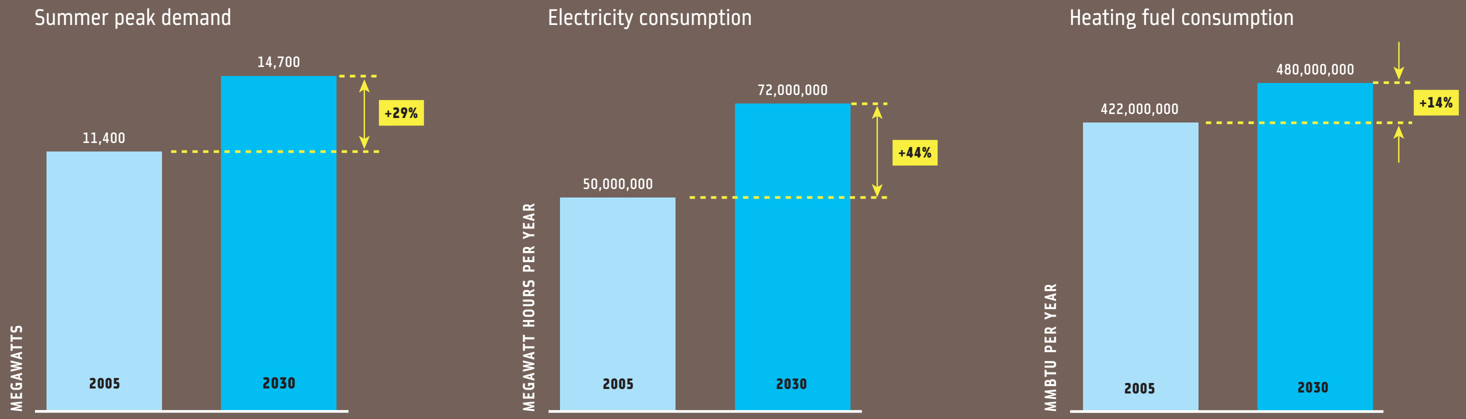
Every year, New Yorkers collectively spend approximately $13.4 billion on the energy that lights our buildings and powers our electronic devices, on our electrical delivery system, and on the fuel used for heating and hot water; the average residential energy bill is $145. But this consumption has additional costs. It is responsible for roughly 80% of our global-warming emissions and more than 40% of all locally generated air pollution.

Even on regular days, our supply is neither as clean nor as affordable as it should be. Our existing fleet of power plants averages around 30 years old, and uses mostly out-of-date technologies. These older plants use 30% to 60% more fuel and produce several times the air pollution of newer plants to generate the same amount of electricity.

But by 2012, even this supply will not be enough. We are continually setting new records for energy usage. As the summer of 2006 showed, our ability to reduce demand in a coordinated, efficient way is limited. And our delivery infrastructure is under increasing pressure.

By 2030, population and economic growth will strain the city's energy network further. If current trends continue, energy demand could grow substantially. By 2015 alone, the city's annual electricity and heating bill, excluding delivery costs, will increase by $3 billion, translating into energy bills that are annually $300 to $400 higher for the average New York household. As we consume more energy, our environmental impact will increase accordingly. By 2015, we will be pumping an additional 4.6 million metric tons of CO_2 into the atmosphere. *(See chart on page 103: New York City Price of Electricity)*

Projected New York City Energy Increase



Source: KeySpan; Con Edison; NYC Mayor's Office of Long-Term Planning and Sustainability

Reducing prices and CO_2 emissions will require displacing high-cost, inefficient plants through an unprecedented demand reduction strategy and new, clean sources of supply.

Energy planning

Today, there is no entity capable of addressing these challenges. There are eight organizations responsible for some dimension of energy planning in New York City, but not one of them is designed to take the city's unique needs into account. None are empowered to bargain on behalf of New Yorkers, while prioritizing air quality, lowering global-warming emissions, and ensuring affordable prices. And there is no existing planning body that analyzes how supply and demand-side strategies can work together to achieve reliable power for the city.

Demand reduction

Reducing our demand while absorbing growth will not only be difficult—it has never been done before. Energy efficiency programs in the United States began during the 1970s, but consumption has still steadily risen along with the proliferation of air conditioners, cell phones, laptops and other electronic devices. Even the most successful programs in the country have failed to flatten demand; while California has held its per capita energy use constant, the state's overall energy needs have continued to grow *(See chart on facing page: Electricity Consumption Per Capita)*

In New York, under-investment, a series of fragmented programs, and the absence of city-specific programs or planning have prevented us from achieving our efficiency potential. Participation in programs has also been hampered by the city's high installation costs and greater proportion of renters; building owners are reluctant to invest in upgrades that will only benefit their tenants through lower energy bills.

We can do better. Smarter choices and targeted investments can yield substantial savings. Our density is an advantage; less than 4% of our buildings contain roughly 50% of the city's built area. By focusing on these sites—and our other largest energy consumers—for upgrades, the impact could be enormous.

Unchecked, our city's peak electricity demand—the highest amount of electricity we will need over the course of a year—is projected to grow by 29% by 2030. Total electricity consumption could rise by 44% or more and our consumption of heating fuels by 14%. But it does not have to grow. We will seek to meet the entirety of this need by increasing our energy efficiency and expanding programs to manage demand on our "peak" days—while actually reducing our consumption of heating fuels by 17%. *(See charts above: Projected New York City Energy Increase*)

New, clean supply

It will take several years to benefit from this ambitious efficiency effort. In the meantime, we must prepare for a short-term rise in our power consumption. We must also add enough clean supply to retire our dirtiest plants, which are frequently located in some of the city's most underserved communities, and make our prices more competitive with the rest of the region. As a result, securing a clean, reliable, affordable energy supply will require generating an additional 2,000 to 3,000 MW of capacity by 2015.

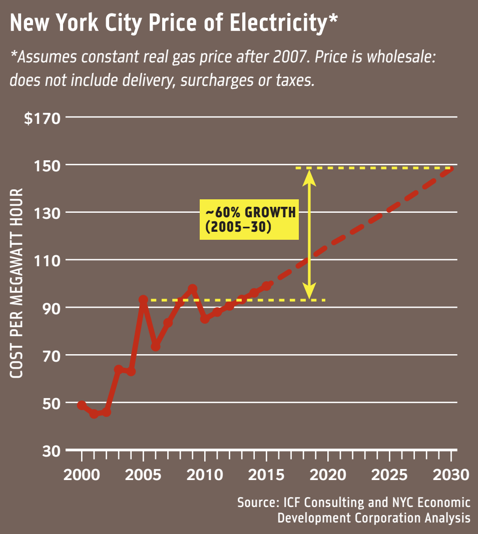
In our current market, that won't be easy. Before the mid-1990s, Con Edison was a regulated monopoly that built, owned, and operated the city's power plants and delivered the electricity they supplied. They were guaranteed a return on their investment, because they could raise ratepayer costs to cover new construction. But in 1998, the company was directed to sell its power plants to foster a competitive electricity market in New York State. Since deregulation, power plant construction and operation is now the role of private developers and owners. But without long-term contracts, there is no guarantee that power prices will provide a sufficient return—and land constraints, construction costs, and higher financing requirements have made the price of building power plants in New York almost three times the national average.

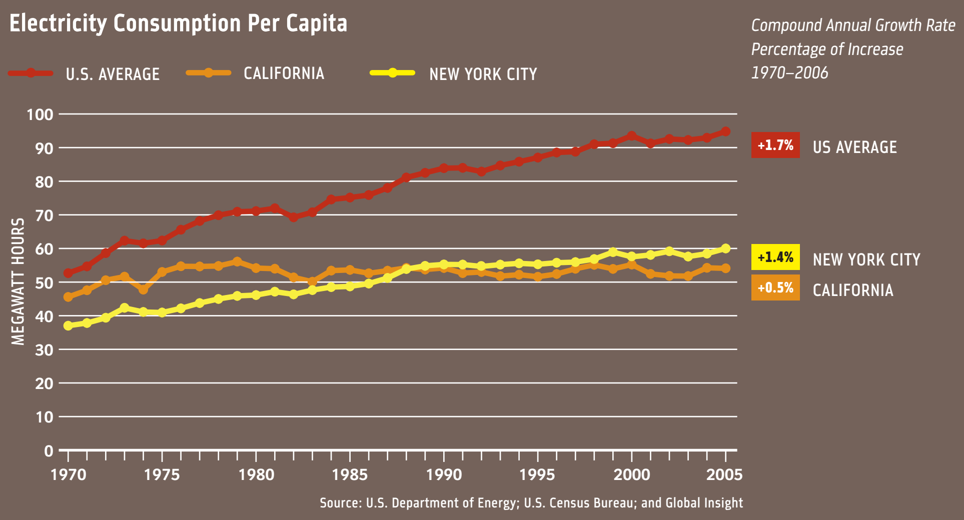
Virtually every existing power plant in the city has the capacity to expand or improve its efficiency and environmental performance—but owners currently have no incentive to do so. Adding more supply would risk lowering prices across the market. While the health benefits are clear, there is no guarantee that owners will make back their investment.

As a result, only one repowering has ever taken place in the city. Since deregulation with the exception of investments by NYPA—a public authority—only two private powerplants have been built.

Our heating and electricity will increasingly rely on natural gas, which is the cleanest-burning fossil fuel. But our delivery capacity is limited, creating some of the highest natural gas prices in the nation.

The cleanest energy sources—such as wind and solar power—are promising, but they are not yet financially feasible to play a large role. Without significant support, they will not be able to assume a greater role in our energy generation.





Delivery infrastructure

We also must make sure that the supply we have can reach its recipients.

The world's first electric power delivery system was developed in New York City in 1882. When Thomas Edison switched on the first electric station in Lower Manhattan, it lit up a total of four hundred bulbs. A year later, there were over 10,000 electric lights in Manhattan fed by a web of overhead wires, which were moved underground after the blizzard of 1888 to improve public safety.

The design of this underground grid has remained essentially unchanged in the decades since. As a result, although we have the most reliable network in the United States, the grid's current technology and complexity make it difficult to repair. This can be especially damaging during events like the 2006 power outages in western Queens, when the lack of "smart" technologies meant that we were unable to assess the extent or location of outages in a timely fashion.

To overcome these challenges, we have developed an aggressive, integrated plan that puts the city's energy, air quality, and greenhouse gas targets within reach.

Our Plan

We know the solution: greater investment in a comprehensive energy efficiency plan, coupled with an increase in clean supply.

We must target our largest energy consumers—institutional buildings, commercial and industrial buildings, and multi-family residential buildings—and accelerate energy efficiency upgrades through a system of incentives, mandates, and challenges.

To retire our oldest, most polluting plants, we must encourage the addition of new, clean power plants through guaranteed contracts, and expand the market for renewable energies in the future.

Together, the strategies just outlined can produce a reliable, affordable, and environmentally sustainable energy network for New York City.

But today there is no entity capable of implementing these projects and realizing their goals.

That's why we will work with the State to create a New York City Energy Planning Board that will help us shape our energy future. The Board will oversee a new entity that will coordinate all energy efficiency efforts within the city.

This plan will require significant effort, capital, and political will. The City will propose an amendment to the City Charter that will require it to invest 10% of its energy bill in reducing the energy consumed by City operations. Citywide initiatives will be funded through an increase in the energy bill surcharge that customers already pay.

By spreading the charges of these initiatives among all energy users, the costs will be reasonable—approximately $2.50 per month for the average household. But they will reap enormous benefits for the entire city.

By implementing an unprecedented energy efficiency strategy, while increasing supply, New York City's overall power and heating bill will plunge by $2 billion to $3 billion annually—saving the average household $230 a year on its energy bill by 2015.

The environmental impacts will be equally impressive. By 2015, our carbon emissions will have been slashed by seven million tons, bringing us closer to our goal of reducing the city's greenhouse gases by 30% by 2030 and providing a healthier environment for all New Yorkers. *(See table on following page: Our Plan for Electricity)*

Our plan for energy:

Improve energy planning

1 Establish a New York City Energy Planning Board

Reduce New York City's energy consumption

2 Reduce energy consumption by City government
3 Strengthen energy and building codes for New York City
4 Create an energy efficiency authority for New York City
5 Prioritize five key areas for targeted incentives
6 Expand peak load management
7 Launch an energy awareness and training campaign

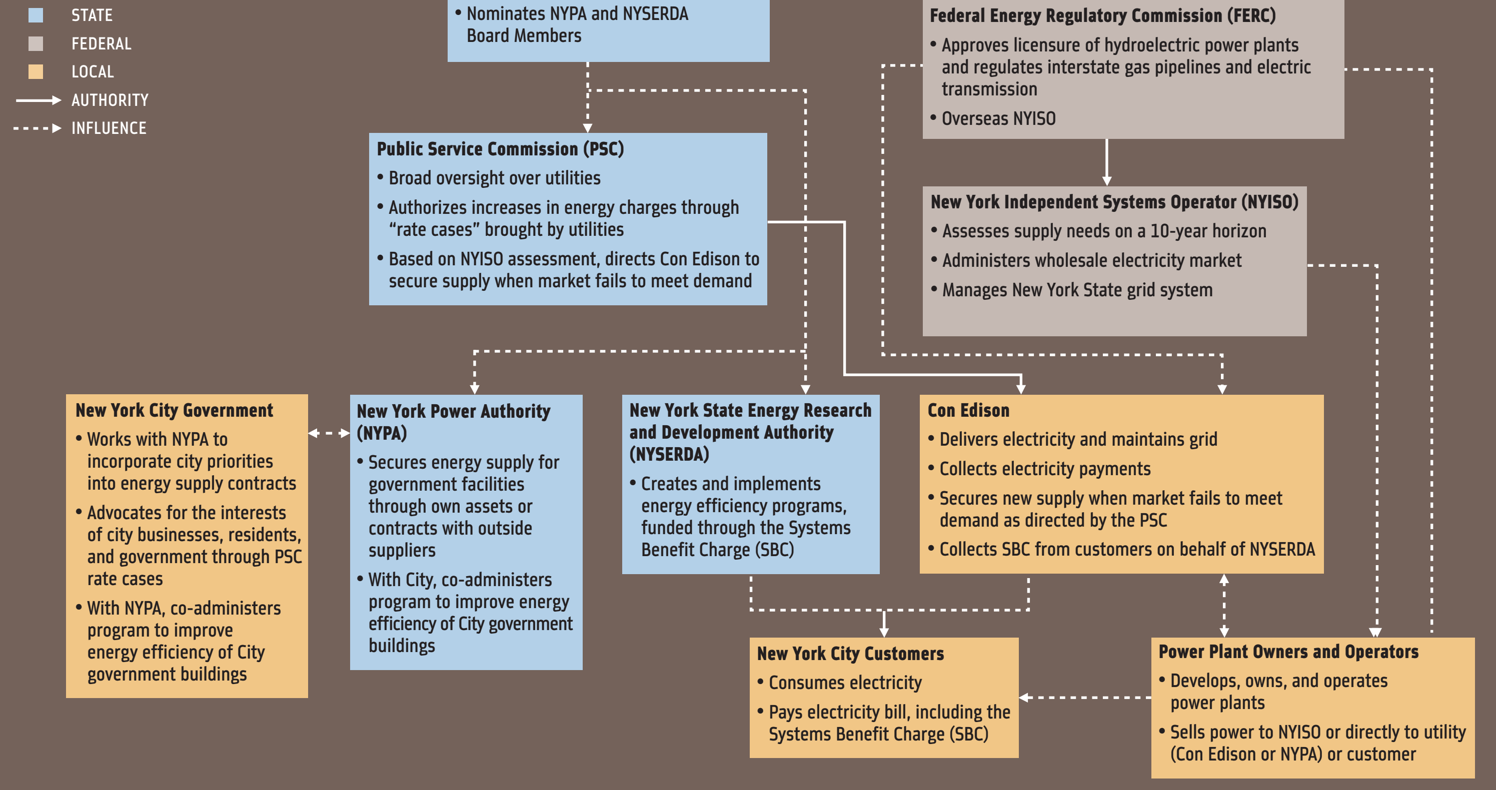
Expand the city's clean power supply

8 Facilitate repowering and construct power plants and dedicated transmission lines
9 Expand Clean Distributed Generation ("Clean DG")
10 Support expansion of natural gas infrastructure
11 Foster the market for renewable energy

Modernize electricity delivery infrastructure

12 Accelerate reliability improvements to the city's grid
13 Facilitate grid repairs through improved coordination and joint bidding
14 Support Con Edison's efforts to modernize the grid

Current Energy Planning Structure In New York City



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Our Plan for Electricity

NEW ELECTRICITY NEEDS	MEGAWATTS
Gap between existing in-city capacity[1] and projected peak demand[2]	2,300
Additional in-city resources required (to meet PLANYC goals, including retirement of inefficient plants) • Reduce greenhouse gas emissions • Reduce pollution • Reduce citywide electricity prices	5,000
TOTAL NEW ELECTRICITY NEEDS	**7,300**

NEW SOURCES OF ELECTRICITY	MEGAWATTS
Reduce New York City's energy consumption • Energy efficiency • Peak load management or demand response	2,500
Facilitate repowering and construction of new clean power plants and dedicated transmission lines	3,400
Expand Clean Distributed Generation	800
Foster the market for renewable energy • Build the market for solar energy • Expand energy production from sustainable biogas and biomass • Support future opportunities: large-scale far off-shore wind, on-site wind, and tidal energy	600
TOTAL NEW SOURCES OF ELECTRICITY	**7,300**

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

1. Includes existing and committed in-city capacity resources (i.e., in-city generation, dedicated generation connected to the New York City grid but located outside the 5 boroughs, and participation in certain New York Independent System Operator demand response programs). It also assumes the retirement of NYPA's 875-megawatt old Poletti power plant in 2010.
2. The New York State Reliability Council and the New York Independent System Operator require that 80% of New York City's projected summer peak demand be met through in-city resources due to limited transmission infrastructure. The projected peak demand for 2030 reflects this 80% rule.

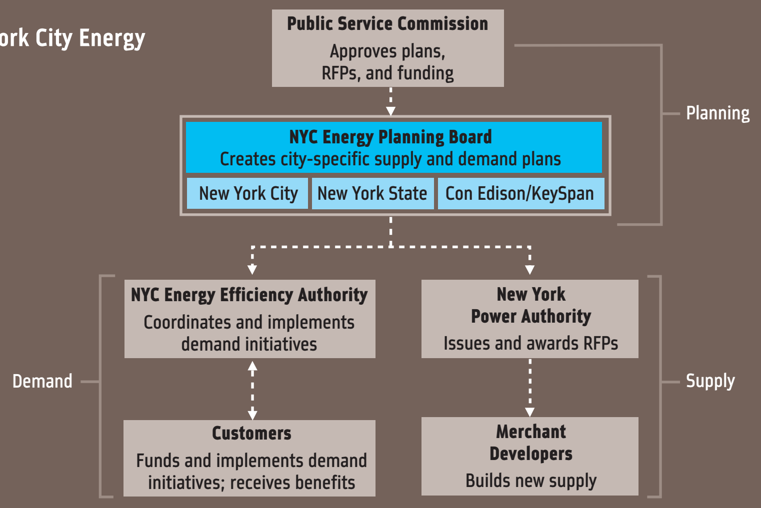
Improve energy planning

To stem global warming, improve the health of New Yorkers, and reduce the city's energy bill by billions of dollars, we must take several big steps: implementing aggressive energy efficiency and peak load management measures, upgrading our aging fleet of polluting power plants, building more Clean Distributed Generation, and developing renewable energy sources.

But the existing organizations, programs, and processes are inadequate to implement these policies. They are not charged with considering goals for cleaning up the environment, moderating prices to consumers, and minimizing land use impacts—and they are not designed to overcome the city's unique challenges.

Finally, no organization is currently empowered to develop a broad vision for energy planning in the city that considers supply and demand together as part of an integrated strategy. *(See chart above: Current Energy Planning Structure in New York City)*

Proposed New York City Energy Planning Board



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

INITIATIVE 1

Establish a New York City Energy Planning Board

We will work with the State and utilities to centralize planning for the city's supply and demand initiatives

There is a clear need for a more comprehensive, coordinated, and aggressive planning effort, focused on the specific needs of New York City. That is why we are pursuing State legislation and regulation to establish a New York City Energy Planning Board. *(See chart above: Proposed New York City Energy Planning Board; see case study: Long Island Power Authority)*

Functions

Comprehensive planning: This entity's primary function would be to review and approve energy plans that include supply and demand strategies to meet the city's needs. This plan would be submitted to the Public Service Commission (PSC) for regulatory and funding approval.

To ensure that these plans are revised regularly, we will urge the State to pass a new energy planning law similar to Article VI, which lapsed four years ago. Article VI required the periodic issuance of a State Energy Plan that assessed capacity needs and identified strategies to meet or manage demand. We believe the law should additionally require the development of localized plans across the state, and should take into account not only peak demand capacity, but also energy consumption, costs to rate payers, environmental impact, and greenhouse gas emissions.

In addition to overseeing the creation of New York City's energy plan, the Board would recommend any necessary ratepayer charges for the fulfillment of its plan to the PSC.

Reducing demand: The Board would set demand reduction targets as part of the city's overall energy plan, recommend funding levels and approve strategies for reaching those goals. A new authority will also be created dedicated to the coordination and implementation of energy efficiency initiatives in New York City.

This authority, a partnership among the organizations involved with energy efficiency programs in New York, would be responsible for developing plans to meet the Board's targets.

Expanding supply: The Board would also set supply targets and recommend a budget for spending on supply initiatives. The Board would facilitate the supply of new clean power to the city by enabling a process to issue long-term contracts to energy supply developers. These contracts would provide a constant revenue stream to pay off investment costs. As a result of this security, power plant owners would be able to attract investors at better financing rates.

One way long-term contracts could be issued is for the State to empower the New York Power Authority (NYPA) or another existing entity to issue and award a power supply request-for-proposals (RFP) that reflects the city's priorities and needs. NYPA already performs this service for government institutions located in the city, including our municipal government, the Metropolitian Transportation Authority (MTA), and the New York City Housing Authority (NYCHA).

Board structure: To ensure a range of perspectives and technical experience, the proposed Board would include representatives from the City, the State, and the utilities.

The City and State representatives would ensure that their respective public policy priorities are reflected in the planning process. The City's representative would also articulate local community perspectives, including environmental justice concerns.

CASE STUDY

Long Island Power Authority

The Long Island Power Authority (LIPA) doesn't just focus on providing electricity to Long Island consumers.

It does that, too. But as the entity empowered by State legislation to generate a power strategy for all of Long Island, LIPA considers how reducing demand and adding supply can work together to meet the area's reliability needs.

When it does procure more power, it offers investors the security of long-term contracts in exchange for supply that is clean, affordable, and efficient.

As a result, while developers are hesitant to enter New York City's volatile energy market, LIPA's willingness to enter into long-term contracts spurred new power plants and transmission lines to serve Long Island.

"We realize how urgent it is to keep our rates and charges as low as possible," said Richard M. Kessel, LIPA's CEO and President. "Since we make no profit on the sale of electricity, we make every effort to do so."

Until 1998, Long Island residents got their power from LILCO, a privately-owned corporation. After a financially-strapped LILCO saw its cost of debt skyrocket, New York State's Legislature stepped in, creating LIPA to act as a single, coordinated buyer. Over time, LIPA has lowered rates by an average of 20%—the largest single electric rate reduction in U.S. history.

LIPA also aims at balancing supply and demand side programs—further keeping prices down.

LIPA's Clean Energy Initiative (CEI) is one of the most ambitious programs of its kind in the nation. The CEI is a 10-year, $355 million commitment to promote energy efficiency and clean generation technologies including the largest commercial solar project in the country.

LIPA also rewards green energy choices, encouraging customers to purchase wind-generated power and soliciting proposals from developers for renewable resource projects.

"With each alternative or renewable energy project we advance," Kessel said, "we take another step away from our over-dependence on fossil fuel burning technologies. Future generations as well as our environment will be the beneficiaries."

The representative from Con Edison would leverage the company's technical capabilities, understanding of grid and reliability issues, and familiarity with energy efficiency programs to shape the city's electricity and steam plans. Both Con Edison and KeySpan would create their own plans for gas demand and supply.

Additional regulatory changes to promote coordination and to increase investment

There are four additional regulatory changes that will help maximize the coordination between energy efficiency and supply efforts and generate new funding sources.

Today, utilities like Con Edison profit from the volume of energy consumed. In order to encourage greater participation with our energy efficiency efforts, we must separate Con Edison's profits from the amount of energy used in the city and replace it with incentives for reducing demand.

We will also advocate for the creation of a forward capacity market, which pays upfront for future capacity. Under this system, developers can secure prices years in advance, creating a level of financial assurance for backers since they know their initial rates of return. This guarantee can also be applied to energy efficiency strategies; programs that pledge a peak reduction can secure payment as if they were selling additional supply. The money can be invested into further efficiency efforts, providing a new revenue stream for reductions into the future.

The Regional Greenhouse Gas Initiative, a multi-state cap and trade program to reduce greenhouse gas emissions from power plants, could potentially bring millions of additional dollars to energy efficiency initiatives in New York. Starting in 2009, greenhouse gas credits will either be given, sold or auctioned to generators. Generators that use less than their allotted amount will be able to cash in the excess credits; those who need more will be able to buy them from the market. The City will continue to advocate that all of these credits are auctioned to power generators, forcing power plants to purchase credits for each ton of carbon dioxide they produce. This money could then be used to finance more energy efficiency efforts.

Finally, we will advocate for an energy planning law similar to Article VI, which lapsed four years ago, to be implemented on a statewide level. This law would serve as a complement to the New York City Energy Planning Board since energy planning for areas adjacent to the New York metropolitan area, such as the lower Hudson Valley and Long Island, can affect the city. Reducing transmission congestion could reduce prices in the city as well as regional CO_2 and other emissions. Therefore, the City will urge passage of a new State planning statute to accomplish these aims.

Reduce New York City's energy consumption

The answer to meeting our city's energy needs cannot simply be to add more supply. For both environmental and economic reasons, our first step toward a comprehensive energy policy must be evaluating how to maximize our energy efficiency.

Nationwide, energy efficiency efforts are focused on industry and automobiles, but in New York, our challenge is different—it is primarily the buildings. Over two thirds of our energy is used in buildings, compared to a national average of less than one third.

And when buildings *are* mentioned, the context is usually new construction. New York City has emerged as a leader in green buildings, with some of the world's most sustainable skyscrapers and affordable housing developments. We have also established new standards for new municipal buildings.

But by 2030, at least 85% of our energy usage and carbon emissions will come from buildings that already exist today. Therefore, we must focus our efforts on improving the city's large existing building stock.

If we ensure that energy-saving measures in our existing buildings are incentivized—and, later on, mandated—we can absorb growth while keeping our power consumption constant and reducing our heating fuels by 14%. This will result in seven million fewer tons of global warming emissions, and help lower the city's overall energy bill by $2 billion to $3 billion by 2015. *(See table on facing page: Energy Usage by Building Type in New York City)*

In addition to lowering energy usage on a daily basis across the city, we must also find more effective ways to manage demand during the periods of greatest need. Our power needs are assessed based on these "peak" moments; by keeping our peak demand constant, we can reduce the need to rely on the most polluting plants during our hottest summer days and relieve the burden on our delivery grid.

INITIATIVE 2

Reduce energy consumption by City government

We will commit 10% of the City's annual energy bill to fund energy-saving investments in City operations

New York City's government spends nearly $800 million a year on electricity, natural gas, and heating oil—and consumes roughly 6.5% of the city's energy. Investments in LED stoplights and retrofits to City-owned buildings have already saved the City money and reduced the City's energy consumption. The opportunity exists to go much further—but the hurdle has always been the competing priorities that pit energy-saving investments against other uses of City funds.

That is why we will propose an amendment to the City Charter requiring that New York City invest, each year, an amount equal to 10% of its energy expenses in energy-saving measures. These measures will include creating systems and tools to manage the energy use of City buildings centrally; conducting routine energy audits and tune-ups of City buildings; retrofitting City buildings and improving maintenance to save electricity and heating bills; and converting streetlights to LEDs when the technology becomes available.

With aggressive management and the funding that this amendment would provide, we are committed to reducing the City government's energy consumption and CO_2 emissions by 30% within 10 years.

INITIATIVE 3

Strengthen energy and building codes for New York City

We will strengthen energy and building codes to support our energy efficiency strategies and other environmental goals

New York City is completing its first major revision to the building code in nearly 40 years, with adoption expected in summer 2007. This will be followed by regular reviews and updates of the code, to be conducted on a three-year cycle.

Energy Usage by Building Type in New York City
Percent of total energy in British Thermal Units (BTU)

WHAT WE USE FOR ENERGY FOR							
BUILDING TYPE	HEAT	HOT WATER	LIGHTING	APPLIANCES*	COOLING**	OTHER	TOTAL
1–4 family residential	7.6%	2.6%	1.7%	2.2%	0.6%	0.0%	**14.7%**
Multi-family residential	7.4%	7.4%	3.0%	3.9%	1.2%	0.0%	**22.0%**
Commercial	8.5%	2.8%	10.2%	4.5%	4.5%	0.9%	**31.4%**
Industrial	2.6%	2.1%	4.0%	3.3%	1.1%	0.2%	**13.0%**
Institutional/government	6.3%	4.0%	3.6%	1.7%	1.4%	0.9%	**17.9%**
ALL TYPES	**32.4%**	**18.9%**	**22.5%**	**15.6%**	**8.8%**	**2.0%**	**100%**

Source: Con Edison; KeySpan; U.S. Department of Energy; New York State Energy Research and Development Authority

**Appliances include electronics and refrigerators as well as other appliances*
***Cooling includes ventilation as well as air conditioning*

Electricity Savings from Compact Fluorescent Light Bulbs

If you replace one standard light bulb with a CFL, **you will save $107 and 12 light bulb changes over the 9-year lifetime of the CFL**

If all 3 million New York City households replace one standard light bulb with a CFL, **the energy savings would be enough to power three Empire State Buildings**

If all New York City households replace 75% of their standard light bulbs with CFL bulbs, **the energy savings would be enough to run all the subways and light all the stations**

Assumptions
- *Average standard (incandescent) light bulb uses 75 Watts and lasts for 750 hrs; equivalent CFL bulb uses 20 Watts and lasts for 10,000 hrs.*
- *Average of 15 incandescent light bulbs per household, each used 3 hours per day*
- *Annual electrical consumption in NYC: 52,280 GWh*

While the new code will include a number of green elements—including rebates for some green building features, requirements for cool (white) roofs and energy code certification, and more stringent ventilation standards—more can be done.

We will make "greening the code" a central focus of the next revision cycle, with an emphasis on implementing the city's energy efficiency strategies, streamlining the process for incorporating new, sustainable technologies into construction, and adaptation to climate change.

Another area of focus will be reducing the amount of cement used in concrete. Creating cement is an energy-intensive process that releases a ton of CO_2 for every ton of cement produced. We will advocate for a different form of concrete production that uses 30% to 40% less cement while retaining strength.

The next three years are also an opportunity to amend other codes influencing the city's energy efficiency, such as the State Energy Conservation Construction Code and New York City's Fire Code. While the State code is required to be amended every three years, the process is often delayed and its provisions are not adequately enforced. We will strengthen enforcement of these codes and push for higher standards, particularly regarding lighting requirements. We will also seek to integrate sustainability considerations more fully into the City's other codes, striking an appropriate balance between reducing implementation barriers while preserving safety standards.

INITIATIVE 4

Create an energy efficiency authority for New York City

We will create the New York City Energy Efficiency Authority responsible for reaching the city's demand reduction targets.

There are currently a number of programs that target demand reduction and energy efficiency in New York City, including NYPA and NYSERDA at the State level and Con Edison at the local level. But these efforts have not always been coordinated, and the City has not had the opportunity to play a more active role in either coordination or in shaping programs of its own, beyond participating in Public Service Commission proceedings. This will have to change if the city is going to achieve unprecedented reductions in energy consumption.

To that end, we propose to create the New York City Energy Efficiency Authority which will direct all of New York City's efficiency and demand reduction efforts. These efforts would be funded through rate-payer based surcharges. This would enable the City to develop a unified effort that is well-tailored to our unique circumstances. The Authority would be charged with developing and managing programs and establishing the incentive structures required to reach the city's demand reduction targets as set by the New York City Energy Planning Board. The City, NYSERDA, Con Edison, and Keyspan would serve on the Authority's board—allowing the Authority to marshal coordinated action among these entities and utilize their resources.

The Authority's first task would be to undertake the three city-wide initiatives that follow: targeting five key areas for energy efficiency; expanding peak load management programs; and undertaking an energy awareness and training campaign. In all three of these, the City will begin working immediately through its existing institutions, but full implementation will require the coordination and funding the Authority would provide.

INITIATIVE 5

Prioritize five key areas for targeted incentives

We will use a series of mandates, challenges, and incentives to reduce demand among the city's largest energy consumers

With 5.2 billion square feet of space parceled into almost a million buildings, reining in the energy consumption of New York's building sector presents a challenge of remarkable complexity and scale. *(See table on following page: Key Areas for Targeted Energy Efficiency Initiatives; see case study on following page: Energy Efficiency Tools)*

As described in the following table, our efforts will be focused around five key areas: institutional and governmental buildings, commercial and industrial buildings, residential buildings, new construction, and appliances and electronics. We have focused primarily on upgrades to existing buildings, since they will still form the overwhelming majority of our building stock by 2030.

We have also singled out the largest sources of consumption for reforms, such as lighting and inefficient appliances. By replacing outdated lighting systems with more energy-efficient models, working at the State and Federal level to steadily improve standards for appliances and electronics, and

Key Areas for Targeted Energy Efficiency Initiatives

			AVERAGE INVESTMENT		IMPACT	
	KEY AREA	INITIATIVE WITH ILLUSTRATIVE EXAMPLES	BY OWNER*	INCENTIVE**	PAYBACK TO CONSUMER AFTER INCENTIVE	% CITYWIDE ENERGY REDUCTION BY 2015 (FROM TREND)
1	**GOVERNMENT & INSTITUTIONAL** 30% by 2017	City Government to **"Lead by example"**: • 30% reduction in buildings and operations by 2017 • Achieved through audits/retrofits, lighting upgrades, and improved maintenance	$400,000 (public school)	n.a.	7–8 yrs.	1.5%
		Mayoral Challenge to institutions, Federal & State Government • Pledge to match the City government target by 2017 • Benchmarking & retro-commissioning or audit/retrofit (< 5-yr payback measures) • Financial incentives from NYCEEA	$880,000 (300,000 sf hospital.)	$470,000	5–6 yrs.	1.3%–2.0%
2	**COMMERCIAL & INDUSTRIAL** Upgrades & Lights	**Efficiency Upgrades** for large commercial & industrial buildings (>100,000 sq. ft.) • Benchmarking & retro-commissioning or audit/retrofit (< 5-yr payback measures) • Mandated by 2015; efficient buildings exempt • Financial incentives from NYCEEA	$220,000 (300,000 sf building.)	$120,000	2–3 yrs.	1.8%
		Lighting Systems brought up to energy code • Required for all spaces at time of renovation or change of tenancy	$4,500 (10,000 sf.)	$2,500	1.5–2 yrs.	2.1%
3	**RESIDENTIAL** Upgrades & CFLs	**Efficiency Upgrades** for large residential buildings (> 50 units) • Retro-commissioning or audit/retrofit (< 5-yr payback measures required) • Mandated by 2015; efficient buildings exempt • Financial incentives from NYCEEA	$39,000 (100,000 sf building.)	$21,000	2–3 yrs.	1.1%
		Large-Scale Direct Install Program for CFLs for all residential properties • Free replacement of incandescent bulbs for 180,000 units per year (voluntary)	29,400–42,000	$150	Immediate	1.5%
4	**NEW CONSTRUCTION** 15-20% Better than Code	New construction to **Exceed Energy Code** by 20%; major renovation by 15% • Commissioning for new construction or major renovation > 100,000 sq. ft. • Aggressive upgrades and enforcement of State energy code	$500,000 (200,000 sf building.)	$0	3–4 yrs.	0.8%
		Graduated Incentives for higher energy savings & environmental performance • For gold or platinum LEED equivalent with superior energy and water savings	$625,000	$125,000	3–4 yrs.	0.3%
5	**APPLIANCES & ELECTRONICS** Incentives & Standards	**Incentivize High Efficiencies** for appliances, electronics, and air conditioners • Sales and stocking incentives to retailers and distributors • Incentivize efficient washer/dryers in apartment buildings	$0***	$110	Immediate	1.0%
		Work at State & Federal level for **improved standards** for appliance and electronics • Monitor and comment on Federal rule-making on EPCA settlement • Propose streamlining the State process for setting appliance standards	n.a.	n.a.		0.3%
					TOTAL	**12.7%–13.4%**

After incentive **Incentive by the proposed New York City Energy Efficiency Authority * No additional cost after incentive*

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

CASE STUDY
Energy Efficiency Tools

There are three key tools to comprehensively reduce energy consumption in buildings: audits, retrofits and commissioning. An **energy audit** analyzes how changes in equipment, fixtures and design can reduce energy use. The implementation of those changes is called a **retrofit** and often involves the physical upgrade of building energy systems and components. Retrofits, depending on the scope of work, can be designed to pay for themselves through the resulting energy savings, with a three to seven year typical payback. Retrofits can involve any component of the building, but usually focus on lighting and heating and cooling systems.

Commissioning for new buildings, and **retro-commissioning** for existing buildings, refer to a process of insuring that a building's equipment is installed correctly and operating at maximum efficiency. These strategies are most effective when combined with improved maintenance. Commissioning typically pays for itself within a year; retro-commissioning within two to three years.

leveraging renovations to enforce our energy code more vigorously, we can achieve enormous savings—in our usage and energy bills. *(See table on previous page: Electricity Savings from Compact Florescent Light Bulbs)*

For private sector change, government has three basic tools in its arsenal: challenges, requirements, and incentives. We will be able to use all three, sometimes within the same targeted area. In many cases, such as the energy upgrades for large commercial and industrial buildings, we will incent behavior to encourage early adoption and then mandate compliance by 2015. We will also challenge the city's leading non-profit and commercial building owners to match the City's commitment to cut its own energy use by 30% in 10 years. The City's commitment will not only set an example, but also help incubate the expertise required for the larger citywide transformation. This, in turn, will reduce the costs of these measures for all.

Every energy-saving measure included is cost-effective, with paybacks within five years or less. And by prioritizing the largest buildings first, the maximum impact will be achieved with minimal complexity.

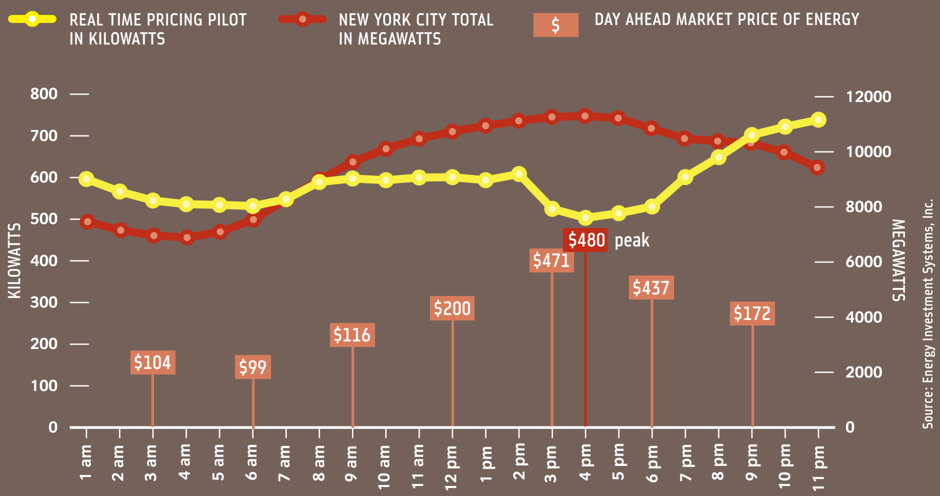
INITIATIVE 6
Expand peak load management
We will seek to cut peak load by 25% through increased enrollment in peak load management programs and real time pricing

Reducing our daily energy usage is critical to achieving our 30% carbon reduction goal and saving money on energy across the city.

But special measures must be taken to manage electrical power usage during the hottest days of the year, when air conditioners are running on high and our power usage is at its peak. At these times, our electric grid is strained and our oldest and least efficient plants must run to meet the city's demand. These power plants guzzle 62% more fuel and release 140% more CO_2 than newer plants. They are also more expensive to run. Our new, natural gas power plants cost $74 to produce one MWh, while our oldest plants, which were designed in the 1960s and 1970s and run on oil, cost over $250 to produce the same amount of electricity.

Peak load management programs are one way to balance electricity supply with demand, reduce the strain on the grid and

Real-Time Pricing Impact on Electricity Consumption*



*on August 1, 2006

limit the use of the more expensive and often least efficient plants. The following initiatives could enable 25% of our peak demand to be shaved from the electric load.

We will seek to expand participation in peak load management programs through smart meters

In peak load management programs, customers agree to reduce their electricity load on the hottest days—either by using less electricity or by using alternative sources of generation. Participants are paid for enrollment and/or for responding during a peak event. Already, the customers enrolled can collectively reduce the city's peak load by appoximately 500 MW—or 4% of the peak electric demand in the city.

We can measure their impact because participants have installed a more sophisticated metering system that allows buildings to track their own energy use—and sometimes the energy consumption of individual tenants—in real-time. But these meters can be costly: a standard meter costs around $30, while smart meters range from $100 to $600.

Although enrollment has increased by 7% over each of the past three years, full participation is not realized due to the high cost of smart meters and the fact that entrance is mostly limited to the largest electricity consumers, such as large commercial and industrial buildings.

To overcome these challenges and allow for wider enrollment in the peak load management programs, the City will urge the PSC to approve Con Edison's plan to install smart meters in every building by 2014.

The City will work with NYPA and Con Edison on installing smart meters in all City-owned buildings before 2014. This could result in a 4% decrease in City government's peak energy usage, while reducing overall energy consumption by 5%. We will also challenge all other institutional, State, and Federal agencies located in the city to participate in peak load programs and increase their overall impact.

We will support expansion of real-time pricing across the city

Currently, consumers are able to make informed choices about when to use their cell phones; in peak times, they know that minutes will cost more than off-peak hours and can adjust their behavior accordingly. Although energy prices fluctuate just as much over the course of a day, this information is almost entirely unavailable to the vast majority of New Yorkers. *(See chart above: Real-Time Pricing Impact on Electricity Consumption; see case study: Real-Time Pricing in New York)*

If customers were able to see the costs of electricity at different times, they could make more educated decisions about when and how they use electricity throughout the day. This is known as Real-Time Pricing (RTP).

Although the State initiated a residential RTP pilot program between 2004 and early 2006, it has not provided incentives for any additional pilots since 2005.

The City will advocate for new incentives to expand RTP pilots in the city and encourage residential participation, with the goal of enrolling 50% of small businesses and residents by 2015. In addition, the City will push the PSC to mandate that 100% of medium and large non-residential customers enter RTP programs over the same time frame.

CASE STUDY

Real-Time Pricing in New York

Ellen Funk loads the dishwasher after dinner, and then she waits until 7 am the next day to turn it on.

"Running the dishwasher after dinner costs five times as much as turning it on in the morning," Funk said. "Why wouldn't I wait?"

Funk is a resident of 322 Central Park West, the first of four buildings across New York City to volunteer for a real time pricing program. Real-time pricing uses sophisticated metering—which 322 CPW installed in 2002—to track the energy usage of building residents. Most homes have meters that are read monthly, but Funk knows how much her electricity costs her every hour.

"I think everyone will buy power this way in the next ten years," said Lewis Kwit, President of Energy Investment Systems (EIS), who manages the building's energy-conserving initiative.

Monthly bills inform 322 CPW residents of their daily usage trends, and color-coated seasonal bulletins tell them what to expect at various hours in the coming months. Peak rates—often found in the hours when everyone gets home from work—represent about 25% of a building's total bill. The more residents conserve energy use during peak hours, the more money they save.

According to research done at Carnegie Mellon University and reported by *The New York Times*, American consumers would save nearly $23 billion a year if they shifted just 7% of their usage during peak hours to less expensive times—the equivalent of the whole nation getting a free month of power every year. Several real time pricing pilots are happening throughout the country, including projects in Illinois, Florida, and California.

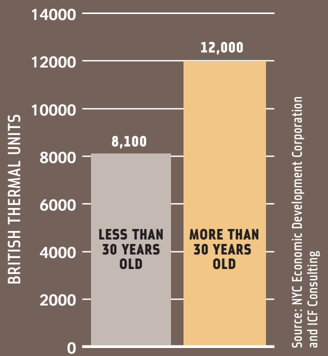
The program at 322 CPW not only helps residents save money, it also allows them to conserve energy when utility companies need it most. This could mean the difference between a brownout and a sufficient energy supply.

"When New York expects a power emergency, our buildings are notified," said Kwit. "And they respond."

Last summer, there were five blackout alerts in New York. During the heat-wave in July 2006, when parts of Queens went dark for days, 322 Central Park West cut their energy use by 42% and sold the unused capacity for $3,000.

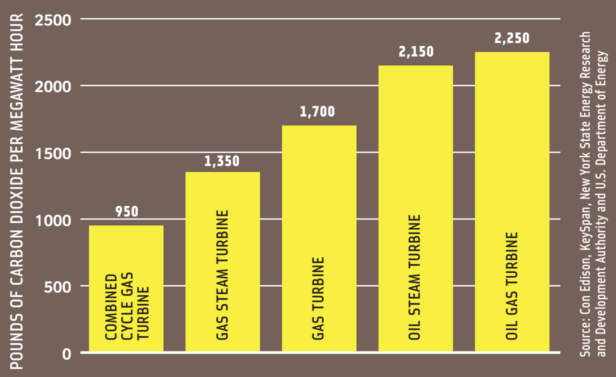
"The people in our building feel really good about the program," said Funk. "It's been a big success."

Average Energy Consumed to Produce 1kWh of Electricity*



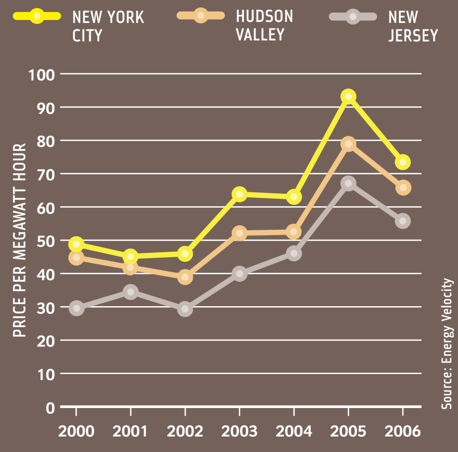
Based on 2006 capacity factors and reported heat rates for all in-city plants

Average Greenhouse Gas Emissions of City Power Plants



PERCENTAGE OF IN-CITY POWER SUPPLY				
CCGT	Gas Steam Turbine	Gas Turbine	Oil Steam Turbine	Oil Gas Turbine
24%	27%	20%	20%	10%

Electricity Prices Across the Region



Price is wholesale, does not include delivery, surcharges, or taxes.

INITIATIVE 7

Launch an energy awareness and training campaign

We will increase the impact of our energy efficiency efforts through a coordinated energy education, awareness, and training campaign

The cost savings of efficiency strategies are clear. In many cases, the programs and opportunities already exist. But unless the public and building professionals appreciate the urgency, are informed about the choices ahead, and understand the savings they can achieve, we will not meet our goal.

As a result, the New York City Energy Efficiency Authority will undertake extensive education, training, and quality control programs to promote energy efficiency. The City will begin to undertake these efforts through a series of partnerships until the Authority is established.

Education: In partnership with schools, marketing professionals, and non-profit organizations, we will develop customized awareness campaigns tailored to specific sectors of the public, including the press, schoolchildren, and those in the building trades.

Training: The effectiveness of each strategy will depend on its proper implementation. That's why we will also create training programs for building operators, builders, designers, retailers, and energy service providers to ensure that building practices reflect the most energy-efficient strategies.

Quality Control: Building owners must be confident that they will receive the expected energy savings. That's why we will establish a certification process for energy auditors, commissioning agents, and contractors performing retrofits.

We will make energy usage in buildings more transparent by encouraging building owners to file an Environmental Protection Agency Portfolio Manager survey, a web-based energy usage breakdown for buildings. This will enable us to analyze consumption patterns, and adapt our efficiency strategies to have the maximum impact.

Finally, we will establish a process to measure and verify the progress of each demand reduction initiative to establish credibility, facilitate consensus about the most cost-effective procedures, and fine-tune our policies to achieve greater effectiveness over time.

Expand the city's clean power supply

Flattening consumption will not happen overnight. Despite our efficiency efforts, by 2015 we will need at least 900 MW of new generating capacity just to keep up with rising demand and expected power plant retirements.

But to achieve New York's environmental goals and lower our energy bills, we must go beyond merely closing the gap between supply and demand. To accelerate the retirement of the city's oldest, most polluting power plants and address environmental justice issues, we must generate enough supply to compensate for that loss of power. In addition, we must also increase supply to make our prices more competitive with the region.

To accelerate the retirement of the older, less efficient plants we will build 2,000 to 3,000 MW of new electric capacity by as early as 2015. The new, efficient plants will displace generation from older plants, help drive down prices in the wholesale market, and enable us to retire 1,000 to 2,100 MW of capacity. Between now and 2015, the City will mostly rely on conventional, clean energy sources to increase supply, but we will work to set the stage for renewable energies such as solar, wind, and tidal power to play a larger role in the future. *(See charts above: Average Energy Consumed to Produce 1kWh of Electricity and Average Greenhouse Gas Emissions of City Power Plants)*

INITIATIVE 8

Facilitate repowering and construct power plants and dedicated transmission lines

We will facilitate the construction of 2,000 to 3,000 MW of supply capacity by repowering old plants, constructing new ones, and building dedicated transmission lines

Achieving clean and reliable energy will require upgrading, expanding, and replacing much of our current energy supply. Between now and 2015, the City will pursue three strategies to increase supply from cleaner power plants. *(See chart above: Electricity Prices Across the Region; see case study on facing page: East River Repowering)*

First, we can maximize existing power plant sites, either by building additional generation facilities within the existing site or modernizing the plant's technology. This process, known as "repowering" can increase efficiency up to 40% and significantly reduce greenhouse gas emissions. Replacing old turbines will also improve local air quality. The City will explore opportunities to facilitate in-city repowering that offers significant additional capacity and achieves immediate local air quality improvements.

Our second option is to build new plants on new sites. New construction costs about the same or less than repowering, but land is limited and construction costs in New York City remain high compared to the surrounding region.

Our final option is to build power plants outside city limits that are completely dedicated to providing electricity to the New York City grid. By controlling the types of plants constructed and connecting those plants directly to the city grid, we can ensure that we do not import energy from dirtier sources such as conventional coal plants.

All three of these options will provide a cleaner energy supply that is also cheaper to run. Through the New York City Energy Planning Board described above, we will help facilitate the issuance of long-term contracts to encourage new plants that are sensitive to communities.

We will also work actively with a broad range of community stakeholders to advocate for the re-enactment of Article X, which established a single streamlined process for reviewing all permitting and siting issues for power plants.

INITIATIVE 9

Expand Clean Distributed Generation ("Clean DG")

We will increase the amount of Clean DG by 800 MW

Not all power generation has to occur at central power plants. Mini-power plants located close to or at the site of use, referred to as distributed generation (DG), currently contribute 180 MW to our supply. Clean DG uses clean fuels, such as natural gas, and is a more efficient form of energy production because the energy travels a shorter distance to its destination, retaining up to 8% more energy. Clean DG can be even more efficient when it utilizes the waste heat from electrical generation to create hot water, heating, and cooling for buildings, so it is often called Combined Heat and Power (CHP). CHP can be done on a building level or developed as a "mini-grid" for multiple buildings within a small area, known as "district energy."

As a result, Clean DG can produce twice as much energy for the same amount of fuel used by older conventional power plants. This can result in substantial cost savings; new projects that integrate Clean DG can earn back their investment in three to five years, while existing buildings can cover costs in approximately five to eight years.

But this technology is not always compatible with our existing grid. As a result, Con Edison sometimes limits the amount of DG that can be connected. Applications that meet the reliability requirements established by the PSC must still undergo a lengthy 11-step connection process that can take months to complete. Lastly, permit applications to the City have also caused delays for Clean DG projects.

The City will work with Con Edison and relevant agencies to reduce the financial, technical, and procedural barriers related to interconnection in order to achieve, at minimum, 800 MW of Clean DG by 2030.

We will work with Con Edison to expand the amount of Clean DG that can be safely connected to the grid.

This spring, Con Edison will be filing with the PSC for a change in the rates that they charge customers. The City will use this opportunity to advocate that Con Edison study the capacity of individual networks to handle more DG without impacting network reliability and power quality. During the same rate case, the City will also ask Con Edison to study new technologies that would increase the amount of Clean DG that can be safely connected to the grid.

In addition, to improve communications between Con Edison and prospective developers of Clean DG, the City will push for Con Edison to develop an on-line interconnection application tracker that clearly shows what stage interconnection applications are in and sends automatic alerts when delays occur.

We will promote opportunities to develop district energy at appropriate sites in New York City

In 2005, Con Edison analyzed the projected energy needs of the Hudson Yards Redevelopment Area. It found that extending the existing steam infrastructure used for heating in Manhattan below 96th Street to reach the Hudson Yards area would be prohibitively expensive—but district energy may be a viable alternative.

At the City's urging, Con Edison is currently overseeing a more extensive analysis of the economic and technical feasibility for a district energy project in the Hudson Yards area. If the study finds that district energy is feasible, the City will seek to implement a district

Source: Con Edison

CASE STUDY

East River Repowering

In April 2005, Con Edison completed a massive repowering project involving a complex choreography of equipment, experts and energy—steam, to be exact.

The company's East River steam generating facility, for years the target of community criticism about the high level of emissions, underwent an extensive program of operational enhancements, equipment upgrades, and reduced oil burning in favor of clean natural gas.

As a result, the facility now is one of the cleanest power generating facilities in New York State.

Steam—which can be used in some cases instead of electricity—is an efficient way to cool a building. Steam cooling in New York is especially valuable because Con Edison's nine central steam plants currently replace the need for 375 MW of electricity, which helps to reduce the city's peak demand on the hottest summer days.

The East River repowering helped expand the city's steam supply, enabling the plant to produce 25% more steam per hour.

But while repowerings lower emissions and increase efficiency, they come at a high cost. All of the new equipment must be installed within the existing parameters of the building, while the old equipment continues operating.

To solve these challenges, most of the large machinery—including two dual-fuel combustion turbines and two heat-recovery steam generators—had to be constructed off-site, shipped to the plant on a barge, and then lifted over the FDR Drive and lowered into the building through openings in the roof and walls.

We will encourage additional repowerings, especially at Con Edison's steam plant on Hudson Avenue in Brooklyn. We will also support the expansion of steam as a power source for the city by expanding the existing discount program to steam.

energy plan through Con Edison or independent developers.

In addition, we will require through the building code that new developments larger than 350,000 square feet across the city complete an analysis on the technical and economic feasibility of installing CHP. This analysis will help building owners understand the benefits of CHP and help accelerate transformation of the CHP market.

INITIATIVE 10

Support expansion of natural gas infrastructure

We will support critical expansions to the city's natural gas infrastructure

New power plants and expanded Clean DG will both require the use of natural gas, the cleanest-burning fossil fuel. Already, natural gas fuels 80% of our power plants and more than a quarter of all energy used in buildings—and in the coming decade its use will continue to rise.

But there are two challenges to reliable, affordable supply of natural gas in New York.

Four long pipelines carry natural gas into the city, extending from the Gulf of Mexico and the Canadian border. On the hottest and coldest days of the year, our demand already exceeds the capacity of these pipelines by up to 1.2 billion cubic feet. We have been able to ensure reliable heating and power by keeping enough gas in storage to cover this gap, but as demand continues to increase it will become more difficult to meet the need.

This delivery constraint leaves us vulnerable to any disruptions along the pipelines or unexpected temperature swings. New York already has some of the highest natural gas prices in the nation. But when cold weather strikes, the spike in demand propels prices even higher. For example, during a cold snap in February 2003, natural gas prices went from \$7.50 to \$28/MMBtu in one day and momentarily reached \$40/MMbtu. While other regions in the Northeast and Midwest were experiencing a similar cold front, the price impact was not nearly as dramatic.

As the demand for heat and power grows, these problems will only get worse—unless we take action to expand our natural gas supply. That's why we will support siting and permitting applications to the Federal Energy Regulatory Commission and other relevant regulatory authorities for additions to our natural gas infrastructure. Currently, there are several active proposals for pipeline projects and liquefied natural gas ("LNG") terminals that would expand our access to gas.

Given how critical new natural gas infrastructure is to our long-term energy security, the City will support the development of new infrastructure projects that are designed to be sensitive to environmental and community needs.

INITIATIVE 11

Foster the market for renewable energy

We will provide incentives and reduce barriers to renewable energy and pilot emerging technologies

Renewable energy is derived from emission-free and seemingly unlimited sources such as solar, wind, and hydroelectric power. Over the long-term, renewable energy has the potential to play a significant role in our energy supply. *(See case study on facing page: Tidal Power in New York City)*

New York State is a leader in renewable power, with extensive hydroelectric and wind resources already located upstate, and several major wind farms currently under development. The State has also committed to ensure that 25% of its energy comes from renewable sources by 2013.

Today, New York City receives over 6% of its electricity from the State's renewable energy resources. In addition, the City recently committed to purchase 20 MW of wind for City government operations starting in 2008. This agreement helped support the development of a second phase of a 107 MW wind farm upstate. New York City consumers also have the opportunity to further support the market for upstate wind and other renewables by selecting green power as their energy source.

If we expand our reliance on renewable energy, we could help secure our energy supply, reduce our greenhouse gas emissions and improve air quality.

Solar energy

Of all the renewable energy sources, solar currently has the greatest potential to generate electricity within the five boroughs. The technology is commercially available, our abundant roofs offer ample space for panels, and solar energy is most available when the city needs it most—during hot, sunny days.

Estimates of solar potential by Columbia University, the City University of New York, and NYSERDA range from 6,000 MW to over 15,000 MW, with one study claiming solar can contribute 18% of peak load by 2022. But solar energy is still not as cost-effective as gas-fired electricity. And New York City is uniquely expensive: our taller buildings require more wires and cranes to carry equipment to rooftops, while extensive interconnection requirements and inspections delay implementation. For these reasons, installed costs for solar are approximately 30% higher than in New Jersey and 50% higher than in Long Island.

As a result, even with incentives from the Federal government and the State, the City has only been able to achieve 1.1 MW of solar capacity. To ensure solar meets its long-term potential to contribute more significantly to our supply, we must employ a range of strategies to develop a more competitive market.

We will create a property tax abatement for solar panel installations

In order to spur the market in the private sector and help achieve needed economies of scale to bring down prices, New York City will offer a property tax abatement for solar installations. The incentive will cover 35% of installation costs for the first three years of the program, with the incentive scaling back to 20% in years four and five. The graduated structure of this incentive will grant early adopters greater benefits, ensuring that a market is established.

In addition, the City will study the cost-effectiveness of solar electricity when evaluated under a Real Time Pricing scenario. The City will also support the construction of the city's first carbon neutral building. This building, located along the East River, will be powered primarily by solar energy.

We will increase use of solar energy in City buildings through creative financing

Since City facilities are not eligible for NYSERDA incentives or tax credits, the economics for public solar projects are even more difficult than in the private sector. In order to facilitate solar projects on City buildings, we will release an RFP to attract private solar developers to build, own, operate, and maintain the panels on City buildings. The City will enter into a long-term contract with the developer to purchase the solar energy generated by these panels.

CASE STUDY

Tidal Power in New York City

A thin sliver of the East River between Queens and Roosevelt Island looks just as it did a year ago. But there's an important difference under the river's surface. Today, turbines in the water's depths are testing the river's ability to harness the tide, creating a powerful kind of energy.

Last December, Verdant Power built and installed two of six planned underwater turbines eight feet below the surface of the East River as part of the Roosevelt Island Tidal Energy project (RITE). The turbines look like windmills, and as the tide goes in and out, they capture some of its energy, converting it directly into electricity.

Tidal power is predictable and reliable, flowing with the everyday force of the moon on New York City's rivers. The density of the water means that fewer turbines are necessary to produce the same amount of electricity as wind turbines.

"It's the depth and strength of the current in New York's waterways that makes them turbine-friendly," said Mollie Gardner, a geologist who works with Verdant Power. "The water is perfect."

Not only is the water itself perfect—it's perfectly situated. Because our rivers are near underground transmission lines, the turbine-generated power could easily be plugged into the existing power grid, allowing for the tidal energy to be sent swiftly to waiting customers. RITE turbines in the East River have already generated more than 10,000 kilowatt hours of tidal power for a supermarket and parking garage just yards away from the pilot site off the Roosevelt Island waterfront.

A third of the $6 million budget went to sonar radar equipment to study the project's effect on its surrounding environment and ensure nearby fish and swooping birds won't be harmed.

If the project is successful, the East River could become home to 300 turbines, providing 10 MW of renewable energy for New York City, enough to power up to 8,000 homes. That power could displace the equivalent of 68,000 barrels of oil, or 430 million cubic feet of natural gas per year.

"We're making such wonderful breakthroughs in harnessing water for energy with the least amount of environmental impact," said Trey Taylor, Co-Founder and President of Verdant Power. "And what excites me is that it's all taking place here in New York City."

We will work with the State to eliminate barriers to increasing the use of solar energy in the city

To further promote solar energy, the City will work with the State Legislature and the PSC to reduce two existing barriers: the amount of solar that can be connected to the grid, currently capped at 8.1 MW, and the amount of excess power that can be sold back to the grid, currently limited to 10 KW of residential power.

Methane and organic waste

Our garbage and sewage offer both potential and perils. If used productively, organic waste or biomass can provide a plentiful source of energy, producing as much as 450 MW—or the equivalent of a medium-sized power plant. Handled improperly, it can add significantly to our greenhouse gas emissions through the production of methane—which is 21 times as potent a greenhouse gas as CO2.

New York City's three main sources of methane include its current solid waste, its former landfills, located within the city, and its sewage treatment plants. Currently, some of this methane is captured and either flared—burned and converted into less potent CO_2—or used to create energy. But much of it still escapes into the atmosphere.

That's why New York City will work to maximize the safe, cost-effective extraction of useful energy from its organic waste streams and minimize the methane and CO_2 emissions associated with waste.

We will pilot one or more technologies for producing energy from solid waste

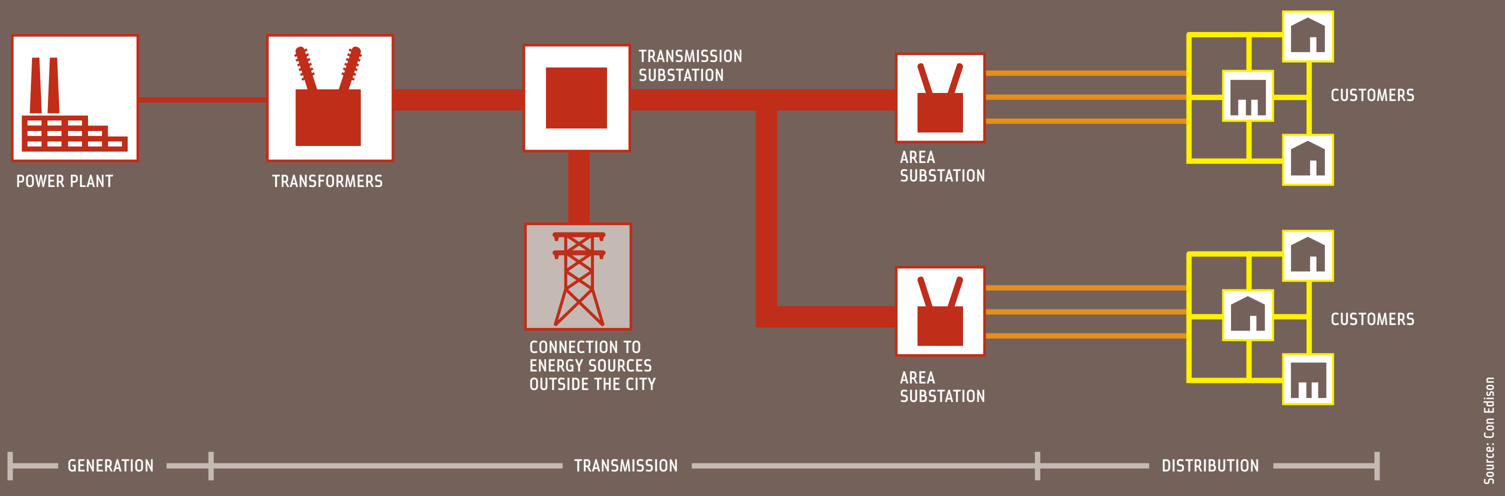
The City's recently approved Solid Waste Management Plan (SWMP) called for the evaluation of alternative waste technologies for converting organic waste into usable energy. Out of 43 technologies studied, two offered superior environmental performance and cost-effectiveness—anaerobic digestion and thermal processing. We will launch pilot projects to test both of these technologies for broader application.

The City is also pursuing a pilot in the Hunts Point Food Distribution Center. In 2004, the City commissioned a study to investigate the feasibility of on-site organic waste recovery at the Food Distribution Center in the Hunts Point neighborhood of the Bronx. The study concluded that it is feasible to site an anaerobic digestion facility that would provide a reasonably priced organics recovery option. The facility would create jobs for the Hunts Point community, generate a renewable energy source and a marketable compost product, and reduce exports of waste to out-of-state disposal facilities with associated truck emissions. The City will work with stakeholders to learn more about the potential for such a facility in Hunts Point, including more exact costs of a potential organics recovery facility. To do so, the City will issue an RFP to target the short list of firms identified in the feasibility analysis, and set specific operational and economic parameters for a facility.

We will end methane emissions from sewage treatment plants and expand the use of digester gas

When wastewater is processed in a sewage treatment plant, it produces digester gas, which contains methane and CO_2. Currently, roughly 60% of New York City's digester gas is collected and used to create energy via fuel cells, most of which is used to power the sewage treatment plant itself, another 25% is flared, and the remaining 15%—the equivalent of 165,000 tons of CO_2—escapes. Over the next three years, the City will end all methane emissions from sewage processing, and will work to expand the use of digester gas for energy production.

Energy Delivery System



We will study the expansion of gas capture and energy production from existing landfills

Beginning in the 1970s, some of the methane from Fresh Kills has been processed and marketed as natural gas, generating revenue for the City. Since the original gas collection system was installed, new technologies have emerged, the cost of natural gas has skyrocketed, and the City has committed to a greenhouse gas reduction target of 30%. Given these changes, the City will initiate a study to explore the feasibility of generating more energy from its landfill gas, and it will review the standards regarding methane capture and flaring at the city's existing landfills every five years to see whether they should be amended to support the City's greenhouse gas reduction goal.

Modernize electricity delivery infrastructure

The final important component of clean, reliable power is the delivery of that energy to New York City customers. *(See graphic above: Energy Delivery System)*

Today, New York City's power grid is the largest underground electric cable system in the world. Operated by Con Edison, there are almost 90,000 miles of underground cable and almost 20,000 miles of overhead cables in the city.

This system is subdivided into mini-grids or network neighborhoods that deliver power directly to each building. The interconnections within our grid provide essential redundancy, making it the most reliable network in the United States. But when power failures do occur, the network's age and complexity can often make it more difficult to identify the problem and restore power. These problems were illustrated most clearly during the 2006 power outages in western Queens when Con Edison could not easily assess the scope of the outages. Calls from customers became the primary way to assess the extent of the damage.

In addition, upgrading our infrastructure —especially the underground cables—can be time consuming, costly, and difficult. Finding locations to site substations in growing neighborhoods is a difficult challenge. In order to improve reliability, we must adapt our grid to the demands of the 21st century, improving communications between customers and the utility, making our grid more transparent so that problems can be identified more easily, and improving its ability to respond to new pressures and incorporate new technologies.

INITIATIVE 12

Accelerate reliability improvements to the city's grid

We will advocate for Con Edison to implement recommendations from the City's report on the western Queens power outages

The damage caused by the 2006 power outages demonstrated the need for extensive upgrades to the city's electric delivery system. A City evaluation found that some of the failures in western Queens could have been avoided if equipment had been updated in a timelier manner, if upgrades to the system had been monitored more closely or if Con Edison had fully implemented recommendations made after the Washington Heights blackout in 1999.

We will advocate before the PSC and through the upcoming Con Edison electric rate case for the implementation of the 53 recommendations contained in the City's report. These recommendations include:

- Expanding the installation of advanced meters, which will improve Con Edison's ability to instantly identify the number of customers affected by a power outage
- Accelerating repairs to failure-prone components of the grid and strengthening oversight of contractors
- Completing the implementation of all recommendations from the 1999 blackout, while evaluating similarities with the Queens blackout for additional lessons on how to improve grid reliability

INITIATIVE 13

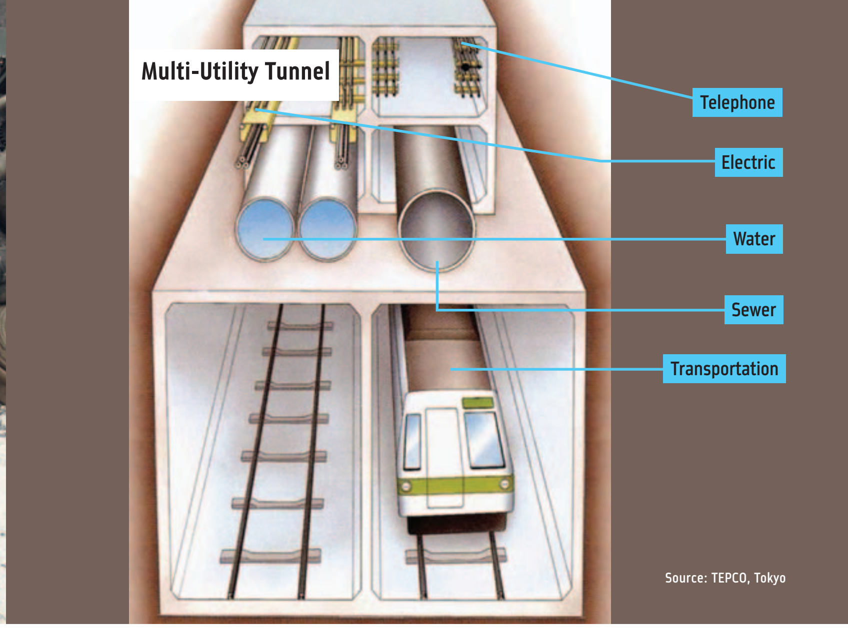
Facilitate grid repairs through improved coordination and joint bidding

We will pursue the passage of joint bidding legislation

When the City undertakes a construction project that involves tearing up the street, each affected utility is responsible for protecting its own cables and other infrastructure. Improved coordination between City contractors and the utilities will result in fewer delays and lower costs.

Joint bidding enables a single contract to cover all the work associated with a project. The City will support joint bidding legislation citywide to allow for fair competitive bidding and more seamless project planning, resulting in fewer street openings and lower costs to the public.

Con Edison worker preparing underground delivery system



In addition, the City will review its policies governing the utilities' ability to open up the street for regular maintenance and repairs. This analysis will identify any unnecessary delays that prevent utilities from undertaking essential improvements such as installing new cables and transformers in a timely manner. We will also look to pilot new models to improve coordination among developers of underground infrastructure, such as the use of a multi-utility tunnel which allocates space for each utility with designated access points. *(See graphic on facing page: Multi-Utility Tunnel)*

We will ensure adequate pier facilities are available to Con Edison to offload transformers and other equipment

Transformers and other heavy equipment needed to maintain New York's energy infrastructure are often delivered via the waterways. This equipment is then offloaded at pier facilities throughout the city. Sites must be capable of handling heavy loads and provide access to acceptable transportation routes to assure prompt and safe delivery of the equipment. In order to maintain and upgrade the reliability of the electric system, it is essential that Con Edison have access to specific dock facilities to offload this equipment during both emergencies and during the regular course of business. This is particularly critical in areas where there is a regular need to install, replace or remove equipment and Con Edison does not own its own waterfront property.

For this reason, the City will work with Con Edison to identify specific critical sites and maintain open access for delivery of equipment along the waterfront.

INITIATIVE 14

Support Con Edison's efforts to modernize the grid

We will support Con Edison's 3G System of the Future initiative

Our current grid was designed during the 1920s. Today, parts of that original system are still in use—and the way it functions remains fundamentally unchanged. But grid technologies are evolving around the world and new models have emerged in Tokyo, Paris, and London.

Con Edison initiated a state-of-the-art research and development project called the *3G System of the Future* to study how to transform our network into a 21st century grid. This will include how to integrate advances in communications, computing and electronics to respond faster and more effectively to localized network problems and demand fluctuations.

This research and development will require a significant investment. The City will support funding requests by Con Edison to advance this research and improve reliability and service for New Yorkers.

Conclusion

Last summer, we saw the strains on our energy infrastructure and the impact it had on our air quality, energy bills, and overall quality of life. And these stresses—growing demand, inefficient supply, and aging delivery network—continue to test our system.

That's why we will launch the most ambitious energy efficiency program in the United States, while easing the financial risks associated with expansion and construction of power plants and dedicated transmission lines. The combination will enable us to retire our city's most polluting plants.

At the same time, we will reduce barriers to Clean Distributed Generation or "mini" power plants that are more efficient and cleaner than centralized power plants.

Lastly, we will continue to purchase wind energy, support the market for solar energy, and pilot new and emerging technologies that use wind, tides, hydrogen, and biogas to generate electricity. By encouraging these emerging, clean technologies, we will begin building a market to establish the cleanest possible energy supply for New York City's future.

Implementing all of these policies will reduce the city's global warming emissions and cut the average New Yorker's energy bill by $230 annually from projected costs in 2015. The new strategies will also result in new economic opportunities as new industries swell around installation, renovations, and production; the retro-fit and retro-commissioning program alone could result in 5,000 new jobs.

By investing in these efforts now, the city of endless energy can stay that way.

Despite decades of improvement, New York City still fails to meet Federal air quality standards—and we have no way of measuring the air quality in individual neighborhoods.

That's why we will create a comprehensive program to reduce emissions from a variety of sources within the city, including vehicles, power plants, and buildings. Natural solutions such as planting one million trees will bring us the rest of the way towards cleaner air for all New Yorkers. To track our progress and target our solutions to the areas of greatest need, we will launch the largest local air quality study in the United States.

Together, these initiatives will enable every New Yorker to breathe the cleanest air of any big city in America.

Air

Air Quality

Achieve the cleanest air quality of any big U.S. city

Air Quality

Credit: © Rob Howard/Corbis

Achieve the cleanest air quality of any big U.S. city

Trucks begin entering the Hunts Point neighborhood hours before sunrise. They arrive by the hundreds under expressways, over highways.

By sunset, more than 15,000 trucks have driven through the peninsula, virtually all powered by diesel fuel. The trucks rattle down alternate routes, of 10 slipping down side streets, past houses and apartment buildings, as they search out the Produce Market, the Fulton Fish Center, the meat market.

Fifteen million people eat food distributed through the center every day. Facilities like the Produce Market were built in the 1960s, when the demand for produce was significantly less. Now there is not enough storage space to meet the need. The trucks help solve this problem. Up to 1,000 act as refrigerators every day, engines gunning for hours to keep the cool air pumping into the back so the produce can stay fresh in its stacked boxes.

Trucks are a fraction of the traffic through the South Bronx. More than 77,000 vehicles pass through the neighborhood daily, spewing exhaust and gasoline fumes. The area is served by only one bus route and the nearest subway can be a significant walk. But with the work of the Hunt's Point Task Force, the opportunity for change is beginning to be realized.

Not so long ago, incinerators, industrial factories, and the rise of traffic and diesel fuels lent most images of our city a blurred, gray edge. The pollution from these sources hurt our city's air quality—and had harmful consequences for the health of New Yorkers.

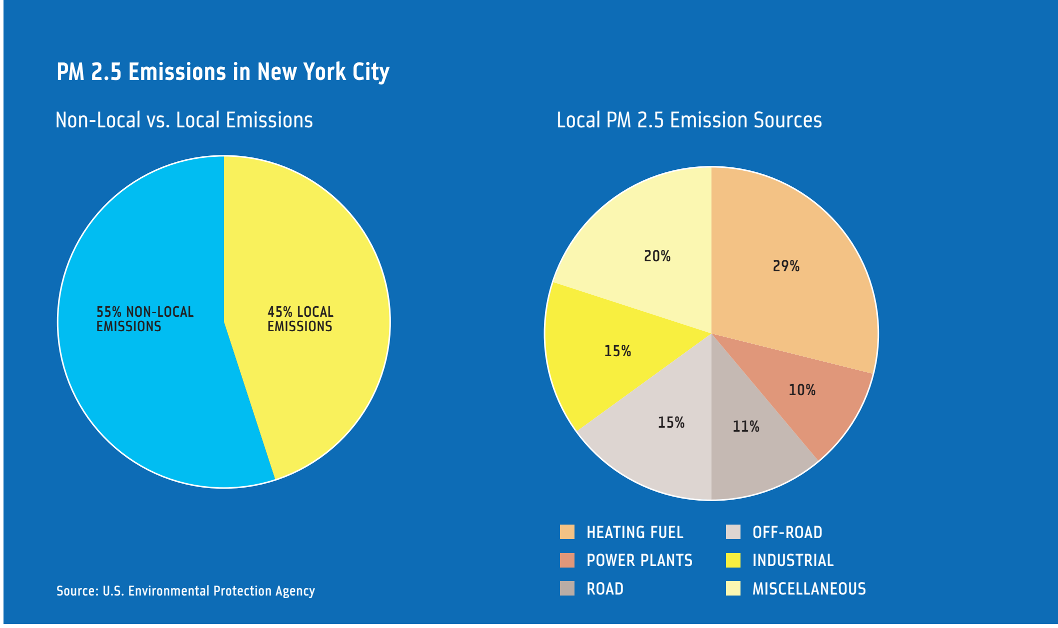
That has changed. Over the past two decades, Federal, State, and local governments have recognized the need for action. In addition to the Federal Clean Air Act, the City has lobbied—and, when necessary, litigated—all levels of government to strengthen these standards. Within the five boroughs, local programs and legislation—such as the retrofit program for City school buses and Metropolitan Transportation Authority (MTA) buses, the City's purchase of hybrid and Compressed Natural Gas (CNG) vehicles, and new construction standards—have all combined to give New York its cleanest air in half a century.

Still, the improvements that have occurred citywide are not felt equally among our neighborhoods. In some communities, the impacts of exposure to local air emissions have likely contributed to higher asthma rates and other diseases. Citywide, air quality fails to meet all of the Federal standards, in large part because of air pollutants that travel here from other states.

The New York City metropolitan area has not yet fully attained Federal air quality standards for two of six ambient air pollutants designated by the Environmental Protection Agency (EPA): ozone, and soot (PM 2.5). This puts us behind all but one of the largest cities in America.

Despite our progress, there is more to be done.

View over Central Park



In the 37 years since the passage of the Clean Air Act, our understanding and awareness of pollution has continued to increase. As our knowledge has evolved, the focus of air quality efforts has shifted. Three main considerations have shaped our approach to improving air quality in every neighborhood.

First, it is becoming clearer where the real dangers lie. Although the EPA tracks six criteria pollutants, among the most dangerous is PM 2.5—more commonly known as soot. Its small size lets it drift deeper into the lungs, where it can cause inflammation and other damage. According to the EPA, exceedances of the PM 2.5 standard cause up to 15,000 premature deaths annually. Estimates from the City's Department of Health and Mental Hygiene show that a 10% decrease of current levels in New York City would result in hundreds fewer deaths annually.

PM 2.5 is a by-product of burning fuel in trucks and buses, factories and power plants, and boilers. Other criteria pollutants—sulfur dioxide (SO_2), nitrogen dioxide (NO_X), and volatile organic compounds (VOC)—form additional PM 2.5 through chemical reactions. In fact, according to the State's Department of Environmental Conservation (DEC), somewhere between 45% and 60% of PM 2.5 levels in New York City comes from sulfate transformed in the atmosphere from SO_2 emissions. *(See charts above: PM 2.5 Emissions in New York City)*

Second, we have also learned what we do not control. More than 50% of New York's PM 2.5 originates outside the city. Some pollution drifts in from other states, mostly from mid-western power plants and factories; more is expelled from airplanes. The wind catches exhaust from the west and carries it into the city. Depending on the time of year, up to 70% of particulate matter measured in the city comes from somewhere else.

Some of these polluters can be held accountable. In 2003, the City joined several states and municipalities in a successful lawsuit challenging the EPA's plans to change regulations to enable older, more polluting facilities to increase air pollution emissions, which would have impacted New York City's air quality. The City also joined a number of states in a public nuisance action designed to force the five largest United States power plant CO_2 polluters to reduce their emissions.

Finally, it is clear we need to re-examine the methods we use for measuring pollutants to more accurately reflect their local impact.

The EPA began addressing regional air pollution issues as part of a broad, interstate approach. The EPA and DEC deliberately placed most monitoring systems away from highways, power plants, and heavily-trafficked roads so that their emissions wouldn't skew the results. The intent was not to record the output of an individual smoke stack, but to understand how that smoke affected the region.

Today, the EPA still largely measures its success by looking at overall area concentrations; the cumulative pollution gathered over a given region. But implicit in that decision is the acknowledgement that the closer one gets to an actual polluter, the greater the exposure to that pollution. In cities like New York, where roads, power plants and highways are interwoven through communities, the ambient measurements are inadequate indicators of actual exposure. Virtually all of us live, work, or walk near heavily trafficked streets. And we are learning that those are the highest risk zones.

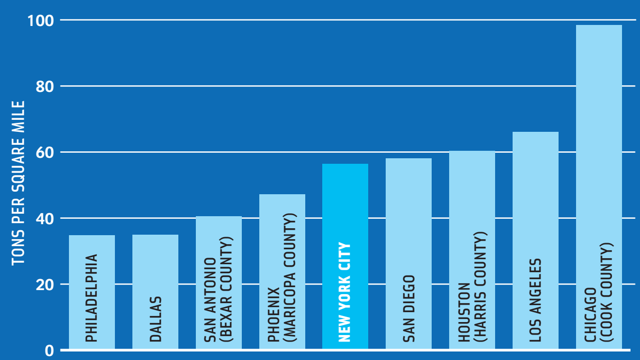
Recent studies have begun to measure local pollution exposure correlated with health impacts of the surrounding communities. This is the next front of air quality science. It is also an area where the City can have an enormous impact. When the issue is solving regional ambient air quality, the impact on any neighborhood is uncertain. But when the focus is on local exposure and community health, there are various opportunities to decrease environmental disparities.

In the South Bronx, where asthma rates are particularly high, the City has worked with local communities to begin installing a network of parks. We are exploring an alternative fuel station for drivers, a program to retrofit and upgrade trucks, and conversion of entire fleets to Compressed Natural Gas, which has 90% lower carbon monoxide and particulate matter emissions than diesel. And there's a lot more we can do.

The findings of these local exposure studies are compelling. We must build on these efforts to gain an accurate understanding of the air quality variations across New York City. Meanwhile, we can begin moving forward on policies designed to reduce our biggest known polluting sources—diesel fuels, gasoline exhaust, building heating oil, and aging power plants with outmoded technology—while promoting natural solutions like trees.

We will also support an air quality plan being developed by New York State to meet Federal standards. This plan will be released in 2008.

PM 2.5 in U.S. Cities*



Source: U.S. Environmental Protection Agency

In cases where city-level data is unavailable, county-level data is provided

PM 2.5 Air Quality Improvement Plan

CATEGORY OF EMISSION SOURCES	PM 2.5 EMISSION IMPROVEMENT
On-road Vehicles	9%
Off-road Vehicles	7%
Electricity And Heating Fuels	23%
Natural Strategies	≈1%
TOTAL	**40%**

Source: NYC Mayor's Office of Long-Term Planning and Sustainability
Calculations based on U.S. Environmental Protection Agency 2001 National Emissions Inventory

Our Plan

We must continue pressuring the states and Federal government to reduce air emissions nationwide. But even as we seek to hold others more accountable, we can begin targeting the sources in New York City even more aggressively. *(See charts above: PM 2.5 in U.S. Cities and PM 2.5 Air Quality Improvement Plan)*

Based on current emissions levels, we will need to reduce our local PM 2.5 by 39% per square mile to achieve the cleanest air of any big city in America. But as other cities take steps to improve, we must keep pace. That means we must be continually re-evaluating our goal and benchmarking it against other cities.

We have chosen PM 2.5 as our standard because of its significant impacts—and because we lag behind our peer cities in stemming its release into the air. But other pollutants such as SO_2, NO_X, and VOCs also contribute to our PM 2.5 levels, so achieving further reductions in those emissions will also be essential.

In order to achieve this goal, we have developed a four-pronged strategy. Transportation accounts for more than 50% of our criteria pollutant emissions. That's why we will reduce emissions from cars, trucks, and buses by promoting fuel efficiency, cleaner fuels, and cleaner or upgraded engines. We will also increase the use of exhaust filters and reduce the added pollution caused by congested streets and idling.

Second, we will apply similar strategies to off-road vehicles, including ferries, construction equipment, and planes. By partnering with the Port Authority, the MTA, New Jersey Transit, and private operators, we can achieve substantial reductions across all transportation sectors.

Third, the electricity and heating fuels used to power and heat our buildings accounts for over a third of emissions. As described in our energy plan, we must tackle old, outdated power plants and exchange them for modern, more efficient models; we must also switch to cleaner burning fuels and remove polluting boilers from schools, prioritizing sites where children suffer from higher rates of asthma and other diseases.

And finally, we must increase natural areas within the city to act as filters to further improve air quality. Trees, plantings, and landscaping serve multiple environmental and aesthetic ends—improving water quality, reducing carbon emissions, and enhancing quality of life in neighborhoods.

But we have an opportunity to do even more. In addition to improving air quality across the city, we can begin understanding how air quality impacts the health of New Yorkers in every neighborhood. That's why we will launch the largest local air quality study ever in the United States and develop an approach for tracking local emission levels. By advancing efforts to understand the real scope of the problem, we can direct our resources to the areas of greatest need.

Through these strategies, we will accelerate air quality improvements so that every New Yorker can depend on the promise that they are breathing the cleanest air of any big city in America.

Our plan for air quality:

Reduce road vehicle emissions

1 Capture the air quality benefits of our transportation plan
2 Improve fuel efficiency of private cars
3 Reduce emissions from taxis, black cars, and for-hire vehicles
4 Replace, retrofit, and refuel diesel trucks
5 Decrease school bus emissions

Reduce other transportation emissions

6 Retrofit ferries and promote use of cleaner fuels
7 Seek to partner with the Port Authority to reduce emissions from Port facilities
8 Reduce emissions from construction vehicles

Reduce emissions from buildings

9 Capture the air quality benefits of our energy plan
10 Promote the use of cleaner burning heating fuels

Pursue natural solutions to improve air quality

11 Capture the benefits of our open space plan
12 Reforest targeted areas of our parkland
13 Increase tree plantings on lots

Understand the scope of the challenge

14 Launch collaborative local air quality study

Reduce road vehicle emissions

In 2005, vehicles traveled 18.6 billion miles throughout the five boroughs, approximately 48 million miles per day. Each year, these trips generate about 11% of our local PM 2.5 emissions, as well as 52% of NO_X and 32% of VOC emissions, both of which contribute to PM 2.5 levels.

There are four main ways to reduce transportation-related emissions: use fewer vehicles by shifting to mass transit; decrease the amount of time vehicles spend stuck in congestion and idling; use less and cleaner fuels; and filter exhaust before it is released into the air.

To fund these efforts, a variety of sources exist: the Port Authority, the Federal Transit Administration (FTA), and the Congestion Mitigation and Air Quality (CMAQ) program. CMAQ grants are awarded in areas that currently or recently failed to meet Federal standards. They are funded by Congress through Federal highway funds and are intended to mitigate any impacts associated with road development.

All of these are necessary to **reduce overall PM 2.5 emissions across the city by 9% by 2017.**

INITIATIVE 1

Capture the air quality benefits of our transportation plan

We will address a significant source of harmful emissions by promoting the use of mass transit

The most effective way to use less fuel is to reduce the number of cars on the road. But this has not been easy over the past 25 years. Although our subway system improved dramatically, the percentage of drivers has remained essentially unchanged. It is clear that improvements to mass transit will not be enough to achieve a significant mode shift among New York drivers, an imperative for our economy and public health. Without intervention, traffic conditions will continue to deteriorate. By 2030, rush hour could last 12 hours every day.

That's why we will seek to implement congestion pricing, a system that charges drivers to enter a city's central business district. Already used in London, Stockholm, and Singapore, New York City's system will assess Manhattan drivers in the designated zone an $8 charge between 6am and 6pm. This charge will result in a 6.3% reduction of vehicles miles traveled in the area, which could yield a 3.7% reduction in VOC, a 2.8% reduction in NO_X, and a 2.8% reduction in carbon monoxide emissions across the city. *(See case study on facing page: Congestion Pricing's Air Quality Impact)*

INITIATIVE 2

Improve fuel efficiency of private cars

We will promote wider use of clean vehicles

In addition to using fewer vehicles, we can also make the ones we have more efficient. Already, New York State has adopted some of the newer vehicle emission standards enacted by California. This alone will reduce New York City's total CO_2 emissions by over 6% by 2030. But there is still room to be more ambitious; we will encourage the state to follow new fuel standards established by California that would reduce carbon emissions from all gasoline sold in New York State.

The City can also do more to reduce emissions of both criteria pollutants and CO_2 by encouraging the purchase of the cleanest, most efficient cars, and increasing the efficiency of taxis and for-hire vehicles.

We will waive New York City's sales tax on the cleanest, most efficient vehicles

In a five-year pilot program, the City will waive its portion of the New York State sales tax on the purchase of the cleanest and most efficient vehicles, including hybrids, according to the highest performance ratings in criteria set by the EPA.

On average, qualifying vehicles attain roughly twice the fuel efficiency and reduce air emissions by half. If 10% of the city's gas vehicles were efficient hybrids, it would reduce our citywide CO_2 emissions by 1%, and by 2030, if market trends accelerate, this will result in more than a 3% PM 2.5 emissions reduction citywide.

We will work with the MTA, the Port Authority, and the State Department of Transportation (State DOT) to promote hybrid and other clean vehicles

In other cities, toll discounts, preferential lane access, and other privileges have been granted to owners of hybrid cars to encourage people to buy them. Such incentives must be applied cautiously; for maximum effect, a single, region-wide approach would need to be adopted. The City will work with the other operators of the region's transportation network to identify approaches for promoting the most efficient vehicles that would make sense for New York.

We will pilot new technologies and fuels, including hydrogen and plug-in hybrid vehicles

The City was an early convert to hybrid vehicles and helped build a broader market for this technology. Over 1,700 hybrids have been added to the City's vehicle fleet in the past five years. By 2006, hybrids represented nearly 7% of the City's total fleet, as compared with less than 1% of the private vehicles registered in New York City.

To maintain our position as a leader in clean transportation technologies, the City will construct a hydrogen fueling station and pilot six hydrogen vehicles starting in 2008. Hydrogen cars emit little more than water vapor upon combustion. As a result, they are essentially zero emissions vehicles.

The three-year demonstration project will introduce the city to the possibilities and potential challenges of this technology. Through this pilot, we will establish a permitting process for hydrogen refueling and vehicle operation within the city and partner with the New York City Fire Department to develop safety standards for operating and refueling. By testing and refining these procedures, we will be able to accelerate a broader transition to hydrogen as soon as the technology becomes more readily available.

The fueling station will be owned and operated by Shell Hydrogen, a division of the Shell Group. Two sites in the Bronx and Staten Island are currently under consideration to be the first hydrogen fueling location in the city. To fund the $820,000 project, the City has applied to the New York State Energy Research and Development Authority (NYSERDA) for a grant.

In addition to hydrogen, we are carefully tracking the development of plug-in hybrid technology. A plug-in hybrid functions like a regular hybrid, but its battery can be charged by plugging into a standard outlet, instead of relying exclusively on the car's gasoline-fueled engine. Drivers can run on the electric mode to achieve 100 miles per gallon, consuming significantly less petroleum and emitting fewer air pollutants and greenhouse gases.

INITIATIVE 3

Reduce emissions from taxis, black cars, and for-hire vehicles

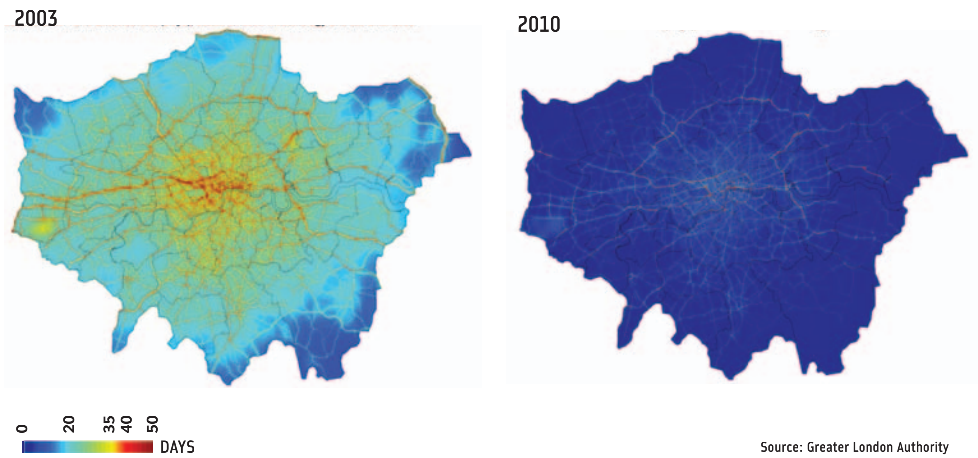
In New York City, there are currently over 13,000 yellow taxi cabs, 10,000 black cars, and 25,000 for-hire vehicles. Because taxis travel tens of thousands of miles per year and the current fleet is so fuel inefficient, taxis account for a substantial share of city emissions: 4% of all ground transportation CO_2 emissions and 1% of all city CO_2 emissions. This initiative will reduce citywide CO_2 emissions by 0.5% while also improving air quality.

We will reduce taxi and limousine idling

Idling is the continuous operation of a vehicle's engine while it is stopped. Many of the city's yellow taxis and black cars spend significant time idling in order to maintain access to their air conditioning and heating. Although there is currently no way to keep air conditioners reliably running with the engines off, emerging technologies have it made it possible to keep a car heated without idling.

In 2007, the City will complete an evaluation of different anti-idling technologies with the black and yellow car industries and select the best option. We will implement this $6 million program between 2008 and 2010 to equip cars with the chosen anti-idling solution, bolstered by a $4.8 million CMAQ grant. We will also launch a citywide anti-idling campaign to reduce idling of all vehicles even more.

Days in London and Surrounding Areas with Excessive PM 10 Levels



Source: Greater London Authority

Models based on 2003 meterology and London atmospheric Emissions Inventory. The daily mean PM 10 is set to an objective level of 50 micrograms per cubic meter, allowed to be exceeded up to 35 days a year.

CASE STUDY

Congestion Pricing's Air Quality Impact

In addition to Buckingham Palace and Trafalgar Square, visitors to London can now take advantage of a new attraction: cleaner air.

As a result of an ambitious congestion pricing experiment aimed at reducing traffic in the city's central business district, congestion fell by 30% and bus use rose by 38% during the morning peak in the first year—this, in a section of the city once infamous for its maddening bumper-to-bumper traffic. And the program is literally a breath of fresh air.

Smog-causing nitrogen oxide emissions and soot in the city have declined by 12%. In addition, carbon dioxide emissions are estimated to have declined by 20%, along with fossil fuel consumption. Region-wide concentrations of particulate matter are also falling.

Congestion pricing programs, which also have been implemented globally in places like Stockholm and Singapore, charge motorists a fee to drive into the densest business districts, providing an incentive for drivers to find other methods of transportation or to carpool.

Wherever they have been implemented, these programs have had similarly positive results on both traffic and air quality.

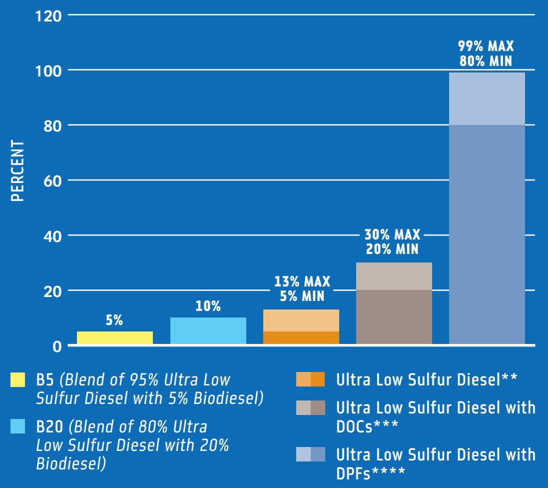
For example, Singapore has seen a 176,400 pounds-per-day reduction in carbon dioxide emissions and a 22-pound reduction in soot.

These pollutants have been linked to increased rates of asthma, emphysema, cancer and heart disease—a fact that has not gone unnoticed in New York City, where child hospitalization rates for asthma are more than twice the national average. In the South Bronx, where more than 77,000 vehicles pass through each day, it is almost four times as high.

"The fumes from those cars and trucks make asthma-triggering pollution commonplace," said Andy Darrell, New York Regional Director for Environmental Defense.

"London already has used congestion pricing to reduce traffic congestion by 30% and pollution by 12% to 20%," said Darrell. "There's no reason why New York—the greatest city in the world—can't do it."

Diesel Fuel Emission Reductions in Particulate Matter
Relative to Low Sulfur Diesel*



*Low Sulfur Diesel is the pre-2006 highway diesel standard, with sulfur content capped at 500ppm (parts per million)

**Ultra Low Sulfur Diesel is the post-2006 highway standard, with sulfur content capped at 15ppm

***Diesel Oxidation Catalysts are devices that use a chemical process to break down pollutants in the exhaust stream into less harmful components

****Diesel Particulate Filters, devices that collect and trap particulate matter from the exhaust stream so it is not released into the air

Source: U.S. Environmental Protection Agency

We will work with the Taxi and Limousine Commission (TLC) and the taxicab industry to double the taxi fleet's efficiency

The dominant taxi vehicle today achieves only 10 to 15 miles per gallon (mpg). More fuel-efficient vehicles are used in limited numbers today, including hybrid-electrics and even a lithium-ion battery powered vehicle. These vehicles are in the first years of use and questions regarding their durability as 24-hour, seven-day-a-week vehicles have yet to be fully answered. We will aim to double the efficiency of new taxis by 2012. Achieving the stated goal will require aggressive work on the part of the TLC to push the automotive industry and the taxicab industry towards answering these questions and ensuring that the vehicles used as taxicabs meet the high safety, service, and sustainability standards of New Yorkers.

This Plan could result in the entire fleet being converted to more fuel-efficient vehicles within eight to 10 years.

We will work with stakeholders to double the fuel efficiency of black cars and for-hire vehicles

In addition, we will work with the TLC to set new standards for additions to the fleet. By 2010, we will require that new cars achieve double the fuel efficiency of today's non-hybrid vehicles. The city's black car industry includes generally late-model luxury sedans that serve a largely corporate clientele through long-term contracts. After several years of use, many of these cars are transitioned to use as community car service vehicles. There are more than 25,000 for-hire vehicles in the city, and many are recycled black cars or law enforcement vehicles. Therefore, cleaner black cars today means cleaner community car service vehicles tomorrow.

This commitment would result in the entire black car fleet being converted to cleaner vehicles within five years, with a 50% decrease in CO_2e emissions from this sector, or 0.8% of the city's overall CO_2e emissions, while also improving air quality.

In addition, TLC will begin working with the community car services, vehicle owners, and lenders to improve awareness of the public benefits and cost savings of running clean vehicles with good gas mileage over old vehicles with poor gas mileage. This will help us work towards a goal of reducing CO_2e emissions from these fleets by 50% by 2017.

INITIATIVE 4

Replace, retrofit, and refuel diesel trucks

We will reduce diesel emissions through City investment and incentives

A substantial amount of the pollution from on-road vehicles is concentrated in one mode; according to a 2002 study, 25% to 50% of the city's local overall criteria pollutant emissions can be traced to heavy duty diesel-trucks.

Significantly reducing emissions from diesel vehicles requires either buying new trucks or employing a range of alternate strategies to improve performance. With the new Federal diesel regulations that went into effect in 2007, all new trucks will release 90% fewer emissions. But diesel vehicles tend to operate for many years; as a result, immediate air quality benefits will require improving the performance of older vehicles. Strategies include retrofitting trucks with diesel oxidation catalysts (DOC) or diesel particulate filters (DPF), upgrading engines, using cleaner fuels, and reducing idling.

A DOC is installed on the tailpipe of the truck to convert CO (carbon monoxide) and HC (hydrocarbons) to H_2O (water) and CO_2. DOCs are often used when equipment is too old to accept the modern retrofits, and range from $2,000 to $5,000 each. A DPF includes the DOC converter but also incorporates a ceramic honeycomb-like structure to capture additional diesel soot or small particles. That means that it can capture a substantially higher amount of PM 2.5, but can be three times as expensive. The cost of a DPF ranges from $10,000 to $15,000, depending on the type and age of the vehicle on which it is installed.

In conjunction with Ultra Low Sulfur Diesel (ULSD), it is possible to reduce PM 2.5 emissions from a single truck by 85% to 90% using these strategies.

We will introduce biodiesel into the City's truck fleet, go beyond compliance with local laws, and further reduce emissions

In 2005, the City Council required the retrofit or replacement of most heavy-duty City highway vehicles with the "best available retrofit technology" and the use of ULSD by 2012. *(See chart: Diesel Fuel Emission Reductions in Particulate Matter)*

The City is in the process of retrofitting its heavy duty vehicles to achieve and exceed compliance thresholds. While compliance can be reached through the use of DOCs or DPFs, some agencies are going above and beyond the requirement with purchases of new compressed natural gas (CNG) trucks. For example, the Department of Sanitation (DSNY) will purchase 10 new CNG trucks in 2007. Similarly, the Department of Parks & Recreation (DPR) purchased 20 CNG sedans this fiscal year and plans to purchase 20 more in the next fiscal year.

With alternative fuels, we will go beyond the legislative requirements and explore even more ambitious options. Biodiesel is an alternative diesel fuel that is produced from animal fats or vegetable oils (including recycled restaurant oils). It can be used alone, but is more commonly mixed with regular diesel. B5 fuel combines 5% biodiesel with 95% regular diesel, while B20 mixes 20% biodiesel with 80% diesel.

Biodiesel has significantly lower emissions than petroleum diesel. DSNY and DPR have already established B5 biodiesel fueling stations for their heavy duty vehicles. During the summer, DPR uses B20 when the fuel is not at risk of gelling from the cold weather.

The City will introduce biodiesel throughout its heavy-duty vehicle fleet. For example, in spring 2007, the City's Department of Transportation (DOT) will begin using B5 biodiesel. The City will gradually increase the percentage of B20 biodiesel as the higher mixtures are proven to work under different conditions and there is an adequate and reasonably priced supply.

We will accelerate emissions reductions of private fleets through existing CMAQ programs

In addition to the City's efforts to improve the environmental performance of its own fleet, we will also work to reduce emissions from private fleets. Private delivery fleets log thousands of miles a year on New York roadways. Since 2000, we have worked with NYSERDA to manage a Federal CMAQ-funded initiative that helps private sector companies and non-profit entities retrofit their vehicles or switch to alternative fuels. Program participants can convert to either CNG or hybrid vehicles or retrofit their diesel vehicles. To date, the City has reached approximately 90 trucks, spending roughly $4 million. And we will do more. *(See case study: FedEx)*

Over the next five years, we will significantly expand this program through $20 million in CMAQ funding. Depending on the type of upgrade and the vehicle, this will allow us to possibly reach more than 450 trucks.

We will work with stakeholders and the State to create incentives for the adoption of vehicle emission control and efficiency strategies

To achieve our air quality goal, we need to reduce emissions from an even greater number of diesel vehicles. The City will work with the State and other stakeholders to create a fund to support costs for retrofits and anti-idling technologies for at least 1,200 more vehicles in the city over five years.

California has developed a program that can serve as a strong model for New York State. The California Carl Moyer Program offers over $140 million a year to fund retrofits to diesel trucks. Over the first six years, the fund has resulted in retrofits of about 7,000 vehicles and emission reductions of 14 tons of NO_X and over one ton of PM per day. In addition, this program has lead to wide-scale adoption of tailpipe controls and the use of lower carbon fuels such as ethanol, biodiesel or natural gas. Another state with a similar programs is Texas, while Massachusetts and Pennsylvania will be unveiling rebate programs by the end of 2007. It is time for New York State to join them.

We will improve compliance of existing anti-idling laws through a targeted educational campaign

Idling releases pollutants into the air, increases engine operating costs for fleets, and shortens engine life. The best anti-idling strategies include a mixture of incentives for retrofits, laws and enforcement of those laws, and education. The CMAQ-funded program and the proposed State incentive mentioned above will play a significant role in reducing emissions from truck idling. But there is even more we can do locally.

Anti-idling technologies are already explored and implemented when feasible, including cold plating (allowing the vehicle to stay refrigerated when the engine is turned off for short periods of time). The City is evaluating these technologies as solutions for our local refrigerated delivery and long-distance trucking fleets. Once the most effective strategies have been identified, we will use CMAQ funding to incentivize owners to incorporate the technologies.

New York also limits the amount of time a vehicle can idle. New York City has a three-minute idling limit that targets all vehicles, including trucks and buses. New York State established an anti-idling law in 1990 that set a five-minute idling limit for heavy-duty diesel vehicles, excluding marine vehicles.

To achieve the widest compliance, the City will partner with community organizations and businesses to launch a series of public service announcements, signage, and other marketing strategies in 2008 to educate the public on the anti-idling laws and the environmental and economic benefits of reduced idling. In addition, the city and its partners will employ a more targeted outreach to drivers, business owners, fleet operators, and unions. A similar program launched by Toronto cost $100,000 to $300,000 and, in some specific locations, resulted in more than a 60% reduction in idling.

CASE STUDY
FedEx

For 36 years, a battalion of diesel-powered FedEx trucks have made their way through our city's streets.

That began to change, though, in 2004, when FedEx began delivering cleaner air as part of a City initiative to reduce emissions from private fleets. Since then, the company has rolled out 48 low-emission, hybrid electric trucks in New York City.

Emblazoned with FedEx's ubiquitous logo, the environmentally-friendly vehicles decrease particulate emissions by 96% and travel 57% farther on a gallon of fuel, reducing fuel costs by over a third.

The project began when FedEx applied for Congestion Mitigation and Air Quality (CMAQ) funds administered by the City's Department of Transportation and New York State Energy Research and Development Authority (NYSERDA). The funds, which are targeted to fleets that will see the greatest emissions and fuel reductions, allowed FedEx to purchase newly-designed vehicles that blended conventional and electric technology.

"New York City is a dynamic economy with many trucks on its streets essential to keep commerce moving," said John Formissano, FedEx's Vice President of Global Vehicles. "It is important that we continue to develop innovative solutions to reduce vehicle emissions."

Indeed, if 10,000 hybrid electric vehicles were on the road rather than current standard vehicles, annual smog-causing emissions would be reduced by 1,700 tons—the equivalent of taking all passenger cars off our roads for 25 days. Carbon dioxide emissions would be reduced by 83,000 tons—the same as planting two million trees. And diesel fuel usage would be cut by 7.2 million gallons, which requires one million barrels of crude oil to produce.

INITIATIVE 5

Decrease school bus emissions

We will retrofit both large and small school buses and reduce their required retirement age

In 2005, the City Council passed Local Law 42, which mandated the use of ULSD and Best Available Technologies (BATs) in school bus transportation. Approximately 3,800 buses are subject to the law. The Department of Education (DOE) is currently working with private school bus companies to retrofit all full-size school buses. To meet BAT requirements, buses will receive DPFs, DOCs, and other filtration systems.

But several thousand smaller school buses were not considered under this local law. The majority of these buses (approximately 2,700 of over 3,000 buses) are diesels.

The City will retrofit all buses with the best available retrofit technology, including DPFs. DPFs would eliminate at least 85% of the small particulate matter. State DOT, which controls the CMAQ funds, has stated that it is willing to provide $20 million for this project and the City will fund the remaining $5 million.

In addition, in the new or extended contracts with the private bus owners, DOE will require that all buses are retired earlier than the existing 19 year limit. Over the next several months, the City will evaluate the appropriate retirement age based on cost and environmental performance.

While private school buses are not covered by the local law, the City will challenge private schools to encourage similar environmental performance.

Reduce other transportation emissions

The EPA separates vehicles that drive on roads and other forms of transportation into two separate categories of study. These "off-road" vehicles include airplanes, trains, ferries, outdoor power equipment, and construction machinery such as dozers, loaders and cranes.

With a growing ferry network and a construction boom, these off-road vehicles contribute almost 15% of the city's PM 2.5 emissions.

The methods to reduce emissions from some of these vehicles are similar to those used for on-road vehicles: improve efficiency, burn cleaner fuels, and filter emissions. By employing these strategies, we will reduce citywide PM 2.5 emissions by 7%.

INITIATIVE 6

Retrofit ferries and promote use of cleaner fuels

We will retrofit the Staten Island Ferry fleet to reduce emissions

Staten Island ferries carry over 19 million passengers annually on a 25-minute, five-mile ride. But these diesel-fueled boats each contain two or three propulsion engines that release significant emissions of PM 2.5, NO_X, hydrocarbons, and sulfur.

The Port Authority is currently funding replacement or retrofits of engines, reducing the eight-boat fleet's total NO_X emissions by an estimated 40%, or 570 tons per year. The replacement/retrofit program will also have a positive effect on PM 2.5. But to further target the PM emissions, the City will install DOCs on each propulsion engine, at a cost of $75,000 to $90,000 per engine.

The City will reduce emissions from the ferries even more with the use of Ultra Low Sulfur Diesel 2 (ULSD2), once a usable form is locally available.

We will work with private ferries to reduce their emissions

Already, we have been working with regional private ferry companies to reduce their emissions. All 41 private ferry boats that serve New York City have agreed to install DOCs in 2007, under a fully-funded Federal program.

But there is an opportunity for even greater reductions. Because they use a different type of engine than the Staten Island Ferries, the private ferry engines are able to operate on Ultra Low Sulfur Diesel 1 (ULSD1), which is available in the region. Although this will increase fuel costs by a few cents per gallon, the emissions reduction is substantial. Therefore, the City will join with the City Council in proposing this conversion. The use of ULSD1 would reduce PM 2.5 by 5% to 10% beyond the reductions expected when DOCs are installed on the city's 41 private ferries in 2007.

INITIATIVE 7

Seek to partner with the Port Authority to reduce emissions from Port facilities

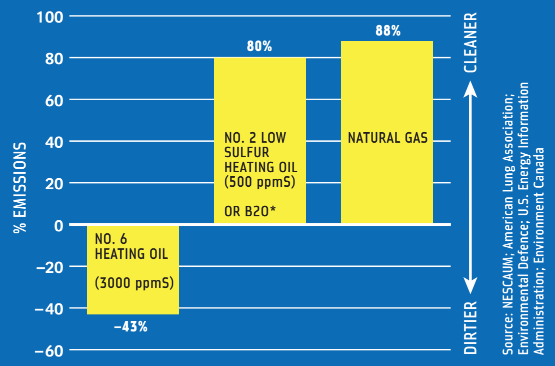
We will seek to work with the Port Authority to reduce emissions from the Port's marine vehicles, port facilities, and airports

Airports and port-related equipment contribute substantially to our local emissions: 11% of particulate matter and 23% of our locally-generated NO_X come from these sources.

This infrastructure is largely controlled by the Port Authority. We will seek to partner with them to position the region's ports as environmental leaders by developing a comprehensive air quality and greenhouse gas emissions plan.

Possibilities for improvements at airports include the use of electric plug-ins at gate ports, clean auxiliary power units, or towing to move planes to and from the gate. The Federal Aviation Administration operates a program to reduce emissions at airports and could be a source of funding for these initiatives.

Comparison of Heating Fuel Emissions
Percentage Reduction in Particulate Matter Emissions Relative to No. 2 heating oil (2000–2500 parts per million Sulfur)



**B20 is a blend of 80% No.2 Low Sulfur Heating Oil with 20% Biodiesel*

INITIATIVE 8

Reduce emissions from construction vehicles

We will accelerate adoption of technologies to reduce construction-related emissions

Construction equipment significantly impacts local emissions, accounting for as much as 13% of NO_X and 30% of PM from off-road vehicles. In 2003, Local Law 77 required that City construction projects use the best available technologies on-site to reduce emissions, such as DPFs, DOCs, and emerging plug-in technologies that allow vehicles to run on electricity instead of combusting fuel. More than 800 City-owned vehicles are subject to the law, along with an additional 115 pieces of leased equipment. Upgrades by City contractors will also impact emissions in private development projects, as the contractors use these new tools for other projects.

The City will accelerate compliance with the law by requiring a consultant to work with all City agencies on implementation. That includes cataloguing every piece of relevant equipment, analyzing possible technologies, and developing standards for construction sites. The consultant will help agencies navigate this process and avoid duplication of effort.

In addition, in City Requests-for-Proposals and the resulting contracts, we will go beyond Local Law 77 and require certain on-road vehicles involved with City projects, such as trucks that remove debris, to meet the same standards. City contractors will be able to meet the terms of the contracts either through retrofits or through new vehicle purchases.

Reduce emissions from buildings

Buildings and industry are responsible for roughly 55% of our PM 2.5 emissions. Improvements in efficiency, as targeted for our energy and carbon goals, will result in a 15% reduction in PM 2.5 for this sector, for a reduction of approximately 6% of overall city PM 2.5 emissions. Further reductions in these sectors will require the use of cleaner fuels. The switch to more natural gas burning power plants or biodiesel blends along with the clean fuel initiatives outlined below will result in an additional 17% reduction in PM 2.5.

INITIATIVE 9

Capture the air quality benefits of our energy plan

We will reduce energy-related emissions by cutting energy consumption and cleaning our energy supply

As described in the energy chapter, there are currently 23 large power plants in New York City; the oldest was constructed in 1951. By 2030, more than 50% of our power plants will be more than 70 years old. These older plants can use as much as 50% more fuel than new technologies such as combined cycle gas turbines (CCGT). In addition, the fuel in older plants tends to be dirtier than the natural gas used in newer plants or the biodeiesel recently piloted by NYPA.

As part of our comprehensive energy plan, we will aggressively improve the energy efficiency of our buildings to reduce electricity and heating fuel consumption. We will also facilitate the repowering, replacement, and retirement of the out-of-date turbines of older plants through long-term contracts for new, clean energy supply. Finally, we will expand clean on-site generation and incorporate more renewable energy. All three strategies reduce the emissions of pollutants and, at the same time, they cut CO_2.

INITIATIVE 10

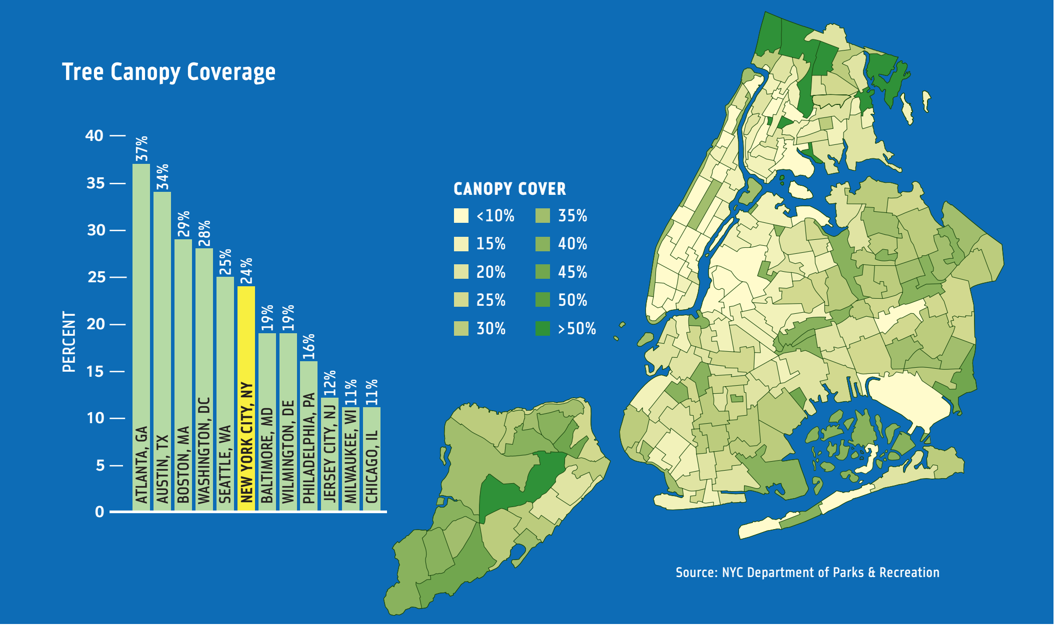
Promote the use of cleaner burning heating fuels

We will pursue multiple strategies to reduce heating fuel usage and enforce stricter emission standards in buildings

Our energy strategy aims to reduce greenhouse gas emissions from heating fuel by 17% through promoting efficiency and improving building insulation. This will also lead to significant reduction in SO_2, NO_X, and PM 2.5 emissions. But we can reduce these emissions further by improving the environmental performance of the fuels we use. *(See chart above: Comparison of Heating Fuel Emissions)*

Heating oil is classified into six types, numbered one through six, based on its boiling temperature, composition, and purpose. The higher numbers are heavier, more viscous, and tend to emit more pollutants when burned. They are also the least expensive. Fuel oils No. 1, No. 2, and No. 3 tend to burn more cleanly and are more costly to purchase. Each of these fuels can have higher or lower concentrations of sulfur, which also impacts the pollution they produce.

Currently, buildings have the option of using either a standard home heating oil—No. 2 fuel with 2,000 sulfur parts per million (ppm)—or a heavier No. 6 fuel. Other cleaner fuel options exist, including natural gas bio-diesel, and cleaner grades of heating oil.



We will lower the maximum sulfur content in heating fuel from 2,000 ppm to 500 ppm.

Currently the sulfur content in No. 2 heating oil—the most commonly used heating oil in the city—is capped at 2,000 ppm. Lowering that cap to 500 ppm, a grade also known as "low-sulfur" that until recently was used for on-road diesel, would result in significant reductions in criteria emissions, with little impact on fuel cost. The City will work with the State to lower the maximum sulfur content permitted in No. 2 fuel used for heating buildings to 500 ppm, creating significant air quality improvements with a modest increase in fuel cost. This grade is readily available and is the current standard in much of New England.

This reduction in the maximum sulfur content in No. 2 heating oil will result in 85% reductions of SO_2 and roughly 50% reductions in PM 2.5. This alone will reduce overall PM 2.5 emissions in the city by 5%. This change will also improve burner efficiency, thereby reducing the amount of fuel consumed. In addition, furnaces burning cleaner fuel do not have to be serviced as frequently. This will reduce operating costs for the customer, generating savings that outweigh the increased cost of the fuel.

We will reduce emissions from boilers in 100 city public schools

Currently, 478 city schools burn No. 4 or No. 6 heating oil; many of these are in neighborhoods where the asthma rates are over three times higher than the national average. By 2017, the City will modify the boiler systems of 100 of these schools, to enable the boilers to burn a cleaner fuel. Schools located in neighborhoods with the highest asthma hospitalization rates—generally rates greater than seven per 1000—will be prioritized in order to achieve the maximum local benefits. These neighborhoods are concentrated in the Bronx, Harlem, Central Brooklyn, and along Jamaica Bay. On average, boiler replacement will cost $5.7 million per school. The cleaner burning boilers will emit 44% less PM 2.5 emissions. Additional benefits will be lower maintenance expenses and CO_2 reductions in the range of 50% because of fuel switching and increased efficiencies, as well as reduced maintenance expenses.

Pursue natural solutions to improve air quality

Trees and other natural areas confer tremendous benefits on the city, including improvements to air and water quality, retention of greenhouse gases, reduced energy costs, and a more inviting streetscape. Trees in particular are effective at cleansing the air. They do this by absorbing pollutants—sulfur dioxide, nitrogen dioxide, and carbon monoxide—through their leaves and intercepting airborne particulate matter on leaf surfaces. Every year, New York City trees remove an estimated 2,200 tons of criteria pollutants from the air. They also take in 42,300 tons of carbon each year. *(See graphic above: Tree Canopy Coverage)*

Indirectly, trees further reduce air pollution by shading buildings, thereby reducing the need for air conditioning during the peak electricity demand periods. In addition, shaded streets have lower temperatures in the summer, slowing the formation of ground-level ozone from NO_X and VOCs. Trees also block wind in the winter, slightly reducing the need for heating. Finally, trees make neighborhoods more beautiful and have been shown to raise property values.

The city's 5.2 million trees cover 24% of the city, 3% below the average for major American cities. Approximately half those trees are located within City-owned parks and along our streets; the other half are largely located on private property. By 2030, we will add an additional one million trees to the city. To achieve this goal we will pursue three main strategies.

INITIATIVE 11

Capture the benefits of our open space plan

We will rely on accelerated tree plantings to help remove harmful emissions as we improve the public realm

As mentioned in our public realm plan, we will ensure that every New York street is fully lined with trees by 2030. Achieving 100% "stocking" for these street trees will require almost tripling the number of trees planted every year in the city.

To achieve this accelerated tree planting schedule, we will revise the zoning code to require new construction and major redevelopment projects to plant one street tree for every 25 feet of street frontage. Private development is projected to provide 3,000 to 5,000 trees a year, with an additional 3,000 per year generated through major capital construction projects.

The City will also plant an additional 12,500 per year at an annual cost of $17 million. We will prioritize plantings in neighborhoods with the lowest stocking levels and highest air quality concerns.

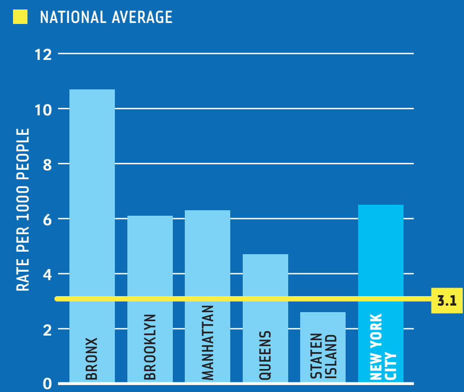
INITIATIVE 12

Reforest targeted areas of our parkland

We will reforest 2,000 acres of parkland

The City will expand efforts to reforest approximately 2,000 acres of parkland by 2017, without compromising space for existing ballfields. Reforestation will take place in Fresh Kills Park in Staten Island, Cunningham Park in Queens, Van Cortlandt in the Bronx, Highbridge in Manhattan, and other parks around the city at a cost of $118 million.

Asthma Hospitalizations
Children age 0 to 14 years, 2004



Source: Centers for Disease Control; NYS Department of Health; analyzed by NYC Department of Health and Mental Hygiene

INITIATIVE 13

Increase tree plantings on lots

We will clean our air while we safeguard our water quality

To increase our tree canopy cover, we must increase coverage beyond our parks and sidewalks. That will require more trees on public and private lots, including parking lots, private housing, institutional properties such as schools and university campuses, and City-owned land.

We will capture the benefits of our water quality strategy

According to the Department of City Planning, parking lots comprise almost 2,000 acres or approximately 1% of the city's land area. The dark asphalt pavement contributes to the heating of the urban area on hot, sunny days, which accelerates the formation of ground-level ozone. In addition, the hard, smooth surfaces contribute to rain runoff that inundates sewer systems during storms. Currently, 10% of the land area of parking facilities in New York City is covered by tree canopy.

The proposed zoning regulations will require perimeter landscaping of commercial and community facility parking lots over 6,000 square feet as well as street tree planting on the adjacent sidewalks. Parking lots over 12,000 square feet would also be required to provide a specified number of canopy trees in planting islands within each lot. This change will not only support cleaner air, it will also mitigate the visual impact of large asphalt lots while more effectively managing storm water runoff and the urban heat island effect.

We will partner with stakeholders to help plant one million trees by 2017

The City will work with community, non-profit, and corporate partners on a 10-year goal to plant trees on private residential, institutional, and vacant land properties in order to achieve our goal to plant one million trees. The City and its partners will focus on areas whose natural environments have borne the brunt of past City policies, and neighborhoods with few green spaces.

Understand the scope of the challenge

The existing air quality monitoring network is designed to track concentrations of the EPA's six criteria pollutants over large geographic areas. This is helpful for identifying broad trends, but does not let us understand the exposure New Yorkers experience every day in their neighborhoods.

That's because there are only 24 monitors for the entire city—and they are located on roof tops, away from the traffic, people, and sidewalks. As a result, we cannot focus our reduction efforts on the areas of greatest need—or track our successes with any precision.

To develop a comprehensive plan that will protect the health of New Yorkers in every neighborhood, we must develop new tools to understand the real nature of the challenge we face.

INITIATIVE 14

Launch collaborative local air quality study

We will monitor and model neighborhood-level air quality across New York City

Over the next 12 months, the City will work with experts in the academic, medical, and private sectors to develop one of the largest local air quality studies ever in the United States. Starting in 2008, the City will begin to study, monitor, model, map, and track local pollution and local adverse impact across New York City, with an emphasis on traffic-related emissions. *(See chart above: Asthma Hospitalizations)*

This enhanced monitoring system in New York will:

- Measure the variation in air quality across all neighborhoods over time
- Assess the impact of development, infrastructure changes, traffic changes, and traffic mitigation measures in our communities
- Provide guidance for future efforts to improve neighborhood air quality

Although a study of this scale is almost unprecedented, our effort will build on recent successful projects to track local emissions. For example, exposure to certain pollutants at schools in the South Bronx have been correlated with hourly truck traffic on nearby highways, and students with asthma had more symptoms on high traffic pollution days.

This research has employed a variety of cost-effective approaches that we can adapt for understanding air quality in all 188 neighborhoods. Strategies will include periodic monitoring at a range of sites and developing statistical models that correlate the impact of traffic and land-use patterns with air quality.

The study findings will establish priority neighborhoods for improvement and provide baseline data to track the impact of development, policy, and transit changes over the coming decades.

Conclusion

These initiatives are designed to provide everyone in our city with healthier air to breathe. We should expect no less than the cleanest air of any big city in America, given the track record we have set in becoming the country's safest large city.

By working to reduce emissions both nationally and locally, we can surpass the air quality of the nation's other largest cities, including Los Angeles, San Antonio, Phoenix, San Diego, Dallas, Chicago, Philadelphia, and Houston.

But these cities will not stop trying to achieve cleaner air for their citizens—and we won't either. That's why we will pioneer a process to track changing pollution levels in every New York neighborhood. As our knowledge improves, we will be able to target our efforts more precisely, and calibrate them to achieve the greatest gains for public health and environmental justice.

One challenge eclipses them all: climate change. We have already started to experience warmer, more unpredictable weather and rising sea levels. But greater changes are ahead. By the end of the century, temperatures across the globe could rise by as much as eight degrees Fahrenheit. In New York, scientists project that 40 to 89 days annually could have 90 degree heat—or hotter. And as a coastal city, we are vulnerable to the most dramatic effects of global warming: rising sea levels and intensifying storms.

We have a special stake in this discussion—but also a unique ability to help shape a solution.

The sheer scale of our city means that New York emits nearly 0.25% of the world's total greenhouse gases; becoming more efficient will have a tangible impact.

But these efforts will build on the strength of the city itself. Our density, reliance on mass transit, and smaller, stacked living spaces mean that New Yorkers produce a fraction of the greenhouse gases compared to the average American. That means growing New York is, itself, a climate change strategy.

Since establishing a model of multi-culturalism and tolerance more than 400 years ago, pioneering the infrastructure networks that enabled modern life, and embodying an ideal of possibility and aspiration, New York has always been the most eloquent argument about why cities matter. Now is our opportunity to define the role of cities in the 21st century—and lead the fight against global warming.

Climate Change

Climate Change

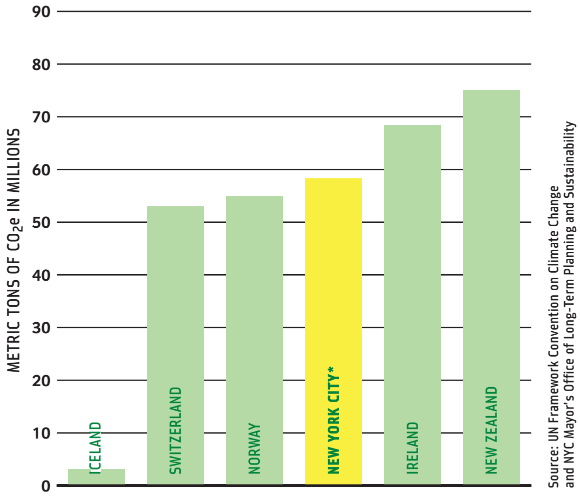
Reduce global warming emissions by more than 30%

Climate Change

Credit: Mario Tama

Reduce global warming emissions by more than 30%

Greenhouse Gas Emissions
2004



**New York City data is for 2005*

Scientists have now proven that human activities are increasing the concentration of greenhouse gases in the earth's atmosphere—and these gases are raising global temperatures. The warming of the earth is causing longer heat waves, rising sea levels, and more violent storms. (*See chart above: Greenhouse Gas Emissions)*

Average temperatures across the world could soar eight degrees Fahrenheit by the end of the century. But the problem isn't only global—we are already feeling the effects in our city.

In Lower Manhattan, the water at the Battery has risen more than a foot during the last century; as a result, what's called a "hundred-year flood" is actually likely to occur every 80 years. In the future, such floods could become twice or even four times as frequent. Violent storms could threaten our homes and we are not yet prepared: a Category 3 hurricane can produce winds of 111 to 130 miles per hour, but our current building code only requires windows to withstand gusts of 110 miles an hour. As a coastal city, New York is especially vulnerable to all of these forces.

And without action the impacts will continue to intensify. In New York, we could experience days hotter than 90 degrees between 11% and 24% of the year. The heat would drive up energy consumption for cooling, making the problem worse, threatening the health of all New Yorkers—especially the elderly—and even increase the number of disease-bearing insects who emerge in warmer, wetter weather.

There are things that can be done now: We can amend the building code, work to protect our infrastructure—we could even consider a storm surge barrier across the Narrows. But the massive changes that scientists predict under extreme scenarios would still place much of the city underwater—and beyond the reach of any protective measures.

No city can change these forces alone, but collective effort can. And New York can help lead the way. *(See chart on following page: Greenhouse Gas Reduction Strategy)*

This Plan is an attempt to sustain our city's success and our momentum forward; to sustain what we love about New York and want to pass on.

In it we have sought to solve a series of distinct challenges; how to generate enough housing in a way that doesn't simply accommodate population growth, but helps shape the city we want to become; how to balance that need against the open space that every neighborhood deserves, while our supply of land remains limited. We have proposed a plan to unleash the most dramatic expansion of our transit system in over half a century and shift people out of their cars; outlined strategies to secure the reliability of the energy and water networks underpinning our city and plans to empower every community through cleaner air, land, and waterways.

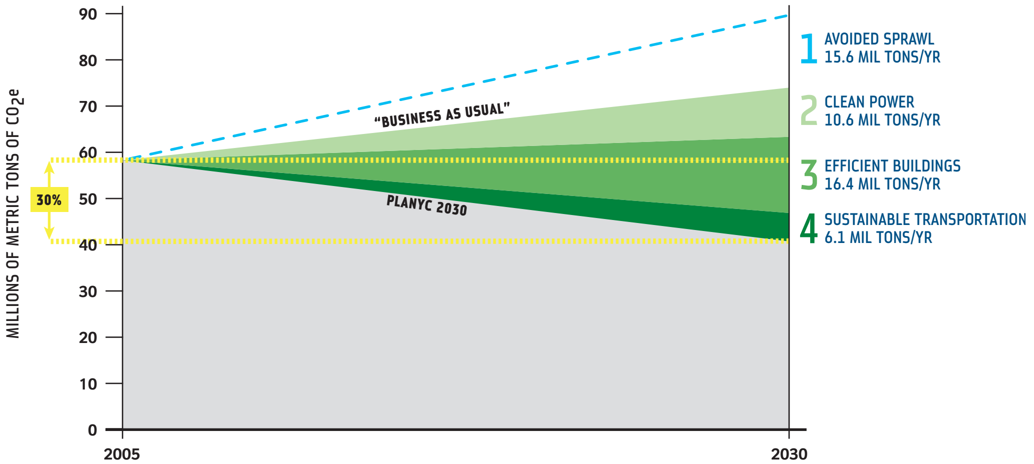
These efforts will require substantial investments—but each will provide an even greater return. Improving our energy infrastructure and lowering demand will reduce our energy costs by billions of dollars over the next decade. Protecting our watershed will avoid a multi-billion-dollar investment in new water filtration plants. Improving transit and reducing congestion will cut down the $13 billion cost to our economy from traffic delays. And the action required to execute these initiatives—constructing new transit lines, retrofitting old buildings, deploying new technology—will create thousands of well-paying jobs.

Each solution serves multiple ends; transit-oriented development can help address our need for housing and reduce traffic congestion; modernizing our energy supply system can reduce air pollution; greening our open spaces can protect the quality of the water in our harbor.

But collectively these initiatives all address our greatest challenge: **climate change.**

East River Park, Manhattan

Projected Impacts of Our Greenhouse Gas Reduction Strategies



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

The result will be an annual reduction of 33.6 million metric tons—and an additional 15.6 million metric tons avoided by accommodating 900,000 people in New York City

1 AVOIDED SPRAWL

Attract 900,000 new residents by 2030 to achieve an avoided 15.6 million metric tons

- Create sustainable, affordable housing
- Provide parks near all New Yorkers
- Expand and improve mass transit
- Reclaim contaminated land
- Open our waterways for recreation
- Ensure a reliable water and energy supply
- Plant trees to create a healthier and more beautiful public realm

2 CLEAN POWER

Improve New York City's electricity supply to save 10.6 million metric tons

- Replace inefficient power plants with state-of-the-art technology
- Expand Clean Distributed Generation
- Promote renewable power

3 EFFICIENT BUILDINGS

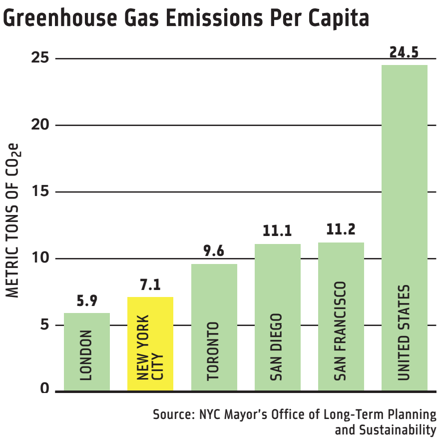
Reduce energy consumption in buildings by 16.4 million metric tons

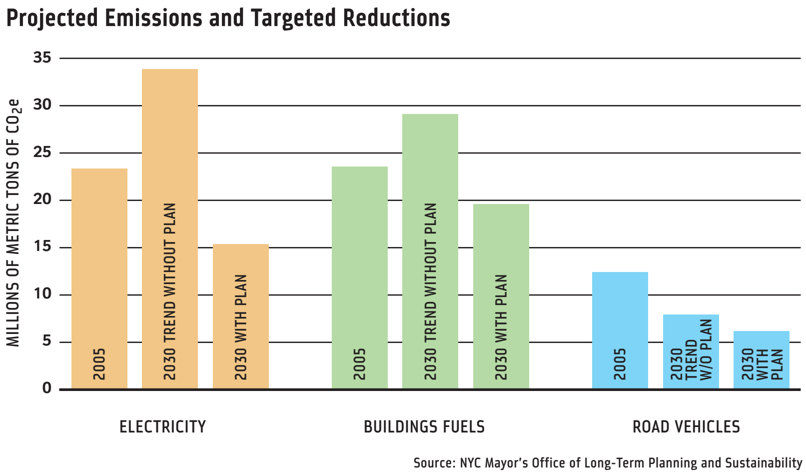
- Improve the efficiency of existing buildings
- Require efficient new buildings
- Increase the efficiency of appliances
- Green the city's building and energy codes
- Increase energy awareness through education and training

4 SUSTAINABLE TRANSPORTATION

Enhance New York City's transportation system to save 6.1 million metric tons

- Reduce vehicle use by improving public transit
- Improve the efficiency of private vehicles, taxis, and black cars
- Decrease CO_2 intensity of fuels





Our Plan

There is no silver bullet to deal with climate change. Greenhouse gas emissions are caused by a variety of sources; there are millions of cars, boilers, and light bulbs contributing to our emissions. By necessity, any solution must be multi-faceted as well.

As a result, our strategy to help stem climate change is the sum of all of the initiatives in this plan.

In our **transportation** plan, we described shifting people from their cars onto an expanded mass transit system because our economy will stall if we can't clear the roads. But a transit trip also uses far less energy than an auto trip, producing less carbon dioxide.

In our **energy** plan, we proposed investing in repowered or new power plants, because they will cost less to operate and improve our air quality. But these new plants will also burn far less fossil fuel and release fewer greenhouse gases.

In our **open space, air quality,** and **water quality** plans, we committed to planting more trees to cool our sidewalks and beautify our neighborhoods; these efforts, too, will reduce greenhouse gas emissions, because trees—especially within the concrete landscape of a city street—cool the air and sequester carbon dioxide.

PLANYC will reduce our city's greenhouse gas emissions by 30% simply by extending and enhancing the inherent strength of New York City itself.

Cities can make the difference.

Cities have always been incubators of ideas, gathering together concentrations of diverse people to produce genuine innovation. But today they matter more urgently than ever before—because of climate change.

Although the word "environment" may not evoke the dense buildings and sidewalks of cities, these very qualities make urban centers the most sustainable places on earth.

Among American cities, New York is the most environmentally efficient. Per capita, New Yorkers produce less than a third of the CO_2e generated by the average American. *(See chart above: Greenhouse Gas Emissions Per Capita)*

This efficiency results from our city's fundamental design. Dense neighborhoods provide stores and services within walking distance, enabling us to run many errands on foot or by bicycle. An extensive public transportation system allows the majority of commuters to travel by mass transit.

We tend to inhabit smaller spaces than our suburban counterparts, with fewer lights and appliances, and less area to heat and cool. Many of these apartments share walls, reducing the need for heat even more. With many buildings dating from prior to World War II, and thus constructed before the era of cheap energy, many of the city's older buildings have natural daylight and ventilation built into their design.

And as New York attracts more residents, it reduces the burden that population places on the global environment in the form of sprawl, which consumes land, energy, and water at a truly gluttonous pace.

On average, each New Yorker generates 7.1 metric tons of CO_2e, compared to 24.5 metric tons from an average American lifestyle. That means that making the city a more appealing place to live—through affordable housing, easily accessible parks, or cleaner air and waterways—radically reduces environmental impacts.

And by investing in the maintenance of the infrastructure that supports urban life—the water system, the roadways, the subways, and our power grid—we ensure that this efficient lifestyle can continue to be sustained for generations.

If New York can absorb 900,000 more people by 2030, it will avoid future increases in global warming emissions by 15.6 million metric tons per year, simply by giving more people the option to settle in our city.

In spite of our inherent efficiency, we can do better. And we must.

Instead we are doing worse. From 2000 to 2005, New York's greenhouse gas emissions increased almost 5%. Almost half of this growth can be traced to the rising energy consumption of every New Yorker in the form of cell phones, computers, and air conditioners; the rest is due to new construction. If these trends continue, by 2030, the city's CO_2e production will increase 27% over our 2005 emissions.

Efficiency efforts often focus on automobiles and power plants. But in New York, we must add a third critical category: buildings. With 950,000 structures containing 5.2 billion square feet, buildings account for 69% of our emissions, compared to 32% nationally. Energy turns on our lights and televisions, runs our heating systems in the winter, and cools us in the summer. It also powers proliferating numbers of air conditioners and other appliances. *(See chart above: Projected Emissions and Targeted Reductions)*

When buildings *are* discussed, standards for new construction are generally the focus. New York has emerged as a leader in green design, with some of the most sustainable skyscrapers and affordable housing developments in the country—and we must continue these efforts. But 85% of the buildings we will have in 2030 already exist today.

That's why our energy plan focuses on reducing consumption in the city's large existing building stock. We have also outlined strategies to ensure that the energy we do use is cleaner and more efficient than our supply today, addressing the second major category of CO_2 emissions: power.

Transportation is the final significant culprit, accounting for 23% of our emissions. Of that, 70% comes from private vehicles—

even though they account for only 55% of all trips in the city. By contrast, mass transit is responsible for only 11.5% of our transportation emissions, meaning car trips are, on average, five times more carbon intensive than a subway ride.

The most effective strategy is simply to reduce the number of vehicles on the road. A simultaneous expansion around of our transit system combined with congestion pricing would help achieve the city's first major mode shift in decades. But we must also address the trucks and automobiles that we *do* have; making them more fuel-efficient, and ensuring that they burn cleaner fuels.

The graph on page 134 shows how we will reduce our CO_2 emissions. Around 50% of our reductions will come from efficiencies in buildings; 32% from improved power generation; and 18% from transportation.

These initiatives will achieve our 30% goal, but ultimately that won't be enough. Scientists agree that far deeper cuts—on the order of 60% to 80%—will be necessary by mid-century if we are to stabilize global temperatures.

That is why we must aggressively track emerging technologies and encourage their adoption. For example, the rooftops of New York City, if covered with solar panels, could produce nearly 18% of the city's energy needs during daytime hours. We have not depended on the widespread use of solar energy in this plan because its costs today are too high for general use; we have tried to rely only on technologies feasible today. But near-term advances promise to reduce the cost of solar panels dramatically; we are also actively accelerating this process by incorporating solar energy into City buildings and reducing some of the legislative barriers to expansion. Once these renewable energy strategies become economically viable, we must be ready to promote adoption on the widest possible scale.

Improvements in batteries, biofuel-burning engines, wind power, and fuel cells for vehicles; higher-efficiency electricity transmission lines; building materials that weigh less and insulate more; and new types of appliances and lighting that consume less electricity: all would help us achieve, and exceed, our 30% goal.

These additional savings must be used to surpass our target, not substitute for the measures envisioned in this plan. Our 30% goal is only a starting point toward the greater cuts that will be required after 2030. That means we cannot rely on technology in the future to replace the initiatives we propose for the near-term; we will need those additional savings later.

New York City will lead the way. Municipal government accounts for approximately 6.5% of the city's overall emissions, concentrated mainly in buildings, wastewater treatment, and transportation. Since 2001, the City has managed to keep its emissions constant, despite an annual 2% rise in electricity use. Actions the City has already taken, such as local laws requiring energy efficiency in new buildings, new purchases of energy-using equipment, and more efficient City fleets, would keep our emissions stable for the next decade. But that won't be enough. (*See chart above: New York City Municipal Greenhouse Gas Emissions)*

That's why our energy plan has set an ambitious, accelerated goal to reduce emissions from City government operations by 30% by 2017.

We also recognize that New York City cannot stop climate change by itself. While there is no substitute for Federal action, all levels of government have a role to play in confronting climate change and its potential impacts.

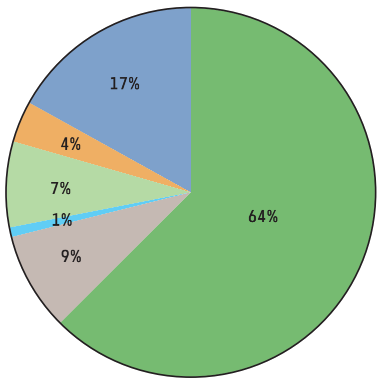
Broader solutions—such as a cap and trade system, which would allow industries to buy and sell carbon credits, or a carbon tax, which would tax all fuels, cars and power plants on the basis of their carbon intensity—cannot feasibly be implemented at the city level. They must be State, regional, or national efforts—and we will advocate for their adoption.

These measures will help slow the pace of climate change, and—if other cities, states, and nations around the world act in concert—we can stabilize our environment by mid-century.

But climate change is already underway. Worldwide, more than 256 billion tons of carbon dioxide have already been released into the atmosphere during the past 10 years, and the impacts will continue being felt for decades. We also cannot depend on the actions of others.

That is why, even as we work to stem the rise of global warming, we must also prepare for the changes that are already inevitable.

New York City Municipal Greenhouse Gas Emissions
Carbon Dioxide Equivalent in Metric Tons per Year, 2006



Total: 3.8 million metric tons

- MUNICIPAL BUILDINGS
- MUNICIPAL VEHICLE FLEET
- SCHOOL BUSES
- DSNY LONG-HAUL TRANSPORT
- STREETLIGHTS/TRAFFIC SIGNALS
- WATER AND SEWER

Note: Figures total to 102% due to carbon absorption by waste and independent rounding

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Our plan for climate change adaptation:

1 Create an intergovernmental Task Force to protect our city's vital infrastructure
2 Work with vulnerable neighborhoods to develop site-specific strategies
3 Launch a citywide strategic planning process for climate change adaptation

Adapting to climate change

We will embark on a broad effort to adapt our city to the unavoidable climate shifts ahead. This will include measures to fortify our critical infrastructure, working in conjunction with City, State, and Federal agencies and authorities; update our flood plain maps to protect areas most prone or vulnerable to flooding; and work with at-risk neighborhoods across the city to develop site-specific plans. In addition to these targeted initiatives, we must also embrace a broader perspective, tracking the emerging data on climate change and its potential impacts on our city. *(See case study on facing page: New York City Disaster Planning; see map on facing page: New York City Flood Evacuation Zones)*

CASE STUDY

New York City Disaster Planning

The sobering images of Hurricane Katrina still haunt us—a testament to our vulnerability in the face of nature's ferocity.

For many New Yorkers, the idea of a similar catastrophe affecting our own city is unthinkable. But a 1995 study by the U.S. Army Corps of Engineers concluded that a Category 3 hurricane in New York could create a surge of up to 16 feet at La Guardia Airport, 21 feet at the Lincoln Tunnel entrance, 24 feet at the Battery Tunnel, and 25 feet at John F. Kennedy International Airport. The impacts could be even greater as a result of waves following the surge or tides, both of which could increase the damage.

As many as three million people would need to be evacuated.

In 2006, the City responded to this threat by unveiling an emergency response plan. A team of more than 34,000 City employees would lead the mobilization effort, bringing residents to evacuation shelters throughout the city. The Fire Department would assist in evacuating the elderly and infirm from hospitals and nursing homes. Mass transit would also be used in the evacuation process, with fares and tolls waived.

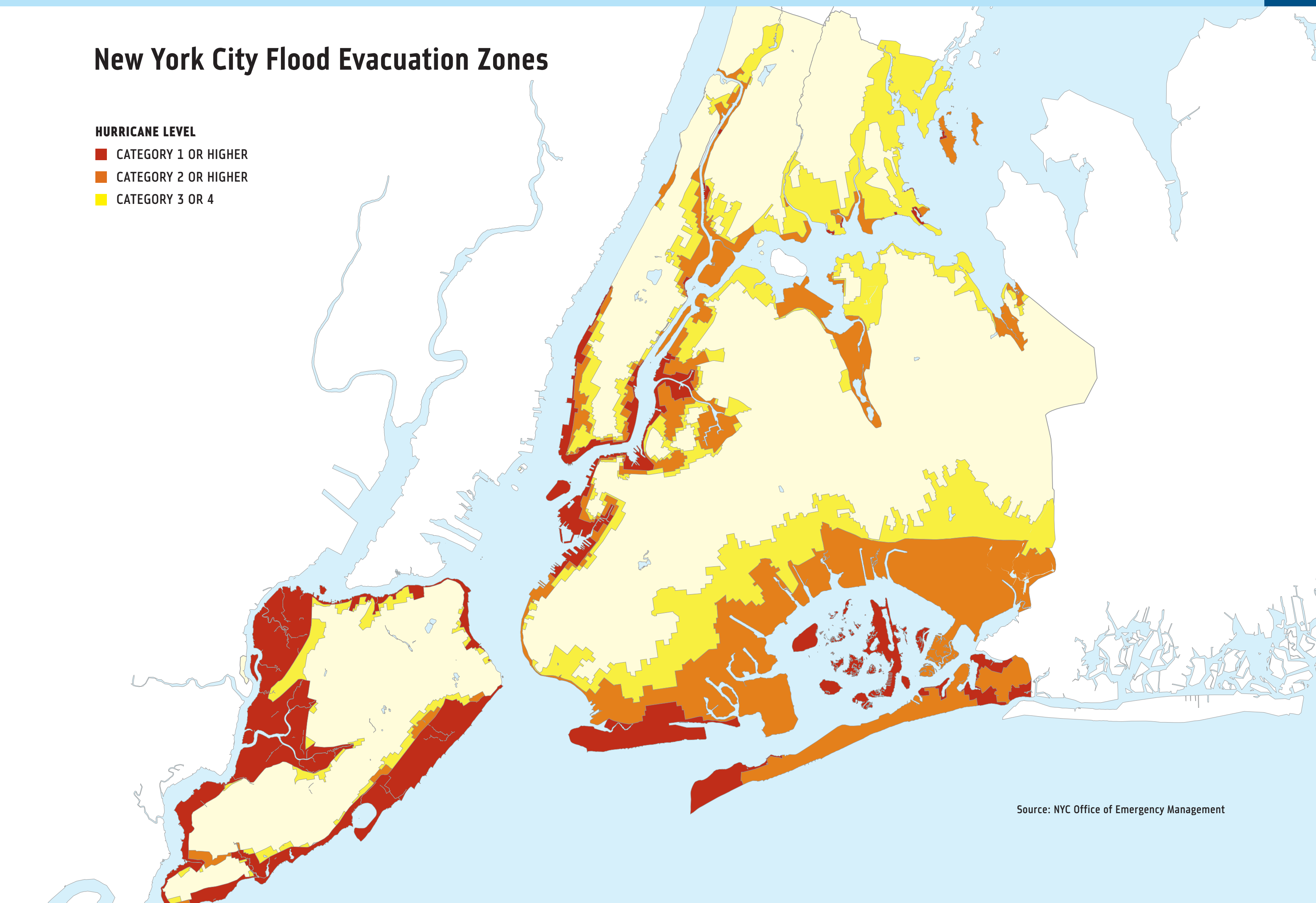
Credit: NYC Office of Emergency Management

Illustrative Depiction of Holland Tunnel Flood Level from Storm Surge

But our dense urban environment would require new approaches from previous disaster recovery efforts. That's why the City has also launched a design competition to create "safe, clean, affordable and rapidly deployable" housing for up to two years.

The only way to reduce the risk of violent storms in the future is to reduce greenhouse gas emissions and thus prevent dangerous climate change. But that will not eliminate the need to be prepared for the worst. By planning for potential future storms today, the worst impacts can be avoided.

New York City Flood Evacuation Zones



Source: NYC Office of Emergency Management

INITIATIVE 1

Create an intergovernmental Task Force to protect our vital infrastructure

We will expand our adaptation strategies beyond the protection of our water supply, sewer, and wastewater treatment systems to include all essential city infrastructure

In 2004, the City's Department of Environmental Protection (DEP) initiated a Climate Change Task Force to study the potential impacts of climate change on our water infrastructure. Working with research scientists at the NASA Goddard Institute for Space Studies, Columbia University's Center for Climate Systems Research, and other institutions, DEP has generated global and regional climate models that have been included in the agency's strategic and capital planning.

For example, the design and operation of our sewer and wastewater treatment systems have been based on existing sea levels—as they are in most jurisdictions. But these levels are changing. When combined with increasingly severe storm surges, there will be significant operational effects. The Task Force evaluated these impacts, enabling DEP to take such risks into account as they site new facilities and invest in existing ones.

But substantial other aspects of our infrastructure remain at risk, especially from sea level change; our subterranean subway system and tunnels, the airports, which are at sea level, power plants, which are often on waterfront sites, waste transfer terminals, and other critical infrastructure are all potentially vulnerable. As these facilities are owned and operated by a variety of entities, protecting these sites will require a coordinated effort among the City, the State, the MTA, the Port Authority, and the utilities.

That's why the City will invite these and other relevant public and quasi-public entities to join the New York City Climate Change Task Force. The Task Force will create an inventory of existing at-risk infrastructure, analyze and prioritize the components of each system, develop adaptation strategies, and design guidelines for new infrastructure.

This will not be an easy task. For most agencies, planning for climate change is a new challenge and given other competing—and often immediate—needs, it is often difficult to prioritize. As a result, integrating climate change impacts into long-term capital planning will require new ways of thinking. But it is essential to begin.

INITIATIVE 2

Work with vulnerable neighborhoods to develop site-specific strategies

We will create a community planning process to engage all stakeholders in community-specific climate adaptation strategies

Protecting our infrastructure is crucial, but we also need to prepare our city to deal with the consequences of climate change, especially in flood-prone areas. There are obvious impacts to people's property and livelihoods from windstorms, flooding, heat waves, and other direct effects of climate change. Shifting climate patterns can take lives and pose major public health dangers.

While all five boroughs have vulnerable coastline, each community's risk and the optimal solutions to minimize that risk will vary. Therefore, preparing for these impacts must include community-specific planning.

A successful community planning process provides the neighborhood with the tools necessary to understand the challenges, engage in problem solving, and effectively communicate preferred solutions. In addition, the process must take into account the unique challenges associated with planning for climate change. Beyond a broadening awareness of the general issues, the details about climate change remain unfamiliar to most of the public—and most publications on the topic are extremely technical and difficult to read. Also, all scenarios are based on projections that continue to evolve.

To begin addressing these challenges, the City has partnered with Columbia University, UPROSE, and the Sunset Park community to design a standardized process to engage waterfront neighborhoods in conversations about climate change adaptation.

We will work with the community to inform them about the potential impacts of climate change and possible solutions—and seek to understand their priorities moving forward. By 2008, we will have a process that can be applied to all at-risk neighborhoods across the city, mostly along the waterfront. We must ensure that all new plans consider the effects of climate change and develop strategies that respond to each community's unique characteristics, including building types, access and use of waterfront, and existing community planning efforts, such as 197A plans and Brownfield Opportunity Area applications.

INITIATIVE 3

Launch a citywide strategic planning process for climate change adaptation

We will begin developing a comprehensive climate change adaptation policy

But all New Yorkers—not just individual neighborhoods—will be impacted by climate change. Protecting the city will require a citywide strategy. *(See case study on facing page: The Cost of Inaction)*

Countries around the world have begun to develop this kind of broad-based framework for climate change adaptation—in Britain, Japan, and the Netherlands.

But New York will become the first major American city to comprehensively assess the risks, costs, and potential solutions for adapting to climate change.

This effort will be unprecedented and challenging. Climate change projections for sea level rise, intensifying storms, and hotter temperatures are just that—projections. The variables involved in forecasting mean that there are no certainties, only probabilities. As a result, a step-by-step approach, with decision points along the way, will be necessary.

Further, some proposals require thinking on a scale that is beyond the traditional scope for public planning. Concepts like sea walls—concrete barriers that would surround the city's coast line—or a series of more targeted storm surge barriers are possibilities, but each raises serious questions. Storm surge barriers could protect significant swaths of our coastline, but still leave others exposed—and cost billions. Any assessment of investments on that scale will need to be undertaken carefully.

We will create a strategic planning process to adapt to climate change impacts

That's why we will create a New York City Climate Change Advisory Board. Composed of non-City government agencies, as well as scientists, engineers, insurance experts, and public policy experts, the advisory board will help the Office of Long-Term Planning and Sustainability develop a planning framework by:

- Developing a risk-based, cost-benefit assessment process to inform investment decisions, including the establishment of clear metrics and decision points
- Assessing possible strategies to protect against flooding and storm surges, and providing recommendations

As the first American city to undertake such a comprehensive climate change planning process, the first phase of this effort includes a scoping study to identify necessary experts, methodology, and design of the larger planning process. This study will look to models abroad, as well as to academic and other work here in the United States.

In addition, we will work with other coastal cities in the United States to share information on climate change planning experiences, develop joint strategies, and pool resources when appropriate.

We will ensure that New York's 100-year floodplain maps are updated

FEMA's floodplain maps for New York City are significantly out of date. The last major revisions were in 1983, based on even earlier data. Since that time, numerous shifts have occurred that should be reflected in these plans: changes to the shoreline and elevations, rising sea levels, and an increased severity of storms, along with technological changes that allow for more accurate mapmaking. Mapping like that done by the U.S. Army Corps of Engineers for the city's hurricane zones will inform the revisions.

These maps determine insurance rates and establish areas subject to building code requirements, so it is critically important that they be accurate and up-to-date. We will work with FEMA to ensure that our floodplain maps reflect the most current information.

We will document the City's floodplain management strategies to secure discounted flood insurance for New Yorkers

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes community floodplain management strategies that go beyond the minimum required. On the basis of this rating system, the 15,000 flood insurance policyholders in the city can receive discounts for aggressive action.

New York City already has relatively strict standards that should make residents eligible for reduced premiums, but we must submit an extensive application documenting our actions to FEMA. The City will compile and submit the documentation required to establish its CRS rating.

We will amend the building code to address the impacts of climate change

The Department of Buildings will assemble a task force composed of City officials, building professionals, and other experts to make recommendations for changes to the building code that address the consequences of climate change. Impacts to be considered include the increased potential for flooding, droughts, high winds, heat waves, the disruption of utility services, and the need for buildings to be inhabitable without energy, a concept known as "passive survivability." This task force will coordinate with other working groups analyzing the impacts of climate change and requirements for adaptation.

CASE STUDY

The Cost of Inaction

Preparing for climate change will be costly. But it is becoming increasingly clear: not preparing will be worse.

According to the Stern Review on the Economics of Climate Change, the overall costs and risks of not adapting to climate change will be equivalent to losing 5% of global Gross Domestic Product (GDP). If environmental and health impacts are taken into account, the estimates of damage could rise to 20% of GDP or more.

Whether or not one believes the science behind global warming, more and more markets do. The insurance industry is already beginning to evaluate municipal investments in light of risks due to climate change. Cities that don't have strong climate change strategies in place may face lower credit ratings, increased insurance costs, and reduced bonding capacity. For example, the world's largest reinsurer, Swiss Re, has instructed corporate clients to come up with strategies for handling global warming or risk losing liability coverage.

The insurance industry's response to the consequences of climate change is continuing to shape the economy. U.S. insurers are already raising rates or leaving markets as a result of increased risk in coastal and fire-prone areas.

In areas where insurers feel the risk is too great, or their ability to raise premiums is hampered by political or regulatory limitations, the risk burden will be shifted to the public as well as to banks and investors. For example, Allstate considered cancelling 20,000 homeowner policies in the Tampa Bay Area; the cuts would have come on top of 32,000 policies that Allstate canceled in South Florida since the 1992 storm. CIGNA Corporation stopped writing new policies in South Florida entirely to reduce its risk of claim losses. CIGNA's sales moratorium took effect a month before the start of the Atlantic hurricane season.

These developments, and others like them, make clear that the costs of inaction now outweigh the expense of action.

Next Steps

This Plan has laid out an ambitious agenda for action that can create a sustainable New York City—and allow us to achieve the overall goal of leaving our children a city that is cleaner, healthier, and more reliable than it is today.

This agenda will require tremendous effort: on the part of City officials and State legislators; by community leaders and our delegation in Washington; from the State government and from every New Yorker. It will not be easy, and it will not be free. But the payoff is real, and big; and the perils of inaction are far greater than the costs of action.

Further, we must start today. We may call this a long-term plan, but building that future will require immediate action. Some will have an impact and meet a need right away; in 2007 we will begin unlocking school playgrounds. For others, like reducing our greenhouse gas emissions, a window of opportunity may be closing.

As a result, we are committed to acting quickly to begin implementing this Plan. We will submit draft legislation to the State Assembly, State Senate, and City Council, and work with legislators to secure its passage. We will work closely, starting immediately, with State agencies to implement the regulatory and administrative aspects of this plan at the State level.

Many of the initiatives in this Plan can be implemented directly by the City. All of the relevant City agencies have participated in shaping these initiatives and will begin as quickly as possible to implement everything that is under our control. The Mayor will ask his Sustainability Advisory Board to continue providing their assistance to this effort, through ongoing advice and by helping City agencies work through the challenges of implementation.

In addition, we will expand the Office of Long-Term Planning and Sustainability to take on new responsibilities, such as fostering interagency cooperation on stormwater management practices and developing a climate change adaptation strategy.

The office will also begin issuing two annual reports. One will report on progress made on each of the Plan's initiatives and overall progress towards the goals. The other will report on climate change, which will include annual updates to the city's greenhouse gas emissions inventory; an assessment of how well our strategies are working toward achieving our greenhouse gas reduction goals; reports on the extent of climate change and the impacts we face; and updates on the city's efforts towards climate change adaptation.

While 2030 may seem like a long way off, there is much that we can accomplish in the next few years. For virtually all of our initiatives, we have identified short-term milestones that can be achieved before the end of this Administration and this City Council in December 2009. Fast action now will be crucial to setting this Plan on the way to realization.

There are now 8.2 million New Yorkers—more than at any time in our history. And more are coming.

They are coming because New York has renewed itself; because over the past three decades **we have achieved one of the greatest resurgences of any American city.**

Growth is ultimately an expression of optimism; it depends on a belief in possibility—essential to New York's soul since its days as an inclusive, turbulent, tolerant Dutch colony.

That is why our recovery has not only strengthened our quality of life, but also our sense of hope. We have proven that challenges once considered insurmountable can be overcome. **It is time to summon that spirit again.**

Over the next two decades, more people, visitors, and jobs will bring vibrancy, diversity, opportunity—and revenue. But **unless we act, they will also bring challenges;** infrastructure strained beyond its limits; parks packed with too many people; streets choked with traffic; trains crammed with too many passengers. Meanwhile, we will face an increasingly precarious environment and the growing danger of climate change that imperils not just our city, but the planet.

We have offered a different vision.

It is a vision of providing New Yorkers with the cleanest air of any big city in the nation; of maintaining the purity of our drinking water and opening more of our rivers and creeks and coastal waters to recreation; of producing more energy more cleanly and more reliably, and offering more choices on how to travel quickly and efficiently across our city. It is a vision where contaminated land is reclaimed and restored to communities; where every family lives near a park or playground; where housing is sustainable and available to New Yorkers from every background, reflecting the diversity that has defined our city for centuries.

It is a vision of New York as the first sustainable 21st century city—but it is more than that. **It is a plan to get there.**

The 127 new initiatives detailed here will strengthen our economy, public health, and quality of life. Collectively, they will add up to the broadest attack on climate change ever undertaken by an American city.

New Yorkers used to think this boldly all the time. Previous generations looked ahead and imagined how their city would grow. They built subways through undeveloped land and established Central Park far from the heart of the city. They constructed water tunnels that could serve millions when our city was a fraction of the size.

Their actions made our modern city possible.

Now it is our turn.

Goals

The concept of "sustainability" brings together economic, social, and environmental considerations precisely because these goals are inter-related. Solutions in one area can bring benefits in another.

Similarly, we have approached this plan holistically, not as a series of separate challenges. Each initiative achieves multiple ends. Some, in fact, rely on others; for example, we cannot meet our air quality goal if we do not also reduce road congestion. And virtually every initiative in this plan contributes to the global fight against climate change, because enabling the most energy- and land-efficient city in America to grow will help reduce our nation's global warming emissions.

Throughout this document, each initiative has appeared with icons representing the various goals it helps achieve. Here we present them in one place, demonstrating the interdependence of our solutions to building a sustainable New York.

	INITIATIVE	HOUSING	OPEN SPACE	BROWNFIELDS	WATER QUALITY	WATER NETWORK	CONGESTION	STATE OF GOOD REPAIR	ENERGY	AIR QUALITY	CLIMATE CHANGE
HOUSING	**CONTINUE PUBLICLY-INITIATED REZONINGS**										
	Pursue transit-oriented development	●	●				●			●	●
	Reclaim underutilized waterfronts	●	●	●			●			●	●
	Increase new transit options to spur development	●					●			●	●
	CREATE NEW HOUSING ON PUBLIC LAND										
	Expand co-locations with government agencies	●					●			●	●
	Adapt outdated buildings to new uses	●					●			●	●
	EXPLORE ADDITIONAL AREAS OF OPPORTUNITY										
	Develop underused areas to knit neighborhoods together	●									●
	Capture the potential of infrastructure investments	●					●			●	●
	Deck over railyards, rail lines, and highways	●	●				●			●	●
	EXPAND TARGETED AFFORDABILITY PROGRAMS										
	Develop new financing strategies	●									●
	Expand inclusionary zoning	●									●
	Encourage homeownership	●									
	Preserve the existing stock of affordable housing throughout New York City	●								●	●
OPEN SPACE	**MAKE EXISTING SITES AVAILABLE TO MORE NEW YORKERS**										
	Open schoolyards across the city as public playgrounds		●								●
	Increase options for competitive athletics		●								
	Complete underdeveloped destination parks		●								●
	EXPAND USABLE HOURS AT EXISTING SITES										
	Provide more multi-purpose fields		●								
	Install new lighting		●								
	RE–IMAGINE PUBLIC REALM										
	Create or enhance a public plaza in every community		●		●					●	●
	Green the cityscape		●		●				●	●	●

Create homes for almost a million more New Yorkers, while making housing more affordable and sustainable.

Ensure that all New Yorkers live within a 10-minute walk of a park.

Clean up all contaminated land in New York City.

Open 90% of our waterways for recreation by reducing water pollution and preserving our natural areas.

Develop critical backup systems for our aging water network to ensure long-term reliability.

INITIATIVE	HOUSING	OPEN SPACE	BROWNFIELDS	WATER QUALITY	WATER NETWORK	CONGESTION	STATE OF GOOD REPAIR	ENERGY	AIR QUALITY	CLIMATE CHANGE
BROWNFIELDS										
MAKE EXISTING BROWNFIELD PROGRAMS FASTER AND MORE EFFICIENT										
Adopt on-site testing to streamline the cleanup process	●		●							●
Create remediation guidelines for New York City cleanups	●		●							●
Establish a City office to promote brownfield planning and redevelopment	●		●							●
EXPAND ENROLLMENT INTO STREAMLINED PROGRAMS										
Expand participation in the current State Brownfield Cleanup Program (BCP)	●		●							
Create a City program to oversee all additional cleanups	●		●							●
Provide incentives to lower costs of remediation	●		●							●
ENCOURAGE GREATER COMMUNITY INVOLVEMENT IN BROWNFIELD REDEVELOPMENT										
Encourage the State to release community-based redevelopment grants	●		●							●
Provide incentives to participate in Brownfields Opportunity Area (BOA) planning	●		●							●
Launch outreach effort to educate communities about brownfield redevelopment	●		●							●
IDENTIFY REMAINING SITES FOR CLEANUPS										
Create database of historic uses across New York City to identify potential brownfields	●		●							●
Limit liability of property owners who seek to redevelop brownfields	●		●							●
WATER QUALITY										
CONTINUE IMPLEMENTING INFRASTRUCTURE UPGRADES										
Develop and implement Long–Term Control Plans				●						
Expand wet weather capacity at treatment plants				●						
PURSUE PROVEN SOLUTIONS TO PREVENT WATER FROM ENTERING SYSTEM										
Increase use of High Level Storm Sewers (HLSS)				●				●		●
Capture the benefits of our open space plan		●		●				●	●	●
Expand the Bluebelt program		●		●				●	●	●
EXPAND TRACK AND ANALYZE NEW BEST MANAGEMENT PRACTICES (BMPS) ON A BROAD SCALE										
Form interagency BMP Task Force				●				●	●	●
Pilot promising BMPs				●				●	●	●
Require greening of parking lots				●				●	●	●
Provide incentives for green roofs				●				●	●	●
Protect wetlands				●					●	●
WATER NETWORK										
ENSURE THE QUALITY OF OUR DRINKING WATER										
Continue the Watershed Protection Program					●			●		●
Construct an ultraviolet disinfection plant for the Catskill and Delaware Systems					●					
Build the Croton Filtration Plant					●					
CREATE REDUNDANCY FOR AQUEDUCTS TO NEW YORK CITY										
Launch a major new water conservation effort				●	●			●		●
Maximize existing facilities					●					
Evaluate new water sources					●					

Improve travel times by adding transit capacity for millions more residents, visitors and workers

Reach a full "state of good repair" on New York City's roads, subways, and rails for the first time in history.

Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure.

Achieve the cleanest air of any big city in America.

Reduce global warming emissions by more than 30%

	INITIATIVE	HOUSING	OPEN SPACE	BROWNFIELDS	WATER QUALITY	WATER NETWORK	CONGESTION	STATE OF GOOD REPAIR	ENERGY	AIR QUALITY	CLIMATE CHANGE
WATER NETWORK	**MODERNIZE IN-CITY DISTRIBUTION**										
	Complete Water Tunnel No. 3					●					
	Complete a backup tunnel to Staten Island					●					
	Accelerate upgrades to water main infrastructure					●					
TRANSPORTATION	**BUILD AND EXPAND TRANSIT INFRASTRUCTURE**										
	Increase capacity on key congested routes						●			●	●
	Provide new commuter rail access to Manhattan						●			●	●
	Expand transit access to underserved areas						●			●	●
	IMPROVE TRANSIT SERVICE ON EXISTING INFRASTRUCTURE										
	Improve and expand bus service						●			●	●
	Improve local commuter rail service						●			●	●
	Improve access to existing transit						●			●	●
	Address congested areas around the city						●			●	●
	PROMOTE OTHER SUSTAINABLE MODES										
	Expand ferry service						●			●	●
	Promote cycling						●			●	●
	IMPROVE TRAFFIC FLOW BY REDUCING CONGESTION										
	Pilot congestion pricing						●	●		●	●
	Manage roads more efficiently						●			●	●
	Strengthen enforcement of traffic violations						●			●	●
	Facilitate freight movements						●			●	●
	ACHIEVE A STATE OF GOOD REPAIR ON OUR ROADS AND TRANSIT SYSTEM										
	Close the Metropolitan Transportation Authority's state of good repair gap						●	●		●	●
	Reach a state of good repair on the city's roads and bridges						●	●		●	●
	DEVELOP NEW FUNDING SOURCES										
	Establish a new regional transit financing authority						●	●		●	●
ENERGY	**IMPROVE ENERGY PLANNING**										
	Establish a New York City Energy Planning Board								●	●	●
	REDUCE NEW YORK CITY'S ENERGY CONSUMPTION										
	Reduce energy consumption by City government								●	●	●
	Strengthen energy and building codes in New York City								●	●	●
	Create an energy efficiency authority for New York City								●	●	●
	Prioritize five key areas for targeted incentives								●	●	●
	Expand Peak Load Management								●	●	●
	Launch an energy awareness and training campaign								●	●	●

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INITIATIVE	HOUSING	OPEN SPACE	BROWNFIELDS	WATER QUALITY	WATER NETWORK	CONGESTION	STATE OF GOOD REPAIR	ENERGY	AIR QUALITY	CLIMATE CHANGE
ENERGY										
EXPAND THE CITY'S CLEAN POWER SUPPLY										
Facilitate repowering and construct power plants and dedicated transmission lines								●		●
Expand Clean Distributed Generation ("Clean DG")								●	●	●
Support expansion of natural gas infrastructure								●	●	●
EXPAND THE CITY'S CLEAN POWER SUPPLY										
Foster the market for renewable energy								●	●	●
MODERNIZE ELECTRICITY DELIVERY INFRASTRUCTURE										
Accelerate reliability improvements to the city's grid								●		
Facilitate grid repairs through improved coordination and joint bidding								●	●	
Support Con Edison's efforts to modernize the grid								●		●
AIR QUALITY										
REDUCE ROAD VEHICLE EMISSIONS										
Capture the air quality benefits of our transportation plan						●			●	●
Improve fuel efficiency of private cars									●	●
Reduce emissions from taxis, black cars, and for hire-vehicles									●	●
Replace, retrofit, and refuel diesel trucks									●	●
Decrease school bus emissions									●	●
REDUCE OTHER TRANSPORTATION EMISSIONS										
Retrofit ferries and promote use cleaner fuels									●	
Seek to partner with the Port Authority to reduce emissions from Port facilities									●	●
Reduce emissions from construction vehicles									●	
REDUCE EMISSIONS FROM BUILDINGS										
Capture the air quality benefits of our energy plan								●	●	●
Promote the use of cleaner burning heating fuels								●	●	●
PURSUE NATURAL SOLUTIONS TO IMPROVE AIR QUALITY										
Capture the benefits of our open space plan				●					●	
Reforest targeted areas of our parkland				●					●	●
Increase tree plantings on lots				●				●	●	●
UNDERSTAND THE SCOPE OF THE CHALLENGE										
Launch collaborative local air quality study									●	
CLIMATE										
PROTECT OUR VITAL INFRASTRUCTURE										
Create an intergovernmental Task Force to protect our vital infrastructure										●
DEVELOP SITE–SPECIFIC STRATEGIES										
Work with vulnerable neighborhoods to develop site-specific strategies										●
INCORPORATE CLIMATE CHANGE CONCERNS INTO PLANNING PROCESS										
Launch a citywide strategic planning process for climate change adaptation										●

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Implementation

One of the biggest challenges to long-term planning in government is that the terms of elected leaders rarely extend into the long term. It means that time will be up before the job is finished, which in some cases limits the desire or ability to embark on multi-year efforts. But we rarely appreciate the extent to which long-term challenges require near-term action to solve or avoid them. As a result, this plan requires fast implementation.

The Bloomberg Administration has made a significant commitment to the fulfillment of this plan, including budget allocations and a commitment to expand the Office of Long-Term Planning and Sustainability. But its implementation will require action by many leaders—in City government, in the City Council and the State Legislature, and in the public authorities that serve the city. Here we outline the responsibilities, critical steps, milestones, and City budget commitments as a guide to how this plan will be implemented.

DOB	NYC DEPARTMENT OF BUILDINGS
DCAS	NYC DEPARTMENT OF CITYWIDE ADMINISTRATIVE SERVICES
DCP	NYC DEPARTMENT OF CITY PLANNING
DEP	NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION
DOE	NYC DEPARTMENT OF EDUCATION
DOF	NYC DEPARTMENT OF FINANCE
DOHMH	NYC DEPARTMENT OF HEALTH AND MENTAL HYGIENE
DOT	NYC DEPARTMENT OF TRANSPORTATION
DPR	NYC DEPARTMENT OF PARKS & RECREATION
DSNY	NYC DEPARTMENT OF SANITATION
EDC	NYC ECONOMIC DEVELOPMENT CORPORATION
HPD	NYC DEPARTMENT OF HOUSING PRESERVATION AND DEVELOPMENT
MTA	METROPOLITAN TRANSPORTATION AUTHORITY
NYCEEA	NYC ENERGY EFFICIENCY AUTHORITY (PROPOSED)
NYS DEC	NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATIOIN
NYSERDA	NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY
PANYNJ	PORT AUTHORITY OF NEW YORK AND NEW JERSEY
NYS PSC	NYS PUBLIC SERVICE COMMISSION
OLTPS	NYC MAYOR'S OFFICE OF LONG-TERM PLANNING AND SUSTAINABILITY
OER	NYC OFFICE OF ENVIRONMENTAL REMEDIATION (PROPOSED)
SCA	NYC SCHOOL CONSTRUCTION AUTHORITY
SMART	SUSTAINABLE MOBILITY AND REGIONAL TRANSPORTATION FUND (PROPOSED)
TBTA	TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY
TLC	NYC TAXI AND LIMOUSINE COMMMISSION

HOUSING

SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
			2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
CONTINUE PUBLICLY-INITIATED REZONINGS							
1 Pursue transit-oriented development							
Use upcoming rezonings to direct growth toward areas with strong transit access	DCP		Complete current Administration agenda for rezonings and land use studies		-	-	
2 Reclaim underutilized waterfronts							
Continue restoring underused or vacant waterfront land across the city	DCP		Complete current Administration agenda for rezonings and land use studies		-	-	
3 Increase transit options to spur development							
Use transit extensions to spark growth as the subways did more than a century ago	MTA/OLTPS/DOT	Transit extensions	Implement increased transit options including BRT to spur development	Undertake rezonings alonside transit expansion	-	-	
CREATE NEW HOUSING ON PUBLIC LAND							
4 Expand co-locations with government agencies							
Pursue partnerships with City and State agencies throughout the city	DCAS/HPD		Create database of City, State, and Federal land for co-location opportunities and housing	Execute on co-location opportunities	2.0	0.2	
5 Adapt outdated buildings to new uses							
Seek to adapt unused schools, hospitals, and other outdated municipal sites for productive use as new housing	DCP/HPD		Use database to identify and execute on initial sites	Execute on co-location opportunities	-	-	
EXPLORE ADDITIONAL AREAS OF OPPORTUNITY							
6 Develop underused areas to knit neighborhoods together							
Continue to identify underutilized areas across the city that are well-served by transit and other infrastructure	DCP		Complete current Administration agenda for rezonings and land use studies	Begin studying areas of opportunity and select few for in-depth re-zoning initiatives	-	-	

SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
			2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
HOUSING							
EXPLORE ADDITIONAL AREAS OF OPPORTUNITY, CONTINUED							
7 Capture the potential of transportation infrastructure investments							
Examine the potential of major infrastructure expansions to spur growth in new neighborhoods	DCP			Identify rezoning opportunities that emerge with implementation of new transit projects	-	-	
8 Deck over railyards, rail lines, and highways							
Explore opportunities to create new land by constructing decks over transportation infrastructure	DCP		Identify railyards, rail lines, and highways that coincide with sustainable development and have the capacity for anticipated growth	Conduct feasibility assessments and identify opportunities for rezonings and required infrastructure investments	-	-	
EXPAND TARGETED AFFORDABILITY PROGRAMS							
9 Develop new financing strategies							
Continue to pursue creative financing strategies to reach new income brackets	HPD		Create Mayor's *New Housing Marketplace Plan* to build 165,000 units of affordable housing	Pursue new opportunities to continue programs to promote affordable housing	-	-	
10 Expand inclusionary zoning							
Seek opportunities to expand the use of inclusionary zoning, harnessing the private market to create economically-integrated communities	HPD		Pursue inclusionary zoning in all appropriate rezonings initiated and reviewed by the city	Continue use of inclusionary zoning in all appropriate rezonings initiated and reviewed by the city	-	-	
11 Encourage homeownership							
Continue to develop programs to encourage homeownership, emphasizing affordable apartments over single-family homes	HPD		Complete *Mayor's New Housing MarketPlace* plan to build 165,000 units of affordable housing	Promote home ownership opportunities where appropriate	-	-	
12 Preserve the existing stock of affordable housing throughout New York City							
Continue to develop programs to preserve the existing affordable housing that so many New Yorkers depend upon today	HPD		Complete Mayor's new housing marketplace plan to build 165,000 units of affordable housing	Pursue new opportunities to continue programs to promote affordable housing	-	-	
OPEN SPACE							
MAKE EXISTING SITES AVAILABLE TO MORE NEW YORKERS							
1 Open schoolyards across the city as public playgrounds							
Open schoolyards as playgrounds in every neighborhood	DPR/DOE		Open all Category 1 sites not requiring capital improvements	Open all school yards in priority neighborhoods	117.2	3.5	Private donors
2 Increase options for competitive athletes							
Make high-quality competition fields available to teams across the city	DPR		Open fields up for community use on 43 fields	Continue to maintain fields	-	-	
3 Complete underdeveloped destination parks							
Fulfill the potential of at least one major undeveloped park site in every borough	DPR		Complete community outreach and designs for all regional parks	Complete construction of all regional parks	386.4	-	
EXPAND USABLE HOURS AT EXISTING SITES							
4 Provide more multi-purpose fields							
Convert asphalt sites into multi-use turf fields	DPR		Complete development of all proposed multi-purpose fields	Maintain transformed fields for continued use	42.1	-	
5 Install new lighting							
Maximize time on our existing turf fields by installing additional lights for nighttime use	DPR		Complete installation of all proposed field lights	maintain installed field lighting and seek new opportunities	21.6	-	
RE-IMAGINE THE PUBLIC REALM							
6 Create or enhance a public plaza in every community							
Create or enhance at least one public plaza in every community	DOT		Continue development of identified plaza initiatives and develop process for community identification of potential new plazas	Construct 10 to 15 plazas; identify new plaza opportunities in priority neighborhoods	134.3	-	
7 Green the cityscape							
Fill every available street tree opportunity in New York City	DPR		Plant 15,000 street trees a year	Achieve 100% street tree stocking level	246.9	8.1	
Expand Greenstreets program	DPR		Complete 240 greenstreets	Complete 640 greenstreets	15.0	0.6	Private donors

	Sub-initiative	Implementation Lead Agency	Non-City Action Needed to Progress	Milestones for Completion by End of: 2009	Milestones for Completion by End of: 2015	New York City Funding, (in $ millions, nominal): Capital (FY '08-'17)	New York City Funding, (in $ millions, nominal): Operating (FY '08)	Other Funding Sources
BROWNFIELDS	**MAKE EXISTING BROWNFIELD PROGRAMS FASTER AND MORE EFFICIENT**							
	1 Adopt on-site testing to streamline the cleanup process							
	Pilot the "Triad" program on two sites	OER		Conduct first two pilots of Triad and evaluate their effectiveness in the city environment	If effective, promote the use of Triad in City and private developments	-	-	
	2 Create remediation guidelines for New York City cleanups							
	Analyze New York City's soil and develop a set of standard cleanup remedies appropriate for the city	OER		Complete urban soil study; city-specific remediation guidelines under development	Achieve agreement on all city-specific presumptive remedies based on urban soil studies	-	-	
	3 Establish a City office to promote brownfield planning and redevelopment							
	Create a new City office to increase resources dedicated to brownfield planning, testing, and cleanups	OLTPS		Establish and fully staff office; regularly evaluate city applications and E-designated sites		-	0.5	
	EXPAND ENROLLMENT INTO STREAMLINED PROGRAMS							
	4 Expand participation in the current State Brownfield Cleanup Program (BCP)							
	Ask State to redistribute BCP tax credits to relieve budgetary pressures, and begin covering New York City-specific contamination	OLTPS	State law	Enact recommended changes to State law		-	-	State
	5 Create a City program to oversee all additional cleanups							
	Create a City-sponsored program to provide oversight of cleanups for any sites not enrolled in other programs	OER	State law	Establish City BCP; oversee all voluntary clean ups and E-designated (Council legislation, State DEC approval, and regulations promulgated)	Continue to oversee voluntary cleanups in New York City not enrolled in a State program	-	0.5	
	6 Provide incentives to lower costs of remediation							
	Dedicate $15 million to capitalize a fund to support brownfield redevelopment	OER		Establish a revolving loan fund; issue first loan for City remediation project		-	15.0	
	ENCOURAGE GREATER COMMUNITY INVOLVEMENT IN BROWNFIELD REDEVELOPMENT							
	7 Encourage the State to release community-based redevelopment grants							
	Advocate for the State to reform the Brownfield Opportunity Area (BOA) program and release planning grant funds to community groups	NYS DEC/OLTPS	State law	Allocate funds to all previous BOA awardees; advocate for new process to streamline state grants to BOAs	Promote additional BOA applications and support community organizations who want to plan brownfield redevelopment	-	-	State
	8 Provide incentives to participate in Brownfields Opportunity Area (BOA) planning							
	Advocate for financial incentives for developments constructed in coordination with a BOA	NYS DEC/OLTPS	State law	Enact State tax incentives for private developers working in coordination with BOA application		-	-	State
	9 Launch outreach efforts to educate communities about brownfield redevelopment							
	Educate and provide technical assistance to communities, private developers, and City agencies to promote brownfield redevelopment	OER		Begin outreach campaigns and liaison services to private developers and non-profit organizations		-	-	
	IDENTIFY REMAINING SITES FOR CLEANUPS							
	10 Create a database of historic uses across New York City to identify potential brownfields							
	Conduct a historic use assessment for all sites in order to measure long-term progress towards goals	OER		Launch study to aggregate all relevant data for a City environmental database	Launch database and provide public access	-	1.5	
	11 Limit liability of property owners who seek to redevelop brownfields							
	Create an insurance program and legal protections to limit the liability of developers willing to clean up land they did not pollute	OER		Design and launch a market-feasible supplemental insurance policy		-	10.0	
WATER QUALITY	**CONTINUE IMPLEMENTING INFRASTRUCTURE UPGRADES**							
	1 Develop and implement Long-Term Control Plans							
	Complete Long-Term Control Plans for all 14 New York City Watersheds, as required by law	DEP		Submit Waterbody/Watershed (WB/WS) Plans for 18 waterbodies NYS DECD, detailing strategies for CSO reduction	Integrate WB/WS plans into the 14 watershed specific Long-Term Control Plans (LTCPs) and submit draft city wide LTCP	-	-	
	2 Expand wet weather capacity at treatment plants							
	Reduce Combined Sewage Overflow (CSO) discharges by more than 185 mgd during rainstorms	DEP		Continue construction	Complete upgrades to 26th Ward and Jamaica WWTP (2015)	-	-	

	SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
				2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
WATER QUALITY	**PURSUE PROVEN SOLUTIONS TO PREVENT STORM WATER FROM ENTERING SYSTEM**							
	3 Increase use of High Level Storm Sewers (HLSS)							
	Convert combined sewers into HLSS and integrate HLSS into major new developments as appropriate	DEP		Create standardized process to analyze proposed sites for possible HLSS (process for HLSS will always be dictated by the unique characteristics of the site)	Continue to implement HLSS process	-	-	
	4 Capture the benefits of our open space plan (See the open space initiatives on page 147 for more information)							
	5 Expand the Bluebelt program							
	Expand Bluebelt in Staten Island and other boroughs, where possible	DEP		Begin expanding Bluebelt to other parts of Staten Island	Create bluebelt strategies in Udalls' Cove and Brookville Boulevard West, Springfield Lake, and Baisley Pond	-	-	
	EXPAND TRACK AND ANALYZE NEW BEST MANAGEMENT PRACTICES (BMPs) ON A BROAD SCALE							
	6 Form an interagency BMP Task Force							
	Make the reduction of CSO volumes and other environmental issues a priority for all relevant City agencies	DEP	Launch NYC BMP Inter-Agency Task Force	Complete Comprehensive BMP plan and associated budget	Continue to implement BMPs citywide	-	-	
	7 Pilot promising BMPs							
	Introduce 20 cubic meters of ribbed mussel beds	DEP		Complete pilot and plan for additional mollusk habitats	Continue to foster natural ecology of city waterways	-	-	
	Plant trees with improved pit designs	DEP / DPR		Complete pilot	Continue practices to improve the ability for tree pits to capture stormwater	-	-	
	Create vegetated ditches (swales) along parkways	DEP/DOT		Complete pilot and identify additional appropriate locations	Continue practices to capture stormwater runoff from streets	-	-	
	8 Require greening of parking lots							
	Modify the zoning resolution to include design guidelines for off-street parking lots for commercial and community facilities	DCP		Complete ULURP process; zoning requirement in effect	Continue to look for ways to reduce the impacts of open parking lots	-	-	
	9 Provide incentives for green roofs							
	Encourage the installation of green roofs through a new incentive program	OLTPS/DOF	City Administrative Code amendment	Launch initiative	Reevaluate success of incentive	-	1.0	
	10 Protect wetlands							
	Assess the vulnerability of existing wetlands and identify additional policies to protect and manage them	DPR/DEP/OLTPS		Complete wetlands study and draft policy	Implement policy recommendations	-	-	
WATER NETWORK	**ENSURE THE QUALITY OF OUR DRINKING WATER**							
	1 Continue the Watershed Protection Program							
	Aggressively protect our watersheds as we seek to maintain a Filtration Avoidance Determination for the Catskill and Delaware Water Supplies	DEP	Renewal of Filtration Avoidance Determination	Renew the City's Filtration Avoidance Determination and fulfill commitments	Continue to work with communities upstate and protection our water supply West of the Hudson	-	-	
	2 Construct an ultraviolet disinfection plant for the Catskill and Delaware systems							
	Construct an ultraviolet disinfection facility to destroy disease-causing organisms in our upstate watershed	DEP		Begin construction of UV disinfection plant	Open UV disinfection plant	-	-	
	3 Build the Croton Filtration Plant							
	Construct a water filtration plant to protect the Croton supply	DEP		Continue to construct Croton Filtration Plant	Complete construction of Croton Filtration Plant (2012)	-	-	
	CREATE REDUNDANCY FOR AQUEDUCTS TO NEW YORK CITY							
	4 Launch a major new water conservation effort							
	Implement a water conservation program to reduce citywide consumption by 60 mgd	DEP		Launch water conservation program	Achieve 60 mgd of water consumption reduction	-	-	

SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF 2009	MILESTONES FOR COMPLETION BY END OF 2015	NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL) CAPITAL (FY '08-'17)	NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL) OPERATING (FY '08)	OTHER FUNDING SOURCES
WATER NETWORK							
CREATE REDUNDANCY FOR AQUEDUCTS TO NEW YORK CITY, CONTINUED							
5 Maximize existing facilities							
Expand our supply potential through increased efficiency	DEP		Begin installation of new hydraulic pumps; begin designing enhanced filtration plant for greater use of Jamaica groundwater	Complete installation of new hydraulic pumps (2011); begin construction of an enhanced filtration plant for greater use of Jamaica groundwater; resume use of	-	-	
6 Evaluate new water sources							
Evaluate 39 projects to meet the shortfall needs of the city if a prolonged shutdown of the Delaware Aqueduct is required	DEP		Finalize a short list of projects for piloting and design	Begin planning for implementation of chosen projects	-	-	
MODERNIZE IN-CITY DISTRIBUTION							
7 Complete Water Tunnel No. 3							
Complete construction of Stage 2 and begin repairing Water Tunnel No. 1	DEP		Open Brooklyn/Queens leg	Open Manhattan leg	-	-	
Complete Stages 3 and 4 of Water Tunnel No. 3	NYC Water Board/DEP		None	Complete design of stage 3	-	-	
8 Complete a backup tunnel to Staten Island							
Replace pipelines connecting Staten Island to Water Tunnel No. 2	DEP	Complete dredging of Harbor by U.S. Army Corp of	Begin replacing pipelines	Complete replacement of pipelines	-	-	
9 Accelerate upgrades to water main infrastructure							
Increase replacement rate to over 80 miles annually	DEP		Continue to replace water mains	Continue to replace water mains	-	4.0	
TRANSPORTATION							
BUILD AND EXPAND TRANSIT INFRASTRUCTURE							
1 Increase capacity on key congested routes							
Seek to fund five projects that eliminate major capacity constraints	SMART Authority	State law to create the SMART Authority	Have funding mechanism in place	Complete ARC, third track, Lincoln Tunnel XBL, Second Avenue Subway (Phase I), and Lower Manhattan Rail Link	-	-	SMART Fund
2 Provide new commuter rail access to Manhattan							
Seek to expand options for rail commuters	State Legislature/ SMART Authority	State law to create the SMART Authority	Continue construction of East Side Access and Second Avenue Subway, move other projects into engineering phase	Complete East Side Access and Metro-North to Penn Station, move other projects forward	-	-	SMART fund
3 Expand transit access to underserved areas							
Seek to provide transit to new and emerging neighborhoods	MTA/DCP/OLTPS	State law to create the SMART Authority	Complete Staten Island study and study of potential subway expansion	Open North Shore transit	-	-	SMART Fund
IMPROVE TRANSIT SERVICE ON EXISTING INFRASTRUCTURE							
4 Improve and expand bus service							
Initiate and expand Bus Rapid Transit	MTA/DOT		Open five BRT routes	Open ten BRT routes (5 additional ones)	46.4	1.2	SMART Fund
Dedicate Bus/High Occupancy Vehicle (HOV) lanes on the East River bridges	MTA/DOT	MTA operation	Operate bus service lanes on all three bridges				SMART Fund
Explore other improvements to bus service	MTA/DOT		Complete implementation of operating improvements for 22 locations				
5 Improve local commuter rail service							
Seek to expand local use of Metro-North and Long Island Rail Road (LIRR) stations	MTA		Improve local connectivity	Increase service frequency after East Side Access opens	-	-	
6 Improve access to existing transit							
Facilitate access to subways and bus stops citywide	DOT		Complete construction of up to three bus stops under Els, up to two Sub-Side interface, and up to 15 new sidewalks to bus stops	Continue implementation of up to three bus stops under Els, up to two SSI locations and up to 15 sidewalks to buses	15.2	-	
7 Address congested areas around the city							
Develop congestion management plans for outer-borough growth corridors	DOT		Complete studies for nine corridors, and begin implementation (2009)	Undertake studies of growth areas and begin implementation	124.8	-	CMAQ grant

SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF 2009	MILESTONES FOR COMPLETION BY END OF 2015	NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL) CAPITAL (FY '08-'17)	NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL) OPERATING (FY '08)	OTHER FUNDING SOURCES
PROMOTE OTHER SUSTAINABLE MODES							
8 Expand ferry service							
Seek to expand service and improve integration with the city's existing mass transit system	EDC/DOT/OLTPS		Issue contract and launch service; study crosstown BRT	Continue operating ferry	-	-	
9 Promote cycling							
Complete the 1,800-mile bike master plan	DOT		Complete 200 new directional miles of bike routes	Complete 820 directional miles of bike routes (inclusive of 2009 commitment)	6.2	8.1	SMART Fund
Facilitate cycling	DOT		Install 400 new CITYRACKS per year; improve and update maps annually	Continue installation of 400 new CITYRACKS per year and map improvements	-	-	
IMPROVE TRAFFIC FLOW BY REDUCING CONGESTION							
10 Pilot congestion pricing							
Seek to use pricing to manage traffic in the Central Business District (CBD)	DOT	State law	Install and run congestion pricing system by Spring 2009	Continue operation of the congestion charge	-	-	SMART Fund
11 Manage roads more efficiently							
Expand the use of Muni meters	DOT		Install Muni Meters in most outer borough central business districts	Install Muni meters on all block faces that warrant them (2010)	-	-	
Develop an integrated traffic management system for our regional transportation network	DOT		Consolidate TMC	Implement ITS on all regional highways	57.3	4.0	
12 Strengthen enforcement of traffic violations							
Expand the number of Traffic Enforcement Agents (TEAs)	NYPD		Hire 100 TEAs and deploy		-	5.3	
Enable all TEAs to issue blocking-the-box tickets	NYPD	State law			-	-	
Expand the use of traffic enforcement cameras	Law	State law	Install cameras		-	-	
13 Facilitate freight movements							
Improve access to JFK	EDC		Implement short-term recommendations from JFK Access Task Force		-	-	
Explore High Occupancy Truck Toll (HOTT) Lanes	NYS DOT/DOT	Study	Complete study		-	-	
ACHIEVE A STATE OF GOOD REPAIR ON OUR ROADS AND TRANSIT SYSTEM							
14 Close the Metropolitan Transportation Authority's state of good repair gap							
Seek a grant from the SMART Authority to cover the MTA's funding gap	MTA/OLTPS	State law			-	-	SMART Fund
15 Reach a state of good repair on the city's roads and bridges							
Seek a grant from the SMART Authority to fund accelerated capital repairs and upgrades	DOT	State law	Resurface 1,925 lane-miles of city streets, exceeding our current pace of resurfacing by 125 lane-miles	Resurface 6,925 lane-miles of city streets, excee ding our current pace of resurfacing by 625 lane-miles v	-	-	SMART Fund
Invest in bridge and tunnel upgrades	DOT	State law	Complete scheduled 10-year bridge capital plan on schedule		-	50.0	SMART Fund
DEVELOP NEW FUNDING SOURCES							
16 Establish a new regional transit financing authority							
Seek to create a SMART Financing Authority to advance new projects and achieve a state of good repair	OLTPS	State law	Establish SMART Fund		-	50.0	SMART Fund

TRANSPORTATION

SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
			2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
IMPROVE ENERGY PLANNING							
1 Establish a New York City Energy Planning Board							
Work with the State and utilities to centralize planning for the city's supply and demand initiatives	EDC/OLTPS	State law	Establish NYC Planning Board		-	-	
REDUCE NEW YORK CITY'S ENERGY CONSUMPTION							
2 Reduce energy consumption by City government							
Commit 10% of the City's annual energy bill to fund energy-saving investments in City operations			Begin investing approximately $80 million a year into improving the energy efficiency of City buildings	Achieve 30% reduction in energy consumption (2017)	-	81.2	
3 Strengthen energy and building codes in New York City							
Strengthen energy and building codes to support our energy efficiency strategies and other environmental goals	DOB/NYSERDA		Complete and adopt first rounds of code changes (2008, 2010)	Continue to update codes, as required	-	-	
4 Create an energy efficiency authority for New York City							
Create the New York City Energy Efficiency Authority responsible for reaching the city's demand reduction targets	EDC/OLTPS	State law to establish the NYCEEA	Create a new authority responsible for the implementation of NYC energy conservation and efficiency programs	Continue to implement efficiency programs	-	-	Energy efficiency surcharges on electricity bill and future RGGI and Forward Capacity funds
5 Prioritize five key areas for targeted incentives							
Use a series of mandates, challenges, and incentives to reduce demand among the city's largest energy consumers	NYCEEA	PSC approval to allocate ratepayer surcharges to NYCEEA	Pass necessary local laws, building code and energy code	Complete all targeted programs and begin to implement new ones	-	-	Energy efficiency surcharges on electricity bill, future RGGI and Forward Capacity funds, and private capital
6 Expand Peak Load Management							
Expand participation in Peak Load Management Programs through smart meters	PSC/Con Edison	PSC to mandate deployment of advanced meters	Ensure Con Edison begins deployment of advanced meters with plan for greater deployment	Achieve 1,000 MW of peak load management	-	-	Energy efficiency surcharges on electricity bill and NYISO incentive programs
Support expansion of real-time pricing across the city	NYSERDA/NYCEEA		Establish appropriate rate and incentive structures	Achieve enrollment of 50% of small businesses and residents by 2015	-	-	
7 Launch an energy awareness and training campaign							
Increase the impact of our energy efficiency efforts through a coordinated energy education, awareness, and training campaign	NYCEEA/OLTPS/CUNY		Launch energy awareness campaign; setup training, certification, and monitoring programs	Continue to improve programs	-	-	Energy efficiency surcharges on electricity bill
EXPAND THE CITY'S CLEAN POWER SUPPLY							
8 Facilitate repowering and construct power plants and dedicated transmission lines							
Facilitate the construction of 2,000 to 3,000 MW of supply capacity by repowering old plants, constructing new ones, and building dedicated transmission lines	NYC Energy Planning Board	State law	Establish NYC Planning Board	Increase clean supply by 2,000 to 3,000 MW and retire 1,000 to 2,100 MW	-	-	Private developers/owners
9 Expand Clean Distributed Generation ("Clean DG")							
Increase the amount of Clean DG by 800 MW	PSC/Con Edison/EDC	Con Edison interconnection study	Study the capacity to increase interconnection limits in each network and work with manufacturers on new circuit breaker technologies	Increase capacity of clean DG citywide by 100 MW	-	-	Energy efficiency surcharges on electricity bill, private capital and NYISO incentives programs
Promote opportunities to develop district energy at appropriate sites in New York City	Con Edison/EDC	Completed study of Hudson Yards District Energy feasibility	Review completed Con Edison Hudson Yards District Energy Study and move forward on district energy projects based on report findings	Update City building code to include requirement for developers of developments over 350,000 square feet to study feasibility of clean DG	-	-	
10 Support expansion of natural gas infrastructure							
Support critical expansions to the city's natural gas infrastructure	EDC	FERC and other regulatory agency approvals	Support appropriate natural gas expansion proposals	Reduce gas prices by $600 million to $900 million	-	-	Private developers/owners

ENERGY

	SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
				2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
ENERGY	**EXPAND THE CITY'S CLEAN POWER SUPPLY, CONTINUED**							
	11 Foster the market for renewable energy							
	Create a property tax abatement for solar panel installations	EDC/DOF	City Administrative Code amendment	Launch solar incentive	Achieve competitive solar market in New York City	-	0.4	
	Study the cost-effectiveness of solar electricity when evaluated on a Real Time Pricing scenario	EDC		Complete study		-	0.1	
	Support the construction of the city's first carbon-neutral building, primarily powered by solar electricity	Solar One/EDC		Begin construction of the city's first carbon-neutral building	Complete construction and operate environmental education programs	3.0	-	
	Increase use of solar energy in City buildings through creative financing	EDC/ DCAS/OLTPS	Release RFP for solar developer	Select solar developer to install solar panels; enter into long-term solar power purchase agreement	Continue to increase the amount of solar electricity generated on City buildings	-	-	NYSERDA/US Department of Energy
	Work with the State to eliminate barriers to increasing the use of solar energy in the city	PSC	PSC regulatory amendments on solar cap; State statute	Increase/remove solar cap in NYC and increase net-metering opportunities statewide	Achieve competitive solar market in New York City	-	-	
	Pilot one or more technologies for producing energy from solid waste	EDC/DSNY		Begin designing at least one pilot alternative waste technology facility	Complete pilots of alternative waste technologies and evaluate policies to implement successful technologies on a larger scale	-	-	
	End methane emissions from sewage treatment plants and expand the use of digester gas	DEP	Analyze opportunities for productive use of digester gas	End methane emissions from waste water treatment plants		-	-	
	Study the expansion of gas capture and energy production from existing landfills	EDC/DEP/DSNY/OLTPS		Complete initial study; begin to follow-up on recommendations	Create a process to review use of gas for energy	-	-	
	MODERNIZE ELECTRICITY DELIVERY INFRASTRUCTURE							
	12 Accelerate reliability improvements to the city's grid							
	Advocate for Con Edison to implement recommendations from the City's report on the western Queens power outages	PSC/Con Edison/EDC	PSC mandate for implementation of recommendations	Begin implementation of City recommendations and all other appropriate recommendations to improve grid reliability	Complete or near complete implementation of City recommendations	-	-	Con Edison
	13 Facilitate grid repairs through improved coordination and joint bidding							
	Pursue the passage of joint bidding legislation	State Legislature/EDC	State law	Approve joint bidding citywide, improve coordination, and begin work on pilot multi-utility tunnel with location identified by formalized team of City, State, and utility representatives	Resolve all regulatory, legal, financial, engineering and operational issues through legislation, if required, to make multi-utility tunnels standard practice for major public capital infrastructure projects	-	-	
	Ensure adequate pier facilities are available to Con Edison to offload transformers and other equipment	EDC				-	-	
	MODERNIZE ELECTRICITY DELIVERY INFRASTRUCTURE							
	14 Support Con Edison's efforts to modernize the grid							
	Support Con Edison's 3G System of the Future initiative	PSC/EDC	PSC approval of Con Edison plans			-	-	Con Edison and Con Edison ratepayers
AIR QUALITY	**REDUCE ROAD VEHICLE EMISSIONS**							
	1 Capture the air quality benefits of our transportation plan (See the transportation initiatives on page 150 and 151 for more information)							
	2 Improve fuel efficiency of private cars							
	Waive New York City's sales tax on the cleanest, most efficient vehicles	OLTPS/DOF	City Administrative Code amendment	Offer incentive	Complete; evaluate extensions	-	1.6	
	Work with the MTA, the Port Authority, and the State Department of Transportation to promote hybrid and other clean vehicles	MTA/PANYNJ/OLTPS	Interagency cooperation	Release assessment of policy options and begin implementation		-	-	
	Pilot new technologies and fuels, including hydrogen and plug-in hybrid vehicles	DOT, OLTPS	NYSERDA funding	Have an operational hydrogen station in New York City	Complete demonstration	-	-	NYSERDA/Shell Hydrogen

SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF 2009	MILESTONES FOR COMPLETION BY END OF 2015	NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL) CAPITAL (FY '08-'17)	NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL) OPERATING (FY '08)	OTHER FUNDING SOURCES
REDUCE ROAD VEHICLE EMISSIONS, CONTINUED							
3 Reduce emissions from taxis, black cars, and for-hire vehicles							
Reduce taxi and limousine idling	TLC/DOT/NYSERDA		Equip participating yellow taxis and black cars with anti-idling equipment		-	-	CMAQ
Work with the Taxi and Limousine Commission (TLC) and the taxicab industry to double the taxi fleet's efficiency	TLC		Work toward completing new standards for taxis	Complete conversion of all taxis to more fuel efficient vehicles	-	-	Private fleet owners
Work with stakeholders to double the fuel efficiency of black cars and for-hire vehicles	TLC		Work toward completing new standards for for-hire vehicles by 2010	Complete conversion of all for-hire vehicles to more fuel efficient vehicles	-	-	Private fleet owners
4 Replace, retrofit, and refuel diesel trucks							
Introduce biodiesel into the City's truck fleet, go beyond compliance with local laws, and further reduce emissions	All agencies with heavy duty fleets		Dispense a biodiesel blend at all city-owned diesel fueling stations	Continue to increase biodiesel blend as needed	-	-	
Accelerate emissions reductions of private fleets through existing CMAQ programs	DOT		Upgrade additional vehicles	Complete upgrades of approximately 450 more vehicles; request additional CMAQ funds	-	-	CMAQ
Work with stakeholders and the State to create incentives for the adoption of vehicle emission control and efficiency strategies	NYS DEC/OLTPS	Creation of State fund	Draft proposed parameters of fund	Seek to retrofit over 12,000 vehicles	-	-	State
Improve compliance of existing anti-idling laws through a targeted educational campaign	OLTPS		Launch anti-idling campaign	Launch additional anti-idling campaigns	-	-	Partnership
5 Decrease school bus emissions							
Retrofit both large and small school buses and reduce their required retirement age	DOE	Receive State funding /renew contracts with bus owners	Begin retrofits on smaller school buses	Complete upgrades to all school buses; reduce retirement age of school buses	5.1	-	State Department of Transportation
REDUCE OTHER TRANSPORTATION EMISSIONS							
6 Retrofit ferries and promote use of cleaner fuels							
Retrofit the Staten Island Ferry fleet to reduce emissions	DOT		Complete engine upgrades to Staten Island Ferry fleet	Complete installation of DOCs and switch to ULSD, or cleaner fuel if locally available for marine engines	2.3	-	PANYNJ
Work with private ferries to reduce their emissions	DOT/NYSERDA	Local law	Install DOCs in ferries; pass legislation promoting the use of ULSD		-	-	CMAQ
7 Seek to partner with the Port Authority to reduce emissions from Port facilities							
Seek to work with the Port Authority to reduce emissions from the Port's marine vehicles, port facilities, and airports	PANYNJ/OLTPS	Partnership with PANYNJ	Begin creating a plan	Complete and implement plan	-	-	PANYNJ
8 Reduce emissions from construction vehicles							
Accelerate adoption of technologies to reduce construction-related emissions	DEP		Require, through contracts, applicable on-road vehicles used in city construction projects to follow requirements of Local Law 77	Pursue strategies to reduce emissions from all construction projects	-	-	
REDUCE EMISSIONS FROM BUILDINGS							
9 Capture the air quality benefits of our energy plan (See the energy initiatives on page 152 and 153 for more information)							
10 Promote the use of cleaner burning heating fuels							
Lower the maximum sulfur content in heating fuel from 2000 ppm to 500 ppm	State DEC/OLTPS	State Code amendment	Draft new sulfur content requirements for State Code	Reduce maximum sulfur content to 500 ppm or less	-	-	
Reduce emissions from boilers in 100 city public schools	DOE/SCA/OLTPS	State funding	Begin replacing boilers	Replace 80 school boilers that burn No. 6 oil to cleaner burning boilers	285.0	-	State
PURSUE NATURAL SOLUTIONS TO IMPROVE AIR QUALITY							
11 Capture the benefits of our open space plan (See the open space initiatives on page 147 for more information)							
12 Reforest targeted areas of our parkland							
Reforest 2,000 acres of parkland	DPR		Begin reforesting 2,000 acres of parkland	Complete reforestation project by 2017	118.8	-	

Category	Sub-Initiative	Implementation Lead Agency	Non-City Action Needed to Progress	Milestones for Completion by End of		New York City Funding, (in $ Millions, Nominal)		Other Funding Sources
				2009	2015	Capital (FY '08-'17)	Operating (FY '08)	
AIR QUALITY	**PURSUE NATURAL SOLUTIONS TO IMPROVE AIR QUALITY, CONTINUED**							
AIR QUALITY	**13 Increase tree plantings on lots**							
AIR QUALITY	Partner with stakeholders to help plant one million trees by 2017	DPR/OLTPS		Launch partnership and begin planting trees	Plant 800,000 trees	-	-	Partnership
AIR QUALITY	**UNDERSTAND THE SCOPE OF THE CHALLENGE**							
AIR QUALITY	**14 Launch collaborative local air quality study**							
AIR QUALITY	Monitor and model neighborhood-level air quality across New York City	DOHMH		Launch study	Create and implement a series of policy recommendations based on results of monitoring	-	3.0	
CLIMATE CHANGE	**PROTECT OUR VITAL INFRASTRUCTURE**							
CLIMATE CHANGE	**1 Create an intergovernmental Task Force to protect our vital infrastructure**							
CLIMATE CHANGE	Expand our adaptation strategies beyond the protection of our water supply, sewer, and wastewater treatment systems to include all essential city infrastructure	OLTPS	Cooperation of non-City agencies	Complete an inventory of all at-risk infrastructure with a priority list of high risk components	Complete agency plans and continue to encourage non-city entities to do the same	-	-	
CLIMATE CHANGE	**DEVELOP SITE-SPECIFIC STRATEGIES**							
CLIMATE CHANGE	**2 Work with vulnerable neighborhoods to develop site-specific strategies**							
CLIMATE CHANGE	Create a community planning process to engage all stakeholders in community-specific climate adaptation strategies	OLTPS		Complete community planning toolkit and create a climate adaptation plan with UPROSE	Engage all waterfront communities in the discussion of climate change	-	-	
CLIMATE CHANGE	**INCORPORATE CLIMATE CHANGE CONCERNS INTO THE PLANNING PROCESS**							
CLIMATE CHANGE	**3 Launch a citywide strategic planning process for climate change adaptation**							
CLIMATE CHANGE	Create a strategic planning process to adapt to climate change impacts	OLTPS	Advisory Board appointments	Release scoping study for a comprehensive climate adaptation planning process	Complete NYC Climate Change Study	-	-	
CLIMATE CHANGE	Ensure that New York's 100-year floodplain maps are updated	DOB/OEM/DCP/OLTPS		Complete remapping of NYC hundred-year floodplain		-	-	
CLIMATE CHANGE	Document the City's floodplain management strategies to secure discounted flood insurance for New Yorkers	DOB/OLTPS		Complete application to FEMA		-	-	
CLIMATE CHANGE	Amend the building code to address the impacts of climate change	OLTPS	Code updates	Create a Task Force to evaluate necessary changes to the Building Code	Implement climate adaptation strategies into the Building Code	-	-	

This Plan is the result of an enormous collaborative effort on the part of government agencies, civic organizations, academic experts, community groups, consultants, interns, representatives of organized labor and the private sector, elected officials and thousands of New Yorkers. Although it is impossible to acknowledge each individually, we wish to thank all those who contributed their ideas, their time, their expertise, and above all, their passion for New York City.

The paper used for this book is recycled, made from 100% post-consumer fiber. In addition, it was manufactured according to carbon neutral standards (excluding the cover).

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2008
Traffic Congestion Mitigation Commission Study

Report to the
Traffic Congestion Mitigation Commission
&
Recommended Implementation Plan

January 31, 2008

RESOLUTION

WHEREAS, on July 26, 2007, Chapter 384 of the Laws of 2007 was enacted, which law established the New York City Traffic Congestion Mitigation Commission (the "Commission") to undertake a review and study of plans to reduce traffic congestion and other related health and safety issues within the City of New York, including but not limited to issues relating to the implementation of a traffic congestion plan to be developed and submitted by the Mayor of the City of New York;

WHEREAS, pursuant to Chapter 384 of the Laws of 2007, the Mayor of the City of New York presented to the Commission and others a detailed congestion pricing plan to address traffic congestion within a zone of severe traffic congestion in Manhattan;

WHEREAS, pursuant to Chapter 384 of the Laws of 2007, the Metropolitan Transportation Authority and the New York State Department of Transportation submitted to the Commission comments on said traffic congestion mitigation plan, as well as (a) a description of the additional capital needs required for implementation of such plan, (b) the proposed utilization of potential revenues derived from such plan for implementation of such plan and (c) the impact of such revenue upon the capital and operating budgets of the Metropolitan Transportation Authority and the New York State Department of Transportation;

WHEREAS, the Commission has conducted public hearings, has taken public testimony, and has reviewed information and proposals submitted by the Mayor of the City of New York and others in order to develop recommendations with respect to details of implementing the traffic congestion mitigation plan for the City of New York in accordance with Chapter 384 of the Laws of 2007;

WHEREAS, pursuant to Chapter 384 of the Laws of 2007, recommendations with respect to the details of implementing the traffic congestion mitigation plan submitted by the Mayor of the City of New York and other traffic congestion mitigation proposals have been prepared by the Commission (the "implementation plan"), for purposes of submitting such implementation plan to the Governor, State Legislature, the Mayor of the City of New York and the New York City Council;

NOW THEREFORE, BE IT RESOLVED, that the Commission hereby approves the implementation plan, as contained in Chapter VI, "Recommendation to the City and State of New York," of the Report to the Traffic Congestion Mitigation Commission & Recommended Implementation Plan for submission to the Governor, the State Legislature, the Mayor of the City of New York and the New York City Council.

Table of Contents

Interim Report to the Traffic Congestion Mitigation Commission

January 10, 2008

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January 9, 2007

Fellow Commission Members,

Attached is the Interim Report to the Traffic Congestion Mitigation Commission. The Report, prepared by agency staff, lays out the Commission's legislative mandate and summarizes the Commission research and evaluation process over the course of the fall. To help inform the Commission's discussions moving forward, I directed agency staff to present and analyze several alternative plans, which we will discuss at the January 10 meeting.

In addition to the Mayor's plan, the Interim Report evaluates four alternatives, each focusing on one of the following approaches: congestion pricing, bridge tolling, pricing of parking and taxis, and license plate rationing. For the Commission's final recommendation, we may select one of the alternatives presented in this report, or may choose to modify one of the alternatives, combine elements of two or more alternatives, or put forward a wholly different plan. In that regard, I wish you to pay particular attention to the portion of the report which details each proposal's relative strengths and weaknesses. I wish to encourage discussion around what combination of blended proposals yields the best and most comprehensive plan.

In three weeks, our Commission will make a final recommendation to the City and State. On January 16th, we will have the opportunity to hear the comments and recommendations of the public on our work thus far and potential recommendations. I look forward to discussing the report in further detail with all of you and building a consensus on the best plan to address traffic congestion and its economic, environmental, and quality of life impacts on New York City and the region.

Sincerely

Marc V. Shaw
Chairman, Traffic Congestion Mitigation Commission

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Executive Summary

The Purpose of the Traffic Congestion Mitigation Commission

High levels of traffic congestion in New York City's central business district (CBD) have an adverse impact on the economy, environment, quality of life, and public health of the City and region. If the population of New York City continues to grow as is projected, congestion will worsen without action to expand transit service and to manage the transportation network more efficiently. In April 2007, New York City Mayor Michael R. Bloomberg proposed piloting a congestion pricing system in the most congested areas of Manhattan as a means of reducing traffic and raising funds for the transit system. Under the proposal, drivers would be charged a fee between 6 a.m. and 6 p.m. to enter, exit, or travel within Manhattan south of 86th Street. The revenue generated by congestion pricing would be used to bring the regional transit system up to a state of good repair and to fund system expansion projects. The congestion pricing plan ("the Mayor's plan") was part of PlaNYC, the Mayor's overall sustainability strategy for the City.

In recognition of the growing congestion problem in Manhattan and in response to the Mayor's plan, the State Legislature passed legislation in July, 2007, which was signed by Governor Eliot Spitzer, creating the 17-member Traffic Congestion Mitigation Commission ("the Commission"). The mandate of the Commission is to study and evaluate approaches to reducing congestion in the most congested areas of Manhattan, including the Mayor's plan, and to recommend a comprehensive traffic congestion mitigation plan to the City and the State by January 31, 2008. The Commission is required to set forth an implementation plan that achieves at least a 6.3 percent reduction in vehicle miles traveled (VMT) in Manhattan south of 86th Street—the estimated level of VMT reduction of the Mayor's plan.[1] The Commission members were appointed by public officials from across the City and State, as shown above.

Commission Appointing Authorities

- Governor: 3 Commissioners
- Assembly Speaker: 3 Commissioners
- Assembly Minority Leader: 1 Commissioner
- Senate President: 3 Commissioners
- Senate Minority Leader: 1 Commissioner
- New York City Council Speaker: 3 Commissioners
- New York City Mayor: 3 Commissioners

As part of the Mayor's plan, the City and State sought to leverage additional federal funding designated by the U.S. Department of Transportation (USDOT) for states and local governments pursuing pricing-based congestion reduction strategies. In August 2007, the City, along with the Metropolitan Transportation Authority (MTA) and New York State Department of Transportation (NYSDOT), signed an Urban Partnership Agreement (UPA) with USDOT. Under this agreement, the City and State are eligible to receive $354 million in federal funding for transit and transportation system improvements if the City and State approve a pricing-based traffic mitigation plan by March 31, 2008. The federal funds would be used to improve transit services prior to the implementation of congestion pricing. The Commission may recommend any approach that achieves a 6.3 percent VMT reduction in Manhattan south of 86th Street, but a plan

[1] Analysis conducted in the spring of 2007 indicated a 6.3 percent VMT reduction for the Mayor's plan. As discussed on page 20, updates to the model used for the analysis were completed in the fall of 2007. With these updates, the projected VMT reduction for the Mayor's plan is 6.7 percent.

that does not use pricing as its primary congestion mitigation mechanism will render the City and State ineligible for the UPA funds.

In its research efforts, the Commission is being supported by an interagency working group of transportation professionals, including planning staff from the Mayor's Office of Long-Term Planning and Sustainability, the MTA, New York City Department of Transportation (NYCDOT), NYSDOT, and the Port Authority of New York and New Jersey (PANYNJ). All work products presented to the Commission by agency staff have been reviewed by the interagency working group.

Commission Process and Work to Date

Over the last four months, the Commission has gone through a comprehensive process of consulting with the public, evaluating a wide range of alternative approaches to traffic mitigation, and weighing the advantages and disadvantages of those approaches. Specifically, the Commission:

- reviewed transportation and transit enhancement plans prepared by the MTA and NYSDOT (these plans outline improvements that would be necessary for implementation of the Mayor's plan);
- held a series of public hearings across the City and region to solicit the input of the public on the issue of traffic congestion, possible remedies, and the impacts of the Mayor's plan;
- developed a list of evaluation criteria by which to evaluate different traffic congestion mitigation options, including indicators on traffic, transit funding, the environment, the economy, and neighborhood quality of life; and
- devised a research agenda examining alternatives, complements, and modifications to the Mayors' plan and reviewed analyses on those topics as prepared by agency staff.

MTA and NYSDOT Improvement Plans

The Commission began by reviewing the MTA and NYSDOT transit and transportation enhancement plans necessary for the implementation of the Mayor's congestion pricing plan. To accommodate the substantial increase in transit ridership expected as a result of the Mayor's plan, the City and the MTA would implement a series of short-term mass transit improvements, especially within the congestion zone and in areas of the city that lack convenient transit access to Manhattan. These improvements would include: new and expanded express bus service, more frequent bus and subway service on key lines, dedicated bus lanes on bridges, bus rapid transit (BRT), and new ferry service. Sufficient service improvements would be in place prior to the implementation of the Mayor's plan to absorb the projected increase in transit demand. New funding would be needed for both the operating and capital costs associated with the MTA's plan.

MTA Transit Enhancement Plan	Costs
Capital Cost	$767 million
Annual Operating Cost	$104 million
Annual Debt Service	$56 million

In addition, NYSDOT evaluated the impact of the Mayor's plan on the regional highway system and on transit services not provided by the MTA. NYSDOT found that the traffic impacts on the arterial system in general would likely be positive or neutral, but it also saw the need for additional monitoring on key highway segments and interchanges to gauge the impacts of congestion pricing. The Mayor's plan may also have a small impact on suburban transit services that are not provided by the MTA. Based on this analysis, NYSDOT proposed, among other improvements, an enhanced traffic monitoring system, regional data collection and information sharing, additional suburban park-and-ride locations, and improved traveler information. New funding would be needed for both the operating and capital costs associated with NYSDOT's plan.

NYSDOT Enhancement Plan	Costs
Capital Cost	$59.5 million
Annual Operating Cost	$0.5 million

Public Hearings and Commission Evaluation Criteria

As part of its statutory mandate to provide the opportunity for the public to participate and comment, the Commission conducted a series of public hearings in each borough of the City of New York (Manhattan, Queens, the Bronx, Brooklyn, and Staten Island), in Long Island, and in Westchester County. The Commission heard testimony from State and local elected officials, transportation and environmental groups, community organizations, and private citizens.

Witnesses provided their views on congestion in the City and the region, and the impact of congestion and various mitigation options on the economy, the environment, quality of life, public health, and the transportation network. Some raised equity, fairness, privacy, and/or feasibility issues with the Mayor's plan, while others indicated their support for the Mayor's plan, stating it would reduce congestion and provide funding for transit. Regardless of their position on congestion pricing, most speakers urged stronger action to counter worsening traffic congestion in and beyond the CBD and to improve the regional transit system.

Following the public hearings, the Commission discussed how it would evaluate alternative traffic congestion mitigation proposals. The legislation establishing the Commission requires that the Commission undertake a thorough review and study of plans to reduce traffic congestion, and that the Commission's recommended plan achieve at least a 6.3% reduction in VMT. Given these guidelines, as well as concerns raised by the public, elected officials, and various stakeholder groups, the Chairman recommended a set of evaluation criteria to guide discussion at the October 25 meeting. The Commission's evaluation criteria are as follows:

1) **Best practices (implemented elsewhere):** the degree to which the program is based on mitigation policies that have successfully been implemented in other cities.
2) **Reduction of Vehicle Miles Traveled**: estimate of VMT reduction in Manhattan south of 86th Street.
3) **Improvements in local and regional air quality and environment:** estimate of emissions reductions and other environmental impacts.

4) **Net revenues raised for mass transit:** estimate of net annual revenues raised to fund the transit system.
5) **Impacts on neighborhoods**
   a. ***Traffic congestion outside of the central business district:*** estimate of traffic impacts on areas of the City outside the CBD.
   b. ***Parking:*** the degree to which the program is likely to decrease the availability of on-street parking in neighborhoods adjacent to the CBD.
6) **Impact on economic classes**: the degree to which the program is progressive or regressive in the allocation of costs and benefits across economic classes.
7) **Regional equity:** the degree to which the program equitably allocates costs and benefits across geographic areas within the New York metropolitan region.
8) **Privacy**: the degree to which the program creates concerns over personal privacy rights.
9) **Implementability**: the feasibility of implementing the program given available technology, the program's design, and start-up and operating costs.
10) **Economic impact on jobs, business and the regional economy:** The impact of the program on the City and regional economy.

Research Agenda

Having set forth its evaluation criteria, the Commission turned its attention to developing a list of alternative congestion mitigation proposals for review and discussion. The Commission took a comprehensive approach to setting its research agenda, choosing to examine a wide array of potential approaches. Based on input from the Commission members, elected officials, the public, and stakeholder groups, the Chairman drafted a research agenda and presented it to the Commission. This agenda, presented in the box to the right, included an evaluation of polices that are alternatives to the Mayor's plan (such as mandatory carpooling), policies that could be alternatives or supplements to the Mayor's plan (such as higher parking meter rates), and modifications to the Mayor's plan (such as moving the northern boundary of the congestion pricing zone from 86th to 60th Street). Each of the options was evaluated using the ten criteria developed by the commission. The results of the research agenda revealed that several different approaches to congestion mitigation, including congestion pricing, bridge tolling, license plate rationing, and taxi and parking

Commission Research Agenda
Options reviewed:

- Regulate and restrict truck movement
- Telecommuting incentives
- Increase cost of parking in CBD
- Reduce use of government parking placards
- Additional taxi stands to reduce cruising
- Raise cab fares and fees charged to cabs
- Raise tolls or variable tolls on existing facilities
- License plate rationing
- Required carpooling
- Creation of High-Occupancy Toll lanes
- Congestion pricing with a 60th St. northern boundary
- Congestion pricing with no intra-zonal charge
- Congestion pricing with a charge on FDR & West St.
- Congestion pricing with variable charges or extended hours
- Congestion pricing with a hybrid exemption
- Congestion charging with a modified toll offset policy
- Tolling alternatives

policies, rate well on a number of the Commission's evaluation criteria and were worthy of further review. (A full summary of the research agenda is presented in Chapter 4 of the Interim Report).

Options for Evaluation

Based on the feedback from the public hearings, the results of the research agenda, and discussion among the Commission members, the Chairman directed agency staff to develop a set of five options for further review by the Commission. These included the Mayor's plan and four alternatives, each focusing on one of the following approaches: congestion pricing, bridge tolling, pricing of parking and taxis, and license plate rationing. The Chairman directed agency staff to estimate the VMT reduction of each option, and to then evaluate all options that meet the mandate of a 6.3 percent reduction in VMT along each of the evaluation criteria established by the Commission. For its final recommendation, the Commission may select one of the alternatives presented in this report, or may choose to modify one of the alternatives, combine elements of two or more alternatives, or put forward a wholly different plan. A summary of the five options, along with the comparative strengths and weaknesses of each, is presented below:

The Mayor's Plan

Description	Parameter	Mayor's Plan
Passenger vehicles entering or leaving Manhattan below 86th Street during the business day (weekdays 6 am to 6 pm) would pay an $8 daily fee. Trucks would pay $21. Certain low-emission trucks would pay $7. For trips within the congestion pricing zone, cars would pay $4 and trucks would pay $5.50. Emergency vehicles, transit vehicles, vehicles with handicapped license plates, taxis, and for-hire vehicles (radio cars) would be exempt. Vehicles using E-ZPass that travel through MTA or Port Authority (PA) tolled crossings on the same day would pay only the difference (if any) between their MTA or PA tolls and the congestion charge. Roads on the periphery of Manhattan will not be in the zone.	*Northern Boundary*	86 St
	Intra-zonal Charge	Yes ($4)
	Through Trips	Free if using peripheral routes
	Direction of Charge	2-Way
	Flat or Variable	Flat $8
	12 Hour or 24 Hour	12 hour
	E-ZPass Toll Offset	Yes
	LPR Surcharge	None
	Fee or Toll	Daily Fee

Strengths

- The Mayor's plan is projected to reduce VMT by 6.7% and to generate $420 million a year in revenues for transit investment.[2]
- The Mayor's plan would reduce traffic across the city, especially in neighborhoods adjacent to the congestion pricing zone, including Upper Manhattan, Long Island City, and Downtown Brooklyn.
- Nearly all low and moderate income commuters take transit to the Manhattan CBD. These workers would benefit from the Mayor's plan through short-term improvements in transit services and long-term expansion of the transit system.

[2] As the Port Authority's proposed toll increase has not yet been approved, the revenue estimates for the Mayor's plan and the alternative congestion pricing plan were based on current Port Authority toll rates. The Port Authority's proposed toll increase would reduce congestion pricing revenues of the Mayor's plan by approximately $50 million a year. This estimate would vary based on the extent to which drivers switch from cash payment to E-ZPass.

- The intra-zonal charge discourages trips within the congestion pricing zone with the same pricing approach as for all other trips into or out of the zone.
- The 86th Street boundary includes a larger portion of the most congested area of Manhattan.
- The plan's free periphery route allows drivers to travel around the CBD without paying the fee. For example, Brooklyn and Queens drivers could travel to the Bronx or Upper Manhattan via the FDR Drive without paying the fee.
- The plan does not raise significant regional equity concerns.

Weaknesses

- Compared to the other four plans, the Mayor's plan has significantly higher capital costs. The Mayor's plan includes a charge on trips within the zone and thus requires many more charging stations, each with an array of E-ZPass and license plate recognition (LPR) cameras.
- Similarly, the Mayor's plan has significantly higher operating costs. The charge on trips within the zone and the free periphery route significantly increase the number of transactions that must be processed for each paying customer.
- Unlike the alternative congestion pricing and toll plans, described below, the Mayor's plan does not include a charge on taxi and livery trips into or out of the zone—a major source of traffic and vehicle emissions in the CBD.
- The Mayor's plan includes the placement of hundreds of cameras within and around the zone's perimeter, compared to only 25 or 13 camera sites needed for the alternate congestion pricing and toll plan respectively. More cameras raise greater privacy concerns.
- As under the alternative congestion pricing and toll plans, park-and-ride activity could increase in neighborhoods near the zone or adjacent to major transit hubs if measures are not taken by the City to manage parking. Similarly, the plan could potentially create localized congestion impacts due to changes in traffic patterns in the region.
- A small proportion of low and moderate income workers—those who drive to the CBD and who do not have a feasible transit alternative—would be disproportionately impacted by the congestion fee as compared to higher income drivers.

The Alternative Congestion Pricing Plan

Description	Parameter	Alt C.P. Plan
The alternative congestion pricing plan is a modified approach to congestion pricing that eliminates the intra-zonal charge and free periphery, charges inbound trips only, and moves the northern boundary of the charging zone to 60th Street. Cars would be charged an $8 fee to drive into the zone on weekdays between 6am and 6pm. Trucks would pay $21, except for low-emission trucks, which would pay $7. Under this fee-based plan, drivers would pay once upon entering the charging zone and would be able to make additional trips in and out of the zone at no additional cost. For E-ZPass users, the value of all tolls paid on MTA or Port Authority bridges and tunnels would be deducted from the fee up to $8. In addition, the plan includes three taxi and parking measures, described at right.	*Northern Boundary*	60 St
	Intra-zonal Charge	None
	Through Trips	Charged
	Direction of Charge	Inbound
	Flat or Variable	Flat $8 fee
	12 Hour or 24 Hour	12 hour
	E-ZPass Toll Offset	Yes
	LPR Surcharge	$1
	Fee or Toll	Daily Fee
	$1 taxi/livery trip surcharge for trips that start and/or end in zone	
	Increase metered parking rates within zone	
	Eliminate resident parking tax exemption within zone	

Strengths

- The alternative congestion pricing plan is projected to reduce VMT by 6.8% and to generate $520 million a year in revenues for transit investment.
- The alternative congestion pricing plan has significantly lower capital and operating costs than the Mayor's plan and is comparable in those categories to the toll plan.
- Similar to the other plans, the alternative congestion pricing plan would reduce traffic across

the city especially in neighborhoods adjacent to the congestion pricing zone, including Upper Manhattan, Long Island City, and Downtown Brooklyn.
- Similar to the Mayor's plan and toll plan, the alternative congestion pricing plan would benefit low and moderate income residents through improved transit.
- The alternative pricing plan would further encourage Manhattan residents to use transit by increasing the cost of parking within the CBD and by adding a $1 surcharge on taxi trips that end or begin within the zone.
- Compared to the Mayor's plan, the alternative congestion pricing plan is easier to implement.
- The plan does not raise significant regional equity concerns.

Weaknesses
- Unlike the Mayor's plan, there is no free peripheral route and drivers would have to pay to travel through the CBD. For example, Brooklyn and Queens drivers that travel to the Bronx or Upper Manhattan via the FDR Drive would pay the congestion fee.
- The elimination of the intra-zonal charge would leave no per-day charge on private auto use within the zone for drivers not using metered parking at their destination. However, the smaller zone minimizes the impact of this problem.
- As under the alternative congestion pricing and toll plans, park-and-ride activity could increase in neighborhoods near the zone or adjacent to major transit hubs if measures are not taken by the City to manage parking. Similarly, the plan could potentially create localized congestion impacts due to changes in traffic patterns in the region.
- A small proportion of low and moderate income workers—those who drive to the CBD and who do not have a feasible transit alternative—would be disproportionately impacted by the congestion fee as compared to higher income drivers.

The East River and Harlem River Toll Plan

Description	Parameter	Toll Plan
All un-tolled East River and Harlem River crossings would be subject to inbound and outbound tolls. These tolls would be in effect 24 hours a day, seven days a week, and would match the toll rates on the MTA's East River crossings.[3] The Henry Hudson Bridge toll was assumed to be increased to $4 to match the rates on the other crossings. Following the MTA toll structure, trucks would pay higher tolls depending on their size. Similar to the Mayor's plan, tolls would be collected electronically; there would be no toll plazas or physical barriers. Cars would be charged a $4 per-trip toll 24 hours a day to enter or leave Manhattan by any East or Harlem River crossing. The Port Authority toll structure would remain the same.	*Tolled Crossings*	East and Harlem River bridges
	Direction of Toll	2-way
	Flat or Variable	Flat $4 toll
	12 Hour or 24 Hour	24 hour
	LPR Surcharge	$1
	Fee or Toll	Per-trip Toll

Strengths
- The toll plan is projected to reduce VMT by 7% and to generate $859 million a year in new revenues for mass transit—the most of any of the alternatives considered.
- The toll plan would enable the City, the MTA, and Port Authority to move toward a more uniform tolling strategy for Manhattan, including the potential implementation of one-way tolling and/or time-of-day pricing on all crossings into Manhattan.
- The toll plan has significantly lower capital and operating costs than the Mayor's plan, and slightly lower operating costs than the alternative congestion pricing plan. One-way tolling on all crossings would further reduce operating costs for both the MTA and the City. The plan also

[3] Tolls would apply to: the Brooklyn Bridge, Manhattan Bridge, Williamsburg Bridge, Queensboro Bridge, Willis Avenue Bridge, Third Avenue Bridge, Madison Avenue Bridge, 145th Street Bridge, Macombs Dam Bridge, Alexander Hamilton Bridge (Cross Bronx Expressway), Washington Bridge, University Heights (207 St.) Bridge, Broadway Bridge and Henry Hudson Bridge (increase from current toll).

includes fewer cameras than the Mayor's plan.

- The toll plan would eliminate the need to match transactions to calculate a daily charge and would enable uniform charges to cash and E-ZPass customers.
- Similar to the Mayor's plan and the alternative congestion pricing plan, the toll plan would benefit low and moderate income residents through improved transit.
- Similar to the other plans, the toll plan would reduce traffic across the city. It would have a greater impact on traffic in the Bronx, especially on through truck traffic.
- Compared to the two congestion pricing plans, the toll plan would significantly impact local trips between the South Bronx and Harlem/Washington Heights. This shift would reduce vehicle emissions in these neighborhoods.

Weaknesses

- Tolls would apply to all trips into and out of Manhattan and would be in effect 24 hours a day, seven days a week. By charging at all hours, the toll plan does not distinguish between drivers who contribute to peak period congestion and drivers who travel at less congested times.
- Unlike the Mayor's plan and the alternative congestion pricing plan, the toll plan does not address trips that start and end within Manhattan. Under the alternative congestion pricing plan, for example, many of these trips would be charged at 60th Street or would be captured by the $1 taxi surcharge within the zone.
- Compared to the two congestion pricing plans, the toll plan would significantly impact local trips between the South Bronx and Harlem/Washington Heights. This shift could have a local adverse economic impact.
- Per-trip tolls would have a greater impact on commercial vehicles than the two congestion pricing plans. A commercial vehicle making multiple trips in and out of Manhattan would pay for each trip under the toll plan, rather than a flat daily fee under either the Mayor's plan or the alternative congestion pricing plan.
- The toll plan would institute a toll on the Cross Bronx Expressway/I-95 corridor, causing potential diversions to other regional routes and tolled facilities. This would require further evaluation.
- The plan has disproportional impacts on motorists from the Bronx.
- As under the alternative congestion pricing and toll plans, park-and-ride activity could increase in neighborhoods near the zone or adjacent to major transit hubs if measures are not taken by the City to manage parking. Similarly, the plan could potentially create localized congestion impacts due to changes in traffic patterns in the region.
- A small proportion of low and moderate income workers—those who drive to the CBD and who do not have a feasible transit alternative—would be disproportionately impacted by the toll as compared to higher income drivers.

The License Plate Rationing Plan

Description	Parameter	Rationing Plan
License plate rationing restricts a set of vehicles from entering a specified area on certain days based on the last digit of the vehicle's license plate. Under this scenario, the City would ban a particular vehicle once every five days, e.g., restricting 20 percent of all vehicles each weekday from 6 am-6 pm. The rationing restriction would apply to the area of Manhattan south of 86th Street. Emergency vehicles, transit vehicles, and vehicles with handicapped license plates would be exempt. Enforcement could be conducted using a system of license plate cameras similar to the Mayor's plan or by posting police officers at each of the entry points into the rationing zone.	*Vehicles Restricted Daily*	20%
	Northern Boundary	86th Street
	12 Hour or 24 Hour	12 hour

Strengths

- The rationing plan is projected to reduce VMT by 10.3 percent, assuming that the system

coordinates plate numbers for multi-car households.
- Similar to the other plans, the rationing plan would reduce traffic across the city, especially in neighborhoods adjacent to the congestion pricing zone, including Upper Manhattan, Long Island City, and Downtown Brooklyn.
- The plan would require either the installation of LPR cameras around the rationing zone, with similar capital cost to the alternative pricing plan, or a dedicated staff of police officers to manually enforce the restriction.
- The plan would not have a disproportionate impact on low and moderate income commuters; all drivers would be equally impacted. Some income equity issues could emerge if two-car households are able to circumvent the restriction.
- The plan raises no regional equity concerns.

Weaknesses
- The plan does not generate revenue and would need to be coupled with a broad-based tax measure to fund transit investments.
- The rationing plan provides less flexibility to businesses. Under the congestion pricing and toll plans, businesses and employees would always have the ability to make auto trips into Manhattan or the CBD, albeit for a price. Under rationing however, businesses would lack that flexibility.
- The rationing plan reduces revenue to the Port Authority and MTA.
- As under all four plans, park-and-ride activity could increase in neighborhoods near the zone or adjacent to major transit hubs if measures are not taken by the City to manage parking. Similarly, as with all four plans, the plan could potentially create localized congestion impacts due to changes in traffic patterns in the region.

The Combination Plan

<table>
<tr><th>Description</th><th>Parameter</th><th>Combination Plan</th></tr>
<tr><td rowspan="6">This plan includes a series of measures to significantly increase the cost of on-street and off-street parking in Manhattan south of 60th Street, including raising the City parking tax for garages within the CBD, eliminating the resident parking tax exemption within the zone, increasing meter rates within the zone, and charging a $2 overnight parking fee for all on-street spaces within the zone. In addition, the plan calls for reducing by 10,000 the number of government parking placards used to commute to jobs in the zone (these placards allow government employees to park in restricted spaces or without charge in metered spaces). In order to reduce taxi traffic, the plan also includes an $8 surcharge on all taxi trips within, into, or out of the area of Manhattan south of 86th Street.</td><td colspan="2">Increase parking tax from 18.375% to 38.375% in CBD</td></tr>
<tr><td colspan="2">Eliminate resident parking tax exemption in CBD</td></tr>
<tr><td colspan="2">Increase meter rates in CBD</td></tr>
<tr><td colspan="2">Reduce by 10,000 number of government parking
placards used to commute to CBD jobs</td></tr>
<tr><td colspan="2">$2 overnight parking fee in CBD</td></tr>
<tr><td colspan="2">$8 surcharge for taxi trips with start and /or end
south of 86 Street.</td></tr>
</table>

- The combination is projected to reduce VMT by 3.2 percent, and thus does not meet the Commission's legislatively mandated criteria and is not evaluated in terms of strengths and weaknesses by the commission

Next Steps

Following the release of this report on January 10, the Commission will hold a public hearing on January 16 to solicit input from the public on the five proposed alternatives. Based on this feedback and further deliberations, the Commission will vote on a final traffic congestion mitigation plan at its January 31, 2008 meeting and forward its recommendation to the Governor, State Legislature, City Council, and Mayor for review.

The commission is free to recommend a modified version of any of the plans presented above or to select a wholly different plan.

Table of Contents

The full appendices are available in a separate document or on-line at:
https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission

I. Introduction

The Purpose of the Traffic Congestion Mitigation Commission

High levels of traffic congestion in New York City's central business district (CBD) have an adverse impact on the economy, environment, quality of life, and public health of the City and region. If the population of New York City continues to grow as is projected, congestion will worsen without action to expand transit service and to manage the transportation network more efficiently. In April 2007, New York City Mayor Michael R. Bloomberg proposed piloting a congestion pricing system in the most congested areas of Manhattan as a means of reducing traffic and raising funds for the transit system. Under the proposal, drivers would be charged a fee between 6 a.m. and 6 p.m. to enter, exit, or travel within Manhattan south of 86th Street. The revenue generated by congestion pricing would be used to bring the regional transit system up to a state of good repair and to fund system expansion projects. The congestion pricing plan ("the Mayor's plan") was part of PlaNYC, the Mayor's overall sustainability strategy for the City.

In recognition of the growing congestion problem in Manhattan and in response to the Mayor's plan, the State Legislature passed legislation in July 2007, which was signed by Governor Eliot Spitzer, creating the 17-member Traffic Congestion Mitigation Commission ("the Commission").[4] The mandate of the Commission is to study and evaluate approaches to reducing congestion in the most congested areas of Manhattan, including the Mayor's plan, and to recommend a comprehensive traffic congestion mitigation plan to the City and the State by January 31, 2008. The Commission is required to set forth an implementation plan that achieves at least a 6.3 percent reduction in vehicle miles traveled (VMT) in Manhattan south of 86th Street—the estimated level of VMT reduction of the Mayor's plan.[5] VMT is a standard indicator used by transportation professionals and policy makers to measure the amount of traffic within a defined road network. Reducing VMT in New York City will ease traffic delays, reduce greenhouse gas and other vehicle emissions, and benefit businesses and workers.

Commission Requirements

Process Requirements

- Review and evaluate alternative traffic congestion mitigation options
- Solicit input from the public
- Issue a recommended plan to the City and State by January 31, 2008

Recommendation Requirements

- Recommended plan must achieve at least a 6.3 percent VMT reduction
- Must include a description of MTA and NYSDOT enhancement plans
- Must be approved by a majority vote of the Commission

[4] For the full text of the legislation (S. 6432, A. 9362), see Appendix A

[5] Analysis conducted in the spring of 2007 indicated a 6.3 percent VMT reduction for the Mayor's plan. As discussed further on page 20, updates to the model used for the analysis were completed in the fall of 2007. With these updates, the projected VMT reduction for the Mayor's plan is 6.7 percent.

Process Going Forward
- Commission to deliberate on draft report options at January 10, 2008 meeting
- Public hearing on draft report on January 16, 2008
- Chairman to discuss final recommendation with Commission members
- Commission to vote on release of final report and recommendation on January 31, 2008

As part of the Mayor's plan, the City and State sought to leverage additional federal funding designated by the U.S. Department of Transportation (USDOT) for states and local governments pursuing pricing-based congestion reduction strategies. In August 2007, the City, along with the Metropolitan Transportation Authority (MTA) and New York State Department of Transportation (NYSDOT), signed an Urban Partnership Agreement (UPA) with USDOT.[6] Under this agreement, the City and State are eligible to receive $354 million in federal funding for transit and transportation system improvements if the City and State approve a pricing-based traffic mitigation plan by March 31, 2008. Pricing-based traffic mitigation systems impose fees on drivers to encourage them to switch to transit or other alternative modes, to carpool, or to travel at less congested times. The federal funds would be used primarily to improve transit services prior to the implementation of congestion pricing, especially in neighborhoods underserved by existing train and bus lines. The State recognized the availability of this funding when setting out the legislation creating the Commission. The Commission may recommend any approach, but a plan that does not use pricing or that is not expected to achieve the 6.3 percent VMT reduction will render the City and State ineligible for the UPA funds.

UPA Funding Requirements

Conditions prior to receiving the UPA grant funds:
- City and State must approve a congestion mitigation plan and grant legal authority to implement by March 31, 2008
- The plan must achieve at least a 6.3 percent reduction in VMT below 86th Street
- The plan must include transit enhancements
- Pricing must be the plan's principle mechanism for reducing congestion
- The plan must be otherwise acceptable to USDOT

If City receives funds, conditions during the period of the UPA grant:
- The plan must be implemented by March 31, 2009
- The plan must be in effect for at least 18 months

This draft report summarizes the Commission's work over the past four months, including the results of its public hearings, research agenda, and deliberations, and the comprehensive analysis of several preliminary alternative traffic congestion mitigation plans prepared for the Commission's consideration. The Commission has gone through a comprehensive process of consulting with the public, evaluating a wide range of

[6] For the full text of the Urban Partnership Agreement, see Appendix B

alternative approaches to traffic mitigation, and weighing the advantages and disadvantages of those approaches. This report presents the results of the Commission's work. The remainder of the report is organized as follows:

Section II: Background - The Mayor's Plan

- Summary of the Mayor's proposed plan, as presented by City staff to the Commission on September 25, 2007.
- Summary of the MTA's and NYSDOT's proposed transit and transportation enhancement proposals necessary to implement the Mayor's plan, as presented by agency staff to the Commission on October 25, 2007.

Section III: Public Comment and the Commission's Evaluation Criteria

- Summary of testimony at the Commission's seven public hearings, held throughout the region in October and November 2007, as presented by Governor's Office staff to the Commission on November 20, 2007.
- Outline of the Commission's evaluation criteria for alternative proposals, as discussed and agreed upon by the Commission on September 25 and October 25, 2007.

Section IV: Research Agenda

- Summary of the results of the Commission's research agenda, as developed by the Commission over the course of its meetings and presented by agency staff to the Commission on November 20, December 10, and December 17, 2007.

Section V: Recommended Alternatives for Further Review

- Outline and evaluation of five alternative traffic congestion mitigation plans selected by the Commission for further review, including: the Mayor's plan, a modified congestion pricing plan, a bridge tolling plan, a license plate rationing plan, and a taxi and parking policies plan.

Appendices

- Legislation creating the Commission, staff white papers, consultant technical memoranda, presentations to the Commission, and other background materials produced during the course of the Commission's work.

Following the release of this report on January 10, the Commission will hold a public hearing on January 17 to solicit input from the public on the five proposed alternatives. Based on this feedback and further deliberations, the Commission will vote on a final traffic congestion mitigation plan at its January 31 meeting and forward its recommendation to the Governor, State Legislature, City Council, and Mayor for review.

Commission Membership and Staff

As stated by the statute that established the Commission, the Commission's membership was nominated by public officials from across City and State government, including: the Governor (three nominees), Speaker of the Assembly (three nominees), President of the Senate (three nominees), Assembly Minority Leader (one nominee), Senate Minority Leader (one nominee), City Council Speaker (three nominees), and Mayor (three nominees). The Commission's chair, Marc Shaw, was appointed by the Governor and approved by the Commission at its first meeting. The Commission's 17 members first convened on September 25 and held four additional meetings before the end of 2007.

Commission Members

Appointed by the Governor

- Elliot "Lee" Sander is Executive Director and CEO of the MTA.
- Marc V. Shaw (Chairman) is Executive Vice President for Strategic Planning at Extell Development Co. and a former Deputy Mayor of New York City and Executive Director of the MTA.
- Anthony E. Shorris is Executive Director of the Port Authority of New York and New Jersey.

Nominated by the Assembly Speaker

- Assemblyman Richard L. Brodsky represents the 92nd Assembly District and serves as Chairman of the Committee on Corporations, Authorities and Commissions.
- Assemblywoman Vivian E. Cook represents the 32nd Assembly District and serves as Assistant Majority Leader.
- Assemblyman Herman Denny Farrell, Jr. represents the 71st Assembly District and serves as Chairman of the Committee on Ways and Means.

Nominated by the Assembly Minority Leader

- Andy Darrell is Director of the Living Cities program at Environmental Defense and also serves as New York Regional Director.

Nominated by the Senate President

- Richard Bivone is President of the Nassau Council of Chambers of Commerce and the President and Founder of RMB Drafting Services.
- Thomas F. Egan is Chairman of the State University of New York Board of Trustees and a managing director at Citigroup Global Markets.
- Gary LaBarbera is the President of the New York City Central Labor Council and serves as Joint Council 16 President.

Nominated by the Senate Minority Leader

- Gerard Romski is a former partner at the law firm Ross and Cohen, LLP and is currently counsel for Arverne by the Sea, a mixed-use development project.

Nominated by the Mayor

- Gene Russianoff is a staff attorney for NYPIRG's Straphangers Campaign and a long-time transit advocate.
- Janette Sadik-Khan is Commissioner of the New York City Department of Transportation.
- Elizabeth C. Yeampierre is a civil rights attorney and Executive Director of UPROSE, Brooklyn's oldest Latino community-based organization.

Nominated by the City Council Speaker

- Rev. Edwin C. Reed is the Chief Financial Officer of the Greater Allen AME Cathedral of New York.
- Andrea Batista Schlesinger is Executive Director of the Drum Major Institute, a progressive policy institute in New York City.
- Kathryn S. Wylde is President and CEO of the Partnership for New York City, a nonprofit organization of the city's business leaders.

In its research efforts, the Commission is being supported by an interagency working group of transportation and transit professionals, including planning staff from the Mayor’s Office of Long-Term Planning and Sustainability, the MTA, the New York City Department of Transportation (NYCDOT), NYSDOT, and the Port Authority of New York and New Jersey (PANYNJ), as well as two transportation engineering firms: Cambridge Systematics (policy research and technical reviews) and Parsons Brinckerhoff (travel demand modeling). The interagency group has met weekly during the course of the Commission’s work to discuss progress on the research agenda and to review a series of white papers on the issues and alternatives raised by Commission members and the general public. All work products presented to the Commission by agency staff have been reviewed by the interagency working group.

In addition, each appointing authority, including the offices of the Assembly Speaker and Minority Leader, Senate President and Minority Leader, and City Council Speaker, assigned a staff liaison to assist in the review of research findings and the preparation for Commission meetings. All white papers delivered to the Commission, as well as presentation materials and research reports, were provided for comment to each appointing authority liaison and their respective staff.

II. Background: The Mayor's Plan

Traffic Congestion: A Growing Challenge to New York City

On a typical weekday in 2005, about 800,000 vehicles entered Manhattan below 60th Street, the area regarded as New York's CBD for the purpose of this report.[7] Although New York City has the most comprehensive transit system in the United States, more than 274,000 workers drove to their jobs in New York's CBD on a typical weekday in 2000.[8] Cars, trucks, buses, taxis, bicyclists, and pedestrians compete for space in an increasingly crowded and congested streetscape. As New York City's population and economy have grown over the past fifteen years, traffic congestion has worsened. Between 1990 and 2005, heavy congestion on the major bridge and tunnel crossings into Manhattan increased from seven hours per day to ten hours per day.[9] Rush hour is no longer confined to the morning and evening peak periods and is spreading to encompass most of the workday (see Graph 1). The impact of traffic volumes on Manhattan speeds can be seen in Graph 2, which summarizes data from GPS systems recently installed in medallion taxicabs. GPS data for October 2007 show that taxi trips average 6 mph within Midtown Manhattan and 8 mph within the CBD as a whole (below 60th Street), between 8 am and 6 pm

New York is now among the most congested cities in the United States. According to the Texas Transportation Institute's *2007 Urban Mobility Report*, the New York region ranks second in the nation in terms of annual aggregate congestion delay.[10] The majority of the delay is spent during the peak hours, with the average traveler experiencing 46 hours of annual delay in 2005, up from 34 hours in 2000, a 35 percent increase.[11] Some congestion is healthy and indicates the vibrancy of a city and its economy. Above a certain level, however, extreme congestion begins to take a toll on a city's economic competitiveness and potential for growth. In the case of the New York metro region, estimates of the cost to the economy of congestion range as high as $13 billion a year.[12] These costs include wasted fuel, lost time, increased operating costs, and lost business revenues. Congestion also increases greenhouse gas and air pollution emissions, degrades the speed and reliability of bus service, and decreases neighborhood quality of life.

Worsening congestion has occurred despite dramatic improvements to the transit system and sustained growth in transit ridership. Since New York City's transit system fell into disrepair in the late 1970's and early 1980's, over $76 billion has been authorized for investment in improving the subway, bus, and commuter rail systems and bringing them into a state of good repair. As service has improved, ridership on the regional transit network has increased dramatically.[13] Overall, drivers make up only

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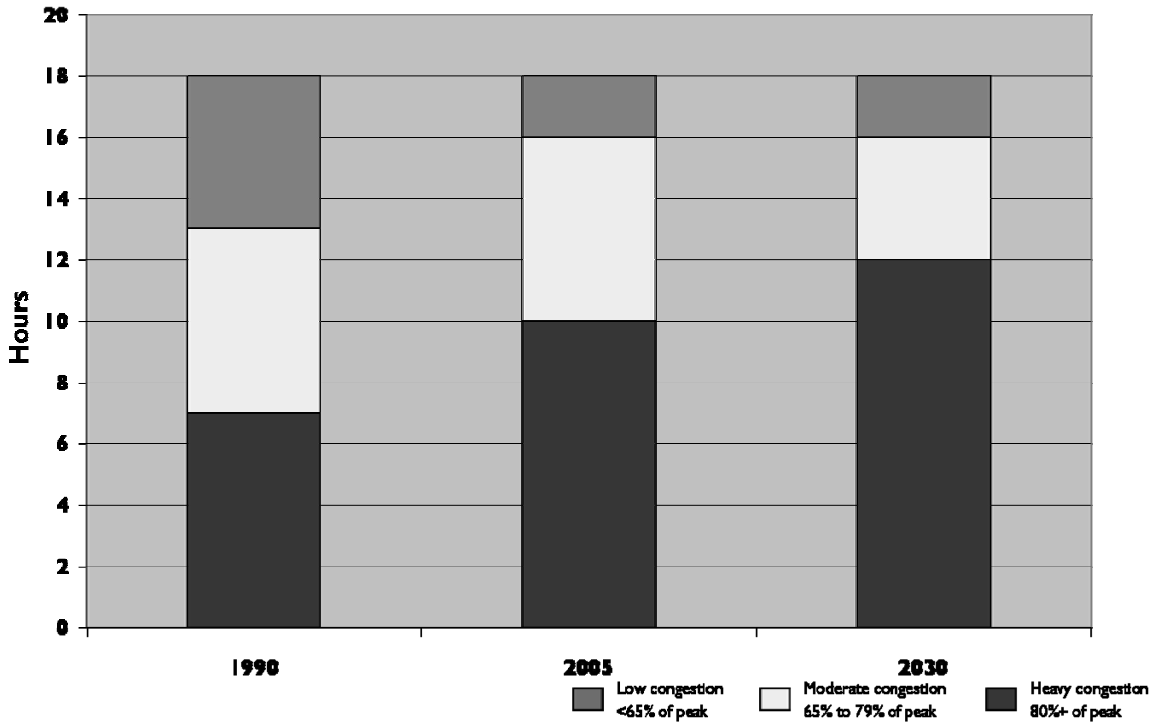
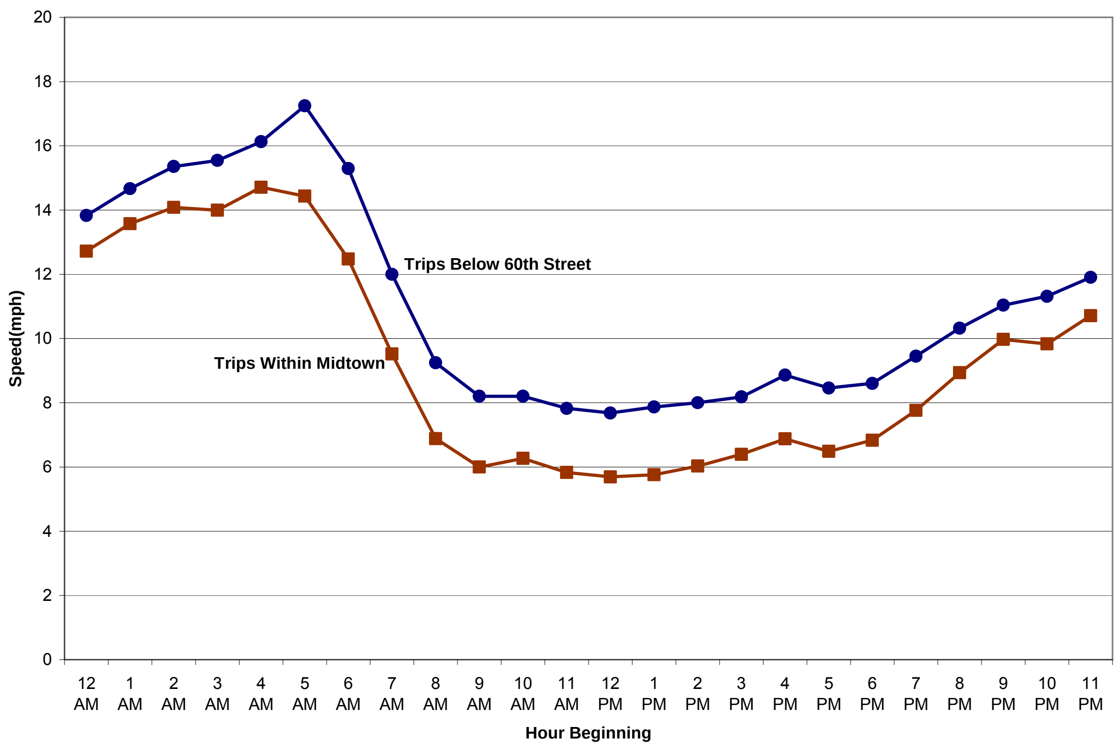
[7] New York Metropolitan Transportation Council (NYMTC). *2005 Regional Transportation Statistical Report*. September 2007. (p. 57)
[8] Source: U.S. Census 2000
[9] New York City Department of Transportation. *Mobility Needs Assessment 2007-2030*. (p. 24)
[10] Texas Transportation Institute (TTI) at Texas A&M University: *The 2007 Urban Mobility Report.* September 2007. (p. 34)
[11] TTI, 2007. (p. 38)
[12] Partnership for New York City (PFNYC). *Growth or Gridlock? The Economic Case for Traffic Relief and Transit Improvement for a Greater New York.* December 2006. (p. 40)
[13] NYMTC, 2007. (p. 43)

Graph 1: Trends in Congestion at Manhattan Bridges and Tunnels 1990-2030



Source: 1990, 2005 NYCDOT Major bridge and tunnel crossings into Manhattan

Graph 2: Average Taxi Speeds for Midtown and South of 60th St. Trips, Weekdays October, 2007



about 16 percent of all commuters to the CBD, the lowest share of any major U.S. city.[14] New York City residents are particularly transit-dependent. For example, only five percent of employed New Yorkers drive to work in the CBD.[15] However, the percentage of CBD-bound travelers who drive has remained relatively constant since 1975.[16] Thus, as the City's population and economy have grown, so has auto traffic to the CBD. Unless driver behavior changes significantly, the number of vehicles entering the CBD each day will continue to rise.

By 2030, nearly a million more residents, 750,000 more jobs, and millions more visitors are expected to further strain the City's transportation system.[17] The current road and highway system cannot handle the anticipated increase in traffic without dramatically worsening traffic and its related impacts on the economy and the environment. Expanding the highway network or adding capacity to existing highways and roads would be an expensive and lengthy process, as well as disruptive to neighborhoods and damaging to the environment. New transit lines are crucial to the City's future development and quality of life, but system expansion projects like the Second Avenue Subway and East Side Access will not be completed for a number of years. Furthermore, the regional transit agencies face a multi-billion dollar capital funding shortfall for their current slate of state of good repair and system expansion projects.[18] Without additional funding now, the system will not be able to meet future ridership demands.

The Mayor's Plan

At the Commission's first meeting on September 25, 2007, representatives from the City gave a presentation on the Mayor's congestion pricing plan. A copy of the Mayor's plan is included in Appendix C. As stated by the City's representative, the purpose of the Mayor's plan is twofold: (1) to reduce traffic congestion in New York City and thereby benefit the economy, environment, and neighborhood quality of life of New York City, and (2) to raise funds for the capital needs of the regional transit system. Funds generated by the plan would also be used to offset investments in the road network necessary to implement the plan.

Under the Mayor's plan, passenger vehicles entering or leaving Manhattan below 86th Street during the business day (weekdays 6 am to 6 pm)—with the exception of the FDR Drive, the West Side Highway, and Battery Park Underpass—would pay an $8 daily fee. Regular trucks would pay $21 and designated low-emission trucks would pay $7. For trips within the congestion pricing zone, cars would pay half price ($4) and trucks would pay $5.50. The charge would apply to all vehicles, except emergency vehicles, transit vehicles, vehicles with handicapped license plates, taxis, and neighborhood car services (radio cars).

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[14] Source: U.S. Census 2000

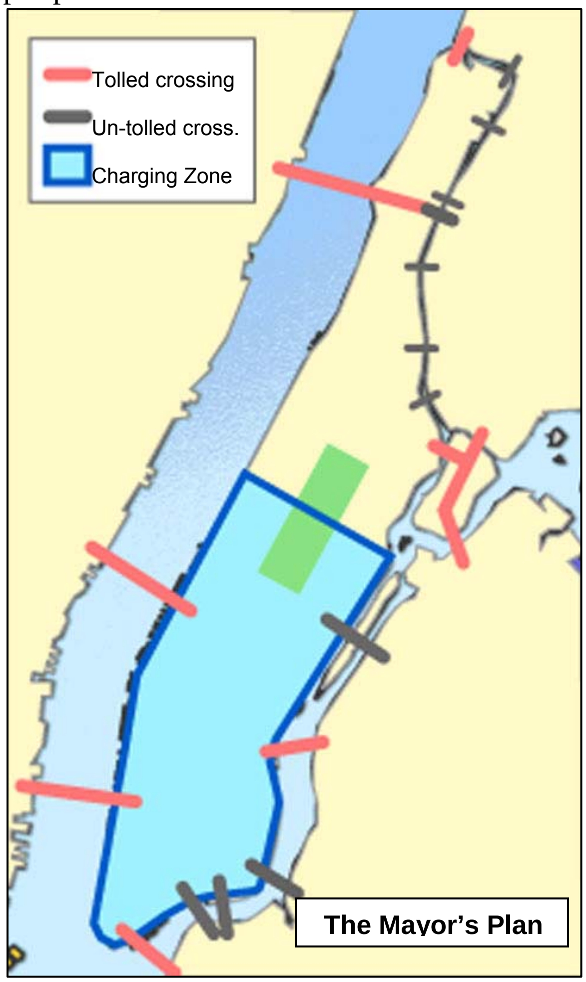
[15] The remainder walk, bike or take transit to the CBD, or work outside of the CBD altogether.

[16] NYMTC, 2007. Auto traffic did register a significant decline after the attacks of September 11, 2001, due to economic dislocations, driving restrictions, and current construction in lower Manhattan, but data has shown traffic to be returning quickly to pre-9/11 levels.

[17] New York City Department of City Planning. *New York City Population Projections by Age/Sex and Borough, 2000-2030.*

[18] New York City Mayor's Office of Long-Term Planning and Sustainability. *PlaNYC: A Greener, Greater New York.* April 2007. (p. 80)

Vehicles using E-ZPass that travel through MTA or Port Authority (PA) tolled crossings on the same day would pay only the difference (if any) between their MTA or PA tolls and the congestion charge. A uniform cost to enter the zone will encourage motorists to use the closest East River crossing rather than diverting to one of the un-tolled East River bridges. This type of "bridge shopping" behavior currently causes significant congestion in downtown Brooklyn, Williamsburg, Long Island City, and parts of the South Bronx. Because roads on the periphery of Manhattan will not be in the zone, drivers making trips around the zone (for example, from Harlem to Brooklyn) would not be charged provided those drivers stayed on the peripheral routes.



Payment would involve no toll gates or waiting areas. The technological backbone of the system would be E-ZPass, which relies on communications between in-vehicle transponders and roadside readers, and is used by more than 70 percent of New York area drivers who pay tolls on MTA and Port Authority bridges and tunnels. For drivers paying by E-ZPass, the charge would appear on drivers' E-Z Pass statements. For those drivers without E-Z Pass, their license plates would be recorded by cameras and payments could be made through the internet, the telephone, or at participating retail outlets. Drivers would have two days to pay the charge before incurring a penalty.

The City proposes implementing the Mayor's plan as a three-year pilot with a concurrent analysis of the plan's traffic, environmental, and neighborhood impacts. Analysis conducted in the spring of 2007 indicated that the Mayor's plan would reduce VMT south of 86th Street by 6.3 percent. As discussed in greater detail on page 20, the model used for the VMT analysis was updated in the fall of 2007. With these updates, the projected weekday VMT reduction for the Mayor's plan rose to 6.7 percent.

The City anticipates that neighborhoods near the congestion pricing zone would also experience a reduction in traffic as fewer drivers pass through on their way to the zone. The City would work with local communities to address any potential negative impacts of the plan, such as drivers seeking to avoid the charge by parking in areas outside the zone and walking or switching to transit. Possible solutions include parking permits for residential neighborhoods and an expansion of the Muni-meter program. Since the September 25 meeting, NYCDOT has begun working with peripheral neighborhoods to identify local parking issues and challenges, including both those related and unrelated to the Mayor's plan.

The Mayor's proposal for congestion pricing is part of a broader transportation plan that would use the revenues from congestion pricing as well as increased State and City contributions to fund major new transit programs and to achieve a state of good repair of the existing system. The plan also includes traffic management measures that would not decrease VMT, including proposed state legislative reforms of block-the-box ticketing rules (which currently do not allow Traffic Enforcement Agents (TEAs) to issue block-the-box tickets), the expanded use of red light cameras and the use of cameras for enforcing bus lanes (both requiring state legislation), and 100 additional TEAs. In a related effort, the City recently announced a comprehensive program to reduce the number and misuse of government parking placards. Under the plan, every City agency will reduce its number of parking placards by at least 20 percent, and the issuance of parking placards will be centralized. A new placard enforcement unit will also be created within the New York City Police Department.

Three key components of the Mayor's plan to reduce traffic

- Congestion pricing
- Transit improvements
- Peripheral strategies

The Mayor's plan has been the subject of considerable public debate since its release in the spring of 2007. While many public officials, policy experts, advocacy organizations, newspapers, and citizens expressed support for the concept of congestion pricing, many raised questions about the Mayor's plan and its impact. A report by the New York State Assembly Committee on Corporations, Authorities and Commissions, issued on July 9, 2007, summarized a series of questions about the Mayor's plan that have dominated public discussion. Those questions are presented below. A key goal of the Commission has been to shed light on these important issues, informed both by the public discussion prior to the Commission's establishment and through its public hearings. (See Chapter III for details on the Commission's public hearings.)

Questions Identified in New York State Assembly "Interim Report: An Inquiry into Congestion Pricing as Proposed in PlaNYC 2030 and S.6068," July 9, 2007

- What congestion pricing revenues are produced by residents of the five boroughs, the suburban counties, and Connecticut and New Jersey respectively?
- What are the congestion impacts of congestion rationing?
- Which neighborhoods outside the zone will see an increase in automobile activity?
- Which neighborhoods outside the zone should receive residential parking permit programs?
- What standards for permit eligibility, and other practices, should be developed?
- Where should the revenues from such permit fees be deposited?
- How should fees be collected from non E-Z Pass users?
- Should environmental reviews be completed before implementing congestion pricing?
- Which neighborhoods will see an increase and which a decrease in air pollution?
- What privacy protections can be applied to congestion pricing?
- Can the plan be amended to reduce its regressivity? If so, what are the revenue

impacts?
- If pricing mechanisms are valid to deal with congestion of city streets, can and should they be applied to other public services and facilities?
- What have been the results of congestion pricing in London and elsewhere with respect to fees, revenues, environmental quality, and congestion? What have been similar results for congestion rationing?
- How can the plan be amended to excuse from payment of congestion fees those complying with alternate-side-of-the-street parking regulations?
- Should taxis and other liveries be exempt from the fee?
- Should buses be required to pay the fee?
- What other revenues are available if congestion pricing is not enacted?
- Should congestion pricing revenues be directed solely at unfunded capital needs, or should they be available for regular operating expenses?
- Should the Mayor's proposal be amended to create an actual “pilot program”?
- Is an average 0.6 mph improvement in traffic flow sufficient to justify the implementation of congestion pricing?
- Do the fees need to be increased in order to guarantee effective congestion reduction?

MTA: Transit Enhancements to the Mayor’s Plan

If the Mayor’s plan were implemented, the City and MTA estimate that an additional 78,000 daily transit trips would take place within the City, and an additional 6,000 transit trips would be generated from the northern and eastern suburbs to the City. As required by the state legislation establishing the Commission, the MTA prepared a report and presentation to the commission that described:

- how the MTA would meet the increase in demand to public transportation due to the implementation of the City plan;
- the additional MTA capital and operating needs required to implement the transit response; and
- the impact of these needs on the MTA’s capital and operating budgets.

To address this increase in ridership, the City and MTA would implement a series of short-term mass transit improvements, especially within the congestion zone and in areas of the city that lack convenient transit access to Manhattan. These improvements would include: new and expanded express bus service, more frequent bus and subway service on key lines, dedicated bus lanes on bridges, bus rapid transit (BRT), and new ferry service. Sufficient service improvements would be in place prior to the implementation of the Mayor’s plan to absorb the projected increase in transit demand.

The MTA would be responsible for expanded express bus, local bus, and subway service. In addition, the MTA and the City would be responsible for jointly implementing a BRT program and would also institute a monitoring system to analyze changes in travel demand and modify the new and expanded transit services as needed. A copy of the MTA report and presentation, which provides a detailed description of the proposed service enhancements, is included in Appendix D.

Components of MTA Enhancement Plan

- 309 new buses to provide service on 12 new bus routes and increased frequency on 33 existing routes within New York City
- 58 new buses to provide expanded express service to Manhattan from the New York suburbs
- New and enhanced bus service will provide improved access to Manhattan and to subway lines serving the CBD
- Enhancements to key subway lines in Manhattan and the other Boroughs, requiring the purchase of 46 new subway cars and $100 million in improvements to subway stations
- Initiation of service improvements prior to the start of the congestion pricing pilot in April 2009
- MTA will cooperatively monitor actual travel with NYCDOT and other agencies

Assuming the use of available federal funds provided for by the Urban Partnership Agreement, the unfunded capital costs associated with these new services total $447 million during the pilot period, and an additional $320 million to be expended after the pilot period if increased bus service is continued. Financing these capital costs would result in an annual debt service of $56 million. Once fully implemented, the MTA would need approximately $104 million annually to operate and maintain this service, net of additional revenue gained by new ridership. These costs are not currently accounted for in the agency's operating and capital budgets. Tables 1 and 2 summarize the capital and operating funds necessary to implement these improvements to the MTA system.

Table 1: Summary of Projected MTA Capital Needs by Year ($ in millions)

Expense Category	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
City buses	220.0	-	-	-	-	-	-	-	-	-	220.0
Subway Cars	105.8	-	-	-	-	-	-	-	-	-	105.8
2 bus Depots	-	80.0	-	-	-	106.7	106.7	106.6	-	-	400.0
Bus Lay-up	2.5	2.5	20	-	-	-	-	-	-	-	25.0
BRT	-	10.9	3.7	3.7	3.6	-	-	-	-	-	21.9
Sub. Buses	-	38.2	-	-	-	-	-	-	-	-	38.2
Park & Rides	-	8.0	32.0	-	-	-	-	-	-	-	40.0
Stat. Renov.	-	-	-	50.0	50.0	-	-	-	-	-	100.0
Less UPA	184.3	-	-	-	-	-	-	-	-	-	184.3
TOTAL	**144.0**	**139.6**	**55.7**	**53.7**	**53.6**	**106.7**	**106.7**	**106.6**	**-**	**-**	**766.6**
Debt Service	**-**	**11**	**22**	**33**	**35**	**40**	**45**	**50**	**53**	**56**	

Source: MTA

Table 2: Summary of Projected MTA Operating Needs by Year ($ in millions)

Operating Expenses	10/2008-3/2009	4/2009-12/2009	2010	2011	1/2012-3/2012	Total
Subway Serv. Start Up	2.1	-	-	-	-	2.1
Subway Car Overhauls	8.0	-	-	-	-	8.0
Bus Service Start Up	34.0	-	-	-	-	34.0
Bus Overhauls	6.7	-	-	-	-	6.7
BRT	6.5	-	-	-	-	6.5
Other Start Up Costs	2.6	-	-	-	-	2.6
Subway Service Operating	-	6.2	8.3	8.3	2.1	24.9
Bus Service Operating	-	65.7	87.6	87.6	21.9	262.8
Bus Storage / Service / Maintenance	-	17.3	23.0	23.0	5.8	69.1
BRT	-	9.8	13.0	13.0	3.3	39.1
Suburban Bus Service	-	14.6	19.5	19.5	4.9	58.5
Data Collection	-	1.3	1.7	1.7	0.4	5.1
Less Revenue	-4.1	-36.7	-48.9	-48.9	-12.2	-150.8
TOTAL	**55.8**	**78.2**	**104.2**	**104.2**	**26.2**	**368.6**

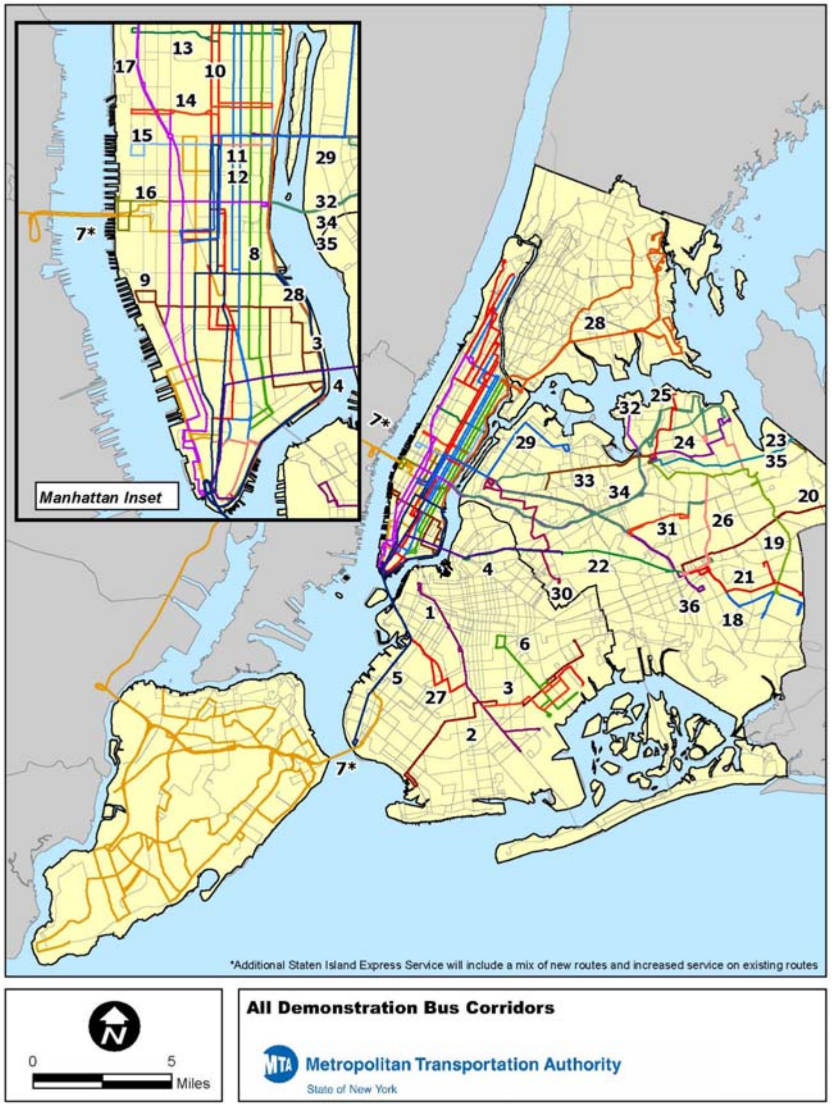
Source: MTA

During the course of its review of the MTA's transit enhancement plan, the Commission discussed a number of issues. Key questions raised included:

- *Issue* - A Commission member raised the issue of the how the additional capital and operating costs identified in the MTA's plan would be paid for and asked the MTA to clarify the total finance cost of the capital program.
    - *Response* – The MTA responded that the MTA operating and capital budgets did not contain the funding necessary to support the new capital and operating costs associated with the enhancement plan. The City has subsequently proposed that the funds from the congestion fee be used to finance the system's capital costs and the MTA and NYSDOT enhancement plans (including operating expenses). The City would use current revenues to finance these costs with the understanding that it would be reimbursed once the system begins generating revenue.

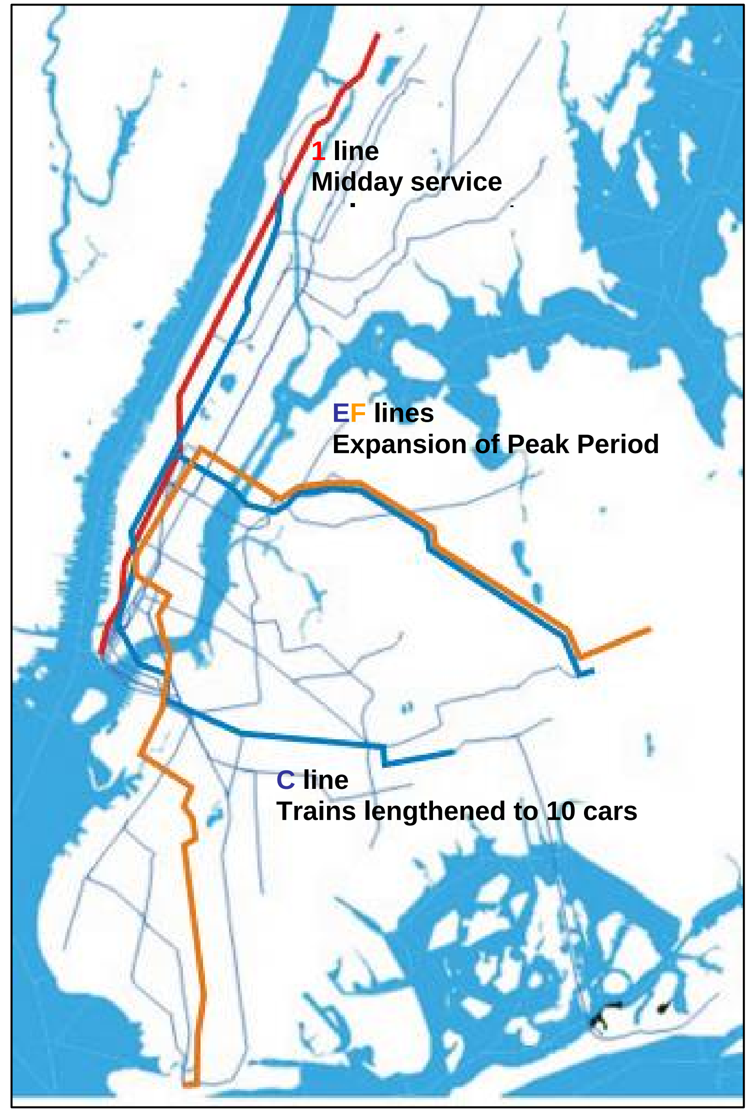
- *Issue* - A Commission member raised the issue of whether NJ Transit and the Port Authority had been engaged in discussions regarding the Mayor's plan and its impact on transit.
    - *Response* – Port Authority staff are participating in the interagency working group. The agency has noted that its proposed toll increase and trans-Hudson capital investments are consistent with the objectives of the Mayor's plan. In addition, City and Port Authority staff have discussed the potential impact of the Mayor's plan on commuters west of the Hudson River with representatives from NJ Transit.

Proposed MTA NYC Bus Improvements



* Numbers in the map above represent
new or expanded bus services

Proposed MTA Subway Improvements



- *Issue* - The Chairman directed staff to make the MTA presentation and all other meeting presentations available to the general public on the Commission's website.
    - Response – Staff made all meeting materials available on the Commission's website: https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission

NYSDOT: Monitoring and Information Enhancements to the Mayor's Plan
The Mayor's plan would also have an impact on the regional highway network. In response, NYSDOT evaluated the effects of the Mayor's plan on the highway system and on transit services in New York State not provided by the MTA (primarily private suburban bus carriers). NYSDOT found that the traffic impacts would likely be positive or neutral, but also saw the need for additional monitoring on key highway segments and interchanges to gauge the impacts of congestion pricing. The Mayor's plan may also have a small impact on suburban transit services not provided by the MTA. As required in the legislation establishing the Commission, NYSDOT prepared a report and presentation to the Commission that included:

- a description of additional capital needs required for implementation of the Mayor's plan;
- the proposed utilization of any potential revenues derived from such a plan for implementation of such a plan; and,
- the impact of such revenue upon the agency's capital and operating budgets.

Upon questioning from the Commission, NYSDOT divided its proposed improvements into two categories: those that were essential to the implementation of the Mayor's plan and those that would complement the Mayor's plan but were not necessary for its implementation. In the essential category, the NYSDOT plan called for an improved traffic monitoring system, regional data collection and information sharing, two additional suburban park-and-ride locations, and improved traveler information. The complementary proposals included a range of initiatives, from enhancing signal timing citywide to creating a "511" traffic information hotline. A copy of the NYSDOT report and presentation is included in Appendix E.

NYSDOT estimated that these improvements would require $59.5 million in capital funds and $500,000 in annual operating funds. These costs are not currently accounted for in the agency's operating and capital budgets. NYSDOT suggested that the start-up costs associated with the NYSDOT enhancements be paid for by New York City funds and revenues generated by the system. Table 3 below summarizes the capital and operating costs associated with NYSDOT's proposal.

Table 3: Summary of NYSDOT Capital and Operating Costs

Project Name	Project Description	Total (Millions)	Annual
Non-MTA Transit Services	Purchase/lease additional suburban express bus Park-and-Ride facilities	$20.00	
Non-MTA Transit Services	Passenger shelters/amenities for suburban express bus service	$10.00	
Expand Transmit/Travel Time Network	Expand installation of Transmit readers to cover all segments of limited access facilities in NYC and increase deployment of real-time traffic information displays	$10.00	
Expand CCTV Coverage	Expand the existing CCTV system coverage to all limited access highways to better monitor traffic conditions on roadways leading to the zone	$5.00	
Instrument Arterial Highways	Expand monitoring of traffic flow on arterial highways	$2.00	
Multi-agency (NYSDOT, NYCDOT, NYMTC) Data Collection and Sharing Needs	One-time start-up costs for transportation data collection	$11.00	
Interagency Information Sharing	Create a user-friendly, GIS and browser-based interface to share traffic data among agencies involved in the Mayor's plan	$1.50	$0.50
TOTAL		**$59.50**	**$0.50**

Source: NYSDOT

III. Public Comment and Evaluation Criteria

Commission Public Hearings

As part of its statutory mandate to provide the opportunity for the public to participate and comment, the Commission conducted a series of public hearings in each borough of the City of New York (Manhattan, Queens, the Bronx, Brooklyn, and Staten Island), in Long Island, and in Westchester County. The Commission heard testimony from numerous witnesses, including State and local elected officials; various transportation, environmental, and community-based organizations; and private citizens. Other individuals who did not present oral testimony at the hearings submitted written testimony.

There was a broad range of public comment provided at the Commission's hearings on traffic congestion and mitigation in the City of New York. The seven hearings were well attended by the public, and the Commission heard approximately 25 hours of testimony. Witnesses provided their views on the current amount and type of congestion in the City and the region, and the impact of congestion and various mitigation options on the economy, the environment, quality of life, public health, and the transportation infrastructure. Regardless of their position on the Mayor's plan, most speakers urged stronger action to counter worsening traffic congestion in and beyond the CBD. A number testified about a current lack of transit options, as well as concerns about the adequacy of existing transit systems and financing for addressing transit needs.

Some raised equity, fairness, privacy, and/or feasibility issues with the Mayor's plan, such as traffic, parking and health impacts on adjacent neighborhoods, burdens on those of lesser means, the disabled and the elderly, and the cost of constructing and maintaining a pricing system. Others indicated their support for the Mayor's plan, stating it would reduce congestion, finance public transportation improvements and improve public health and air quality in the region. A significant share of those who testified in support of the Mayor's plan did so contingent on the provision of enhanced transit services and parking mitigation strategies.

A variety of witnesses spoke of the regional nature of transportation and expressed concerns about the impact that congestion mitigation proposals could have on commuters, residents, and the transportation infrastructure regionally. Many witnesses provided specific options to address congestion including mass transit and highway/bridge improvements, freight movement, modifications to pricing for the use of roadways, the use of technology, alternative transportation modes, traffic and parking enforcement, telecommuting, and more. Suggestions ranged from allocating more curb space for truck loading and unloading, to implementing a mandatory three-person carpooling rule below 60th Street, to increasing the number of bus routes throughout the City. Appendix F provides a full list of the recommendations that the Commission received through the hearing process. In addition, full transcripts of the hearings and written testimony received by the Commission are available on the Commission's website.[19]

[19] Web address as accessed 1/3/08: https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission/public-testimony

Commission Evaluation Criteria

After reviewing the Mayor's plan and soliciting feedback from the public, the Commission discussed how it would evaluate alternative traffic congestion mitigation proposals. When the Mayor's plan was released in the spring of 2007, a range of questions were raised as to its impact on traffic, the economy, the environment, equity, peripheral neighborhoods, and funding for transit. The legislation establishing the Commission requires that the Commission undertake a thorough review and study of plans to reduce traffic congestion, and that the Commission's recommended plan achieve at least a 6.3 percent reduction in VMT. Given these guidelines, as well as concerns raised by the public, elected officials, and various stakeholder groups, the Chairman recommended a set of evaluation criteria to guide discussion at the October 25 meeting. The criteria were reviewed by the Commission and adopted. The Commission's evaluation criteria are as follows:

1. **Best practices (implemented elsewhere):** the degree to which the program is based on congestion mitigation policies that have successfully been implemented in other cities.
2. **Reduction of Vehicle Miles Traveled in the business district**: estimate of VMT reduction in Manhattan south of 86th Street.
3. **Improvements in local and regional air quality and environment:** estimate of emissions reductions and other environmental impacts.
4. **Net revenues raised for mass transit:** estimate of net annual revenues raised to fund the transit system.
5. **Impacts on neighborhoods**
    a. ***Traffic congestion outside of the business district:*** estimate of traffic impacts on areas of the City outside the CBD.
    b. ***Parking:*** the degree to which the program is likely to have a positive or negative impact on the availability of on-street parking in neighborhoods adjacent to the CBD.
6. **Impact on economic classes**: the degree to which the program is progressive or regressive in the allocation of costs and benefits across economic classes.
7. **Regional equity:** the degree to which the program equitably allocates costs and benefits across geographic areas within the New York metropolitan region.
8. **Privacy**: the degree to which the program creates concerns over personal privacy rights.
9. **Implementability**: the feasibility of implementing the program given available technology, the program's design, and start-up and operating costs.
10. **Economic impact on jobs, business and the regional economy:** The degree to which the program is likely to have a positive or negative impact on total jobs and the City and regional economy.

The Commission has consistently applied these criteria to all options considered, including the Mayor's plan. The interagency working group has used the Commission's evaluation criteria as the template for its research and analysis.

IV. Research Agenda

Development of the Research Agenda
Having set forth its evaluation criteria, the Commission turned its attention to developing a list of alternative congestion mitigation proposals for review and discussion. The Commission took a comprehensive approach to setting its research agenda, choosing to examine a wide array of potential approaches. Based on input from the Commission members, elected officials, the public, and stakeholder groups, the Chairman drafted a research agenda and presented it to the Commission at the October 25 meeting. This agenda, presented in Table 4 below, included an evaluation of polices that are alternatives to the Mayor's plan (such as mandatory carpooling), policies that could be alternatives or supplements to the Mayor's plan (such as higher parking meter rates), and modifications to the Mayor's plan (such as moving the northern boundary of the congestion pricing zone from 86th to 60th Street). These categories encompass the full range of alternative approaches to congestion mitigation. The research agenda was a living document and was frequently expanded and modified during the research effort.

Table 4: Commission Research Agenda

	Alternative to the Mayor's Plan	Supplement to the Mayor's Proposal	Modification to the Mayor's Proposal
Regulate and restrict truck movement	√	√	
Telecommuting incentives	√	√	
Increase cost of parking in the central business district (CBD)	√	√	
Reduce use of parking placards by public employees	√	√	
Additional taxi stands to reduce cruising ("No Hail Zone")	√	√	
Raise cab fares and fees charged to cabs	√	√	
Raise tolls or implement variable tolls on existing facilities	√		
License plate rationing	√		
Required carpooling	√		
Creation of High-Occupancy Toll ("HOT") lanes	√		
Congestion pricing with a changed northern boundary			√
Congestion pricing with no intra-zonal charge and a charge on FDR & West St.			√
Congestion pricing with variable charges or extended hours			√
Congestion pricing with a hybrid exemption			√
Congestion charging with a modified E-ZPass toll offset policy			√

Each of the items on the research agenda was subject to a uniform review process by the interagency group and was evaluated based on the Commission's ten criteria. Staff used a set of standard tools to analyze each alternative, applying the appropriate tool based on the nature of the alternative. These tools included the New York Metropolitan Transportation Council's Best Practices Model or BPM.[20] The BPM is an advanced travel demand model that estimates how regional traffic and transit flows respond to changing land use, infrastructure and toll and fare policy conditions. The model is the standard federally accepted tool for NYMTC's members, used in all regional air quality analyses and planning activities.[21] The BPM covers a 28-county region and can provide detailed data on changes to travel patterns in the City and region, including VMT, auto trips, and transit trips. Other tools used by agency staff included research on best practices, spreadsheet-based models that isolated the impact of taxi and parking policies, emissions impact analysis, and a cost and revenue model.[22]

The BPM underwent a scheduled update in September 2007 in which the 2005 transit network was loaded. However, the 2002 transit network was used in the April 2007 model run, which formed the basis of the Mayor's Plan. The update was completed in September 2007 and reflects increases in the amount of mass transit service throughout the city and metro area. For example, there are now four operational subway tracks on the Manhattan Bridge, as opposed to two that were in service in 2002. One result of the model update is that when congestion pricing is applied, drivers find their transit alternative slightly more attractive and are thus slightly more likely to switch to transit. The update has slightly increased the VMT reduction estimated for the Mayor's plan from 6.3 percent to 6.7 percent.

Over the past four months, the interagency working group has reviewed a wealth of analysis, including over twenty runs of the BPM on various scenarios, white papers summarizing the findings for each alternative, technical memos on the implementation of select alternatives in other cities, and several detailed presentations summarizing the above. Given the Commission's desire to provide a succinct account of its work, this report provides a high-level overview of the research results. A complete set of appendices is available on the Commission's website, which includes the full work product of the interagency group.[23] Included are presentations that were made by agency

[20] The BPM was used to study alternatives expected to affect multiple aspects of travelers' mode and route choice. Since the model includes multivariate statistical simulations of the actual choices made by travelers, it weighs the importance of policies like license plate rationing against other inputs into travelers' choices (such as the price, availability, and convenience of transit versus driving). This makes it ideal to study policies that may have multiple, or even counterintuitive, impacts.

[21] The BPM is being used, for example, to model the traffic and air quality impact of the Tappan Zee Bridge and I-287 Corridor Study and the Goethals Bridge Modernization Draft Environmental Impact Statement.

[22] Spreadsheet models were used when the level of detail needed to test the alternative was not available in the BPM (the BPM is a regional model that does not represent detailed operations like parking meters, or the stopping and starting of taxis). The spreadsheet models applied documented price elasticities to estimate the expected change in demand for transportation goods (such as curb parking), with respect to changes in price (such as raising parking meter rates). This approach is ideal when the alternative was specifically targeted at a particular market segment, and is a standard application of economic analysis techniques that are accepted throughout the transportation field.

[23] https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission

staff to the Commission and white papers which apply the Commission's evaluation criteria to each of the alternatives considered (see Appendix G).

As part of its work, the interagency working group discussed the potential impact of the MTA's and Port Authority's proposed toll increases on the Mayor's plan or on any alternative congestion pricing scenario. The MTA has approved a modest increase in tolls on its Manhattan crossings, including the Brooklyn-Battery Tunnel, the Queen Midtown Tunnel, and The Triborough Bridge.[24] The Port Authority has also proposed increasing tolls on its Hudson River crossings, including the Holland and Lincoln tunnels and the George Washington Bridge.[25] A summary of the MTA and Port Authority toll proposals is presented below in Table 5.

Both the MTA and Port Authority toll proposals were released after the Commission's research process was well underway. In order to be consistent with the requirements of the UPA and given that the Port Authority has not yet finalized or received approval of its plan, the interagency working group used the base traffic and toll conditions from the UPA as the basis of the Commission analysis. Once the proposals were available, the group took the proposed toll increases into consideration in the analysis of the alternatives. The MTA toll increases are modest, between four and ten percent, and thus will not significantly impact the revenues raised by the Mayor's plan or its VMT impact. In the case of the Port Authority proposal, the peak toll rates will match the $8 daily congestion fee. Taken with the Mayor's plan, the VMT impact of congestion pricing will not change substantially. Revenue that would have been collected through congestion fees would instead be collected as tolls by the Port Authority. Preliminary analysis under the BPM indicates that the toll increases would reduce net revenues under the Mayor's plan by approximately $50 million a year. Further, the model assumes an increase in the E-ZPass market penetration rate from 73 percent to 78 percent. To the extent that cash to E-ZPass migration is higher, net revenues would decrease.

Table 5: MTA Approved Toll Increase and Port Authority Proposed Toll Increase

MTA	Current East River Tolls	Approved Future Tolls
E-ZPass Car Toll	$4 (one-way)	$4.15 (one-way)
Cash Car Toll	$4.50 (one-way)	$5 (one-way)
Port Authority	**Current Hudson River Tolls**	**Proposed Future Tolls**
Peak E-ZPass Car Toll (6-9am; 4-7pm)	$5 (round-trip)	$8 (round-trip)
Off-Peak E-ZPass Car Toll	$4 (round-trip)	$6 (round-trip)
Cash toll (all times)	$6 (round-trip)	$8 (round-trip)

As the Commission discussed the agenda over the course of the fall, Commission members made a number of comments, including:

[24] The MTA also approved toll increases on the Henry Hudson Bridge; E-ZPass tolls will increase from $1.75 to $1.90 and cash tolls from 2.25 to $2.75. A full description of the toll increase, including increases in truck tolls, can be found on the MTA website: http://www.mta.info/mta/news/hearings/fareandtoll/bandt-sample.htm

[25] The Port Authority is also proposing toll increases on the PATH system and other inter-state bridges. These increases have yet to be approved. A full description of the toll increase, including increases in truck tolls, can be found on the PORT AUTHORITY website: http://www.panynj.gov/budget_cap_plan/index_pt1.html

- *Issue*: A Commission member questioned the accuracy of the BPM given that it uses a 1997 survey of travel behavior in the New York City metro region to inform its determination of traveler mode choice.
    - *Response*: further review by staff and the Chairman established that an update of the mode choice element (which is based on the 1997 travel survey data) was not feasible within the timeframe of the Commission and that the BPM, the federally accepted planning tool used by the state and regional transportation agencies, was capable of conducting the analysis necessary for the Commission's work.

- *Issue*: A Commission member requested that an origin and destination study be conducted to determine the travel patters in the New York City region.
    - *Response*: agency staff concluded that an accurate origin-destination study for an area as large as that modeled in the BPM was not feasible within the four-month time frame of the Commission. The Chairman also directed agency staff to meet with the Commission member to further discuss the issue (see text box below).

Why did the Commission rely on existing data rather than launch a new origin-destination survey?
Origin-destination surveys are used by transportation planners around the world to gather information on trip patterns and mode choices and to plan transportation and transit projects. In a typical O-D study, such as the Regional Travel-Household Interview Survey (RT-HIS), conducted in1997-1998, a statistical sampling method is used to survey a representative collection of households. Respondents are asked to provide demographic information and details of their specific travel patterns. An O-D survey typically takes several years to complete. For example, before conducting their survey, the RT-HIS survey team had to first identify 42,000 representative households in the 28-county region. Each household was sent a survey, and follow-up recruitment and interviews were conducted with each respondent. Final responses were validated and weighted to capture the best approximation of the demographic and travel mix seen in the region. The RT-HIS household interview and recruitment process alone took over a year, from February 1997 to May 1998. Data analysis and report preparation took additional time, and the final work product was not released until 2000.

Alternatives and Supplements to the Mayor's Plan
At the meetings on November 20 and December 10, agency staff presented the results of analysis on potential alternatives and supplements to the Mayor's plan. These ranged from significant traffic interventions, such as banning trucks from the CBD during daytime hours, to smaller policy initiatives, such as providing tax incentives to encourage telecommuting. Given the varying scale of these proposals, the impact on daily VMT ranges from zero to over a six percent reduction. Some alternatives, such as required carpooling, would not raise any funds for transit, while others, such as a $2 surcharge on all for-hire vehicle trips within the zone (including taxis, livery cabs, and black cars), could raise as much as $140 million a year. Table 6 on the following pages summarizes the research on alternatives and supplements reviewed by the Commission.

Table 6: Research Results – Alternatives and Supplements to the Mayor's Plan

Policy Category	Specific Approach	Change in VMT south of 86th Street*	Revenue raised for transit**
Night delivery and telecommuting incentives			
Telecommuting incentives		0.03 - 0.21%	$0
Policies to encourage businesses to schedule deliveries during the evening, thereby reducing day time congestion.	*Per-axle charge and tax incentive*	0.1 - 1.0% daytime, 0% over 24 hours	$0 - 200 million
	Daytime delivery ban	8.1% daytime, 0% over 24 hours	$0
Increase cost of parking in the Manhattan CBD			
Policies to increase the cost of on-street and off-street parking in the CBD, thereby encouraging drivers to switch to transit.	*Eliminate parking tax rebate for Manhattan residents*	0.05%; less if parking operators absorb tax	$22 million
	Raise parking tax to 28.375% from 18.275% (applies to all drivers)	0.2%; less if parking operators absorb tax	$71 million
	Raise parking tax to 38.375% from 18.275% (applies to all drivers)	0.3%; less if parking operators absorb tax	$120 million
	Increase rates for on-street parking	0.5%	$17 million
	Overnight on-street parking fee ($2 in CBD)	0.4%	$7 million
	Parking freeze	0%	$0
	Treat value of employer-provided parking as income, for city income tax purposes	0.02%	Small
	Parking cash-out	0.02%	$0
Reduce use of parking placards by public employees			
Policies to reduce the number of parking placards (which allow city, state, and federal employees to park for free on-street), and thereby encourage public employees to switch to transit.	*Reduce free on-street parking for government employees currently commuting to jobs in lower Manhattan by 3,000 placards*	0.1%	$0
	Reduce by 5,000 placards	0.2%	$0
	Reduce by 10,000 placards	0.3%	$0

Policy Category	Specific Approach	Change in VMT south of 86th Street*	Revenue raised for transit**
Taxi policies: surcharges and taxi stands			
Policies to reduce taxi cruising through expansion of taxi stands and no-hail zones	Additional taxi stands in CBD	Not known	$0
Policies to increase the cost of cab rides within the zone, thereby encouraging cab riders to switch to transit.	*$1 surcharge*	0.3%	$70 million
	$2 surcharge	0.6%	$140 million
	$4 surcharge	1.0%	$270 million
	$8 surcharge	1.7%	$516 million
License plate rationing			
Policies that ban groups of vehicles from entering the CBD on specific days of the week (based on the last digit on the vehicle's license plate), thereby encouraging transit use and reducing traffic into the CBD.	*1 in 10 days*	5.1%***	Reduces MTA and PA toll revenues that support transit
	1 in 5 days	10.3%***	Reduces MTA and PA toll revenues that support transit
Carpool and HOV/HOT lane strategies			
Policies that require vehicles entering the CBD to be carrying at least two or three passengers, thereby encouraging transit use and reducing traffic into the CBD.	Required carpooling	Expected to be substantial	Reduces MTA and PA toll revenues that support transit
Implementing lanes for exclusive use by high-occupancy vehicles and/or vehicles paying a toll so as to increase capacity and reduce congestion on major highways leading into the CBD.	Creation of High-Occupancy Toll ("HOT") lanes	0%	Uncertain
East River bridge tolls			
Implementing per-trip tolls 24 hours on all East River bridges into Manhattan	MTA toll structure on all East River bridges ($4 each way with E-ZPass)	5.6%	$531 million

* All figures are 24 hour averages unless otherwise noted.
** Revenue figures do not include impact, if any, on MTA and Port Authority toll revenues.
*** Figures assume that all vehicles from each multi-car household are restricted on the same day.

For more detailed research findings on the alternatives, please refer to the Commission's website.[26] Included in the appendices are the summary presentations made to the Commission on November 2 and December 10, as well as white papers on each of the alternatives and technical memoranda on select options.

During the course of its review of potential alternatives and supplements to the Mayor's plan, Commission members discussed a number of issues. These included:

- The Commission requested a number of clarifications, including details on the methodology used to evaluate each of the alternatives. (These were provided by the interagency working group at the December 17 meeting. See Appendix H)
- In response to the proposal to ban trucks from the CBD during daytime hours, several Commission members voiced serious concerns over the feasibility and the adverse economic impacts of this approach.
- The Commission discussed the merits of the residential parking tax exemption for Manhattan residents. Some Commission members believe the provision would decrease cruising for street parking by providing car owners with an incentive to store their vehicles in a garage. Others felt the exemption provides an incentive for residents to own a car.
- In response to proposals to raise metered parking rates within the CBD, several Commission members voiced support for the proposal as a way to discourage driving and to raise revenue.
- In response to proposals to levy a $2 or $1 surcharge on taxi trips within the CBD, several Commission members voiced support for such a proposal. One Commissioner cautioned that an overly high surcharge would actually be an incentive for people to drive, especially those who now take transit from the suburbs and then take a taxi. One Commissioner requested an analysis of raising the surcharge to $4 or $8. (Estimates of the impact of these two options were provided at the December 17 meeting and are included in Table 6.)

Modifications to the Mayor's Plan

At the December 17th meeting, Commission staff presented the analysis of potential modifications to the Mayor's plan. Staff looked at a wide range of potential modifications, including changes to: the northern boundary of the congestion pricing zone, the types of trips charged (i.e. exempting trips within the zone), the fee structure (i.e. the use of variable or 24 hour fees), and the type of charge (i.e. the use of a per-trip toll rather than a daily fee). The chart on page 27 presents the VMT and revenue impacts of these alternatives. The alternatives fall with a range from 5.9 to 8.3 percent VMT reduction and $387 million to $615 million in net revenue generated for transit. The revenue numbers do not take into account the impact on MTA and Port Authority toll revenues, a substantial portion of which are used to fund transit operations and capital needs. Capital costs range from $224 million for the Mayor's plan to $62 million for the East River Bridge tolls alternative.

[26] https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission

Explanation of Modifications to the Mayor's Plan

- Northern Boundary – moving the northern boundary of the congestion pricing zone south to 60th Street.
- Intra-zonal Charge – eliminating the $4 fee charged to trips taken solely within the congestion pricing zone.
- Through Trips – charging vehicles that drive only on the FDR and 9A/West Side Highway, these routes were free under the Mayor's plan.
- Direction of Charge – charging only inbound trips, rather than trips in both directions (the Mayor's plan charges outbound traffic).
- Variable Fee – charging a varying congestion pricing fee at different times of the day.
- 24 Hour Charging – charging the congestion fee 24 hours a day.
- Toll Offset – eliminating or reducing the toll offset provided to users of the MTA and Port Authority tolled crossings into Manhattan.
- License Plate Recognition Surcharge – levying a $1 surcharge on drivers who enter the zone and do not use E-ZPass
- Fee or Toll – charging a per-trip toll instead of a daily fee

For more detailed research findings on the alternatives, please refer to the Commission's website.[27] Included is the summary presentation made to the Commission on December 17.

During the course of their review of potential modifications to the Mayor's plan, Commission members discussed a number of issues. These included:

- A Commission member noted the savings in terms of annual operating costs of eliminating the charge on trips within the zone. Also noted was the fact that the reduction in operating cost may more than offset the loss in revenues.
- Several Commission members stated the need to charge residents of the zone for driving if the intra-zonal charge were eliminated. Options considered included a taxi surcharge, increased parking meter rates, a $2 overnight parking fee in Manhattan, and increases in the City's parking tax.
- The Commission discussed the relative merits of including a free periphery route. One Commission member noted that eliminating the free periphery route might have negative consequences on low-income neighborhoods in Brooklyn and the Bronx.
- The Commission discussed the relative merits of moving the northern boundary of the zone to 60th Street. Noted were the modest impact on net revenues and the likely small impact on parking in the area north of 60th Street, given the limited supply and high cost of parking in this area.
- In general terms, the Commission discussed the possibility of packaging a modified congestion pricing plan together with several of the supplements discussed at the December 10th meeting.

[27] https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission

Table 7: Research Results – Modification to the Mayor's Plan

Modification	Mayor's Plan	#1	#2	#3	#4	#4A	#4B	#5	#6	Cordon toll
		Move northern boundary to 60th Street	Eliminate intra-zonal charge	Charge thru trips using periphery	Charge inbound trips only	Inbound only with variable tolls	Inbound only with variable tolls- 24 hours	Reduce or eliminate E-ZPass toll offset	$1 surcharge for LPR customers	
Northern Boundary	86 St	**60 St**	60 St	60 St	60 St	60 St	60 St	60 St	60 St	**60 St**
Intra-zonal Charge	Yes	Yes	**No**	No	No	No	No	No	No	No
Through Trips	Free	Free	Free	**Charged**	Charged	Charged	Charged	Charged	Charged	Charged
Direction of Charge	2-Way	2-Way	2-Way	2-Way	**Inbound Only**	Inbound Only	Inbound Only	2-Way	2-Way	2-Way
Flat or Variable	Flat $8	Flat $8	Flat $8	Flat $8	Flat $8	**$10/$8/$6**	$10/8/6/4	Flat $8	Flat $8	Flat (MTA)
12 Hour or 24 Hour	12 hour	12 hour	12 hour	12 hour	12 hour	12 hour	**24 hour**	12 hour	12 hour	24 hour
E-ZPass Toll Offset	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes	N/A
LPR Surcharge	None	None	None	None	None	None	None	None	**$1**	None
Fee or Toll	Daily Fee	Daily Fee	Daily Fee	Daily Fee	Daily Fee	Daily Fee	Daily Fee	Daily Fee	Daily Fee	**Toll**
VMT Change	6.7%	6.2%	5.9%	6.1%	6.0%	6.8%	8.2%	8.3%	6.3%	13.4%
Capital Cost	$224.30	$219.17	$125.37	$72.88	$72.88	$72.88	$72.88	$72.88	$72.88	$ 71.85
Gross Revenue	$649.00	$585.00	$475.00	$497.00	$498.00	$526.00	$618.00	$672.00	$513.00	$ 1,155.00
Operating Cost	$229.46	$197.98	$62.58	$58.21	$62.43	$61.71	$99.36	$57.06	$57.92	$ 96.05
Net Revenue	$419.54	$387.02	$412.42	$438.79	$435.57	$464.29	$518.64	$614.94	$455.08	$ 1,058.95

Note 1: Net revenue for Transit does not include impact on Port Authority and MTA toll revenues used to fund transit operations and investments. Cost estimates are preliminary.

Note 2: As described in further detail on page 21, the revenue estimates for the Mayor's plan and options 1-6 were based on current Port Authority toll rates. The Port Authority's proposed toll increase would reduce congestion pricing revenues of the Mayor's plan by approximately $50 a year. This estimate would vary based on the extent to which drivers switch from cash payment to E-ZPass.

- A Commission member requested an analysis of the alternatives showing the distribution of fee revenues by geographic trip origin. At the direction of the Chairman, this analysis has been provided for the pricing-based alternatives analyzed in this report and is presented in the next chapter.
- The Chairman directed the Commission to begin thinking about three or four possible alternatives for further review in January, including the Mayor's plan, a modified congestion pricing plan, a toll plan, and a non-congestion pricing plan. The Chairman stated that he would hold small group meetings with Commission members over the last two weeks in December and the first week in January to discuss these options.

V. Options for Evaluation

At the direction of the Commission Chairman, agency staff evaluated the Mayor's plan and four alternatives, described below. The alternatives each focus on one of four different approaches: congestion pricing, bridge tolling, pricing of parking and taxis, and license plate rationing. The Chairman directed staff to evaluate the VMT reduction of each option and to evaluate all options that meet the mandate of a 6.3 percent reduction in VMT using each of the evaluation criteria established by the Commission. Note that in all alternatives, new revenues would be used to fund transit and other transportation-related capital projects.

For its final recommendation, the Commission may select one of the alternatives presented in this report, or may choose to modify one of the alternatives, combine elements of two or more alternatives, or put forward a wholly different plan. The recommendation made by the Commission in its final report will take a number of factors into account, including research findings, comments from the public, and the strengths and weakness of each option. Through this process, the Commission can choose to modify any given plan, including those in this report, so as to reduce its weaknesses and enhance its strengths.

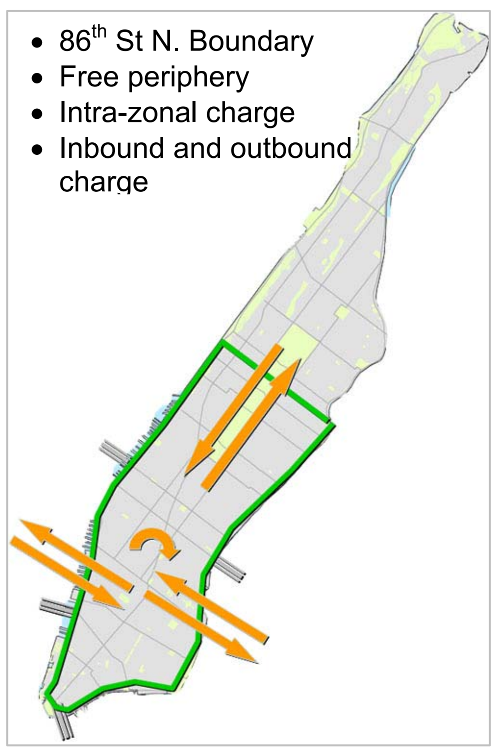
The options are as follows:

<u>Option 1: The Mayor's Plan</u>

For a full description of the Mayors plan, please refer to Section II, page 8. The chart and graphic below summarize the key elements of the Mayor's plan. As noted earlier, the Mayor's plan would be implemented in tandem with a series of traffic enforcement and neighborhood parking improvements, as proposed in PlaNYC.

Table 8: The Mayor's Plan

Parameter	Mayor's Plan
Northern Boundary	86 St
Intra-zonal Charge	Yes ($4)
Through Trips	Free if using peripheral routes
Direction of Charge	2-Way
Flat or Variable	Flat $8
12 Hour or 24 Hour	12 hour
E-ZPass Toll Offset	Yes
LPR Surcharge	None
Fee or Toll	Daily Fee
Supplements	
Neighborhood parking strategies	

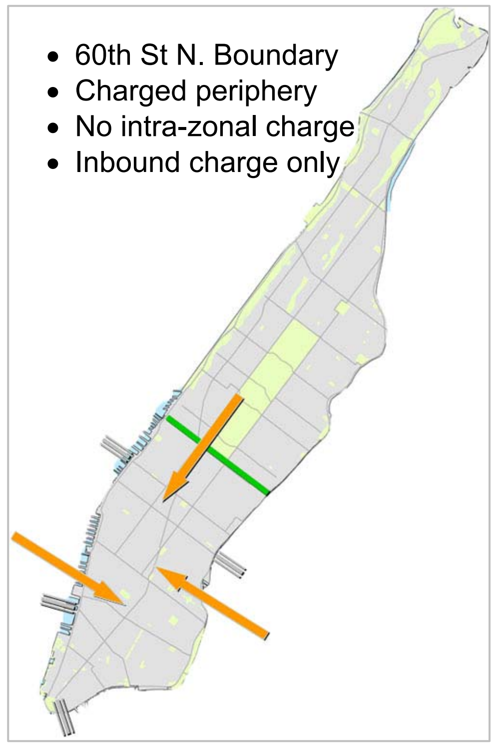


<u>Option 2: An Alternative Approach to Congestion Pricing</u>

The alternative congestion pricing plan is a modified approach to congestion pricing that eliminates the intra-zonal charge and free periphery, charges inbound trips only, and moves the northern boundary of the charging zone to 60th Street. Cars would be charged an $8 fee to drive into the zone on weekdays between 6am and 6pm. Trucks would pay $21, except for low-emission trucks, which would pay $7.[28] Under this fee-based plan, drivers would pay once upon entering the charging zone and would be able to make additional trips in and out of the zone at no additional cost. For E-ZPass users, the value of all tolls paid on MTA or Port Authority bridges and tunnels would be deducted from the fee up to $8.

Table 9: Alternative Congestion Pricing Plan

Parameter	Plan
Northern Boundary	60 St
Intra-zonal Charge	None
Through Trips	Charged
Direction of Charge	Inbound
Flat or Variable	Flat $8 fee
12 Hour or 24 Hour	12 hour
E-ZPass Toll Offset	Yes
LPR Surcharge	$1
Fee or Toll	Daily Fee
Supplements	
Neighborhood parking strategies	
$1 taxi/livery trip surcharge for trips that start and/or end in zone	
Increased metered parking rates within zone	
Eliminate resident parking tax exemption within zone	



The alternative congestion pricing plan would use the same electronic fee collection system as the Mayor's plan, but with a significantly reduced number of sensors due to the elimination of the intra-zonal charge and free periphery. Moving the northern boundary to 60th Street would lead to many more intra-Manhattan trips being charged the $8 fee, such as trips from the Upper East Side into the CBD. Non-E-ZPass users would be subject to a $1 surcharge to encourage E-ZPass use and to cover the additional cost of processing license plate image transactions. In addition, the alternative congestion pricing plan includes a package of parking and taxi policies designed to further discourage driving within the zone, including a $1 surcharge on taxi and livery trips that start and/or end within the zone during congestion pricing hours, increased on-street parking meter

[28] The discount would apply to new trucks that meet the most current EPA engine standards and to trucks that have been retrofitted with EPA-approved equipment to reduce emissions by 85 percent. The goal of this incentive is to encourage truck owners to switch over to cleaner diesel trucks, which currently constitute a small portion of the regional truck fleet.

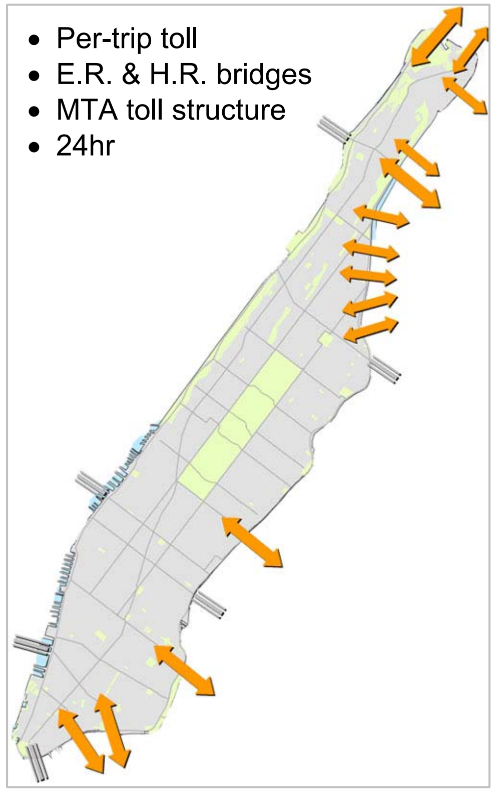
rates within the zone, and elimination of the resident parking tax exemption for off-street parking garages and lots within the zone.

Option 3: Tolling the East River and Harlem River Bridges

Agency staff also conducted further analysis of an East River and Harlem River bridge toll plan (henceforth the toll plan). The toll plan expands on previous proposals to toll the City's major East River crossings, including the Brooklyn, Manhattan, Williamsburg, and Queensboro bridges, and differs somewhat from the tolling option presented to the Commission on December 17.

Table 10: The Toll Plan

Parameter	Plan
Tolled Crossings	East and Harlem River bridges
Direction of Toll	2-way
Flat or Variable	Flat $4 toll
12 Hour or 24 Hour	24 hour
LPR Surcharge	$1
Fee or Toll	Per-trip Toll
Supplements	
Neighborhood parking strategies	



Under the toll plan, all un-tolled East River and Harlem River crossings would be subject to inbound and outbound tolls. These tolls would be in effect 24 hours a day, seven days a week, and would match the toll rates on the MTA's East River crossings.[29] The Henry Hudson Bridge toll would also be increased to match the rates on the other crossings.[30] Following the MTA toll structure, trucks would pay higher tolls depending on their size. Similar to the Mayor's plan, tolls would be collected electronically using E-ZPass readers and license plate recognition (LPR) cameras; there would be no toll plazas or physical barriers, except where they already exist. In essence, cars would be charged a $4 per-trip toll (rising to $4.15 on March 16, 2008) 24 hours a day to enter or leave Manhattan by any East or Harlem River crossing. The Port Authority toll structure would remain the same.

The toll plan would allow for the subsequent elimination of two-way tolling on all of the MTA's East River crossings and the implementation of inbound only tolling on all river crossings into Manhattan, resulting in operating cost savings.

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[29] Tolls would apply to: the Brooklyn Bridge, Manhattan Bridge, Williamsburg Bridge, Queensboro Bridge, Willis Avenue Bridge, Third Avenue Bridge, Madison Avenue Bridge, 145th Street Bridge, Macombs Dam Bridge, Alexander Hamilton Bridge (Cross Bronx Expressway), Washington Bridge, University Heights (207 St.) Bridge, Broadway Bridge and Henry Hudson Bridge (increase from current toll).

[30] Any toll increase on the Henry Hudson Bridge would be subject to a SEQR review.

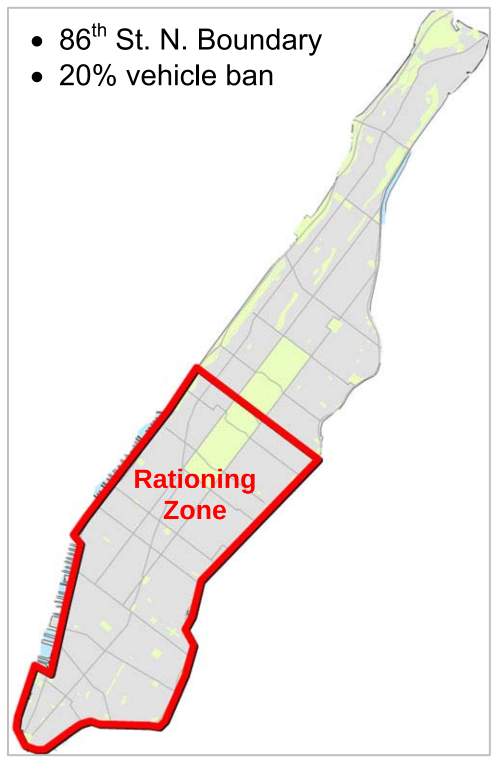
This plan includes a new toll on the Alexander Hamilton Bridge, which is part of the I-95 corridor and carries significant through traffic. Increasing the cost of travel from the George Washington Bridge to the Cross-Bronx Expressway could cause some through traffic to divert to other routes, such as the Tappan Zee Bridge. Further analysis of this issue and potential mitigation measures is required if this option is to be pursued.

Option 4: License Plate Rationing

For a fourth option, the Chairman directed agency staff to present for discussion a license plate rationing plan (henceforth the rationing plan). License plate rationing restricts a set of vehicles from entering a specified area on certain days based on the last digit of the vehicle's license plate. Agency staff analyzed a scenario under which the City would ban a particular vehicle once every five days, thereby restricting 20 percent of all vehicles each weekday from 6 am-6 pm. The rationing restriction would apply to the area of Manhattan south of 86th street. Emergency vehicles, transit vehicles, and vehicles with handicapped license plates would be exempt. Enforcement could be conducted using a system of LPR cameras similar to the Mayor's plan or by posting police officers at each of the entry points into the rationing zone. For further information on license plate rationing, please refer to the license plate rationing white paper in Appendix G.

Table 11: The Rationing Plan

Parameter	Plan
Vehicles Restricted Daily	20%
Northern Boundary	86th Street
12 Hour or 24 Hour	12 hour
Supplements	
Neighborhood parking strategies	



Unlike the other four alternatives under consideration, the rationing plan would not generate revenue for transit through fees or tolls. At the December 10th meeting, the Commission discussed whether it should examine broad-based tax policies that could be coupled with a rationing plan. The Chairman concluded that a comprehensive analysis of broad-based tax options was beyond the scope of the Commission's mandate. The Chairman did, however, direct staff to conduct a preliminary survey of broad-based tax options that could generate revenue for transit. This analysis is presented in the text box on the following page. If so desired, the State Legislature and Governor can further evaluate these tax options after the conclusion of the Commission's work.

Also discussed was the issue of two-car households. Under a rationing plan, a commuter with access to two cars could simply switch vehicles on the day that the primary vehicle is banned. As a solution to this problem, it was proposed that the motor vehicle departments in New York, New Jersey, and Connecticut create a system to register license plates by household. Although the feasibility of this approach has not yet been determined, the VMT impacts of the rationing plan presented here assume the implementation of household-based vehicle registration.

Broad-Based Tax Options: Revenue Potential

A series of income, corporate, sales, excise, and MTA-dedicated tax revenue options were analyzed by Commission staff, as summarized in the table below. These tax revenue estimates were prepared by the New York City Office of Management and Budget. If so desired, the State Legislature and Governor can further evaluate these tax options after the conclusion of the Commission's work, as well as other tax options, such as creation of a carbon tax, increases in the City personal income tax rates, raising the State payroll taxes, or increases in the MCTD[31] Urban Tax rates.

Tax	Tax rate		Additional Revenue Generated ($ mil)			
	Current	Proposed	NYC Counties	Other MCTD Counties	Conn/ NJ	Total
Income Taxes						
Restore commuter tax (1)	--	0.45% / 0.65%	-	-	-	$867
Corporate Taxes						
Raise MCTD corporate surcharge (2)	17.0%	30.0%				$710
Sales Taxes						
Raise MCTD sales tax (3)	0.375%	0.75%	$435	$307	-	$742
Excise Taxes						
Raise motor vehicle fuel tax (4)	$0.08	$0.16				$533
Dedicated Taxes						
Raise MCTD mortgage recording tax (5)	0.30% / 0.25%	0.60% / 0.50%	$234	$248	-	$482

Source: Preliminary estimates based on analysis conducted by NYC OMB.

(1) Prior to 1999, wages and salaries earned by nonresidents (commuters) in New York City were taxed at a rate of 0.45 percent and self-employment income taxed at 0.65 percent.
(2) The corporate surcharge includes several taxes on businesses operating within the MCTD.
(3) In addition to State and local sales taxes, a 0.375 percent sales tax is currently levied within the MCTD.
(4) New York State currently levies a $0.08 per gallon excise tax on motor vehicle fuels. This proposal would raise that tax for the whole state.
(5) The mortgage recording tax refers to two separate taxes levied within the MCTD: one on the borrower, at a rate of 0.30 percent of the value of the recorded mortgage, and a second on the lender, at a rate of 0.25 percent of the value of the recorded mortgage for one-family to six-family homes.

[31] The Metropolitan Commuter Transportation District (MCTD) consists of the 12 counties of New York, Bronx, Kings, Queens, Richmond, Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk, and Westchester.

Option 5: A Combination of Parking and Taxi Policies

Finally, the Chairman directed staff to evaluate a plan that used a combination of polices that increase the cost of parking and taxi fares ("the combination plan"). This plan includes a series of measures to significantly increase the cost of on-street and off-street parking in Manhattan south of 60th Street, including raising the City parking tax for garages within the CBD, eliminating the resident parking tax exemption within the zone, increasing on-street parking meter rates within the zone, and charging a $2 overnight parking fee for all on-street spaces within the zone. In addition, the plan calls for reducing by 10,000 the number of government parking placards used to commute to jobs in the zone (these placards allow City, State, and Federal employees to park in restricted spaces or without charge in metered spaces.) In order to reduce taxi traffic, the plan also includes an $8 surcharge on all taxi trips within, into, or out of the area of Manhattan south of 86th St. For further detail on these parking and taxi proposals, please refer to the parking policy and taxi policy white papers in Appendix G.

Table 12: The Combination Plan

Plan Components
Increase parking tax from 18.375% to 38.375% in CBD[32]
Eliminate resident parking tax exemption in CBD
Increase on-street parking meter rates in CBD
Reduce by 10,000 the number of government parking placards used to commute to CBD jobs
$2 overnight parking fee in CBD
$8 surcharge for taxi trips that start and /or end south of 86 Street.
Supplements
Neighborhood parking strategies (outside of the CBD)

[32] The current off-street parking tax in Manhattan is 18.375 percent.

VMT Reduction and Revenue for the City

Estimate of VMT reduction in Manhattan south of 86th Street and of net annual revenues raised to fund the transit system.

Table 13 below lays out the VMT reduction, capital costs, operating costs, and net revenues for each the five alternatives.[33] The Mayor's plan, the alternative congestion pricing plan, the toll plan, and the rationing plan all meet the Commission's mandate to recommend a plan that reduces VMT by 6.3 percent, and are therefore evaluated on the Commission's other criteria.[34] Although it generates significant revenues, the combination plan falls well short of meeting the VMT reduction mandate, and as a result, it is not evaluated further.

The Mayor's plan, alternative congestion pricing plan, and toll plan all raise significant revenues that could be used to fund current and future transit and transportation projects. The rationing plan would need to be combined with new taxes or fees to generate funds. As discussed earlier, the two congestion pricing options do not take into account the Port Authority's proposed toll increase, which would reduce the net revenues of these options by approximately $50 million a year.[35]

Table 13: VMT Reduction and Revenues Generated

Option	Mayor's Plan	Alt. Pricing Plan	Toll Plan	Rationing Plan	Combination Plan
VMT Reduction (Below 86 St.)	**6.7%**	**6.8%**	**7.0%**	**10.3%**	**3.2%**
Capital Cost	$224	$73	$67	*	NA
Gross Revenue	$649	$582	$947	**	$660
Operating Cost	$229	$62	$88	*	***
Net Revenue	**$420**	**$520**	**$859**	**	**Apprx. $660**

*Costs are not estimated as they are dependent on implementation approach
**Alone, the rationing plan would generate no revenues. Coupled with a tax, it could generate comparable revenues to the other options
***Not estimated but not expected to be substantial

This analysis raises several issues for further consideration:

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[33] These costs are preliminary estimates based on analysis conducted by Cambridge Systematics and NYCDOT staff.
[34]The rationing plan figure assumes that all vehicles within each multi-car household are restricted on the same day.
[35] Revenue that would have been collected through congestion fees would instead be collected as tolls by the Port Authority. Preliminary analysis under the BPM indicates that the toll increases would reduce net revenues under the Mayor's plan and the alternative congestion pricing plan by approximately $50 million a year. Further, the model assumes a change in E-ZPass penetration rates of 73 percent to 78 percent. To the extent that cash to E-ZPass migration is higher, net revenues would decrease.

- ***Tolls vs. Congestion Fees***: The toll plan raises the most revenue ($859 million annually) and has one of the larger VMT reductions of all plans considered. Tolls raise substantially more revenue than congestion pricing fees because they would be in effect 24 hours a day (as compared to 12 hours for a congestion fee) and would charge drivers for every trip in and out of Manhattan (as compared to a daily fee that allows multiple trips). Unlike the two congestion pricing options, the toll plan would impact driver behavior at all times of day, not just during periods of peak congestion.

- ***Relative Capital Costs***: The complexity of the Mayor's plan results in higher capital costs as compared to the other plans. The capital costs of an electronic toll or fee collection system is driven by the number of electronic sensors and cameras needed to ensure compliance. By including a charge on trips within the zone, the Mayor's plan requires 340 charging stations across Manhattan, each with an array of E-ZPass readers and LPR cameras, increasing capital costs to over $200 million. In comparison, the alternative congestion pricing and tolling plans require 25 and 13 charging stations, respectively, and each requires less than $75 million in capital costs. The capital costs for rationing would depend on whether an electronic or manual enforcement system was used.

- ***Relative Operating Costs***: The complexity of the Mayor's plan also drives up the operating costs of the system. The operating costs of a congestion pricing or electronic toll system are driven by the number of transactions that the system must process for each paying customer. For the Mayor's plan, the 340 charging stations located within the zone and at every entrance point to the zone would generate a large number of redundant E-ZPass reads and camera images, as many vehicles would already have been captured upon entering or leaving the zone. As a result, operating costs for the Mayor's plan are projected to consume 35 percent of gross revenues as compared to ten percent for the alternative congestion pricing plan and nine percent for the toll plan. Operating costs for the rationing plan would depend on whether an electronic or manual enforcement system was used. In the future, the toll option would allow for one-way tolling into Manhattan, thus lowering operating costs at MTA facilities.

- ***Ensuring New Revenues are Dedicated to Transit*:** At the Commission's public hearings, several speakers raised concerns over what mechanism would ensure that new funds were in fact spent on transit improvements. As directed by the Chairman, the final report will include further discussion of this issue.

Best Practices

The degree to which the program is based on congestion mitigation policies that have successfully been implemented in other cities.

All four plans are based on traffic mitigation practices that have been used in other major cities in the United States, Europe, and Asia. These practices include:

- ***Fee-based congestion pricing zones***: London introduced a fee-based congestion pricing system in 2003. Drivers into central London's Congestion Pricing Zone (CPZ) are charged a flat £8 ($16) fee between 7 am and 6 pm on weekdays. Evaluation studies have shown that the number of vehicles entering the CPZ is down 16 percent from prior to the implementation of the charge. In 2006, the charging zone generated net revenues of £123 million ($244 million), which were used to fund enhanced bus service and other transit improvements.[36] The London scheme is most similar to the Mayor's plan and is similar to the alternative congestion pricing plan in some respects.

- ***Tolling and toll cordons***: New York City has a long history of using tolls on major river crossings to raise revenue for the transportation system. More recently, the Port Authority has used variable tolls on its Hudson River crossings in an effort to encourage drivers to travel during off-peak periods. Internationally, Stockholm, Sweden, uses a toll cordon around the city center to raise revenue and reduce traffic. The Stockholm toll cordon, which was recently made permanent after a six month pilot period, reduced traffic entering the city by 22 percent.[37]

- ***License plate rationing***: License plate rationing has been implemented in several Latin American cities with severe air quality problems. The three best documented examples are in Mexico City, Mexico; Bogotá, Colombia; and São Paulo, Brazil. The short-term benefits of these programs had the desired effect of reducing motor vehicle travel, and the trial programs were made permanent. Lessons learned from these cities, however, show that long-term results have been mixed. Short-term air quality and traffic impacts have been difficult to sustain, as many drivers switched to taxis or purchased an additional vehicle to circumvent the restriction.

Improvements in local and regional air quality and environment

The degree to which the program reduces air pollution and impacts the environment.

Motor vehicle emissions are a significant contributor to local and regional air quality problems. Public health authorities are concerned about the impact of air pollution on public health in New York City and the region. Hence, agency staff modeled the impact of each of the four options on emissions of three key air pollutants: volatile organic compounds (VOCs), nitrogen oxides (NO_x), and carbon monoxide (CO). VOCs and NO_x are two of the precursors for ground-level ozone, commonly referred to as smog.[38] All three pollutants are demonstrated risks to public health and are regulated by the Federal Clean Air Act. The results of the emissions analysis are presented below in Graph 3. As

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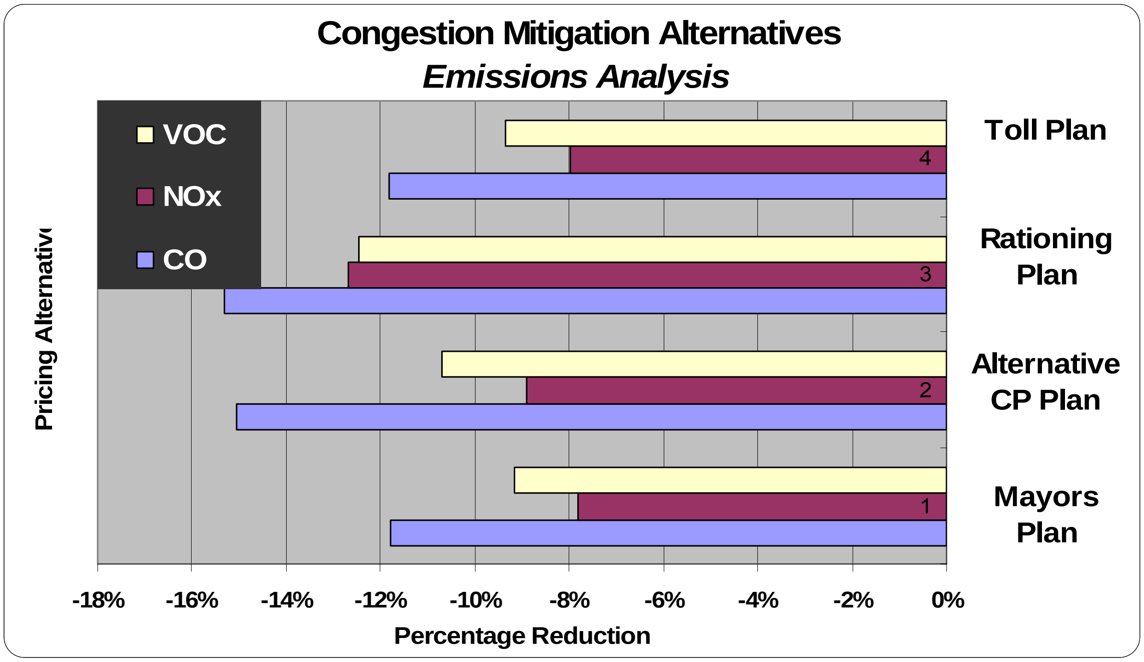
[36] Transport for London. *Central London Congestion Charging Zone: Impacts Monitoring Fifth Annual Report.* July 2007. (p. 114)

[37] Stockholm Trial website as accessed on 01/03/08: http://www.stockholmsforsoket.se/templates/page.aspx?id=183

[38] Analysis was conducted using the on-line NYSDOT MOBILE6 emissions calculator. VMT and speed outputs from the BPM were input into the model to determine relative levels of emissions for: the base case (current conditions) and for each of the alternatives. The difference in emission levels between the base case and each of the alternatives was then calculated as presented in Table 14.

shown, all four plans are estimated to reduce emissions of these three key pollutants. These numbers represent decreases in emissions for the area south of 86th Street. Given that all of the options would change local and regional traffic flows, emissions impacts are likely to vary by neighborhood.

Graph 3: Emission Reduction Impact on Manhattan South of 86th Street



All four plans would reduce emissions by lowering VMT within New York City and improving vehicles speeds, which reduces idling—a significant source of pollution. However, neighborhood air quality is driven by a number of interrelated factors, including pollution from traffic, pollution from point sources (such as power plants), weather patterns, topography, and regional pollution (i.e. from other states). A more detailed air quality analysis would be required to determine the impact of the emissions reductions displayed in Table 14 on air quality and public health indicators. Such an effort would require additional resources and time to complete.

Impacts on Neighborhoods: Traffic and Parking

The estimate of traffic impacts on areas of the city and region outside the CBD and the degree to which the program is likely to have a positive or negative impact on the availability of on-street parking in neighborhoods adjacent to the CBD.

In terms of neighborhood traffic impacts, agency staff used the results of the BPM to estimate the VMT reduction for selected geographic areas for each of the four options. This analysis, presented in Table 14, looked at traffic within sections of the City and in neighboring suburban areas. All four options are projected to significantly lower VMT outside of the area of Manhattan south of 86th Street. The largest traffic impacts are likely to be in areas immediately adjacent to the congestion zone or newly tolled bridges, as those areas will experience less through traffic headed into and out of the CBD. Accordingly, the Mayor's plan, the alternative congestion pricing plan, and the rationing plan will significantly reduce traffic in Upper Manhattan, Inner Brooklyn, and Western Queens. The toll plan, which would include tolls on bridges leading into Harlem and Washington Heights, would have a larger impact on traffic in the Bronx as compared to the other plans. Under the toll and congestion pricing plans, local traffic patterns in Brooklyn and Queens would likely change as traffic is redistributed from free City bridges to tolled crossings.

Each alternative would be beneficial to neighborhoods adjacent to the pricing zone by reducing through traffic bound for the congestion zone. However, the plans could cause an increase in park-and-ride activity in neighborhoods adjacent to the congestion zone or near major transit hubs. Motorists who park-and-ride seek to avoid a toll or fee by driving to an area outside the CBD, parking their cars, and then taking transit or walking to their final destination. These motorists can increase competition for on-street parking spaces in residential neighborhoods and generate more traffic on local streets. In many neighborhoods, this phenomenon already occurs as drivers seek to avoid the high parking costs in the CBD, congestion on approaches to Manhattan river crossings, and tolls on MTA and Port Authority crossings. At the Commission's public hearings, Commission members heard considerable concern over this issue from residents and neighborhood groups. As indicated in the description of the options, all four plans would include monitoring and parking mitigation measures to offset the impact of increased park-and-ride behavior.

Impacts on Congested Areas

VMT reductions can generally be expected to reduce traffic congestion and improve traffic flow. The specific impact on traffic conditions will vary depending on the level of traffic congestion that drivers currently experience. For example, a given VMT reduction will be more noticeable in conditions of heavy traffic congestion than when vehicles are already flowing freely on streets or highways. The effect of VMT reductions from the different alternatives can be seen by examining changes in the "level of service," a standard classification of traffic conditions widely used by traffic engineers. This scale classifies traffic conditions from good to bad using a scale from A to F. For level of service A, traffic is flowing freely and there is no traffic delay. For level of service F, streets are operating at or beyond their capacity and drivers experience stop-and-go conditions with unpredictable travel times.

Policies that mitigate traffic congestion will reduce the amount of time that drivers spend in level of service F conditions and shift conditions to toward better levels of service. For example, Graph 4 shows the effects of the Mayor's plan on level of service the CBD. Total VMT in level of service F conditions would be reduced by 26%, and by 16% for level of service E (near-breakdown conditions). Total VMT in the best conditions (level of service A) would increase by 13%.

Table 15 shows the reduction in level of service F for the CBD and other geographic areas, for each of the alternatives under consideration. As this table shows, level of service F conditions would be reduced not only in the CBD, but also in neighborhoods across the City.

Graph 4: Level of Service Impacts of the Mayor's Plan

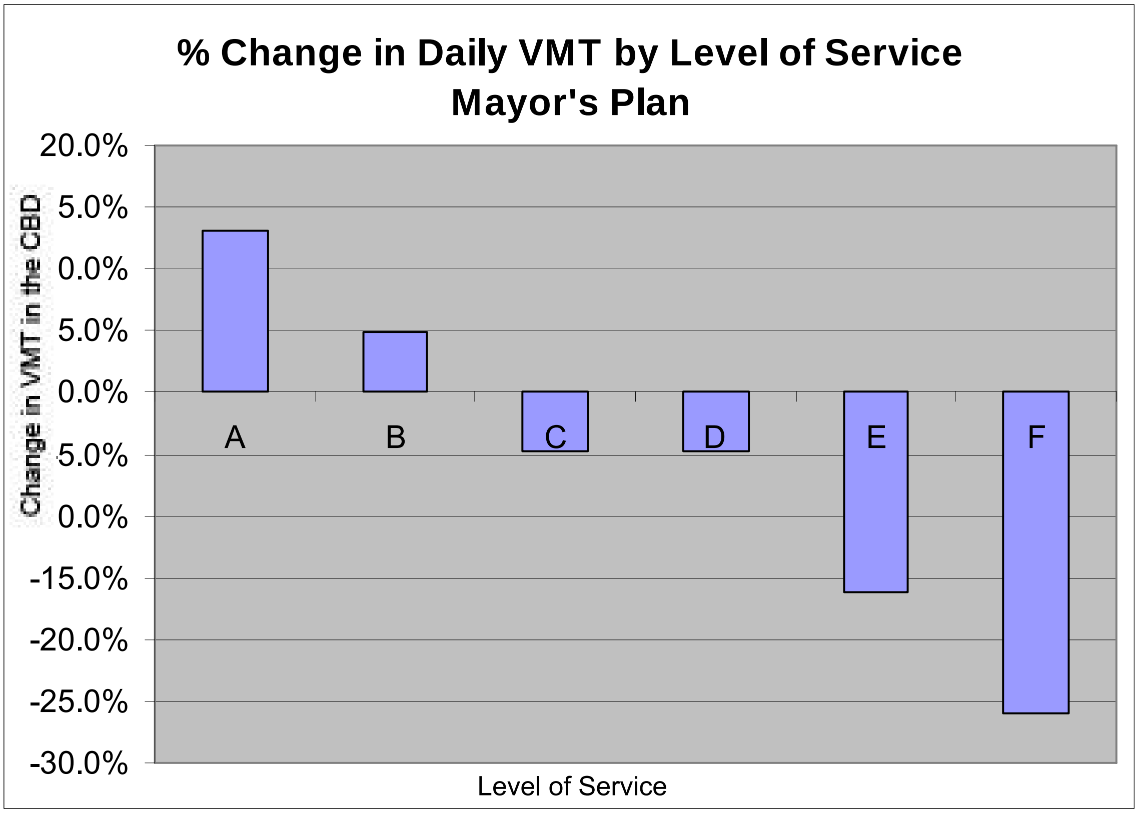


Table 14: VMT Reductions by Sub-region

	1. Mayor's Plan	2. Alternative Congestion Pricing Plan	3. Toll Plan	4. Rationing Plan
Manhattan South of 86th St	-6.7%	-6.8%	-7.0%	-10.3%
Manhattan CBD (South of 60th St)	-6.3%	-6.4%	-6.2%	-10.4%
Manhattan 60th - 86th St	-8.2%	-8.0%	-9.4%	-9.8%
Manhattan north of 86th St	-4.9%	-3.8%	-4.1%	-8.6%
Manhattan (total)	-5.9%	-5.4%	-5.7%	-9.5%
Bronx	-1.9%	-1.3%	-5.8%	-2.9%
Brooklyn	-2.0%	-1.9%	-2.8%	-2.9%
Northwest Brooklyn *	-3.8%	-4.7%	-6.0%	-4.7%
Rest of Brooklyn	-1.1%	-1.1%	-1.1%	-2.3%
Queens	-1.5%	-1.4%	-2.0%	-2.6%
Western Queens **	-5.6%	-6.1%	-6.9%	-7.5%
Rest of Queens	-1.2%	-0.9%	-1.5%	-2.2%
Staten Island	-1.3%	-1.0%	-0.8%	-2.3%
Long Island	-0.3%	-0.3%	-0.4%	-0.4%
New Jersey	-0.3%	-0.3%	-0.3%	-0.7%
Orange & Rockland	-0.4%	-0.4%	0.3%	-0.5%
East of Hudson (CT, Dutchess, Putnam and Westchester)	-0.3%	-0.2%	-0.5%	-0.7%
NYC	-2.4%	-2.1%	-3.2%	-3.9%
Outside NYC	-0.3%	-0.3%	-0.3%	-0.6%

*Northwest Brooklyn includes: Park Slope, Carroll Gardens, Boerum Hill, Red Hook, Downtown Brooklyn, Williamsburg, Greenpoint and Bushwick
**Western Queens includes: Long Island City, Astoria and Sunnyside

Table 15: Change in Daily Level of Service F for Selected Geographies

	1. Mayor's Plan	2. Alternative Congestion Pricing Plan	3. Toll Plan	4. Rationing Plan
Manhattan (South of 86th St)	-28.7%	-34.3%	-26.6%	-39.1%
Manhattan CBD (South of 60th St)	-26.0%	-32.3%	-22.1%	-37.6%
Manhattan 60th - 86th St	-33.2%	-37.6%	-34.0%	-39.6%
Manhattan north of 86th St	-24.4%	-20.9%	-11.4%	-39.7%
Manhattan (total)	-27.0%	-29.0%	-20.6%	-39.3%
Bronx	-9.2%	-8.3%	-34.6%	-23.4%
Brooklyn	-17.2%	-14.1%	-19.7%	-18.1%
Northwest Brooklyn *	-23.0%	-22.1%	-28.4%	-18.2%
Rest of Brooklyn	-12.9%	-8.3%	-13.4%	-18.1%
Queens	-9.4%	-8.8%	-9.5%	-13.4%
Western Queens **	-34.4%	-38.6%	-46.3%	-29.4%
Rest of Queens	-7.0%	-5.8%	-5.9%	-11.8%
Staten Island	-9.9%	-12.3%	-11.8%	-21.1%
Long Island	-5.0%	-8.0%	-7.5%	-9.1%
New Jersey	-0.9%	-0.8%	0.8%	-2.5%
Orange & Rockland	0.1%	-1.3%	-0.1%	-7.2%
East of Hudson (CT, Dutchess, Putnam and Westchester)	-7.3%	-7.9%	-7.5%	-8.8%
NYC	-15.9%	-15.7%	-16.1%	-22.8%
Outside NYC	-2.2%	-2.9%	-1.6%	-4.7%

*Northwest Brooklyn includes: Park Slope, Carroll Gardens, Boerum Hill, Red Hook, Downtown Brooklyn, Williamsburg, Greenpoint and Bushwick
**Western Queens includes: Long Island City, Astoria and Sunnyside

Impact on economic classes

The degree to which the program is progressive or regressive in the allocation of costs and benefits across economic classes.

Agency staff examined how each of the four options would impact residents of varying income levels.

Under the rationing plan, both high and low income motorists would be compelled to alter their travel behavior for days on which their vehicles were restricted. Consequently, the rationing plan would not have a disproportionate impact on low or moderate income drivers. That said, families with two or more vehicles may possibly have greater travel flexibility under the rationing plan, if a driver with two cars could switch vehicles on the day when her primary vehicle is restricted. Households with two vehicles have, on average, higher incomes than households with a single vehicle. Issuing license plates by household could avoid this problem, but would require, at a minimum, the cooperation of the motor vehicle departments from New York, New Jersey, and Connecticut as well as extensive enforcement if drivers sought to evade these efforts.

The Mayor's plan, the alternative congestion pricing plan, and the toll plan all include the imposition of new fees and tolls. In order to better understand the impacts of these costs on different socioeconomic groups, agency staff examined the income profiles of those groups most likely to pay the fee or toll. This data is presented in Table 16.[39] This analysis raises several issues for further consideration:

- **The fee and toll plans most impact those who drive to the CBD on a daily basis:** As was noted in the introduction, the vast majority of trips into the zone are not made by automobile. Therefore, individuals who typically walk, bike, or take transit to the CBD would not be financially affected by the fee or toll options. Of motorists, those who drive into the CBD every day for work would be most impacted. For example, under the Mayor's plan a daily auto commuter from Upper Manhattan to the Financial District would pay about $2,000 in congestion fees each year (versus $912 a year for transit). By comparison, a motorist who drives into the zone on weekdays once or twice a month for shopping or entertainment would pay about $100 to $200 a year in congestion fees under the Mayor's plan.

- **Those who commute by car to the CBD earn comparatively higher incomes:** Agency staff analyzed the income levels of city and suburban residents who use the auto as their primary mode to reach Manhattan jobs. Staff found that of the 2.14 million workers in Manhattan, about 292,000, or 14 percent, drive to work each day. These workers have a median annual income of $60,941. This compares to a median annual income of $46,416 for all workers in Manhattan, including the 1.85 million who take transit, walk, or bike to work. In aggregate, the fee would most impact commuters who earn 31 percent more than the median income of all Manhattan workers. Taking into account other income earners in the household, workers who

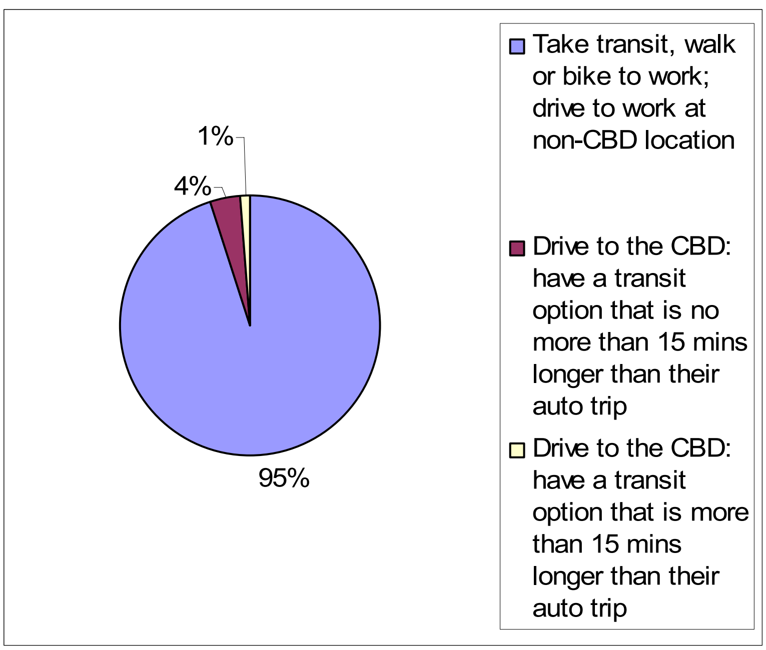
[39] MTA research has shown that many motorists are reimbursed for their toll expenses by their employers. For example, the MTA found that 22 percent of weekday motorists using the Queens-Midtown Tunnel are reimbursed for their tolls. This analysis does not take toll reimbursement into account.

drive to work in Manhattan have a median household income of $103,700. This compares to a median household income of $89,379 for all Manhattan workers.

- **A small proportion of low and moderate income commuters who drive would be disproportionately impacted by a fee or toll:** Most low and moderate income commuters into the CBD take transit or walk, and would not be impacted by a fee or toll. Of all City residents who commute to work, only five percent drive to the CBD.[40] Of that five percent, most (80 percent) have a feasible transit alternative to get to work that would take no more than 15 minutes longer than their auto trip.[41] Therefore, only one percent of Manhattan workers lack a viable alternative to paying a congestion fee or toll (see Graph 4). The low and moderate income workers disproportionately impacted by a fee or a toll represents a further sub group within this one percent.

- **A large number of low and moderate income residents would benefit from improved transit services under any of the three revenue-generating plans:** As a group, low and moderate income City residents rely more on transit for their travel needs as compared to higher income City residents. Therefore, these residents would benefit more from the short-term transit enhancements that would precede a toll or fee plan and from the expansion to transit system made possible by increased revenues for transit investment.

Graph 5: Travel Choices of Commuters who Live in New York City



[40] 2000 U.S. Census
[41] Bruce Schaller, "Necessity or Choice: Why People Drive into Manhattan." Transportation Alternatives, February 2006.

Table 16: Income Analysis by Travel Mode of Commuters to Manhattan

		Residence of Manhattan Commuters								
	Total workers in Manhattan	***Manhattan***	***Bronx***	***Brooklyn***	***Queens***	***Staten Island***	***Long Island***	***Hudson Valley***	***New Jersey***	***Connecticut***
Total Workers	2,141,105	624,712	182,844	359,608	354,795	53,151	135,873	118,280	276,903	31,471
Mean earnings	$75,112	$89,563	$35,353	$48,412	$43,318	$58,347	$99,947	$131,664	$95,976	$205,307
Median earnings	$46,416	$50,784	$29,759	$35,549	$35,549	$50,784	$72,113	$79,223	$69,066	$121,881
Drove to work	292,454	28,249	24,525	30,469	51,681	8,883	31,464	39,267	69,375	7,143
Mean	$88,532	$96,248	$58,564	$61,181	$52,024	$64,406	$98,391	$108,549	$111,866	$191,687
Median	$60,941	$60,941	$42,151	$44,893	$42,252	$53,831	$74,144	$76,176	$71,097	$69,066
Other means*	1,848,651	596,463	158,319	329,139	303,114	44,268	104,409	79,013	207,528	24,328
Mean	$72,989	$89,247	$31,757	$47,229	$41,834	$57,132	$100,416	$143,152	$90,665	$209,306
Median	$45,705	$50,784	$28,033	$35,549	$35,549	$49,768	$71,097	$81,254	$67,035	$137,116

Source: U.S. Census, American Community Survey 2006
* Includes: transit, walking, and bicycling

Regional Equity

The degree to which the program equitably allocates costs and benefits across geographic areas within the New York metropolitan region.

To better understand regional equity impact of the proposals, agency staff analyzed the geographic origins of current travelers to the CBD and who would pay new fees or tolls under each of the four plans. As license plate rationing does not include fees or tolls and applies to all drivers regardless of place of residence, agency staff concluded that the rationing plan would not raise regional equity issues. For the remaining three plans, agency staff determined the number of CBD-bound drivers from six geographic areas across the New York region. Staff then evaluated five key questions:

(1) What proportion of CBD-bound travelers come from each geographic area?
(2) What proportion of drivers to the CBD come from each geographic area?
(3) What proportion of *current MTA and Port Authority toll revenues* are paid by CBD-bound drivers from each geographic area?
(4) What proportion of *new congestion mitigation toll and fee revenues* under the three options would be paid by CBD-bound drivers from each geographic area?
(5) What proportion of *toll and fee revenues dedicated to transit* (including both current tolls and proposed congestion mitigation tolls or fee) would be paid by CBD-bound drivers from each geographic area?

Who travels into the CBD?
First, agency staff determined the place of residence of drivers who travel into or within the CBD during a typical weekday.[42] This data is presented in Table 17. In all cases, the table indicates the place of residence of travelers and not the origin of their trips. The first column shows the proportion of travelers to the CBD on a typical weekday from each of the geographic areas. This column includes travelers who drive, take transit, walk or bike. For example, 34 percent of travelers to the CBD live in Manhattan.

The second column shows the proportion of drivers to or though the CBD on a typical weekday from each of the geographic areas.[43] This table includes all trip purposes (both work and non-work) of auto drivers. If a person travels more than once per day, he or she is counted only once. For example, the table shows that 24 percent of those driving to or through the CBD live in New Jersey.

These two sets of figures provide a baseline against which to compare the proportion of drivers who currently pay tolls at MTA and Port Authority facilities against

[42] Residents of the CBD shown in these tables include those who: (1) travel exclusively within the CBD, and those who (2) leave the zone and then travel back into the CBD later in the day (reverse commuters, for instance). The unit is travelers, not trips, meaning that a traveler who makes multiple trips during the day is counted only once.

[43] Drivers to the CBD shown in these table include those who: (1) drive to a destination in the CBD at least once during the day; and (2) drive through the CBD at least once during the day. The unit is drivers, not trips, meaning that a driver who makes multiple trips during the day is counted only once, but tolls and/or fees paid on all trips are included.

the proportion of drivers who would (1) pay congestion mitigation congestion mitigation tolls or fees under each of the three options and (2) contribute to transit under each of the three options through both existing tolls and congestion mitigation tolls or fees.

Table 17: Who currently travels to the CBD and how do they get there?

Place of residence	CBD Travelers on a typical weekday: where do they live?	
	Travelers who drive, take transit, walk or bike to the CBD (24 hours)	Travelers who drive to or through the CBD (24 hours)
Manhattan	34%	27%
Bronx, Bklyn, Qns, SI	39%	35%
Nassau/Suffolk	4%	7%
Other NY State	3%	6%
Connecticut	1%	2%
New Jersey	19%	24%
Total - %	100%	100%
Total	2,616,697	670,935

For this type of data, the BPM provides a standard report that groups together the Bronx, Brooklyn, Queens, and State Island. Agency staff is working to calculate data by borough and will present those results to the Commission once they are completed.

Who pays tolls today?

Second, agency staff determined what proportion of current MTA and Port Authority toll revenues collected from CBD-bound drivers are paid by motorists from each geographic area. This data is presented in Table 18.[44] These drivers include both those that are traveling to the CBD and those that are passing through the CBD en route to another destination. For example, the table shows that 45 percent of toll revenues collected from CBD-bound drivers are paid by residents of New Jersey. Looking back to Table 17 that compares to the 24 percent of CBD-bound drivers from New Jersey.

Table 18: Who pays tolls today?

Place of residence	Proportion of tolls paid by CBD-bound drivers from each geographic area (typical weekday)
Manhattan	7%
Bronx, Bklyn, Qns, SI	29%
Nassau/Suffolk	7%
Other NY State	9%
Connecticut	4%
New Jersey	45%
Total	100%

Who would pay a new charge, fee, or toll under each option?

Third, agency staff analyzed what proportion of congestion mitigation toll and fee revenues would be paid by CBD-bound drivers from each geographic area. This data is presented in Table 19. The payments used to compute this table include:

[44] Note that "current MTA and Port Authority toll revenues collected from CBD-bound drivers" includes only tolls paid by CBD-bound drivers and not total toll revenues collected by the Port Authority or MTA. The percentages are calculated using the new toll schedules recently proposed by the PA and MTA.

- For the Mayor's plan: congestion pricing charge paid to the City.
- For the alternative congestion pricing plan: congestion pricing charge paid to the City, $1 surcharge on taxi/livery/black car trips beginning or ending in the zone during charging hours, additional parking taxes paid by Manhattan residents once the resident tax discount is removed for parking in the CBD, and additional on-street parking fees paid in the CBD.
- For the toll plan: tolls paid on City-owned East River and Harlem River Bridges (which are currently not tolled).
- In each case, the payments in these columns do not include any tolls paid to the MTA or PA, so the columns for each option tabulate mutually exclusive universes of dollars from the column showing tolls currently paid.

For example, under the Mayor's plan, seven percent of fee revenues are paid by drivers from Nassau and Suffolk counties. Looking back to Table 17, this compares to the seven percent of CBD-bound drivers from Nassau and Suffolk counties.

Table 19: Who would pay a new toll or fee under each option?[45]

Place of residence	What proportion of congestion mitigation fee and toll revenues would be paid by CBD-bound drivers from each geographic area?		
	Mayor's Plan	Alt. Congestion Pricing Plan	Toll Plan
Manhattan	31%	32%	28%
Bronx, Bklyn, Qns, SI	38%	38%	49%
Nassau/Suffolk	7%	6%	6%
Other NY State	7%	6%	8%
Connecticut	1%	1%	1%
New Jersey	17%	17%	7%
Total	100%	100%	100%

Who would contribute to transit under each plan?

Finally, agency staff analyzed the broader issue of who pays towards the needs of the regional transit system. The purpose of the Commission is to consider plans that reduce congestion in the CBD and that raise new revenues for transit investment. Existing MTA and Port Authority tolls on the Hudson and East river crossings both raise significant funds for transit services and investment and encourage commuters to take transit by increasing the cost of driving. In other words, drivers who use MTA and Port Authority facilities are already contributing revenues to the regional transit system. Therefore, the Mayor's plan and the alternative congestion pricing plan use fee structures that credit toll revenues already being paid by drivers. The toll plan goes further, and levies no new costs on CBD-bound drivers who use MTA and Port Authority crossings.

[45] As discussed on page 21, this chart does not reflect the Port Authority's proposed toll increase.

Hence, agency staff calculated how much CBD-bound drivers from each geographic area contribute to transit, including both MTA and Port Authority revenues used to support transit and proposed new congestion mitigation toll and fee revenues from each of the three plans. The data from this analysis is present in Table 20.[46] For example, under the alternative congestion pricing plan drivers to or through the CBD from the northern New York suburbs ("Other New York State") would contribute seven percent of all toll and congestion mitigation toll or fee revenues dedicated for transit. Looking back at Table 17, this compares to six percent of total drivers to or through the CBD from the New York suburbs.

Table 20: Who would contribute to transit under each option?

Place of residence	What proportion of current toll and congestion mitigation toll and fee revenues dedicated to transit would be paid by CBD-bound drivers from each geographic area?		
	Mayor's Plan	Alt. Congestion Pricing Plan	Toll Plan
Manhattan	22%	24%	24%
Bronx, Bklyn, Qns, SI	32%	34%	41%
Nassau/Suffolk	7%	6%	7%
Other NY State	8%	7%	8%
Connecticut	2%	2%	2%
New Jersey	29%	27%	19%
Total	100%	100%	100%

Comparisons of Tables 18 and 19 with Table 17 show imbalances between geographic areas in the distribution of both current tolls and of congestion mitigation fees or tolls, in comparison to each geographic area's share of CBD-bound drivers. Given the imbalances in current toll payments, each of the three proposed plans creates a closer correlation between total driver entries to the CBD and their overall level of support for mass transit.

The revenue-related goal of the Commission's work is to raise funds for mass transit. Table 20 best conveys how much each geographic area contributes to mass transit, as it includes current tolls that are used to subsidize mass transit as well as congestion mitigation tolls and fees. A comparison of Tables 20 and 17 shows that:

- **The Mayor's plan allocates transit subsidies among drivers largely in proportion to the percentage of CBD-bound drivers in each geographic area.** For example, as shown in Table 20, the proportion of CBD-bound drivers from the Bronx, Brooklyn, Manhattan, Queens and Staten Island is almost exactly equivalent to the proportion of transit subsidies raised from these areas (32 percent and 35 percent respectively) as are the figures for New Jersey (29 percent of transit subsidies and 24 percent of drivers). Manhattan is slightly underrepresented (22 percent of transit subsidies vs. 27 percent of drivers).

[46] The total amount contributed to transit includes: (1) the proportion of MTA and PA tolls paid by driver to or through the CBD that is dedicated to transit; (2) congestion mitigation fees or tolls paid by drivers to or through the CBD (all of which is dedicated to transit); and (3) in the case of the alternative congestion pricing plan, revenues from the $1 taxi surcharge and the elimination of the resident parking tax exemption for car owners within the CBD.

- **Similarly, the alternative congestion pricing plan allocates transit subsidies largely in proportion to the percentage of CBD-bound drivers from each geographic area.** Transit subsidies paid by Manhattan residents are slightly closer to their representation among CBD-bound drivers (24 percent of subsidies compared with 27 percent of drivers).

- **The toll plan allocates transit subsidies less proportionately as compared to the two congestion pricing plans.** Drivers from the Bronx, Brooklyn, Queens, and Staten Island pay a greater proportion of transit subsidies from tolls as compared to the proportion of CBD-bound drivers from those four boroughs (41 percent of transit subsidies compared with 35 percent of drivers). Much of this disproportionate impact is due to the tolling of local traffic between the Bronx and Upper Manhattan, much of which is unrelated to the CBD.

Privacy

The degree to which the program creates concerns over personal privacy rights.

The Mayor's plan, the alternative congestion pricing plan, and the toll plan raise similar privacy concerns. All three options employ a network of E-ZPass readers and LPR cameras that will capture the location of a vehicle at a given time and date in order to administer a congestion charge or toll. Currently, drivers on Port Authority and MTA crossings can choose to pay cash instead of using E-ZPass if they wish not to have their vehicles recorded. However, under the two congestion pricing options as well as the toll option, drivers would not be able to avoid having their vehicle information captured by a public agency, either via an E-ZPass read or license plate image. The Mayor's plan would collect the most vehicle information, since over 300 charging locations would be required to record the location and time that vehicles move into, out of, and within Manhattan south of 86th Street. By comparison, the alternative congestion pricing plan would collect the least amount of information, as its 25 charging locations will only record vehicles upon their entry into Manhattan south of 60th Street. Similarly, the toll plan has many fewer charging locations, but will generate records of vehicle movements both into and out of Manhattan.

The collection of large amounts of vehicle information raises the issue of how data should be processed and stored and whether or not it should be made available to third parties, such as law enforcement. If the Mayor's plan, the alternative congestion pricing plan, or the toll plan is implemented, a detailed set of data and personal privacy protections will be required. Adopting the privacy standards of the E-ZPass system, which is used by 23 toll operators in 12 states, is one option. E-ZPass has developed a set of best practices for collecting, exchanging and securing vehicular data and personal information for road charging. These include data archiving limitations, legal restrictions to limit data access by law enforcement or other government agencies, and assurances that no personal information is associated with field data. Several IAG agencies outside of New York are also piloting so-called anonymous E-ZPass accounts. Similar to pre-paid cell phones, an anonymous E-ZPass account provides a tag that can be purchased with a cash credit on the tag and that can be managed without provision of a mailing address or credit card information to the E-ZPass Customer Service Center.

Implementability

The feasibility of implementing the program given available technology, the program's design, and start-up and operating costs.

Based on the agency staff evaluation, the four options are all feasible within New York City, although each presents a unique set of implementation issues:

- **Feasibility of electronic tolling and LPR technology**: The Mayor's plan, the alternative congestion pricing plan, the toll plan, and the rationing plan with LPR enforcement would all require the use of electronic toll collection and LPR technology. LPR technology has been used successfully in Europe and Canada. Electronic toll collection technology is widely used in the United States, including by the MTA and Port Authority. Under both of the congestion pricing plans, however, these technologies would be applied within an urban street environment, rather than on a highway or at controlled toll plazas. The London system has successfully used LPR technology in an urban environment. The toll plan would be comparatively simpler to implement, as the application would be on bridge approaches with more controlled traffic flows.

- **Alternative congestion pricing plan - 60th Street boundary:** Any northern boundary located within the Manhattan street grid poses similar implementation challenges. Siting the physical charging infrastructure might be more difficult at 60th Street than further uptown because of the presence of cross-town subway tunnels under parts of 60th Street.

- **The Mayor's plan - inclusion of an intra-zonal charge:** As discussed earlier, the inclusion of an intra-zonal charge significantly increases the complexity of a congestion charging system. To charge for intra-zonal travel, charging infrastructure would need to be constructed within the CBD. Preliminary studies show that approximately 225 charging locations would need to be constructed within the zone to charge intra-zonal drivers. Intra-zonal transactions (E-ZPass and license plate camera reads) would constitute a significant proportion of the overall daily volume of transactions requiring data processing.

- **The Mayor's plan – inclusion of a free periphery:** As discussed earlier, allowing free travel for through traffic on the peripheral routes adds implementation complexity to congestion pricing because charging infrastructure would need to be constructed at all entrances and exits of the FDR Drive and at each intersection on Route 9A. Additionally, charging infrastructure would need to be deployed in such a way to preserve free through routes on surface streets between the river crossings and the peripheral roads.

- **Congestion pricing toll offsets**: Both the Mayor's plan and the alternative congestion pricing plan provide a credit to drivers who pay E-ZPass tolls on Port Authority and MTA facilities. This feature adds administrative complexity to congestion pricing. However, it is technically feasible to integrate the City's charging operation with the existing toll operations. This feature may also slightly increase processing costs as compared to the toll option, which does not include offsets.

Economic impact on jobs, business and regional economy

The degree to which the program is likely to have a positive or negative impact on total jobs and the City and regional economy.

Estimates of the annual cost of congestion on the regional economy range as high as $13 billion.[47] Any of the four options under consideration are expected to reduce this cost, particularly if commercial vehicles encounter less congestion and improve their productivity. However, each option does have slightly different implications including:

- **Tolls would have the largest impact on commercial vehicles**: One modification with implications for business and the regional economy is the choice between a congestion fee or a per-trip toll. For a commercial vehicle making multiple trips in the CBD, a fee would be a single, daily cost that may be offset by increased trip frequency (as the vehicle made more trips). The increased costs from a toll approach would be greater for commercial vehicles that make repeated trips into and out of the CBD, without any greater productivity savings to offset the costs.

- **Business cost saving through eliminating the intra-zonal charge**: Unlike the Mayor's plan, the alternative congestion pricing plan would not include an intra-zonal charge or an outbound charge. These changes would reduce costs for businesses that use vehicles that do not enter or leave the charging zone and would thus avoid paying a congestion fee.

- **Rationing provides less flexibility**: Under the fee and toll plans, businesses and employees would always have the ability to make auto trips into Manhattan or the CBD, albeit for a price. Under rationing however, businesses would lack that flexibility. If a company's delivery van was banned from the CBD on a given day, that company would simply be unable to make any deliveries with that vehicle. The inflexibility of the rationing plan would impose a cost on companies that depend on deliveries or employees who need to use their vehicles for work. This would be particularly true for small businesses that have a small number of available vehicles.

[47] PFNYC, 2006. (p. 40)

Options Summary

During the course of this chapter, the four options have been weighed against each other based on the Commission criteria. This section summarizes the comparative strengths and weaknesses of each of the four plans.

The Mayor's Plan

Strengths

- The Mayor's plan is projected to reduce VMT by 6.7% and to generate $420 million a year in revenues for transit investment.
- The Mayor's plan would reduce traffic across the city, especially in neighborhoods adjacent to the congestion pricing zone, including Upper Manhattan, Long Island City, and Downtown Brooklyn.
- Nearly all low and moderate income commuters take transit to the Manhattan CBD. These workers would benefit from the Mayor's plan through short-term improvements in transit services and long-term expansion of the transit system.
- The intra-zonal charge discourages trips within the congestion pricing zone with the same pricing approach as for all other trips into or out of the zone.
- The 86th Street boundary includes a larger portion of the most congested area of Manhattan.
- The plan's free periphery route allows drivers to travel around the CBD without paying the fee. For example, Brooklyn and Queens drivers could travel to the Bronx or Upper Manhattan via the FDR Drive without paying the fee.
- The plan does not have significant regional equity impacts.

Weaknesses

- Compared to the other three plans, the Mayor's plan has significantly higher capital costs. The Mayor's plan includes a charge on trips within the zone and thus requires many more charging stations, each with an array of E-ZPass and LPR cameras.
- Similarly, the Mayor's plan has significantly higher operating costs. The charge on trips within the zone and the free periphery route significantly increases the number of transactions that must be processed for each paying customer.
- Unlike the alternative congestion pricing and toll plan, the Mayor's plan does not include a charge on taxi and livery trips into or out of the zone—a major source of traffic and vehicle emissions in the Manhattan CBD.
- The Mayor's plan includes the placement of hundreds of cameras within and around the zone's perimeter, compared to only 25 or 13 camera sites needed for the alternate congestion pricing and toll plan respectively. More cameras raise greater privacy concerns.
- As under all four plans, park-and-ride activity could increase in neighborhoods near the zone or adjacent to major transit hubs if measures are not taken by the City to manage parking. Similarly, as with all four plans, the plan could potentially create localized congestion impacts due to changes in traffic patterns in the region.
- A small proportion of low and moderate income workers—those who drive to the CBD and who do not have a feasible transit alternative—would be disproportionately impacted by the congestion fee as compared to higher income drivers.

The Alternative Congestion Pricing Plan

Strengths

- The alternative congestion pricing plan is projected to reduce VMT by 6.8% and to generate $520 million a year in revenues for transit investment.
- The alternative congestion pricing plan has significantly lower capital and operating costs than the Mayor's plan and is comparable in those categories to the toll plan.
- Similar to the other plans, the alternative congestion pricing plan would reduce traffic across the city especially in neighborhoods adjacent to the congestion pricing zone, including Upper Manhattan, Long Island City, and Downtown Brooklyn.
- Similar to the Mayor's plan and toll plan, the alternative congestion pricing plan would benefit low and moderate income residents through improved transit.
- The alternative pricing plan would further encourage Manhattan residents to use transit by increasing the cost of parking within the CBD and by adding a $1 surcharge on taxi trips that end or begin within the zone.
- Compared to the Mayor's plan, the alternative congestion pricing plan would be easier to implement.
- The plan does not have significant regional equity impacts.

Weaknesses

- Unlike the Mayor's plan, there is no free peripheral route and drivers would have to pay to travel through the CBD. For example, Brooklyn and Queens drivers that travel to the Bronx or Upper Manhattan via the FDR Drive would pay the congestion fee.
- The elimination of the intra-zonal charge leaves no per-day charge on private auto use within the zone for drivers not using metered parking at their destination. However, the smaller zone minimizes the impact of this problem.
- As under all four plans, park-and-ride activity could increase in neighborhoods near the zone or adjacent to major transit hubs if measures are not taken by the City to manage parking. Similarly, as with all four plans, the plan could potentially create localized congestion impacts due to changes in traffic patterns in the region.
- A small proportion of low and moderate income workers—those who drive to the CBD and who do not have a feasible transit alternative—would be disproportionately impacted by the congestion fee as compared to higher income drivers.

The Toll Plan

Strengths

- The toll plan is projected to reduce VMT by 7.0% and to generate $859 million a year in new revenues for mass transit—the most of any of the alternatives considered.
- The toll plan would enable the City, the MTA, and Port Authority to move toward a more uniform tolling strategy for Manhattan, including the potential implementation of one-way tolling and/or time-of-day pricing on all crossings into Manhattan.
- The toll plan has significantly lower capital and operating costs than the Mayor's plan, and slightly lower operating costs than the alternative congestion pricing plan. One-way tolling on all crossings would further reduce operating costs for both the MTA and the City. The plan also includes fewer cameras than the Mayor's plan.
- The toll plan would eliminate the need to match transactions to calculate a daily charge and enables uniform charges to cash and E-ZPass customers.
- Similar to the Mayor's plan and the alternative congestion pricing plan, the toll plan would benefit low and moderate income residents through improved transit.
- Similar to the other three plans, the toll plan would reduce traffic across the city. It would have a greater impact on traffic in the Bronx, especially on through truck traffic.
- Compared to the two congestion pricing plans, the toll plan would significantly impact local trips between the South Bronx and Harlem/Washington Heights. This shift would reduce vehicle emissions in these neighborhoods.

Weaknesses

- Tolls would apply to all trips into and out of Manhattan and would be in effect 24 hours a day, seven days a week. By charging at all hours, the toll plan does not distinguish between drivers who contribute to peak period congestion and drivers who travel at less congested times.
- Unlike the Mayor's plan and the alternative congestion pricing plan, the toll plan does not address trips that start and end within Manhattan. Under the alternative congestion pricing plan, for example, many of these trips would be charged at 60th Street or would be captured by the $1 taxi surcharge within the zone.
- Compared to the two congestion pricing plans, the toll plan would significantly impact local trips between the South Bronx and Harlem/Washington Heights. This shift could have a local adverse economic impact.
- Per-trip tolls would have a larger impact on commercial vehicles than the two congestion pricing plans. A commercial vehicle making multiple trips in and out of Manhattan would pay for each trip under the toll plan, rather than a flat daily fee under either the Mayor's plan or the alternative congestion pricing plan.
- The toll plan would institute a toll on the Cross Bronx Expressway/I-95 corridor, causing potential diversions to other regional routes and tolled facilities. This would require further evaluation.
- The plan has disproportional impacts on motorists from the Bronx.
- As under all four plans, park-and-ride activity could increase in neighborhoods near the zone or adjacent to major transit hubs if measures are not taken by the City to manage parking. Similarly, as with all four plans, the plan could potentially create localized congestion impacts due to changes in traffic patterns in the region.
- A small proportion of low and moderate income workers—those who drive to the CBD

and who do not have a feasible transit alternative—would be disproportionately impacted by the toll as compared to higher income drivers.

The Rationing Plan

Strengths

- The rationing plan is projected to reduce VMT by 10.3 percent, assuming that the system coordinates plate numbers for multi-car households.
- Similar to the other plans, the rationing plan would reduce traffic across the city, especially in neighborhoods adjacent to the congestion pricing zone, including Upper Manhattan, Long Island City, and Downtown Brooklyn.
- The plan would require either the installation of LPR cameras around the rationing zone, with similar capital cost to the alternative pricing plan, or a dedicated staff of police officers to manually enforce the restriction.
- The plan would not have a disproportionate impact on low and moderate income commuters; all drivers would be equally impacted. Some income equity issues could emerge if two-car households are able to circumvent the restriction.
- The plan has no regional equity impacts.

Weaknesses

- The plan does not generate revenue and would need to be coupled with a broad-based tax measure in order to fund transit investments.
- The rationing plan provides less flexibility to businesses. Under the congestion pricing and toll plans, businesses and employees would always have the ability to make auto trips into Manhattan or the CBD, albeit for a price. Under rationing however, businesses would lack that flexibility.
- The rationing plan reduces revenue to the Port Authority and MTA.
- As under all four plans, park-and-ride activity could increase in neighborhoods near the zone or adjacent to major transit hubs if measures are not taken by the City to manage parking. Similarly, as with all four plans, the plan could potentially create localized congestion impacts due to changes in traffic patterns in the region.

List of Appendices

Appendices
The appendices are available in a separate document or on-line at:
https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission

Recommended Implementation Plan

January 31, 2008

VI. Commission Recommendation to the City and State of New York

In the summer of 2007, New York's Governor and State Legislature created the Traffic Congestion Mitigation Commission and charged its members with developing a solution to the severe traffic congestion problem in New York City's central business district (CBD). The legislation establishing the Commission required it to study and evaluate different approaches to reducing congestion in the CBD, including the congestion pricing plan forwarded by Mayor Michael R. Bloomberg in April of 2007, and to recommend a comprehensive traffic congestion mitigation plan to the City and the State by January 31, 2008. The Commission was required to set forth an implementation plan that achieves at least a 6.3 percent reduction in vehicle miles traveled (VMT) in Manhattan south of 86th Street—the estimated level of VMT reduction of the Mayor's plan.

Ideas Considered by the Commission

- Telecommuting incentives
- Increase cost of parking in the central business district (CBD)
- Reduce use of parking placards by public employees
- Additional taxi stands to reduce cruising ("No Hail Zone")
- Increasing cab fares and fees charged to cabs
- Raising tolls or implementation of variable tolls on existing facilities
- East River bridge tolls
- License plate rationing
- Required carpooling
- Creation of High-Occupancy Toll ("HOT") lanes
- Congestion pricing with a changed northern boundary
- Congestion pricing with no intra-zonal charge and a charge on FDR & West St.
- Congestion pricing with variable charges or extended hours
- Congestion pricing with a hybrid exemption
- Congestion pricing with a modified E-ZPass toll offset policy
- Truck restrictions

Over the past four months, the Commission has conducted a thorough review of potential congestion mitigation plans and the strengths and weaknesses of these approaches. During this process, the Commission recognized that an effective traffic congestion mitigation plan must include new funding for the MTA Capital Plan. At the direction of the Commission, agency staff has analyzed several different congestion mitigation options, ranging from telecommuting incentives to truck restrictions (see box at left). The results of the Commission's analysis have been made available to the public and are posted online.[1] In addition, the Commission held two sets of public hearings (a total of 14) across the City and region and received testimony from public officials, advocacy groups, community organizations, and private citizens. The comments, concerns, and suggestions articulated at these hearings have informed the Commission's work, including its evaluation criteria, research agenda, and final recommendation.

Following the release of its Interim Report on January 10, the Commission held its second round of public hearings, one in each borough of New York City and one each in Nassau and Westchester counties. Speakers commented on the options outlined in the Interim Report and stated the need for the Commission to identify specific implementation strategies relating to transit improvements, revenue allocation, environmental review, neighborhood parking, and

[1] Commission website: https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission

privacy protection. A number of speakers testified about the need for improved transit service in the City generally and in specific neighborhoods. Some speakers expressed opposition to all the options presented in the Interim Report, while others advocated for a specific alternative. Several hearing participants encouraged the Commission to adopt the alternative congestion pricing plan as presented in the Interim Report, which they viewed as an improvement over the Mayor's proposal. Among other reasons, these advocates supported the plan's simpler design, reduced number of camera locations, and lower capital and operating costs. Several participants also approved of moving the congestion zone's northern boundary from 86th Street to 60th Street. Comparatively few participants in the hearing supported the toll plan.

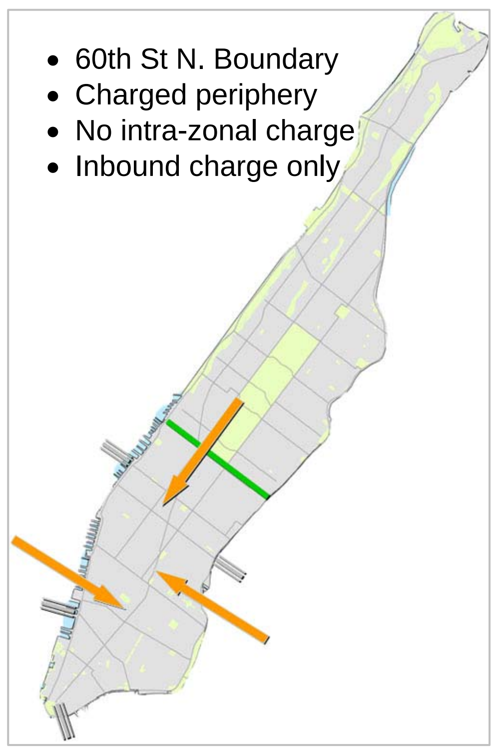
This report follows up on the Commission's Interim Report, released January 10, and lays out the Commission's final recommendation to the Governor, the State Legislature, the City Council, and the Mayor.

Recommended Plan

Upon further deliberation and input from the public, the Commission recommends that the City and State implement congestion pricing in Manhattan south of 60th Street. The Commission's plan builds on the alternative congestion pricing plan presented in the Interim Report and adds a series of implementation guidelines to be discussed in the next section.[2] The guidelines touch on issues raised throughout the Commission's deliberations, including: privacy protection, neighborhood parking, dedication of revenues for transit, and environmental review.

Table 9: Alternative Congestion Pricing Plan

Parameter	Plan
Northern Boundary	60 St
Direction of Charge	Inbound
Fee Rate	Flat $8
Hours of Charge	6 am – 6 pm
E-ZPass Toll Offset	Yes
LPR Surcharge	$1
Supplements	
$1 taxi/livery trip surcharge for trips that start and/or end in zone	
Increased metered parking rates within zone	
Eliminate resident parking tax exemption within zone	
Implementation Measures	
Residential parking permit program	
Dedication of revenues to transit	
Short-term transit enhancements	
Privacy protections	
Environmental review	



[2] See pages pg. 30-31 of the Interim report to the Traffic Congestion Mitigation Commission, January 10, 2008.

Under the Commission's plan, cars would be charged an $8 fee to drive into the areas of Manhattan south of 60th Street on weekdays between 6am and 6pm. Trucks would pay $21, except for low-emission trucks, which would pay $7.[3] Under this fee-based plan, drivers would pay once upon entering the charging zone and would be able to make additional trips in and out of the zone at no additional cost. For E-ZPass users, the value of all tolls paid on MTA or Port Authority bridges and tunnels would be deducted from the fee up to $8.

The Commission's plan would use an electronic fee collection system based on E-ZPass and license plate cameras. Non-E-ZPass users would be subject to a $1 surcharge to encourage E-ZPass use and to cover the additional cost of processing license plate image transactions. In addition, the Commission's plan includes a package of parking and taxi policies designed to further discourage driving within the zone, including a $1 surcharge on taxi, black car, and car service trips that start and/or end within the zone during congestion pricing hours, increased on-street parking meter rates within the zone, and elimination of the resident parking tax exemption for off-street parking garages and lots within the zone.

Table 21: Plan Traffic Benefits

Geography	VMT Reduction	Reduction in Most Severe Traffic*
Manhattan south of 86th Street	-6.8%	-34.3%
Manhattan north of 86th Street	-3.8%	-20.9%
Western Queens**	-6.1%	-38.6%
Northwest Brooklyn***	-4.7%	-22.1%
Bronx	-1.3%	-8.3%
Staten Island	-1.0%	-12.3%

* Measures reduction in level of service (LOS) F conditions (e.g. stop-and go traffic).
** Western Queens includes: Long Island City, Astoria and Sunnyside
*** NW Brooklyn includes: Park Slope, Carroll Gardens, Boerum Hill, Red Hook, Downtown Brooklyn, Williamsburg, Greenpoint and Bushwick

The Commission's plan provides an effective and practical solution to the problem of traffic congestion in New York's central business district (CBD) and meets the evaluation criteria used by the Commission to reach its final recommendation (see tables 21 and 22). The plan will help the City to meet the transportation challenges posed by projected population and job growth; it exceeds the 6.3 percent VMT reduction required by the State legislation establishing the Commission; and it will raise an estimated $491 million per year for transportation investment.[4] Investing in the MTA Capital Plan was one of the main objectives sought by the Commission. Compared to the Mayor's plan, the Commission's plan has considerably lower operating and capital costs and a simpler fee structure.[5] By increasing both the cost of taxi trips and parking within the zone, the plan ensures that those who live inside the zone also pay for auto use. The plan will also

[3] The discount would apply to new trucks that meet the most current EPA engine standards and to trucks that have been retrofitted with EPA-approved equipment to reduce emissions by 85 percent. The goal of this incentive is to encourage truck owners to switch over to cleaner diesel trucks, which currently constitute a small portion of the regional truck fleet.
[4] Net revenue of $491 million calculated based on the MTA and Port Authority's approved toll increases.
[5] The capital cost of the Commission's plan is estimated at $73 million, and the annual operating cost is estimated at $62 million. These cost estimates are preliminary and based on construction cost factors from early 2007. If the plan is approved, the City will calculate updated capital cost estimates.

reduce traffic in neighborhoods adjacent to the zone, decrease vehicle emissions, and benefit the City and regional economy.

Compared to its considerable strengths, the Commission's plan has relatively few weaknesses. Similar to the other plans considered in the Interim Report, the Commission's plan may increase park-and-ride activity in neighborhoods adjacent to the zone or near major transit hubs. As will be discussed in the implementation section, the Commission recommends that the City be required to offer communities a residential parking permit program (RPP) prior to the start of congestion pricing and to track park-and-ride activity as part of a comprehensive monitoring program. In terms of economic equity, the Commission's plan will negatively impact a small proportion of New Yorkers of limited income: those who drive to work in the CBD and have no feasible transit alternative. This group represents less than one percent of all New York City commuters to the CBD. The vast majority of City residents of limited income will benefit from short and long-term transit improvements that revenues generated by the plan will make possible.

Finally, the Commission believes that the Commission's plan is the first step towards a coordinated traffic management strategy for Manhattan and the region. Such a strategy could include one-way tolling and variable pricing on strategic crossings into Manhattan in combination with a 60th Street cordon or a coordinated congestion pricing scheme. A coordinated tolling or pricing strategy has the potential to reduce operating costs for the City, MTA, and Port Authority, to improve the efficiency of the regional transportation system, to raise additional revenues, and to set a precedent for further regional transportation cooperation. The Commission recommends that the State consider the long-term benefits of a coordinated approach to tolling or congestion pricing.

Table 22: Evaluation of the Commission's Plan

Criteria	Commission Finding
Reduction in Vehicle Miles Traveled (VMT)	The plan will reduce VMT in the area of Manhattan south of 86th Street by 6.8 percent, exceeding the requirement in the legislation establishing the Commission. The plan will also reduce traffic across the City and region.
Net Revenue	The plan will generate $491 million a year in net revenues for transit investment. The plan's design will result in significantly lower capital and operating costs than the Mayor's plan.
Best Practices	The plan is modeled on successful congestion pricing programs in London, England and Stockholm, Sweden. The London and Stockholm programs have both achieved significant reductions in traffic congestion while also raising new revenues for transportation investment.
Impacts on Air Quality and the Environment	The plan will reduce motor vehicle emissions in the congestion pricing zone, neighborhoods adjacent to the zone, and citywide. Congestion pricing will support the City's ongoing efforts to improve air quality and public health and to reduce emissions of greenhouse gases.
Neighborhood Impacts	The plan will significantly reduce through-traffic in neighborhoods adjacent to the zone, including Upper Manhattan, Long Island City,

	and Downtown Brooklyn. Like all four alternatives considered, the plan may increase park-and-ride activity in some neighborhoods. These impacts can be mitigated through neighborhood parking strategies and must be addressed in the City's implementation plan.
Impacts on Economic Classes	By raising money for short and long-term transit improvements, the plan will most benefit transit commuters to the CBD. Analysis shows that these commuters earn 31 percent less in income than auto commuters to the CBD. A small proportion of New Yorkers of limited income—those who drive to jobs in the CBD—would be disproportionately impacted by the plan.
Regional Equity	The main purpose of the revenue stream created by congestion pricing is to support the MTA Capital Plan. Commission members raised concern over the regional equity of the congestion pricing plan regarding the contribution of commuters from west of the Hudson River to the MTA Capital Plan.
Privacy	Like all four alternatives considered, the plan raises some privacy concerns. Compared to the Mayor's plan however, the Commission's plan requires significantly fewer license plate camera locations. The privacy impacts of the plan can be mitigated through controls on the storage and sharing of vehicle data, which should be addressed in the City's implementation plan.
Implementability	The plan is feasible and will rely primarily on technologies already in use in the New York area, such as E-ZPass. Neither new technology nor unprecedented levels of interstate coordination would be required.
Economic Impact	The plan will have a positive impact on the economy of the City and region by improving worker productivity, reducing business costs, and securing the future of the transit system.

Implementation Principles

In addition to its primary task of recommending a traffic congestion mitigation plan, the Commission also considered how such a plan should be implemented. In this section the Commission proposes a set of implementation principles for consideration by the City and State. These principles reflect issues and concerns raised by the Commission, elected officials, advocacy and community groups, and the general public, and their application will ensure that the Commission's goals are achieved in a way that takes all of these issues into account. Although presented in the context of the Commission's plan, these principles should apply to <u>any</u> pricing-based congestion mitigation plan considered by the City and State.

Summary: Implementation Principles

1. Dedicated Transit Account: Funding the MTA Capital Plan must be the primary goal of revenues from congestion pricing. In addition, the Commission notes that there will be unfunded MTA operating needs related to short-term transit improvements, including those placed into operation prior to the start of congestion pricing, that must be addressed.

2. Short-Term Transit Improvements: The Commission recommends that strategic improvements to subway, bus, and express bus services be in place prior to the start of congestion pricing. These improvements should be financed with revenues from congestion pricing.

3a. Neighborhood Parking Strategies: The Commission recommends that the City be required to allow neighborhoods adjacent to the zone to opt into a residential parking permit program prior to the start of congestion pricing. This program should be consistent with the recommendations of the environmental review.

3b. Monitoring Program: The Commission recommends that the City be required to implement a traffic and environmental monitoring program prior to the start of congestion pricing. If the monitoring program identifies significant adverse environmental impacts, the Commission recommends that the City be required to implement appropriate mitigation measures.

3c. Environmental Review: The Commission recommends that the City be required to conduct a thorough environmental review of the plan based on the principles of the State Environmental Quality Review Act (SEQRA).

4. Privacy: The Commission recommends that the City be required to take appropriate steps to protect the privacy of drivers, such as restrictions on the handling of vehicle data and the provision of an anonymous payment option.

5. Payment Options: The Commission recommends that the City be required to provide a wide range of payment options to non-E-ZPass users, such as payment via kiosks, at designated retail stores, on the internet, via SMS, and by phone.

6. Traffic Enforcement: The Commission recommends that the City, in coordination with congestion pricing, increase the enforcement of existing traffic laws and reduce the abuse of government-issued parking placards.

7. Economic Impacts on Drivers of Limited Income: The Commission recommends that the State Legislature consider changes to State tax policy so as to mitigate any disproportionate impacts of the plan on drivers of limited income.

8. Regional Equity: The Commission recommends that the State Legislature consider the concerns raised by some Commissioners regarding the contribution of commuters from west of the Hudson River to the MTA Capital Plan.

(1) Dedication of Revenues

At the Commission's hearings, many witnesses wanted guarantees that the funds generated by a congestion pricing system would be invested in transit and not diverted to other unrelated needs. This concern was shared by testifiers representing a broad range of views on congestion pricing. The Commission recommends that State build on the successful model for dedicating transit revenue under State Law that has been in place since 1980. This approach must be strengthened for the purpose of congestion pricing. Therefore, the Commission recommends the following:

- **Securing of congestion pricing revenues**: Funding the MTA Capital Plan must be the primary goal of revenues from congestion pricing. In addition, the Commission notes that there will be unfunded MTA operating needs related to short-term transit improvements, including those placed into operation prior to the start of congestion pricing, that must be addressed. All net revenues generated by the congestion pricing fee and the taxi surcharge should be deposited into a dedicated MTA account similar to the agency's dedicated real estate tax accounts. These funds should only be used for capital investments for system improvement, expansion, and state of good repair projects, excluding normal replacement. Such projects may include, but are not limited to, new buses and bus facilities, BRT routes, park-and-ride facilities, commuter rail improvements, and subway expansion and rehabilitation. By law, revenues should not be used for any other purposes. Priority in the distribution of funding should be given to those areas in need of additional transit investments. Funds should be used for both new capital expenditures and for debt service associated with those expenditures. As prescribed in the law establishing the Commission, the MTA should submit a new five year capital plan by March 31, 2008.

- **Governance structure for congestion pricing revenues**: The use of congestion pricing revenues for capital expenditures should be subject to approval by the MTA Capital Program Review Board (CPRB), as required by law. However, only for the approval of the plan submitted by March 31, 2008 by the MTA for this account only, the Commission recommends that a representative of the New York City Council Speaker be provided with the same rights and privileges of the CPRB members appointed by the Governor upon the recommendation of the Senate Minority Leader and Assembly Minority Leader. The expenditures in the congestion pricing account should not be used to offset any funding obligations to the MTA by any governmental entity. For capital expenses funded by congestion pricing revenues, the MTA shall follow all legally applicable prevailing wage laws. In addition, the MTA should continue to be responsive to local government and community concerns and to conduct all public hearings as required by law.

- **Securing of parking revenues**: All funds from increased on-street parking rates and the elimination of the resident parking tax exemption within the zone should be dedicated by the City of New York to additional transit, pedestrian, bicycle, and parking management improvements, including, but not limited to, expanded ferry service, bus signalization, BRT investments, bicycle facilities, and pedestrian enhancements. NYCDOT should submit an annual plan to the City Council for approval on the use of these funds and shall report on the actual expenditures of such a plan.

- **Maximizing resources for transit**: In order to provide enhanced transit services throughout the region, a significant amount of new capital is needed for transportation infrastructure. However, issuing bonds (the method of borrowing typically used by the City and the MTA for capital investments) requires a guaranteed revenue stream over the long term.

- **Transparency:** The Commission recommends that the MTA report annually on all receipts and expenditures of the congestion pricing account, including taxi surcharge revenues. The report should detail operating expenses of the program, enhancement plans, and all fund expenditures. This report and all capital plan amendments relating to this account should be readily available to the public, including posting on the MTA website, and be submitted to the Governor, State Legislature, Mayor, MTA CPRB, and City Council.

(2) Transit Service Improvements Prior to Congestion Pricing

At the Commission's public hearings, several speakers stated that additional transit service would be necessary to accommodate the increase in bus and subway ridership caused by congestion pricing. In its presentation to the Commission, the MTA pledged to improve transit service prior to the start of congestion pricing to meet increases in ridership and to fulfill the requirements of the UPA. The Commission reiterates the importance of having the MTA's transit enhancement plan in place prior to the implementation of the Commission's plan.

(3) Neighborhood Parking Strategies, Monitoring, and Environmental Review

The Commission recommends that State Legislature enact a customized environmental review process that adheres to the principles of the State Environmental Quality Review Act (SEQRA) and City Environmental Quality Review (CEQR) and that recognizes the plan's unique legislative approval path and review process to date. SEQRA/CEQR is the standard environmental review process for all City projects and policies that may have an adverse impact on the environment. The relevant section of SEQRA states:

> In adopting SEQRA, it was the Legislature's intention that all agencies conduct their affairs with an awareness that they are stewards of the air, water, land, and living resources, and that they have an obligation to protect the environment for the use and enjoyment of this and all future generations. The basic purpose of SEQRA is to incorporate the consideration of environmental factors into the existing planning, review and decision-making processes of state, regional and local government agencies at the earliest possible time.[6]

When planning a project, government agencies are required by SEQRA/CEQR to conduct a preliminary review to determine whether the project may have adverse environmental impacts. If the project is found to have potential impacts, the agency is further required to solicit public comments, consider alternatives to the project, analyze the potential environmental impacts of each alternative, and justify the selection of a preferred alternative. The results of this process are then disclosed in an Environmental Impact Statement (EIS) and released to the public.

During the course of its work, the Commission undertook processes that, in effect, addressed many key elements of the SEQRA/CEQR process.[7] The Commission determined that its plan would have a beneficial impact on the environment by reducing auto traffic and vehicle emissions both in the congestion pricing zone and citywide.[8] Several laws have provided that the full SEQRA process is unnecessary when other processes have fully analyzed a project’s environmental impacts in a public setting, thus rendering full SEQRA review duplicative.[9] Therefore, the Commission’s alternatives analysis and public outreach should serve as the foundation of the environmental review process for the congestion mitigation plan approved by the State. Treating the commission process in this way is consistent with past practice for complex issues involving legislative action and existing public review. Such an approach will leverage the substantial work conducted by the Commission and recognize that the State Legislature will, if so desired, authorize the City to implement a specific traffic congestion mitigation plan (thus precluding the City from considering other alternatives).

The Commission further recommends that the State require that the City fulfill SEQRA/CEQR's remaining mandates by soliciting public comment on the potential adverse environmental impacts of the authorized plan, analyzing these potential impacts, identifying possible mitigation measures, and by developing a comprehensive monitoring

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[6] Environmental Conservation Law (ECL) § 8-0103 (8) and 6 NYCRR Part 617.1 (c)

[7] The Commission held two sets of public hearings and received comment on the environmental impacts of congestion pricing, mitigation measures, and alternative congestion mitigation plans. Public comment was incorporated into the Commission’s ten evaluation criteria (which included environmental impacts), its research agenda, and the five alternative congestion mitigation plans selected for further review. Agency staff have conducted traffic and air quality impact analysis on each of the five alternatives, and made these analyses available for public review and comment.

[8] The plan would also generate funding for short and long-term transit improvements; further encouraging transit use and supporting the environmental goals of the program and benefiting the City’s environment and economy. Congestion pricing, like all of the four alternatives plans considered, may cause an increase in park-and-ride activity in neighborhoods adjacent to the zone. However, these neighborhoods would also experience a significant reduction in through-traffic heading to Manhattan.

[9] Some examples include permits issued by the Adirondack Park Agency, and under Articles VII, VIII and X of the Public Service Law. Other laws, while requiring a SEQRA process, have tailored that process to other legislatively-mandated process. Examples include the Long Island Pine Barrens Act and the Low Level Radioactive Waste Disposal Commission Act.

plan. In addition, the Commission recommends that the City be required to implement a robust monitoring program during the initial phase of implementation of the authorized plan. SEQRA/CEQR requires that if adverse environmental impacts are identified, the government agency conducting the review must incorporate mitigation measures into its plan to the maximum extent practicable. The Commission recommends that the City be required to conduct ongoing monitoring of the recommended plan's environmental impacts, including impacts on traffic and neighborhood air quality. If significant adverse traffic, air quality, or other environmental impacts are identified during the monitoring phase, the City should be required to implement one or more of the mitigation measures identified in the EIS, such as residential parking permits or traffic improvements. The findings of the City's efforts should be summarized in a customized EIS released prior to the start of congestion pricing. The process should be structured so as to enable the City to meet the March 31, 2009 UPA deadline. Through this process, the plan approved by the State will have undergone all the key elements of SEQRA/CEQR review.

The details of the Commission's recommended environmental process for the Commission's plan are as follows:

Part I – Environmental Review

- **Alternatives analysis and evaluation of impacts**: the Commission's 14 public hearings should serve as the initial public comment phase for the environmental review process. The Commission's Interim Report, which laid out five alternatives, should serve as the alternatives analysis for the environmental review process.

- **Preferred alternative**: the preferred alternative will be specified by the State Legislature, if so desired, in legislation authorizing New York City to implement a traffic congestion mitigation plan. The approved plan should serve as the preferred alternative for the environmental review process.

- **Scoping process and public comment**: Through public hearing(s), the City should solicit comments on the proposed scope of the environmental review, potentially significant adverse impacts of the project, and mitigation measures to address those impacts. The City should then release a scoping document identifying any potentially significant adverse impacts, if any, for further analysis and review. Likely topics may include: traffic, noise, neighborhood parking availability, air quality, transit, and pedestrian impacts.

- **Analysis of potentially significant adverse impacts**: The City should conduct an analysis of any potentially significant adverse environmental impacts, develop possible mitigation measures, and outline a detailed monitoring plan for each potential impact.

- **Release of customized Draft EIS**: the City should release a Draft EIS summarizing the above, including the possible mitigation measures and monitoring plan. The Draft EIS should be released prior to the start of congestion pricing. The City should hold public hearing on the Draft EIS.

- **Release of Customized Final EIS**: after incorporating public comment, the City should release a Final EIS. The Final EIS should be released prior to the start of congestion pricing. Ten days after the public release of the Final EIS, the City should release a findings statement regarding its decision on an appropriate monitoring plan and potential mitigation measures.

Part II –Initial Implementation, Monitoring, and Mitigation

- **Monitoring program**: the City should monitor the traffic, air quality, noise, parking, and other environmental impacts of the project and release annual reports on these impacts. A preliminary report should be made available within six months of the start of congestion pricing and these reports should be made available to the public on the internet. The monitoring program must be in place prior to the implementation of congestion pricing to establish baseline conditions.

- **Mitigation program**: the City should implement mitigation measures for significant adverse impacts identified by the monitoring program and should solicit public comment on proposed mitigation plans. The City should be required to initiate mitigation plans, if needed, within the first six months of congestion pricing. The Commission also recommends that the City pay particular attention to neighborhood parking impacts. Parking mitigation measures may include, but not be limited to, traffic improvements, expanded use of Muni-meters, changes to parking regulations, and residential parking permits (RPP). RPP programs will be subject to the approval process described below.

- **Residential parking permits**: NYCDOT is currently developing a citywide parking policy through a community planning process. Under the policy, neighborhoods will be able to request RPP. NYCDOT will then work with the local community to develop the boundaries of the RPP zone, which must then be reviewed by the Community Board, Borough President, and City Council. This process will be in place prior to the implementation of congestion pricing. The Commission supports this approach to RPP and further recommends that neighborhoods adjacent to the pricing zone be prioritized so that RPP can be implemented in neighborhoods that choose to opt in, prior to the start of congestion pricing. In addition, the Commission recommends the State pass legislation authorizing New York City to implement RPP.

(4) Privacy Protections

The Commission recommends that the City take appropriate steps to protect the privacy of drivers into the congestion pricing zone. The City should comply with the privacy standards of the E-ZPass Interagency Group (IAG), adhere to all applicable City and State laws regarding the sharing of vehicle and private information with third parties, and implement additional privacy standards. Under current IAG protocols, participating agencies are not required to delete records that are no longer needed for billing inquiries or non-payment enforcement. The City should delete all vehicle data, including E-ZPass reads and LPR photos, that are no longer needed for billing inquiries or non-payment enforcement. All data kept for research purposes should be stripped of vehicle information. In addition, the City should seek to develop an anonymous payment option through E-ZPass that allows a driver to pay the congestion pricing fee without revealing his or her identity.

(5) Payment Options
The Commission recommends that the City be required to provide a wide range of payment options to non-E-ZPass users who enter the congestion zone during charging hours, such as the option of paying via kiosks, at designated retail stores, on the internet, via SMS, and by phone.

(6)Traffic Enforcement
The Commission recommends that the City, in coordination with congestion pricing, increase the enforcement of existing traffic laws. Measures should include stricter enforcement of block-the-box rules, bus lanes, and of the rules pertaining to government issued parking placards.

(7) Economic Impacts on Drivers of Limited Income
Although most New Yorkers of limited income would benefit from the Commission's plan through improved transit services, the plan would negatively impact a small proportion of New Yorkers of limited income—those who commute by car to CBD. The Commission recommends that the State Legislature consider changes to State tax policy so as to mitigate these impacts.

(8) Regional Equity
The Commission recommends that the State Legislature consider the concerns raised by some Commissioners regarding the contribution of commuters from west of the Hudson River to the MTA Capital Plan.

S T A T E   O F   N E W   Y O R K

S. 6432 A. 9362

2007-2008 Regular Sessions

S E N A T E - A S S E M B L Y

July 23, 2007

IN SENATE -- Introduced by COMMITTEE ON RULES -- (at request of the Governor) -- read twice and ordered printed, and when printed to be committed to the Committee on Rules

IN ASSEMBLY -- Introduced by M. of A. SILVER, FARRELL, BRENNAN, BRODSKY, TEDISCO -- Multi-Sponsored by -- M. of A. ARROYO, AUBRY, BENEDETTO, BRADLEY, BROOK-KRASNY, CLARK, COOK, CUSICK, CYMBROWITZ, ESPAILLAT, FIELDS, GALEF, D. GORDON, GOTTFRIED, GREENE, HEASTIE, JACOBS, LAFAY-ETTE, LANCMAN, LAVINE, MARKEY, MAYERSOHN, McENENY, MILLMAN, ORTIZ, PAULIN, PERALTA, N. RIVERA, P. RIVERA, ROSENTHAL, SEMINERIO, YOUNG -- (at request of the Governor) -- read once and referred to the Committee on Transportation

AN ACT establishing the New York city traffic congestion mitigation commission and requiring the development of a traffic congestion mitigation plan by the mayor of the city of New York; to amend the public authorities law, in relation to capital program plans; and providing for the repeal of such provisions upon expiration thereof

THE PEOPLE OF THE STATE OF NEW YORK, REPRESENTED IN SENATE AND ASSEMBLY, DO ENACT AS FOLLOWS:

Section 1. Legislative declaration. The legislature hereby finds and declares: (a) that traffic congestion in New York city`s business district has a severe adverse impact on public health, the environment of New York city and adjoining areas, and overall employment and job development; (b) that such adverse health impacts are exacerbated by other sources of environmental pollution in and around New York city, including pollution from commercial and residential buildings; (c) that a variety of possible ways to address these problems exist, including through pricing mechanisms, short-term and long-term mass transit operating and capital improvements, green building programs, incentives and other initiatives; (d) that action must be taken to address these problems as soon as possible; and (e) that the Federal government has made

EXPLANATION--Matter in ITALICS (underscored) is new; matter in brackets { } is old law to be omitted.

LBD12051-01-7

funding available to finance such solutions. The legislature therefore finds and declares that there should be a traffic congestion mitigation plan within the city of New York.

S 2. Notwithstanding any provision of law to the contrary, the mayor of the city of New York is hereby authorized to present a detailed congestion pricing plan to address traffic congestion within a zone of severe traffic congestion in Manhattan (the "traffic congestion mitigation plan"), which plan may include such other components, proposals or steps as shall be deemed necessary, and hereby is authorized to implement the congestion pricing provisions of such plan if the conditions set forth in sections three, four, five and six of this act are met. Such plan shall include: (a) the geographic area within Manhattan to be covered by such plan; (b) the proposed dollar amount of any congestion pricing fee; (c) the technology to be used to implement such pricing plan; and (d) the number and scope of any exemptions granted from such fee requirements.

S 3. There is hereby established a New York city traffic congestion mitigation commission (the "commission") which shall undertake a review and study of plans to reduce traffic congestion and other related health and safety issues within the city of New York, including but not limited to issues relating to the implementation of the traffic congestion mitigation plan to be developed and submitted by the mayor of the city of New York. The commission shall consist of seventeen members appointed by the governor, three of whom shall be appointed on the nomination of the speaker of the assembly, three of whom shall be appointed on the nomination of the temporary president of the senate, one of whom shall be appointed on the nomination of the minority leader of the senate, one of whom shall be appointed on the nomination of the minority leader of the assembly, three of whom shall be appointed on the nomination of the mayor of the city of New York, and three of whom shall be appointed on the nomination of the speaker of the New York city council. The chair of the commission shall be nominated by the governor and approved by a majority of the total members of the commission.

S 4. As part of its mandate, the commission shall conduct hearings, take testimony and review information and proposals regarding traffic congestion in the city of New York. In addition, the commission shall issue to the governor, the state legislature, the mayor of the city of New York and the New York city council recommendations with respect to the details of implementing the traffic congestion mitigation plan submitted by the mayor and other traffic congestion mitigation proposals (the "implementation plan"). The implementation plan must provide for at least the same level of traffic mitigation, as measured by the 6.3 percent reduction in average vehicle miles traveled, as proposed in the traffic mitigation plan submitted to the United States department of transportation for the Urban Partnership Agreement on June 22, 2007.

S 5. On or before August 1, 2007, the mayor of the city of New York shall submit the traffic congestion mitigation plan to the commission, the governor, the state legislature, the New York city council and the metropolitan transportation authority. On or before October 1, 2007, the metropolitan transportation authority and the New York state department of transportation shall submit comments on the traffic congestion mitigation plan, as well as: (a) a description of the additional capital needs required for implementation of such plan; (b) the proposed utilization of any potential revenues derived from such plan for implementation of such plan; and (c) the impact of such revenue upon the authority`s capital and operating budgets and the agency`s capital and

operating budgets, respectively. On or before January 31, 2008, the commission shall by a majority vote approve its implementation plan and submit such plan to the governor, the state legislature, the mayor of the city of New York and the New York city council.

S 6. The state legislature shall consider such implementation plan on or before March 31, 2008. The city of New York shall not impose or collect any fee for traveling into or within the designated congestion mitigation zone unless the implementation plan has been approved by the state legislature on or before March 31, 2008 and signed into law by the governor, pursuant to a request from the mayor that the state legislature consider such plan where such request has been approved by the New York city council in a resolution approved by a majority of its members; provided, however, that nothing in this act shall otherwise prevent or limit the city of New York or the state of New York from taking any other steps to mitigate traffic congestion.

S 7. Paragraph (c) of subdivision 1 of section 1269-b of the public authorities law, as added by chapter 637 of the laws of 1996, is amended to read as follows:

(c) on or before October first, {nineteen hundred ninety-nine} TWO THOUSAND THIRTEEN and every fifth year thereafter, the authority shall submit to the metropolitan transportation authority capital program review board two capital program plans for the five-year period commencing January first of the following year.

S 8. Subdivision 1 of section 1269-b of the public authorities law is amended by adding a new paragraph (d) to read as follows:

(D) ON OR BEFORE MARCH THIRTY-FIRST, TWO THOUSAND EIGHT, THE AUTHORITY SHALL SUBMIT TO THE METROPOLITAN TRANSPORTATION AUTHORITY CAPITAL PROGRAM REVIEW BOARD, TWO CAPITAL PROGRAM PLANS FOR THE PERIOD JULY FIRST, TWO THOUSAND EIGHT TO DECEMBER THIRTY-FIRST, TWO THOUSAND THIRTEEN. IN ADDITION TO THE REQUIREMENTS OF THIS SECTION, THE TWO CAPITAL PROGRAM PLANS SUBMITTED PURSUANT TO PARAGRAPH (C) OF THIS SUBDIVISION SHALL INCORPORATE THE COMPONENTS OF A CONGESTION PRICING PLAN AND/OR OTHER CONGESTION MITIGATION MEASURES ACTED ON BY THE LEGISLATURE, INCLUDING: (I) A DESCRIPTION OF THE ADDITIONAL CAPITAL NEEDS REQUIRED FOR IMPLEMENTATION OF SUCH PLAN AND/OR MEASURES; (II) THE PROPOSED UTILIZATION OF ANY POTENTIAL REVENUE DERIVED FROM SUCH PLAN AND/OR MEASURES FOR SUCH CAPITAL NEEDS, INCLUDING ANY POTENTIAL FEDERAL FUNDS FOR SUCH A PLAN AND/OR MEASURES; AND (III) THE IMPACT OF SUCH POTENTIAL REVENUE UPON THE AUTHORITY`S CAPITAL BUDGET.

S 9. Notwithstanding any other section of law, on or before March 31, 2008 the commissioner of transportation shall submit to the governor and the state legislature a five year capital program for state and local highway and bridge, rail and ports, aviation and non-MTA transit through March 31, 2014. Such plan shall include system-wide goals and objectives for capital spending, the amount of capital funding required for each year and an estimate of the sources of such capital funding. The plan shall also include selection criteria for capital projects.

S 10. This act shall take effect immediately and shall expire and be deemed repealed on June 30, 2012; provided, however, that this act shall expire and be deemed repealed if the United States department of transportation does not commit at least two hundred fifty million dollars in funding prior to October 1, 2007; provided, that such expiration and repeal shall not occur if the United States department of transportation commits at least two hundred million dollars prior to October 1, 2007, and the city of New York commits, prior to December 31, 2007, an amount equal to the difference between two hundred fifty million dollars and

the amount committed by the United States department of transportation; provided that the city of New York shall notify the legislative bill drafting commission upon the occurrence of the enactment of the legislation provided for in this act in order that the commission may maintain an accurate and timely effective data base of the official text of the laws of the state of New York in furtherance of effectuating the provisions of section 44 of the legislative law and section 70-b of the public officers law.

Execution Copy

Urban Partnership Agreement
by and between
U.S. Department of Transportation
and its
New York City Urban Partner

Executive Summary

This Urban Partnership Agreement sets forth an agreement in principle between the U.S. Department of Transportation (the "Department") and the Department's New York City Urban Partner, comprised of the New York City Department of Transportation ("NYC DOT"), the New York Metropolitan Transportation Authority ("MTA"), and the New York State Department of Transportation ("NY DOT"). On June 22, 2007, NYC DOT, MTA, and NY DOT submitted an application (the "Mayor's Plan") to the Department's Urban Partnership Program. Thereafter, the New York State legislature established a commission to develop a plan to address traffic congestion in New York City.

In the event the New York State legislature enacts and the New York City Council approves the Mayor's Plan, the Urban Partner agrees to undertake the following actions: (i) institute a broad area pricing system in Manhattan south of 86th Street; (ii) construct new transit facilities, including two bus depots, a bus lay-up facility, park-n-ride facilities, and pedestrian improvements; (iii) construct a series of bus rapid transit ("BRT") and/or bus-based corridors; (iv) implement transit technologies, including Transit Signal Priority leading to and in selected Manhattan transit corridors; (v) make improvements to regional ferry service; (vi) collect and analyze transportation data to support the West of Hudson regional transportation analysis; (vii) construct an East River bus lane; and (viii) purchase and operate additional buses to meet the mobility needs of New York City. In exchange for these commitments, the Department intends to allocate $354.5 million in Federal grant funding for actions (i) through (vi), according to the terms of a grant agreement (or a series of grant agreements) to be negotiated by the Department and the Urban Partner. The Urban Partner will be responsible for funding actions (vii) and (viii).

In the event the New York State legislature enacts and the New York City Council approves an alternative congestion mitigation plan for New York City, no Federal assistance will be provided in connection with the Urban Partnership Program, unless such plan is, in the opinion of the Department, reasonably projected to achieve material reductions in traffic congestion within New York City by means of congestion pricing and provides bus service sufficient to meet the mobility needs of New York City.

In either case, the Urban Partner agrees that all elements of the congestion mitigation plan will be operative not later than March 31, 2009.

THIS MEMORANDUM OF UNDERSTANDING (this "MOU"), dated as of August 8, 2007, is made by and among the Secretary of Transportation (the "Secretary"), the Federal Highway Administration ("FHWA"), the Federal Transit Administration ("FTA"), the Research and Innovative Technology Administration ("RITA") (the Secretary, FHWA, FTA, RITA, collectively, the "Department"), and the undersigned State, county and/or municipal governmental entities, as the case may be (collectively, the "Urban Partner").

Agreement in Principle

1. **Agreement in Principle.** This MOU sets forth an agreement in principle among the undersigned concerning the terms and conditions of Federal assistance to be provided by the Department for the transportation projects described herein. This MOU represents solely the intent of the parties (including, without limitation, the intent of the Department to allocate funds as set forth in Section 4(a) below), and no party shall be legally bound hereby. Any agreement between the Department and the Urban Partner concerning funding of the transportation projects described herein shall be set forth in a grant agreement (or a

series of grant agreements) (the "Grant Agreements") to be negotiated and executed by the parties to this MOU. The Department reserves the right, in its sole discretion, not to fund the transportation projects (or any part thereof) described in this MOU or otherwise set forth in the application filed by the Urban Partner to the Urban Partnership Program. The parties understand that no Federal assistance will be provided to NYC DOT, MTA or NY DOT in connection with the Urban Partnership Program unless and until the New York State legislature enacts and the New York City Council approves either (i) the Mayor's Plan or (ii) an alternative congestion mitigation plan for New York City acceptable to the Department in its sole discretion.

2. Background. Transportation system congestion is one of the greatest threats to our Nation's economic prosperity and way of life. Whether it takes the form of trucks stalled in traffic, cargo stuck at overwhelmed seaports, or airplanes stuck on the tarmac, congestion costs the Nation an estimated $200 billion a year. The problem of traffic congestion in our major metropolitan areas in particular is severe and worsening. In 2003, traffic jams in the Nation's largest 85 urban areas cost Americans 3.7 billion hours and 2.3 billion gallons of fuel. Congestion is also affecting the quality of life in America by robbing us of time that could be spent with families and friends and in participation in civic life.

The signatories to this MOU do not believe that gridlock is our inevitable fate. In May 2006, the Department announced a major initiative to reduce transportation system congestion. This plan, the *National Strategy to Reduce Congestion on America's Transportation Network* (the "Congestion Initiative"), provides a blueprint for Federal, State, and local officials to consider as they work together to reverse the alarming trends of congestion. One major component of the Congestion Initiative is the Urban Partnership Agreement (or "UPA"). As announced in the Department's solicitation for Urban Partners published in the Federal Register on December 8, 2006 (at 71 FR 71231 (2006)) (the "Federal Register Notice"), applicants designated by the Department as Urban Partners would adopt the "Four Ts:" tolling (congestion pricing), transit, telecommuting and technology – strategies believed to be effective on a combined basis in reducing traffic congestion. In return for such commitment, the Department, to the extent requested and appropriate, would support its Urban Partners' implementation of the Four Ts with financial resources, regulatory flexibility, and dedicated expertise and personnel.

3. Designation as Urban Partner. In accordance with the Federal Register Notice and for purposes of this MOU, the Department designates each of the following entities, collectively, as an "Urban Partner:"

(a) New York City Department of Transportation;
(b) New York Metropolitan Transportation Authority; and
(c) New York State Department of Transportation

4. Grant Agreements for Mayor's Plan. In the event that the New York State legislature enacts and the New York City Council approves the Mayor's Plan, the Department and the Urban Partner agree to negotiate a grant agreement (or a series of grant agreements) that would reflect the following terms and conditions:

(a) **Federal Projects and Sources of Funding**. The Department shall provide funding for each of the following projects (the "Federal Projects") under the Federal programs and in the amounts provided below, in each case subject to the statutes, regulations and the implementing guidance of the Department governing such programs and subject to the Urban Partner's agreement to commence the Local Projects set forth in Section 4(b):

Execution Copy

Project	Source of Funding	Amount of Funding
Tolling (congestion pricing) projects		
• **Area pricing of Manhattan.** The Urban Partner will institute a broad area pricing system in Manhattan south of 86th Street (the "pricing zone"), as described in New York City's UPA application. This system will charge vehicles a toll rate for entering or exiting the pricing zone and a toll rate for driving within the zone. The system shall achieve at least a 6.3% reduction in vehicle miles traveled ("VMT") within the pricing zone. The system shall be in operation – and shall maintain the 6.3% reduction in VMT – for no less than eighteen months.	• FHWA's Value Pricing Pilot Program (VPPP)	• $5.0 million in funds appropriated when needed and available, but in any event no later than the end of Fiscal Year 2009; funding subject to appropriation
	• RITA's Intelligent Transportation Systems Operational Testing to Mitigate Congestion (ITS-OTMC) Program	• $5.4 million in funds appropriated when needed and available, but in any event no later than the end of Fiscal Year 2009; funding subject to appropriation
Transit projects		
• **Transit facilities.** The Urban Partner will (i) construct all or part of the Charleston Annex and Jamaica bus depots and a bus lay-up facility, (ii) construct new or enhance existing park-n-ride facilities, and (iii) implement pedestrian improvements for sidewalks and safe routes to transit. • **Transit technology.** The Urban Partner will implement Transit Signal Priority and advanced solid-state controllers ("ASTC") at no less than 223 intersections in selected transit corridors leading to or in the Manhattan core.	• FTA's Bus and Bus-Related Facilities Discretionary Grant Program ("Section 5309")	• $213.6 million in funds appropriated for Fiscal Year 2006 or Fiscal Year 2007 (to be allocated in amounts pro rata for the project elements set forth in the Urban Partner's application to the Urban Partnership Program)
• **Bus projects.** The Urban Partner will construct a series of bus rapid transit ("BRT") and/or bus-based corridor projects that support either the Mayor's Plan or an alternative congestion mitigation plan acceptable to the Department. The Department will reserve through the end of Fiscal Year 2009 for the funding of such projects $112.7 million in New Starts funds appropriated for Fiscal Year 2007. Such funds will be made available to the New York City Department of Transportation (or its designee) for such projects, provided that the projects (and the project sponsor) satisfy applicable New Starts criteria and other programmatic requirements. The Department will use its reasonable best efforts to render decisions on funding such projects prior to the expiration of the exemption from certain New Starts rating criteria available to otherwise qualified projects that receive less than $25 million in New Starts funding.	• FTA's New Starts Program (including the Small Starts and Very Small Starts Programs)	• $112.7 million in funds appropriated for Fiscal Year 2007
• **Improvements to regional ferry service.** The Urban Partner will carry out a number of projects to improve regional ferry boat service, as described in applications filed for funding under FHWA's Ferry Boat Discretionary Program.	• FHWA's Ferry Boat Discretionary Program	• $15.8 million in contract authority funds made available for obligation for Fiscal Year 2007
• **Collection and analysis of Alternatives Analysis transportation data.** The Urban Partner will support the Alternatives Analysis phase for the West of Hudson Regional Transportation Alternatives Analysis/Draft Environmental Impact Statement by collecting and analyzing data on transit ridership patterns, travel times, and mode preference.	• FTA's Alternatives Analysis Discretionary Program	• $2.0 million in funds appropriated for Fiscal Year 2006 or Fiscal Year 2007

(b) **Local Projects to be Implemented by Urban Partner**. In connection with the implementation of the Federal Projects, the Urban Partner shall agree to commence the following projects (the "Local Projects") to meet the mobility needs of New York City:

(i) The purchase and operation of up to 367 new transit buses of various types, including express, standard, and articulated, to meet a service plan to be submitted by MTA; and

(ii) The construction of an East River bus lane.

(c) **Completion of Projects.** Unless otherwise agreed by the Department and the Urban Partner, both the area pricing system and the bus service necessary, in the reasonable opinion of the Department, to meet the mobility needs of New York City shall be operative not later than March 31, 2009. The bus service shall be in operation in advance of the initiation of area pricing. In the event that the action(s) funded in connection with the Urban Partnership Agreement experience delay due to circumstances beyond the control of the Urban Partner, the Department may either negotiate an extended completion date or terminate the action(s).

(d) **Other Terms and Conditions.** Each of the Grant Agreements shall additionally provide that:

(i) Except $1.6 million in funds allocated to the Urban Partner under the Value Pricing Pilot Program for project planning and development, no funds obligated by the Grant Agreements shall be drawn down by the recipient unless and until all legal authority necessary to implement each of the Federal Projects (including, without limitation, legal authority to implement congestion pricing) has been duly adopted and taken effect, which authority shall be adopted and in effect within 90 calendar days following the opening of the next session of the New York State legislature;

(ii) No funds obligated by the Grant Agreements shall be drawn down by the recipient unless and until each member of the Urban Partner with the authority to toll has agreed to exempt privately operated over-the-road buses from tolls to the same extent it has exempted (or proposes to exempt) public transportation from tolls in connection with the Federal Projects;

(iii) The Department reserves the right to de-obligate funds obligated under any of the Grant Agreements (or to require the return of such funds) in the event a recipient breaches or otherwise fails to perform under any of the Grant Agreements;

(iv) The recipient shall not assess congestion charges against any vehicles owned or operated by any foreign government or international organization or its representatives, officers, or employees if notified by the U.S. Department of State that, pursuant to U.S. international legal obligations, the vehicles are exempt from such charges;

(v) The recipient makes customary representations to the Department that the Federal Projects comply with all applicable Federal, State and local laws;

(vi) The recipient agrees to provide to the Department (and its designees) access to the Federal Projects and all data collected by the recipient with respect to the

Federal Projects for purposes of the Department's oversight of the Federal Projects;

(vii) To the extent requested by the Department, the recipient agrees to designate an independent third party to perform all program evaluations required by law or as reasonably directed by the Department in order to assist in the evaluation of the Federal Projects; and

(viii) An amount equal to the funding provided by the Department through the New Starts Program in connection with the Urban Partnership Program shall be expended by New York City in support of the Mayor's Plan (including, without limitation, for the acquisition of technology associated with the implementation of area pricing).

(e) **Actions Prior to Execution of Grant Agreements.** Prior to the execution of the Grant Agreements, the Department shall have received the following, in addition to usual and customary deliverables:

(i) New or amended applications to FHWA's Ferry Boat Program and FTA's New Starts Program (including the Small Starts and Very Small Starts Programs), as required by the Department; and

(ii) An opinion of counsel, satisfactory in form and substance to the Department, concerning the Federal Projects.

5. Grant Agreements for Alternative Plan. In the event that the New York State legislature enacts and the New York City Council approves an alternative congestion mitigation plan, the Department and the Urban Partner agree to negotiate the funding of such plan if it:

(a) Is reasonably expected to reduce average vehicle miles traveled by at least 6.3 percent across a geographic area of similar size and travel characteristics to the area proposed for pricing under the Mayor's Plan;

(b) Uses pricing as the principal mechanism for achieving this congestion reduction;

(c) Includes at least an eighteen month operation of congestion pricing;

(d) Provides bus service sufficient, in the reasonable opinion of the Department, to meet the mobility needs of New York City, with bus service in operation in advance of the initiation of pricing;

(e) Will be implemented by the deadlines for project completion specified in section 4(c);

(f) Is subject to a grant agreement (or series of grant agreements) that contains the terms set forth in section 4(d), except for the terms set forth in section 4(d)(viii);

(g) Requires that an amount equal to the funding provided by the Department through the New Starts Program in connection with the Urban Partnership Program shall be expended by New York City in support of such plan (including, without limitation, for the acquisition of technology associated with the implementation of area pricing); and

(h) Is otherwise acceptable to the U. S. Secretary of Transportation.

6. Non-Disclosure. Prior to the public announcement of the Urban Partner by the U.S. Secretary of Transportation, the undersigned agree not to disclose the contents hereof to any third party, except by written agreement of the Department or as required by law.

[Signatures appear on the following page.]

<u>United States Department of Transportation</u>

Signature_____________________________ **Date** ______________________

Mary E. Peters, Secretary of Transportation

Signature_____________________________ **Date** ______________________

J. Richard Capka, Federal Highway Administrator

Signature_____________________________ **Date** ______________________

James S. Simpson, Federal Transit Administrator

Signature_____________________________ **Date** ______________________

John A. Bobo, Jr., Research and Innovative Technology Administrator (Acting)

<u>Urban Partner</u>

Signature_____________________________ **Date** ______________________

Astrid C. Glynn, Commissioner, New York State Department of Transportation

Signature_____________________________ **Date** ______________________

Janette Sadik-Khan, Commissioner, New York City Department of Transportation

Signature_____________________________ **Date** ______________________

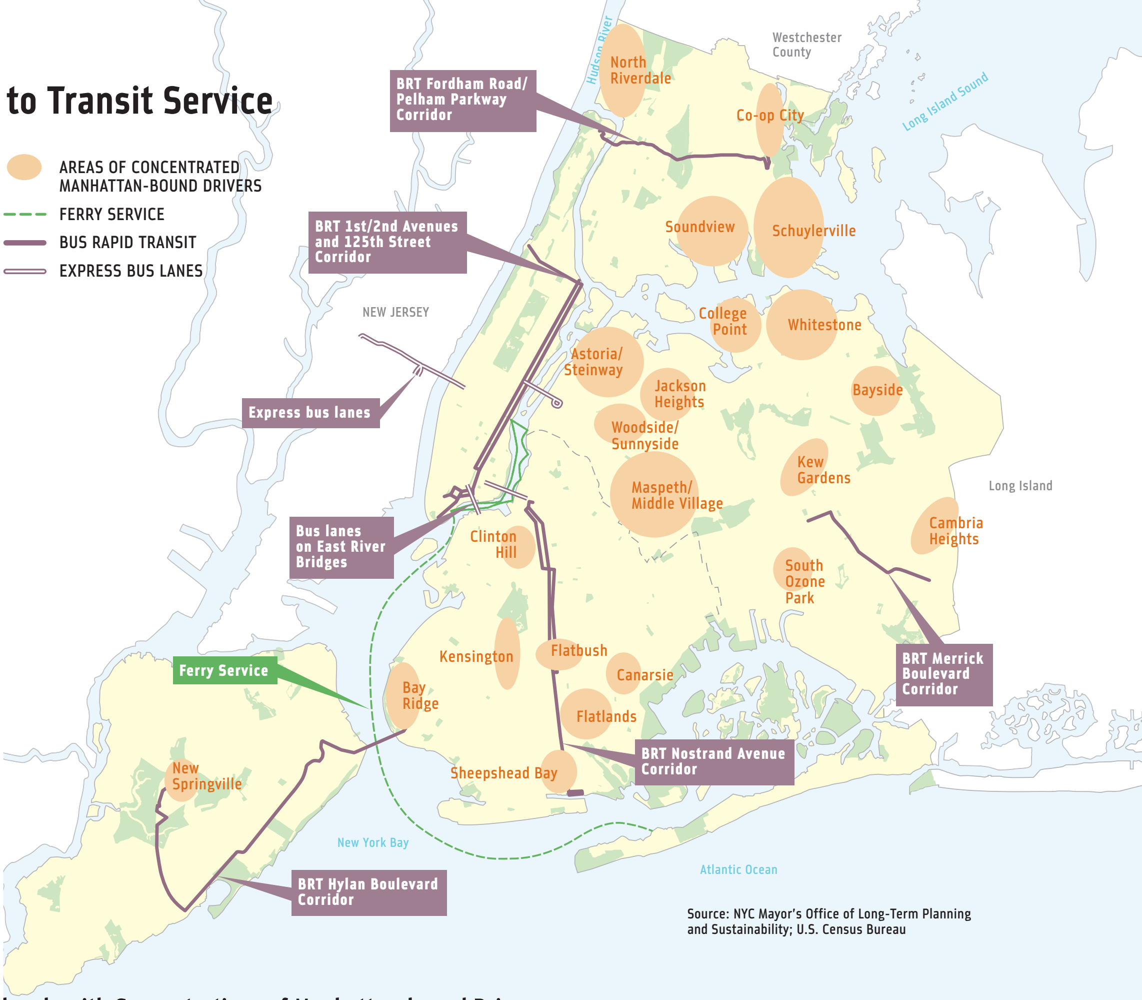
Elliot G. Sander, Executive Director and CEO, Metropolitan Transportation Authority

Near-Term Improvements to Transit Service

In all New York City neighborhoods, a majority of Manhattan-bound commuters take transit. But the areas shown in this map have higher concentrations of drivers to Manhattan than any other parts of the city. Many of these areas do not have rail transit service; others have subway or rail service that does not meet all residents' needs. With only slight enhancements to the system more people in these areas would choose transit over driving. These enhancements would emphasize connections to the subway or commuter rail system where feasible; minimize transfers; improve reliability; and use existing bus routes and corridors where possible.

Intermodal connections improve the timing or the location of bus stops to make an existing two-seat ride more convenient. **Rerouting existing bus routes** can bring buses closer to potential riders or make routes more direct. **Bus prioritization** can change traffic lights when buses approach to speed bus travel. **Improving subway and rail station access** can cut walking distances or make entrances easier to navigate. On some routes, **bus frequency** is too low for the potential demand and could be increased; on others, frequency is sufficient to allow **skip-stop** or **limited-stop service** that would cut travel times. **New bus routes** would increase options within the system—but are the most expensive of these short-term measures. In addition, many of these neighborhoods will benefit from **other projects** outlined in this plan, ranging from new commuter rail service to BRT.

The table below outlines which of these strategies we would recommend for each neighborhood.

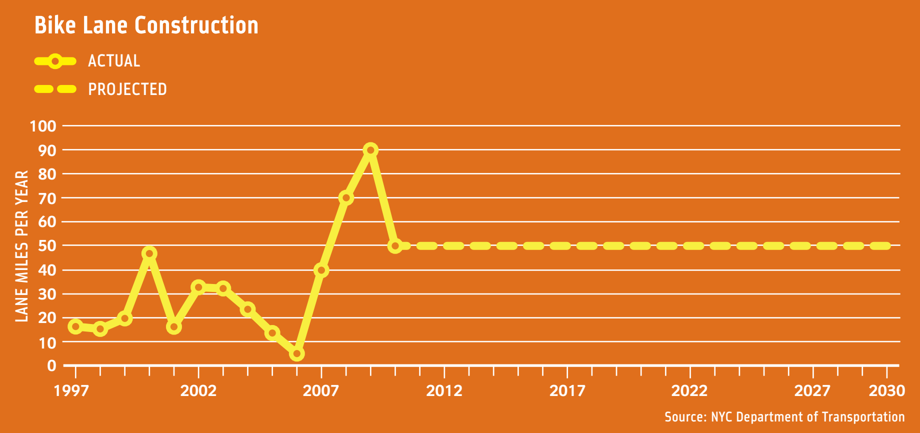


Source: NYC Mayor's Office of Long-Term Planning and Sustainability; U.S. Census Bureau

Potential Improvements for 22 Neighborhoods with Concentrations of Manhattan-bound Drivers

NEIGHBORHOOD		INTERMODAL CONNECTION	RE-ROUTING OF EXISTING BUS ROUTE	BUS PRIORITIZA-TION	SUBWAY AND RAIL STATION ACCESS	INCREASE BUS FREQUENCY	SKIP STOPS/ LIMITED STOPS	NEW BUS ROUTE	OTHER PROJECTS
BRONX	Co-op City	●							Metro-North to Penn Station; BRT
	North Riverdale	●							Metro-North to Penn Station
	Schuylerville	●		●					
	Soundview	●		●	●				
BROOKLYN	Bay Ridge		●	●			●		
	Canarsie	●	●			●			Nostrand BRT
	Clinton Hill	●			●				Bus Lane on Manhattan Bridge
	Flatbush	●		●					Nostrand BRT
	Flatlands	●		●		●	●		
	Kensington				●				
	Sheepshead Bay				●				Nostrand BRT
QUEENS	Bayside	●	●			●			LIRR East Side Access
	Cambria Heights	●	●	●					Merrick Blvd BRT
	College Point	●		●				●	
	Jackson Heights	●	●		●	●	●	●	Bus Lane on Queensboro Bridge
	Kew Gardens	●	●	●					LIRR East Side Access
	Maspeth / Middle Village / Ridgewood		●		●				
	South Ozone Park	●	●	●	●				
	Astoria / Steinway		●	●	●				Bus Lane on Queensboro Bridge
	Whitestone		●						
	Woodside / Sunnyside	●						●	LIRR East Side Access
STATEN ISLAND	New Springville							●	Hylan Blvd BRT

Source: NYC Mayor's Office of Long-Term Planning and Sustainability



INITIATIVE 8

Expand ferry service

We will seek to expand service and improve integration with the city's existing mass transit system

Along Newtown Creek, which separates Brooklyn and Queens, the transformation of New York's waterfront is clear. To the north, apartment buildings are rising and land is being cleared for thousands of additional units of housing at Queens West, many of which will be affordable to middle-income families. To the south sit the low-lying factories and warehouses of Williamsburg and Greenpoint, which are being converted into a waterfront esplanade, parks, and housing.

Across the city, more than 60 miles of largely-abandoned waterfront land is being reclaimed for recreation and new communities. But some of these neighborhoods lack the basic transportation infrastructure required for sustainable growth. In some areas, the nearest subway stop is more than three-quarters of a mile away. Where there is service, the trains and buses are increasingly crowded as growing numbers of commuters use stations closest to Manhattan.

Ferries and water taxis can help solve both of these problems. In addition, ferries have proven that they can provide critical backup transportation for the city during emergencies, as they did on 9/11 and during the 2003 blackout.

That's why we will seek to expand ferry service to emerging neighborhoods across the city and seamlessly integrate it into the city's transportation network.

The City will seek to initiate a new privately-operated ferry system along the East River that will connect developing areas of Brooklyn and Queens with Midtown and Lower Manhattan. This new service would connect ferry landings at Queens West, Greenpoint and North and South Williamsburg, with landings at Pier 11 (Wall Street) and East 34th Street in Manhattan. In addition, we will seek to pilot service between Manhattan and the Rockaways in Queens. Other parts of the city where ferry service may make sense—such as southern Queens, the south shore of Staten Island, and the Bronx—will be evaluated based on potential ridership and financial flexibility.

Ferry service is most effective when it connects riders with land-based transit bringing them close to their inland destinations. That is why we will work with the MTA to extend bus routes to ferry docks from Midtown. We will also explore the possibility of using BRT or other fast service on crosstown routes for more efficient connections, especially across 34th Street and 42nd Street.

Finally, for ferries to be considered an effective component of the city's mass transit system, they must be treated that way. That is why ferry passengers must be able to use their MetroCards for ferries and the connecting bus service. We will work with the MTA and the ferry companies to achieve this intergration.

INITIATIVE 9

Promote cycling

We will pursue strategies to encourage the growth of cycling across the city

Cycling also offers an environmentally-friendly and space-efficient way to travel around the city. Other cities have embraced cycling as emission-free, low-cost travel mode that promotes a healthy lifestyle—and one that New Yorkers are increasingly embracing. Cycling in the city is estimated to have increased 75% from 2000 to 2006. But there is still plenty of room to grow; less than 1% of New Yorkers commute to work by bicycle. *(See case study: Cycling Emerges Around U.S.)*

We will complete the city's 1,800-mile bike master plan

In order to reduce traffic and reach our clean air and greenhouse gas reduction goals, New Yorkers should be given the option of reaching their jobs and major city destinations through cycling. That is why we will dramatically accelerate the implementation of the City's 1,800-mile bike lane master plan, to ensure that the entire system is in place before 2030. *(See chart above: Bike Lane Construction)*

CASE STUDY

Cycling Emerges Around U.S.

When Brean Martin needs a ride across Chicago, he plops his bike on a rack between a bus's headlights.

"Now, every bus has carriers," said Martin. "I get the feeling it helps bus drivers be more careful about bikers on the road."

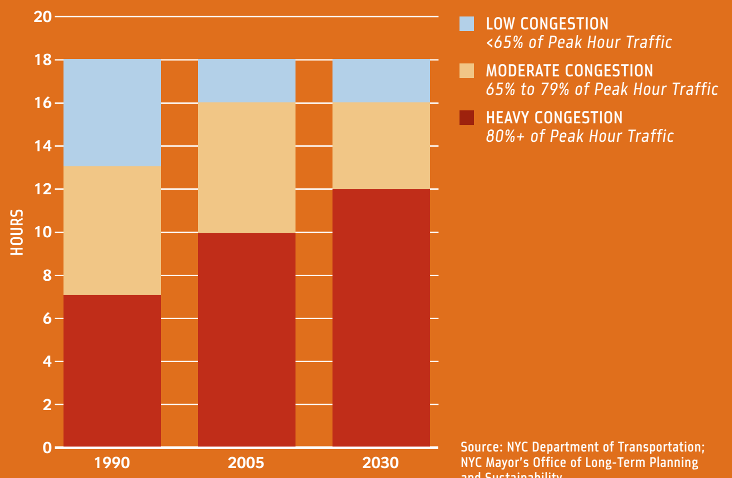
Cities across the nation are looking to the two-wheeler as a key to creating sustainable, enjoyable public transportation. They're planning miles of bike paths, starting public bicycle programs, and zeroing in on safety measures. Seattle, Portland, and Boulder have instituted major networks. Baltimore and Philadelphia are on the road to better biking, too.

By 2015, Chicago wants at least 5% of all trips less than five miles to be on bicycle. The city has discovered that shifting trips to bikes can become a congestion management strategy. It has already installed more than 160 miles of bike lanes throughout the city.

Brean Martin thinks car congestion has already lightened up.

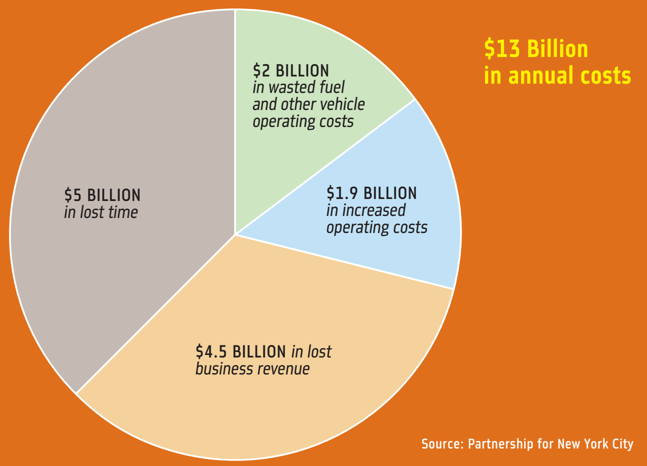
"It used to be that I'd go flying on my bike through dead-stopped traffic," said Martin. "Now, the cars actually move."

Hours of Congestion



Source: NYC Department of Transportation; NYC Mayor's Office of Long-Term Planning and Sustainability

Annual Cost of Congestion to the New York Region



Source: Partnership for New York City

The plan includes 504 miles of separated bike paths (Class 1 facilities) and 1,296 miles of striped bicycle lanes or markings reminding drivers and cyclists to share the road (Class 2 and 3). To date, only 420 miles have been constructed.

We will complete Phase 1 of the plan in 2009, which will add 200 lane miles in targeted areas across the city—with the first 40 finished by June 2007.

We will prioritize areas with high demand, building connections between existing portions of the network, and strengthening access to parks through special bike paths known as greenways. These greenways not only offer their own recreational benefits such as biking, skating, and walking throughout our city's park system; they can also open up new areas of parkland.

Phase 2 and beyond will complete the remaining bike lanes, resulting in 1,800 total lane miles of bicycle facilities in New York City.

BIKE MASTER PLAN STATUS

LANE MILES	CLASS 1	CLASS 2	CLASS 3	TOTAL
Built	200	176	44	420
Planned for 2030	42	1,076		1,380
TOTAL	504	1,296		1,800

Source: NYC Department of Transportation

We will facilitate cycling

In addition to implementing the master plan, we must provide support for city cyclists and encourage New Yorkers to explore this form of transportation. That means improving public education on the benefits of cycling and on safety issues, increasing necessary bicycling infrastructure such as bike racks and lockers, and improving observation of traffic and bicycling laws.

Cyclists often point out that their main concern is having safe places to store their bikes. To solve this problem, the City's Department of Transportation (DOT) will continue the CITYRACKS program by installing 1,200 additional on-street bicycle racks throughout the City by 2009, and commit to that level of installation until every neighborhood has adequate bike parking. We will also pursue legislation to require that large commercial buildings make provision for bicycle storage either on site or reasonably nearby.

Improve traffic flow by reducing congestion

The city's quality of life and economic prosperity depend on a transportation system that can meet demand. That means we must use our streets more efficiently if we are to absorb millions of new residents, workers, and tourists.

To achieve this goal, we will expand proven strategies to smooth traffic flows; and we will encourage commuters to shift from their cars onto an improved transit system, while providing better service for those who choose to continue to drive. *(See charts above: Hours of Congestion and Annual Cost of Congestion to the New York Region)*

INITIATIVE 10

Pilot congestion pricing

We will seek to use pricing to manage traffic in the Central Business District (CBD)

Over the last 30 years, even significant improvements in our subway system have not substantially changed the way New Yorkers get to Manhattan. Despite enhancements in safety, efficiency, and aesthetics, the percentage of drivers has remained essentially unchanged.

On a given workday, the Manhattan CBD is home to nearly 2 million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Cars compete for the road with buses, trucks pedestrians, cyclists and taxis. Vehicles trapped in traffic spew pollution into the air, putting the health of those living near congested roads at risk; and the resulting jams cost the region more than $13 billion dollars every year. As our population grows by another 900,000 people, we add more than 20 million visitors annually, and 750,000 new jobs—many concentrated in the CBD—the consequences of congestion will become ever more severe.

The strategy that has emerged around the world as the most effective tactic to this gridlock is congestion pricing, a system that charges drivers a fee for entering a city's center. London, Stockholm, and Singapore all employ congestion pricing. Here in the United States, the U.S. Department of Transportation has also encouraged cities to undertake market-based congestion reduction initiatives. *(See case study on facing page: London Congestion Pricing)*

In every case where it has been implemented, congestion pricing has been successful at reducing traffic both within the "congestion zone" and outside it, speeding bus service, decreasing delivery times, improving air quality, and cutting greenhouse gas emissions, with no material impact on the economy, including retail activity in the zone in which the charge applies.

Key to the success of congestion pricing in those cities—and the widespread acceptance of initially reluctant businesses and residents—is the fact that congestion pricing is only one part of an overall commitment to increase investment in mass transit.

That is what we propose for New York. We believe a thoughtfully designed congestion pricing program should be part of a solution to the regional and city-wide transportation gridlock we will be facing. Its proceeds would be dedicated to funding billions of dollars of transportation improvements, including immediate enhancements to some of New York's least transit accessible communities. *(See following page: New York City's Congestion Pricing Plan)*

Summarized below is an illustrative example of how congestion pricing could be implemented and its impact. The details would have to be determined through a collaborative process between the City and the State, because State legislation would be needed to enable the City to impose a fee and give the City the right to fine violators. State law could authorize the City to define the pricing area, the amount of the charge, the hours it would apply, and the fines for failure to pay, or it could specify those details in the legislation. The legislation would also need to specify the type of environmental review that would be necessary.

Given its successful track record in other major global cities, we seek to pilot congestion pricing in New York for a test period of three years. The best way to predict whether it will work—and whether the benefits outweight the inconveniences—is to try it. Further, we believe that a pilot could be undertaken with no outlay of City or State funds, but leveraging Federal and private dollars.

Operating congestion pricing

Passenger vehicles entering or leaving Manhattan below 86th Street during the business day (weekdays 6 am to 6 pm)—with the exception of the FDR Drive, the West Side Highway, and West Street—would pay an $8 daily fee. Trucks would pay $21. Autos that drive only within "the Zone" would pay half price. The charge would apply to all vehicles, except emergency vehicles, those with handicapped license plates, taxis, and for-hire vehicles (radio cars).

Vehicles using E-Z Pass that travel through MTA or Port Authority (PA) tolled crossings on the same day would pay only the difference between their MTA or PA tolls and the congestion charge, so that drivers don't have an incentive to detour across free bridges. Because roads on the periphery of Manhattan will not be in the Zone, trips around the Zone (for example, from Harlem to Brooklyn) would not be charged.

Payment would involve no toll gates or waiting areas. The technological backbone of the system would be E-Z Pass, which relies on high-speed sensors, and is used by more than 70% of New York area drivers. The charge would appear on drivers' E-Z Pass statements.

For those drivers without E-Z Pass, their license plates would be checked automatically by cameras mounted on traffic light poles, with payment options available through Internet, the telephone, or at participating retail outlets. Drivers would have two days to pay the charge.

Impact of congestion pricing

The main benefit of congestion pricing would be reduced traffic congestion. Traffic within the Zone would decrease 6.3%. Speeds are projected to increase 7.2%. The impact would also be felt in the other boroughs, since the number of cars passing through other neighborhoods on their way to Manhattan will decline. This is especially the case on key thoroughfares leading to bridges, including Flatbush Avenue in Brooklyn and Queens Boulevard in Long Island City. (One study suggested that 43% of all traffic in downtown Brooklyn and 57% of rush-hour traffic in Long Island City is bound for Manhattan). Overall, travel speeds in all four boroughs would get better due to congestion pricing in Manhattan.

The 4.6% of New York City residents who drive to work in the Zone would pay a daily charge less than the cost of commuting by Express Bus, and they would have a faster commute than today. Everyone who drives, especially in Manhattan, would experience the benefits of reduced traffic and higher speeds. Workers and companies whose income depends on providing services in Manhattan would be more productive. A plumber who currently spends a quarter of his day sitting in his van in Midtown traffic traveling from site to site would be able to do more work every day—increasing his income far more than the $8 fee he pays. Delivery firms would have fewer packages delayed. Buses would run faster. Taxi drivers would carry more fares in a shift. These benefits would lower costs of doing business in the city, and benefit all New Yorkers.

The implementation of short-term improvements would be essential to the success of any congestion pricing program and to the transit infrastructure described earlier in this chapter, including: bus rapid transit, improved express bus service, dedicated bus lanes on bridges, and new ferry service, especially to areas of the city that lack convenient mass transit access to Manhattan today. In many cases, these improvements would be put in place prior to implementation of congestion pricing.

CASE STUDY

London Congestion Pricing

In 2000, headlines often compared the speeds of central London traffic to Victorian horse-and-buggies. And so did Londoners.

"Some days, it took me almost an hour to drive six miles from home to work in the morning," said Gregory Phillips, an architect who works in the city's West End.

But when Mayor Ken Livingstone introduced an internationally proven congestion-mitigation strategy he was named the city's "Deadliest Enemy" by the London *Daily Telegraph.*

The strategy was congestion pricing—a plan to charge drivers a daily fee for the use of London's busiest roads during business hours.

Opponents of the congestion charge argued the charge would "strangle retailers" in the area. More than half of Londoners believed that the fee would make no difference in traffic patterns at all. Westminster City Council called on the High Court to order a full-scale public inquiry into the program, and more than 60% of the city's population stood against the idea.

Despite the skepticism, in February 2003, London began charging cars £5 ($10) to access central London's most congested streets.

Traffic delays in London have plunged substantially—by 30%. Road speeds have increased 19% from the introduction of congestion pricing. A feared drop in retail spending never materialized.

Since the program started, more than $360 million has been funneled into expansions and improvements of mass transportation—improvements that are attracting more Londoners to public transit. Bus ridership has increased 30% during peak periods The extra road space has been reshaped into stunning public spaces like the new plaza at Trafalgar Square.

Now, Gregory Phillips rides his bicycle to work. "Since the introduction of the congestion charge, I find that I cycle in almost every day, and I love it," he said.

In fact, Phillips said, his commute has actually become much quicker. "If I'm cycling, I can get into the office in 35 minutes."

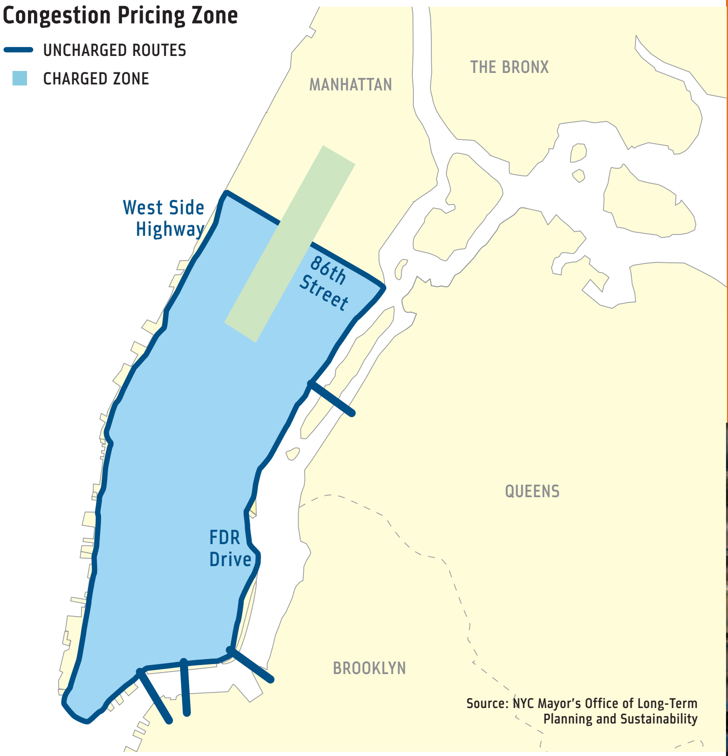
Now that's an improvement.

CHANGE IN TRAFFIC WITHIN LONDON'S CHARGING ZONE AFTER CONGESTION PRICING

Automobiles	–34%
Heavy trucks	–7%
Vans	–5%
Buses	+21%
Taxis	+22%
Bicycles	+28%
ALL VEHICLES	**–12%**

Source: Transport for London

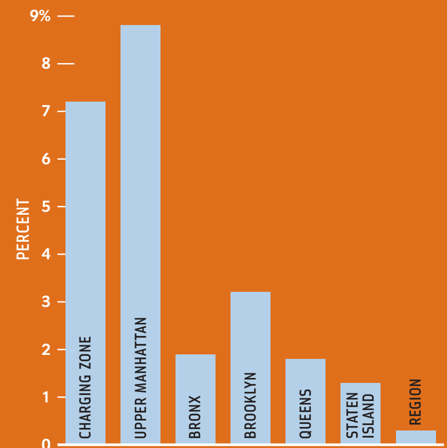
New York City's Congestion Pricing Plan



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Traffic Improvement After Congestion Pricing

Increase in average speed over 24 hours



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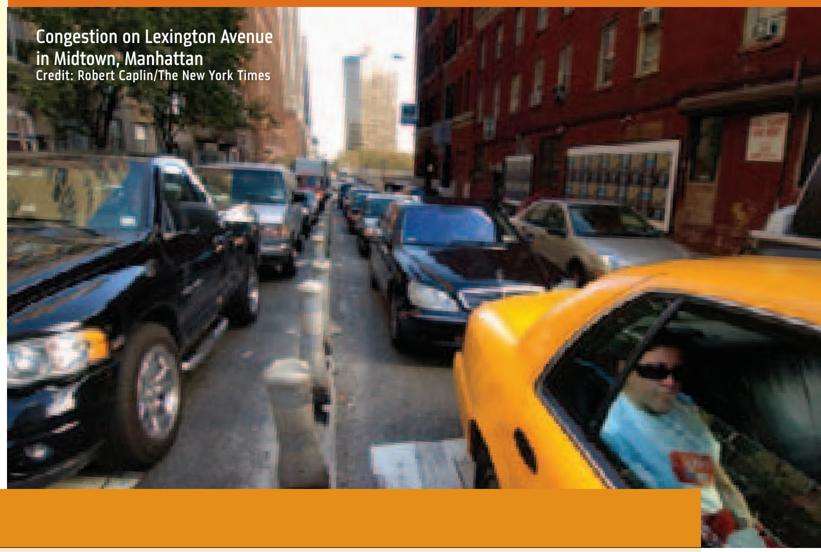


Congestion on Lexington Avenue in Midtown, Manhattan
Credit: Robert Caplin/The New York Times

CONGESTION PRICING FEATURES	
Zone boundaries	Manhattan below 86th Street, except • West Street and West Side Highway • FDR Drive • Battery Park Underpass • Queensboro, Williamsburg, Manhattan andBrooklyn Bridges and their approaches.
Hours	6 am–6 pm, Monday–Friday (no charges on weekends)
Charges: autos	$8 daily charge to enter, leave, and move within the zone during charging hours $4 daily charge for travel only within the zone during charging hours
Charges: trucks	$21 daily charge to enter, leave, and move within the zone during charging hours $5.50 daily charge for travel only within the zone during charging hours
Trips bypassing the Zone	Drivers do not pay unless they enter the zone. For example, driving from Brooklyn to the Bronx on the Brooklyn Bridge and FDR Drive would still be free
Toll rebates for E-Z Pass users	E-Z Pass users paying bridge and tunnel tolls to enter the zone will be credited the amount of their round-trip tolls that day, up to $8. For example, an E-Z Pass driver who now uses the Battery Tunnel to enter and leave Manhattan will pay no additional charge, because the current round-trip toll they pay is already $8
Exemptions	No charges for: • Handicapped license plates • Emergency vehicles and transit buses • Yellow taxis and livery cabs
Collection technology	At-speed E-Z Pass readers will allow fee collection without slowing vehicles down. Vehicles not equipped with E-Z Pass will be recorded by cameras and drivers can pay the fee by phone, internet or at participating retailers within 48 hours.
Revenues	All net revenues will be dedicated 100% to transportation investments through the SMART Financing Authority
Operating entity	NYC Department of Transportation will control the system, which will be built and maintained by a contractor yet to be selected

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Over time, more and more commuters would benefit from the longer-term investments in mass transit, 50% of which would be funded by the nearly $400 million net revenues of congestion pricing in its first full year.

Although areas near the congestion pricing zone should experience reductions in traffic due to fewer drivers passing through on their way to the Zone, we would work with local communities if it seems that they would be impacted by drivers seeking to avoid the congestion pricing charge. Possible solutions include parking permits for residential neighborhoods and an expansion of the Muni meter program in commercial areas.

Overall, 94,000 travelers are projected to take advantage of new and improved transit choices, achieving the city's first significant mode shift in decades. Only 1.4% are expected not to take the trip into the Zone at all because of the congestion charge. The majority of these will travel instead to destinations in Upper Manhattan and the outer boroughs, helping businesses in those areas. As a result, the overall economic impact of the congestion charge is expected to be neutral to positive, consistent with the experience of cities where congestion pricing is in operation.

INITIATIVE 11

Manage roads more efficiently

We will increase the use of Muni meters within the city and develop an integrated traffic management system for our regional transportation network

We will expand the use of Muni meters

Muni meters, first introduced in New York in 1996, offer numerous advantages compared to traditional single-space parking meters. For drivers, they increase parking capacity by allowing cars to park closer together. They also enable the city to improve traffic flow by charging vehicles progressively higher fees for longer stays, encouraging shorter stays and more turnover. This increased turnover reduces double-parking and cuts the amount of time drivers spend "cruising" for a parking space. The meters also allow for more flexible payment options, accepting coin, credit card or city parking cards, and they create more sidewalk space for pedestrians—one Muni meter can replace up to six single space meters.

While Muni meters are currently only in use in certain areas, DOT will introduce them in business districts across the city, completing installation in all possible locations by 2011.

We will create an integrated traffic management system

The region's congestion problems are compounded by inefficiencies and lack of coordination among agencies and travelers. Poorly timed signals can cause backups, and drivers are often not alerted to traffic jams until they are actually sitting in them.

That's why the City has launched a five-year plan to unify and expand the information systems on our transportation network and enhance coordination throughout the region. Although we have utilized Intelligent Transportation Systems (ITS) for years through the use of cameras and electronic signage on highways, the real benefits can only be achieved when the information is centralized and coordinated.

Also in 2008, the New York Police Department, New York State Department of Transportation and the City's DOT will open the Joint Transportation Management Center, in Long Island City, which will enhance our ability to track and coordinate responses to traffic incidents.

But coordination is only the beginning; significant improvements require significant investments in technology. We will continue technological upgrades. By 2009, we will electronically control the timing on more than 70% of the city's traffic signals, allowing us to respond in real-time to emerging traffic conditions; by 2012, all of the city's highways will be equipped with ITS technologies.

Expanded technology and coordination will improve our ability to respond to traffic incidents, manage traffic congestion, and deliver information to drivers in real time.

INITIATIVE 12

Strengthen enforcement of traffic violations

We will improve our ability to enforce traffic laws

The number of vehicles is not the only contributor to congestion. Drivers who violate traffic laws make congestion worse. While the City undertakes focused efforts to increase enforcement, we must make broader, more systematic changes to enhance enforcement. We will undertake two initiatives and advocate for State action on a third to ensure that many drivers do not suffer from unnecessary congestion due to the illegal behavior of a few.

We will expand the number of Traffic Enforcement Agents

There are an estimated 800 intersections around New York City—in all five boroughs—where the presence of traffic enforcement agents (TEA) will be beneficial—not as ticket writers, but as traffic directors. The NYPD currently has approximately 500 "level 2" traffic enforcement agents whose main role is to direct traffic. But on any given day, the majority wind up not controlling the flow at busy intersections, but ensuring the movement of traffic around construction sites and other disruptions. To provide the coverage that will keep traffic moving, the NYPD will increase the force of level 2 TEAs by 100 agents this year, to be followed by further increases in the future.

We will enable all TEAs to issue blocking-the-box tickets

A major cause of true gridlock is drivers choosing to "block the box"—to cross an intersection even if there is no room on the other side. But writing a "blocking-the-box" ticket is currently a state-regulated moving violation, which may only be issued by police officers and selected traffic enforcement agents. We will seek to create a new parking violation that will allow both police officers and all TEAs to write block-the-box tickets faster, which will encourage more vigilant ticketing of violators.

Metropolitan Transportation Authority

MTA Comments on New York City Traffic Congestion Mitigation Plan

Presentation to the
Congestion Mitigation Commission

October 25, 2007

Presentation Purpose

"The MTA …shall submit comments on the implementation of the Mayor's Plan, including additional capital needs resulting from the plan and proposed uses of any potential revenues…"

Presentation Purpose

- **To summarize the October 2007 MTA report to the Commission**
  - MTA's plan meets the increase in demand for public transportation
  - The additional MTA capital and operating needs required to implement the transit response
  - The impact of these needs on MTA's capital and operating budgets

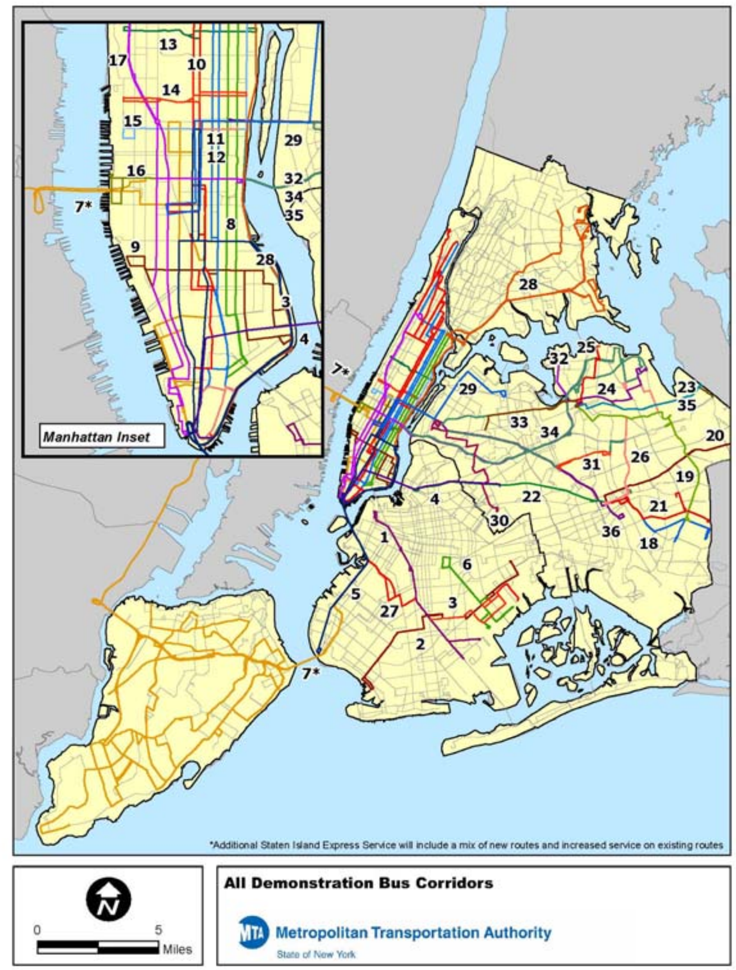
Overview

- **City Plan Benefits MTA**
  - Promotes and expands the use of transit
  - Results in new services
  - Provides additional resources to support long term investment in transit capital plan
- **Outcomes**
  - Changes in demand for transit
  - Changes in the use of MTA B&T crossings
  - Changes will require time to take shape

Meeting the Increase in Demand for Public Transportation

City Diversions

- **Market**
  - Daily auto diversions from within NYC are estimated by the City to be 78,000
  - Trips originate in the outer boroughs and in the CBD
- **MTA strategy**
  - New bus routes and enhancements to existing bus routes linked to Manhattan
  - Enhanced bus links to subway lines serving Manhattan
  - Enhancements to key subway lines in Manhattan and the Outer Boroughs
  - Ramp up prior to second Quarter 2009 Pilot Test start
  - MTA will cooperatively monitor actual travel with NYCDOT and other agencies



Meeting the Increase in Demand for Public Transportation

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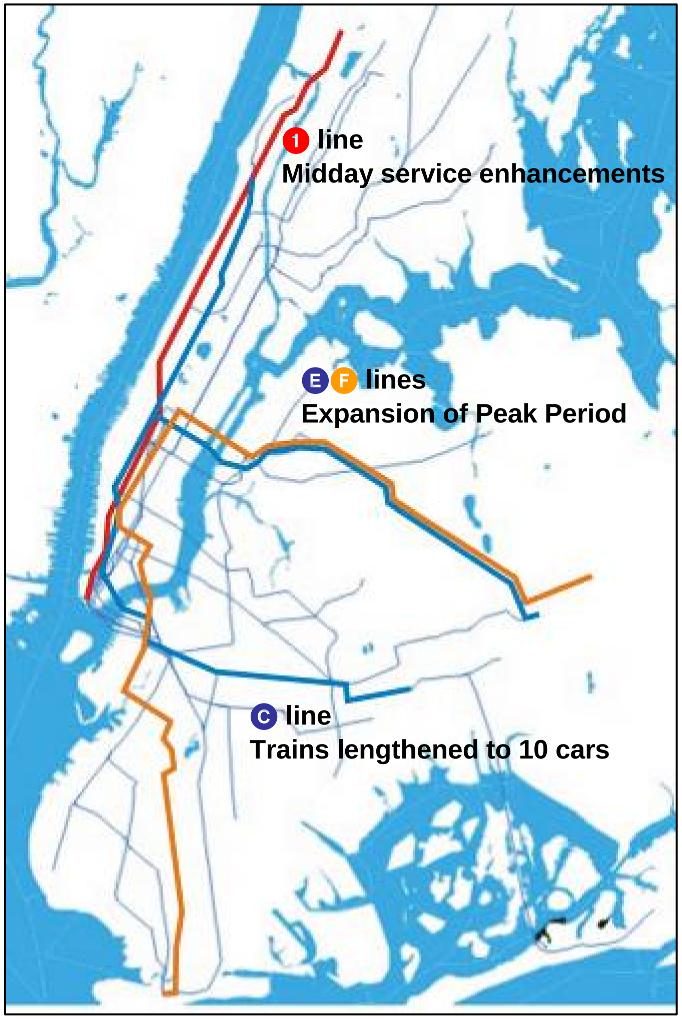


Subway Service Improvements

Meeting the Increase in Demand for Public Transportation

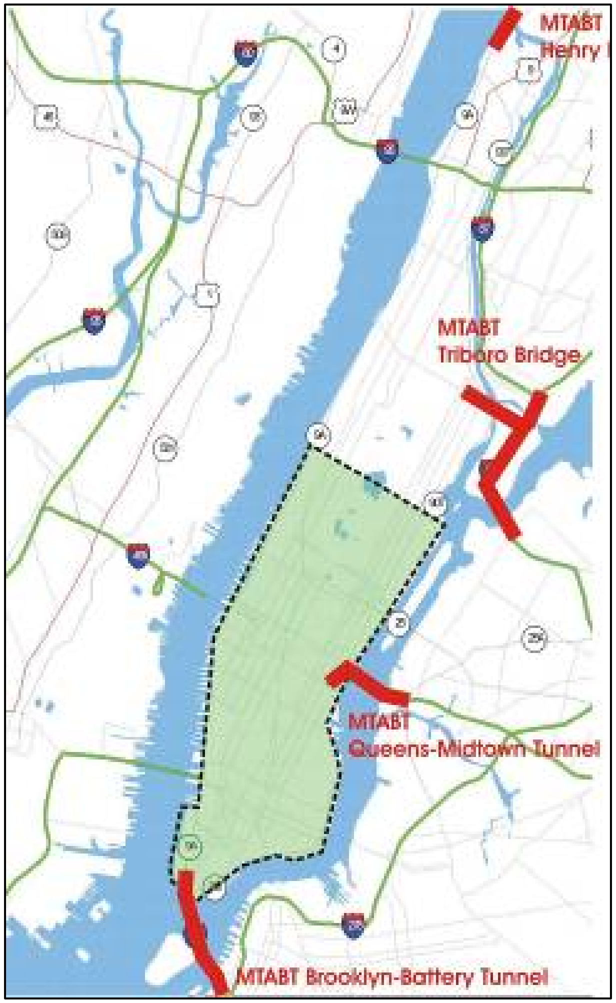
Suburban Diversions

- **Market**
  - Daily diversions from Mid-Hudson for travel to core estimated at 2,500; from Long Island 3,500
  - Dispersed over the 5,000 square mile MTA commuter rail territory
- **MTA Strategy**
  - Generally accommodated on the existing 1,300 daily trains serving the core
  - Express bus service to the core where other capacity needed in coordination with NYS DOT
  - MTA will cooperatively monitor actual travel with NYSDOT and other agencies

Meeting the Increase in Demand for Public Transportation

MTA Crossings

- **Market**
  - MTA crossings serve approximately 170,000 Manhattan-bound trips
  - Vehicles equipped with E-ZPass entering Manhattan via these MTA crossings would have their congestion charges reduced by the amount of toll paid
    - Brooklyn Battery Tunnel
    - Queens-Midtown Tunnel
    - Triborough Bridge (Manhattan segment)
    - Henry Hudson Bridge
  - Toll offset would not apply to cash paying customers
- **MTA Strategy**
  - Monitor facility volumes and delays
  - Evaluate diversions from free crossings to B&T for E-ZPass rebate versus diversions of B&T cash customers to free crossings to avoid toll plus charge
  - Initial bridge and tunnel shopping
  - Impacts on E-ZPass Support Center



Cost of Implementing Additional Transit Improvements

Estimated Capital Costs and Impacts

- **Total estimated cost: $767 million, comprised of:**
  - **2008-2009**

    Capital Needs @ $283 million ($467 million - $184 million Federal UPA grant funding)
    - Buses, bus depots and lay-up area
    - Subway cars
    - BRT service implementation
    - Suburban buses and park+ride facilities

  - **2010-2012**

    Capital Needs @ $163 million
    - Bus lay-up area, BRT service, subway station enhancements, suburban park+ride facilities

  - **Post-2012**

    Capital Needs @ $320 million
    - Construction of two bus depots

Cost of Implementing Additional Transit Improvements

Estimated Operating Costs and Impacts

- **The estimated net cost to "ramp up" the new services in the last quarter of 2008 and the first quarter of 2009 is $55.8 million (the gross cost is $59.9 million)**
  - Bus service and subway service, railcar and bus overhauls, BRT
  - Estimated operating revenue: $4.1 million
- **The estimated net cost of operating the new transit services and facilities each year for the 3 year pilot is $104.2 million (the gross cost is $153.1 million annually)**
  - Subway service, bus service and depots, BRT, suburban bus service, monitoring and data collection
  - Estimated operating revenue: $48.9 million / year
- **An annual view of both estimated capital and operating costs provides further insight**

Cost of Implementing Additional Transit Improvements

Annual Estimate Summary ($ in millions)

Operating

Operating Expenses	Oct 2008-Mar 2009	Apr 2009-Dec 2009 (Congestion Pricing Pilot Period)	2010 (Congestion Pricing Pilot Period)	2011 (Congestion Pricing Pilot Period)	Jan 2012-Mar 2012 (Congestion Pricing Pilot Period)	Total
Subway Service Start Up	2.1	-	-	-	-	2.1
Subway Car Overhauls	8.0	-	-	-	-	8.0
Bus Service Start Up	34.0	-	-	-	-	34.0
Bus Overhauls	6.7	-	-	-	-	6.7
BRT	6.5	-	-	-	-	6.5
Other Start Up Costs	2.6	-	-	-	-	2.6
Subway Service Operating	-	6.2	8.3	8.3	2.1	24.9
Bus Service Operating	-	65.7	87.6	87.6	21.9	262.8
Bus Storage / Service / Maintenance	-	17.3	23.0	23.0	5.8	69.1
BRT	-	9.8	13.0	13.0	3.3	39.1
Suburban Bus Service	-	14.6	19.5	19.5	4.9	58.5
Data Collection	-	1.3	1.7	1.7	0.4	5.1
Less Revenue	-4.1	-36.7	-48.9	-48.9	-12.2	-150.8
TOTAL	55.8	78.2	104.2	104.2	26.2	368.6

Cost of Implementing Additional Transit Improvements

Annual Estimate Summary ($ in millions)

Capital

Congestion Pricing Pilot Period

Capital Commitments	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Buses	220.0	-	-	-	-	-	-	-	-	-	220.0
Subway Cars	105.8	-	-	-	-	-	-	-	-	-	105.8
2 Bus Depots	-	80.0	-	-	-	106.7	106.7	106.6	-	-	400.0
Bus Lay-up Area	2.5	2.5	20	-	-	-	-	-	-	-	25.0
BRT	-	10.9	3.7	3.7	3.6	-	-	-	-	-	21.9
Suburban Buses	-	38.2	-	-	-	-	-	-	-	-	38.2
Suburban Park and Ride	-	8.0	32.0	-	-	-	-	-	-	-	40.0
Station Renovation / Enhancements	-	-	-	50.0	50.0	-	-	-	-	-	100.0
Less UPA	-184.3	-	-	-	-	-	-	-	-	-	-184.3
TOTAL	144.0	139.6	55.7	53.7	53.6	106.7	106.7	106.6	-	-	766.6
Annual Debt Service if Capital is Financed by Debt *	-	11	22	33	35	40	45	50	53	56	

* Assumes a recurring revenue stream to ensure the marketability of the debt

Monitoring Program

- **Comprehensive monitoring is essential**
  - MTA agencies will monitor ridership and volumes on its trains, buses and crossings before, during and after the pilot program to determine the actual impacts on its network and budgets.
  - Adjustments to the span and scope of services will be made, where applicable.
  - MTA will coordinate research and planning with NYC and NYS.

Summary

- Congestion Pricing will encourage expanded use of MTA transit services in both NYC and the suburbs
- MTA will need to respond to changes over time in demand for transit and to changes in use of MTA B&T crossings
- Revenue from Congestion Pricing will provide resources to support these investments and additional resources to support long term capital investment in transit

1. Overview

Implementation of a congestion pricing program can benefit the Metropolitan Transportation Authority (MTA) in two important respects --- (1) the policy will promote and expand the use of mass transit in the region; and (2) the resources raised by imposition of congestion charges can provide significant additional resources to support long-term investment in transit infrastructure.

The purpose of this report is to provide the MTA's comments on New York City's congestion pricing plan (City Plan) to the New York City Traffic Congestion Mitigation Commission. In accordance with the State statute creating the Commission, this report will describe:

- How MTA will meet the increase in demand to use public transportation due to the implementation of the City Plan;

- The additional MTA capital and operating needs required to implement the transit response; and

- The impact of these needs on MTA's capital and operating budgets.

For the purposes of commenting on the City Plan, the MTA has utilized the City's overall projection of diversions to public transportation resulting from the imposition of a congestion charge. However, it is anticipated that it will take considerable time throughout 2009, the first implementation year of the City Plan, for the changes in travel generated by congestion pricing to stabilize into recurring patterns, as commuters and other travelers identify routes, times and modes that best meet their needs. Consequently, the initial service strategies presented in this report to meet the demand created by the City Plan will require continued monitoring of travel patterns and service adjustments as the program matures. Forecasts of traffic impacts on MTA bridge and tunnel crossings from vehicles diverting from the currently toll-free East River Bridges continue to be assessed but are expected to fluctuate early on as motorists that elect to continue to drive will "bridge shop" for the shortest time travel and best overall net price.

Successful implementation of the City Plan will require the MTA to provide a full complement of new and enhanced service aimed at accommodating expected auto diversions for those traveling into and within the Manhattan Congestion Zone, as well as access improvements to existing transit service. A portion of this additional service will need to be implemented in advance of the imposition of the congestion charge.

Neither the operating nor capital costs associated with these improvements are provided for in either the MTA's four-year (2008-2011) Financial Plan or the Authority's current five-year Capital Plan (2005-2009). However, the United States Department of Transportation has elected to enter into an Urban Partnership Agreement with the New York State Department of Transportation, the MTA and the New York City Department of Transportation which, if effectuated, will provide about $185 million to support MTA related capital costs of the congestion pricing initiative.

After assuming the use of available federal funds provided for by the Urban Partnership Agreement, the unfunded capital costs associated with this new service total $767 million. Fully capitalizing these costs would result in $56 million in additional annual operating debt service expenses. These projects are expected to be advanced on an expedited basis and are anticipated to be fully committed during the three year pilot program ending in 2012. Additionally, once the congestion charge is implemented, approximately $104 million will be needed annually to operate and maintain this service, net of additional revenue gained by new ridership. It is estimated that about $400 million of capital funds and $55.8 million in net operating funds would be needed late in 2008 and in early 2009, prior to the implementation of the congestion charge in April 2009.

2. Increased Demand and How the MTA Will Respond

"... comments on the traffic congestion mitigation plan..."

MTA's response to the City's Plan is focused on how the transit system will respond to changes in travel due to congestion pricing. The changes are described in terms of the following markets:

City Diversions: defined as estimated motorists originating in the City who will divert to transit, New York City Transit (NYCT) subways and buses as well as MTA Bus (MTAB**),** and who will make up the majority of the congestion pricing travel impact;

Suburban Diversions: defined as suburban New York motorists who will divert to transit (primarily using Long Island Rail Road and Metro North Railroad commuter services) and who are estimated by the City to be much fewer in number than City diversions; and

MTA Crossings: defined as motorists (with E-ZPass) who will continue to enter by vehicle into the Congestion Zone defined in the City Plan by private vehicle, but who may divert from the City-owned free East River crossings to MTA Bridges & Tunnels' (B&T) Manhattan crossings due to the proposed congestion fee offset. Additionally, B&T will be impacted by motorists without E-ZPass who currently use B&T crossings but would divert to the City's toll free crossings because of the imposition of congestion fees.

City Diversions

Successful implementation of the City Plan will require a significant effort by MTA New York City Transit (NYCT) and MTA Bus (MTAB) to accommodate the motorists who will divert to transit. The number of daily auto diversions to transit from within NYC is estimated by the City to be approximately 78,000. This includes both diversions to transit from the outer boroughs and northern Manhattan to the congestion zone as well as diversions within the congestion zone. Most of these new trips are estimated to originate in a relatively small number of areas of the City with fewer connections to the existing subway and/or bus network. These areas, such as far eastern Queens or southeastern Brooklyn, currently generate a larger share of daily auto trips in the City. The corridors recommended for additional transit services have been defined by MTA working with New York City based upon modeling efforts by both to identify the neighborhoods and areas of the existing transit network most likely to be affected.

The MTA strategy for these areas consists primarily of a combination of new bus routes and enhancements to existing routes linking these areas directly into the Manhattan Congestion Zone, and enhanced bus links to subway lines which serve Manhattan and the Congestion Zone. Within Manhattan, bus and subway service is also being bolstered in anticipation of new demand for intra-core zone trips caused by motorists whose trips originate and end in Manhattan and who transfer from outer borough services that connect to Manhattan. Finally, service on key subway lines in Manhattan and the outer boroughs will be enhanced during midday and shoulder periods to increase customer capacity.

MTA plans to ramp up these new services by initiating many of them in late 2008 and early 2009 in advance of the April 2009 start of the three year congestion pricing pilot.

Overall, MTA proposes to use a total of 309 additional buses within New York City to provide the new and enhanced services. Map 1 and Table 1 show these corridors and routes along with the number of total additional buses to be assigned to each.

In addition, MTA will participate in the City's first Bus Rapid Transit (BRT) program in 2008. Service will begin on up to five routes in different areas of the City over the next two years. Key elements will include new bus lanes, distinctive pavement treatments on the bus lanes, sidewalk extensions to the bus lanes in some locations to speed boarding, new stations with new shelters, traffic signal priority at some intersections, branded buses, and an enhanced enforcement program by the City. Further details on this program, including implementation costs are found in the Transportation section of the PlaNYC report.

Map 1
Congestion Pricing Bus Corridors

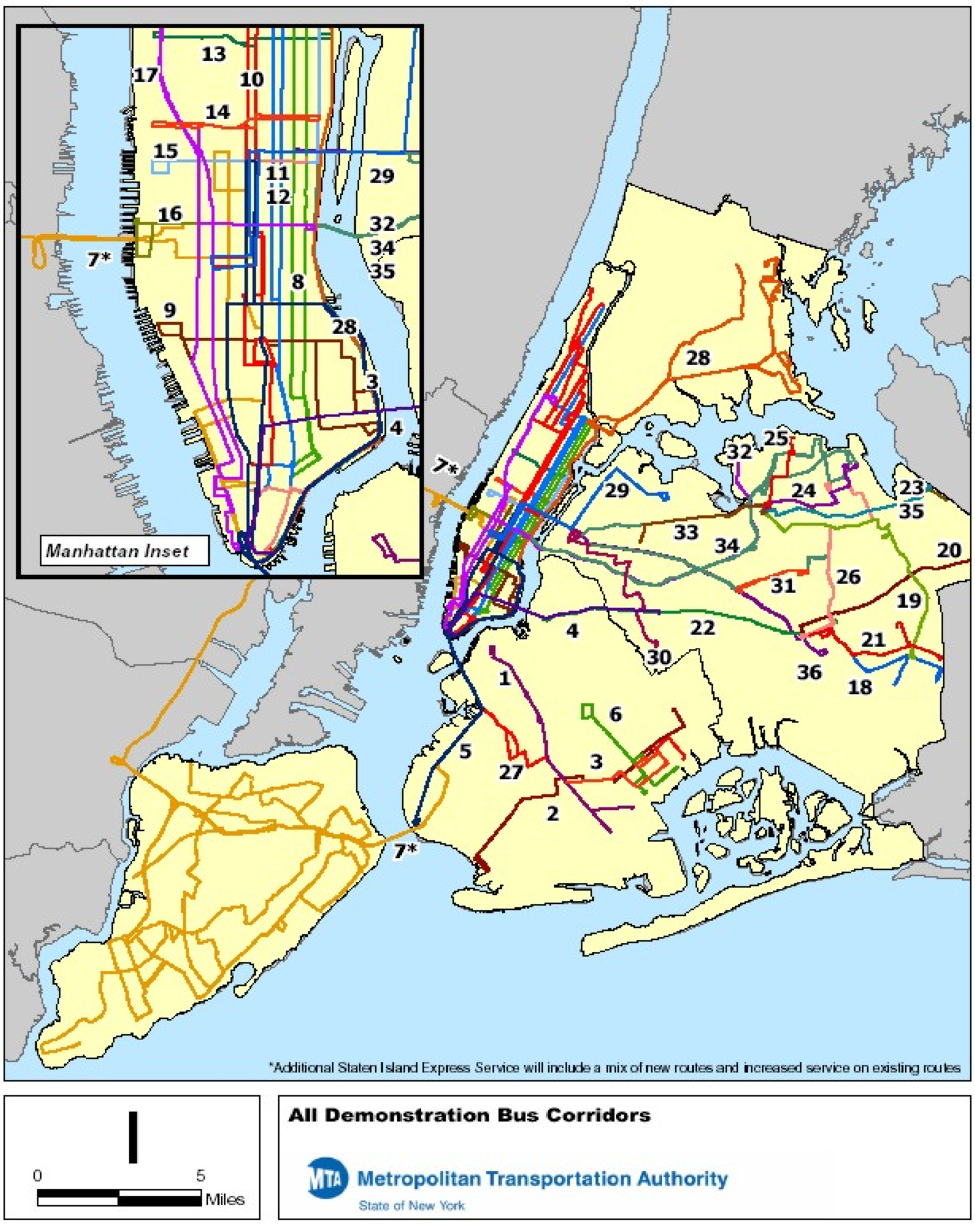


Table 1
New NYCT/MTA Bus Service Required for Congestion Pricing

Map Key	Map Color	Corridor	Total Buses Required: Local	Artic	Express
New York City Transit Routes					
Brooklyn					
1	Purple	Flatbush Avenue (B41 Local/Limited)	33		
2	Brown	Ave. H/Glenwood/Flatlands from Rockaway Parkway to Flatbush Avenue (B6)	6		
3	Red	**NEW ROUTE**: Canarsie/East 80th St/Glenwood Rd/Avenue H to Flatbush Avenue	6		
4	Dark Blue	**NEW ROUTE**: Metropolitan Avenue to Williamsburg Bridge and Lower Manhattan	12		
5	Blue	**NEW ROUTE:** Bay-Ridge-Manhattan Express Route			23
6	Green	Remsen Avenue (B17)	6		
Staten Island					
7	Orange	SI-Manhattan Express (All routes)			33
Manhattan					
8	Green	1st /2nd Avenue (M15)		6	
9	Brown	14th Street (M14)		6	
10	Red	5th Avenue/Madison (M1/M2/M3/M4)	9		
11	Blue	Lexington/3rd Avenue (M101/M102/M103)		5	
12	Blue	Lexington Avenue/3rd Avenue Corridor (X90)			10
13	Dark Green	86th Street (M86)		4	
14	Red	65th/66th Streets and 67th/68th Streets (M66)	2		
15	Light Blue	57th Street/York Avenue (M31)	3		
16	Green	42nd Street (M42)	3		
17	Purple	Broadway/7th Avenue (M20/M104)	3		
Queens					
18	Blue	120th Avenue/Merrick Boulevard (Q84)	2		
19	Green	46 Av/48 Av/Springfield Blvd. (Q27 Ltd.)	2		
20	Brown	Hillside Avenue (Q43)	2		
21	Red	Linden Boulevard/Merrick Boulevard (Q4)	2		
22	Green	Metropolitan Avenue to Jamaica (Q54)	2		
23	Light Blue	Northern Boulevard (Q12)	3		
24	Purple	Northern Blvd/Crocheron Ave/32nd Ave (Q28)	2		
25	Red	Union Street/149th Street (Q14)	2		
26	Pink	Utopia Parkway/Bell Boulevard (Q31)	6		
NYC Transit Total (193 buses)			**106**	**21**	**66**

			Total Buses Required		
Map Key	**Map Color**	**Corridor**	**Local**	**Artic**	**Express**
MTA Bus Company Routes					
Brooklyn					
27	Red	Canarsie-Manhattan Express			13
Bronx					
28	Light Brown	**NEW ROUTES**: NE Bronx –Lower Manhattan Express (3 separate routes)			21
Queens					
29	Blue	**NEW ROUTE**: 21st Street to Midtown Manhattan via Queensboro Bridge (extension and variation of Q19A)*		5	
30	Purple	48^{th} Avenue/58th Street/Forest Avenue (Q39)*		2	
31	Red	Jewel Avenue (Q64)*		2	
32	Purple	**NEW ROUTE**: College Point-Manhattan Express Route			12
33	Brown	**NEW ROUTE**: Northern Blvd.-61st St. to Woodside LIRR		10	
34	Dark Green	**NEW ROUTES**: NE Queens-Lower Manhattan Express (3 separate routes)			21
35	Dark Green	Northern Blvd to Manhattan Express (QM3)			3
36	Purple	Queens Boulevard Local Bus (Q60)*		2	
		Expanded Service on Existing Routes*		25	
MTA Bus Company Total (116 buses)				46	70
GRAND TOTAL (309 buses)			**106**	**67**	**136**

* Assumes routine bus purchases will equip other runs on these routes with articulated buses.

In addition to the core bus strategy, MTA is planning selected subway service enhancements where and when demand is likely to occur, and where additional capacity exists. These additional services, given current operating capacity and car availability constraints will provide new and enhanced services in corridors where there could be increased demand. The plan includes subway service increases on the 1 line (Broadway-7th Avenue) during midday to address some of the projected increase in afternoon trips within the Congestion Zone. To serve neighborhoods in Brooklyn that currently have a relatively high percentage of auto commuters, capacity will be increased on the C (Fulton Street) line by extending all trains from 8 cars to 10 cars. To address some of the projected additional demand from southeast Queens, additional E and F line (Queens Boulevard) service is planned consisting of four additional train trips that extend the duration of peak AM service levels into shoulder periods by one-half hour. Providing this additional subway service will require the purchase of 46 new subway cars (including spares). In addition, subway station capacity enhancements, such as additional or widened stairways, will have to be constructed in a number of stations to accommodate additional subway riders.

Suburban Diversions

Short-term expansion of the commuter rail network to serve the Manhattan-bound peak travel market is constrained by a number of factors including capacity at Pennsylvania Station, storage and track capacity, platform lengths that cannot accommodate longer trains, insufficient number of cars to provide supplemental service, and a shortage of parking spaces in some locations. As a result of these constraints, the strategy to accommodate auto diversions from the northern and eastern suburbs will depend on some combination of: (1) maximizing the utilization of the existing system, (2) establishing new suburban express bus service coupled with the construction of Park and Ride facilities, and (3) expanding rail service where feasible. The right mix of these strategies will depend on the degree to which suburbanites that currently pay tolls to reach Manhattan will shift their travel behavior.

The number of auto diversions from the northern and eastern suburbs is estimated by the City to be substantially lower than those in New York City. The City Plan forecasts daily transit diversions of approximately 2,500 from the Mid Hudson region served by Metro-North (MNR) and 3,500 trips from Nassau and Suffolk Counties served by the Long Island Rail Road (LIRR). These diversions, which represent a small portion of MTA's commuter rail ridership, will be dispersed throughout MTA's commuter rail service area.

Initially, serving diverted suburban motorists bound for Manhattan will largely be accomplished by taking advantage of the existing commuter rail services with minor budget impacts in 2009. However, as the congestion pricing program matures demand may emerge on sections of the commuter rail network where less capacity is available than elsewhere, or at stations where parking is more limited. To help address this demand up to 58 express buses to provide direct service to Manhattan may be needed. To support this potential additional service, the United State Department of Transportation's Urban Partnership grant includes funding for two new suburban Park and Ride facilities.

If necessary, suburban diversions will also be accommodated by adding commuter rail service in a limited number of locations where feasible, using the existing MNR and LIRR network. For example, if actual suburban diversions are greater than estimated demand, additional railroad service enhancements may be made in the shoulder period (the one or two hour period before and after the peak one hour where capacity exists), by increasing train lengths where possible, or by additions to existing railroad station access services (such as Long Island Bus (LIB) service to major LIRR stations, Tappan-Zee Express buses to Tarrytown or White Plains; or Haverstraw ferries to Ossining Station).

Map 2
Long Island Rail Road Network

Map 3
Metro-North Railroad Network

MTA Crossings

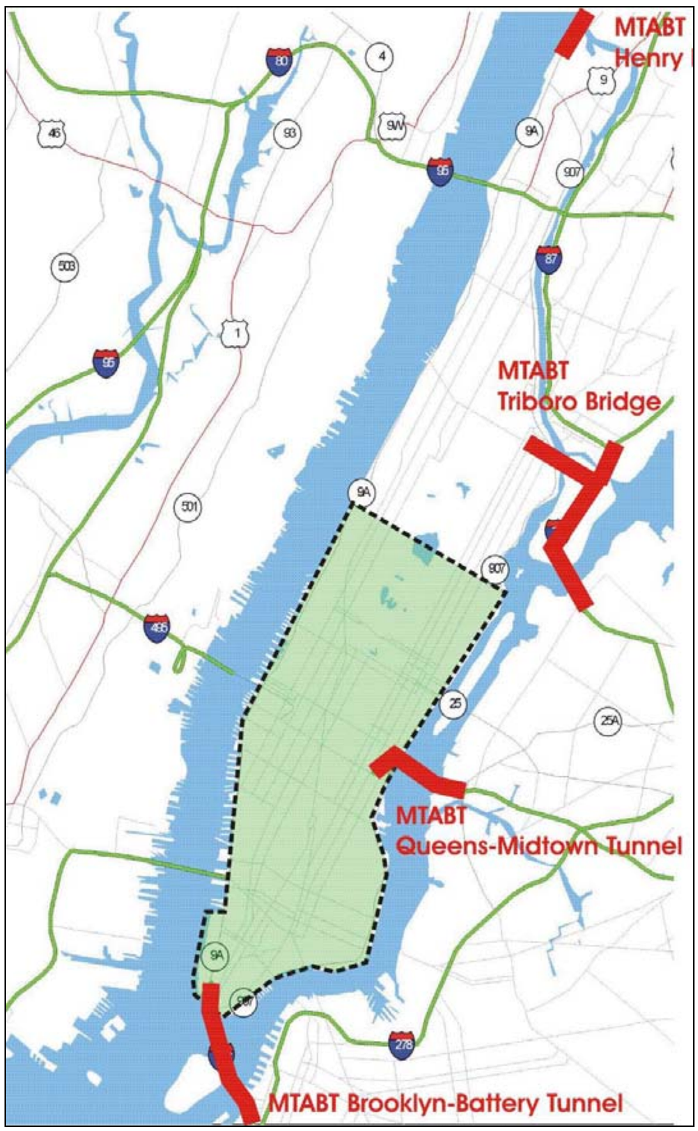
The City's congestion pricing fee would be imposed on all motorists entering or exiting the Congestion Zone, including those who use the toll free East River bridges into Manhattan. The City Plan assumes that the introduction of charging will equalize the price among the East River crossings and create a more rational framework for driving choices. Vehicles equipped with E-ZPass, entering or exiting the Congestion Zone that utilize B&T crossings serving Manhattan (specifically the Brooklyn-Battery Tunnel the Queens-Midtown Tunnel, the Triborough Bridge and the Henry Hudson Bridge), would have their congestion charges reduced by the amount of toll paid to B&T on the day in question. In order to encourage EZ-Pass use to facilitate traffic flow, the toll offset would not apply to cash paying customers.

MTA B&T crossings serving Manhattan carry an average of 170,000 vehicles a day --- 125,000 Manhattan-bound, between 6 AM and 6 PM. E-ZPass use is widespread, with an overall market rate share of about 75 percent. Today E-ZPass customers at these facilities experience only minimal delays at toll plazas during the peak period.

There are a number of likely, but conflicting, traffic impacts on MTA facilities resulting from the City Plan. It is premature to make a judgment regarding the overall effect that the congestion charge will have on traffic volume or revenue generation implications. Estimates of diversions between MTA crossings and the toll free bridges resulting from the congestion charge continue to be assessed and are particularly difficult to project early on in the three year pilot. Facility usage levels are likely to fluctuate initially as motorists "bridge shop" to find the best balance between net cost and facility accessibility.

Volume on MTA crossings (for example the Brooklyn Battery Tunnel and the Queens-Midtown Tunnel) may increase as facilities become crossings of choice, providing a shorter, faster trip for many motorists who continue to drive into the Congestion Zone. However, this increase in volume will be partially or fully offset by motorists who currently pay with cash to cross a B&T facility that may divert to the free City crossings to avoid being charged both a toll and the congestion fee, since the City plan proposes to credit only E-ZPass customers for the toll paid to B&T. MTA crossings are also likely to experience greater use during off-peak and shoulder periods when existing capacity is expected to be able to accommodate this new demand.

Map 4
MTA Bridges & Tunnels Crossings into Manhattan



3. Capital and Operating Costs and Impacts

”*A description of the additional capital and operating needs required for the implementation of such plan*”

Implementation of service changes to support the City Plan will create new capital and operating needs beyond those already included in the Authority’s current 2005-2009 Capital Plan and its four-year Financial Plan (2008-2011) that accounts for its operating budget.

Capital Investments

As shown in the table below, the capital cost of new transit service totals $951 million including expenditures for City and suburban buses, new subway cars, subway station renovations and enhancements, expanded and new maintenance facilities, and suburban park and ride lots. These expenditures will be partially offset by $184.3 million in anticipated federal funds available through the New York Urban Partnership agreement, leaving a remaining gap of $767 million. In order to expedite the delivery of service, the MTA where possible, will maximize the use of existing contract options for bus and subway related procurements. Contractual commitments for all of these projects are expected to be made prior to the end of the three year congestion pricing pilot program in 2012. It is estimated that about $400 million of these funds would be needed in late 2008 and in early 2009, prior to the implementation of the congestion charge in April 2009.

Table 2
Summary Of MTA Capital Needs
($ in millions)

Project Category	Project	Capital Cost
City Bus Service	309 Articulated, Local & Express Buses	$ 220.0
	2 Bus Depots (Brooklyn & Queens)	400.0
	1 Bus Layup Facility	25.0
	Bus Rapid Transit Service	21.9
City Subway Service	46 Subway Cars (new and spare rail cars)	105.8
	Station Renovations and Enhancements	100.0
Suburban Service	58 Suburban Express Buses	38.2
	2 Suburban Park and Ride Facilities	40.0
Subtotal – Capital Need		**$950.9**
Federal UPA Grant		**($184.3)**
Total Unfunded Capital Need		**$766.6**

Operating Expenses

Operating costs related to the City Plan are divided into two categories --- those costs that will be incurred prior to the flow of the implementation of the congestion charge, and annually recurring costs that will be sustained after the program is fully operational.

The MTA will begin ramping up transit service in the last quarter of 2008 to ensure that alternatives to the automobile are firmly in place when the fee goes into effect. As summarized in the table below these sunk costs are estimated to total $55.8 million (net of additional revenue) and include the phased implementation of service improvements over a six month period beginning in October 2008. Also included are additional one time costs to overhaul existing buses and subway cars to extend the life of equipment that would otherwise have been retired but is now essential to supplementing transit service in advance of the delivery of the new fleet. While not included in the following table, MTA Bridges and Tunnels, depending on how the City plans to operate the back office functions related to the opening, administration and servicing of a significant number of new E-ZPass accounts, is likely to incur considerable one time and recurring costs. These costs as well as those anticipated to result from the toll crediting system envisioned in the City Plan are excluded at this time pending resolution of the City's strategy to address these customer needs. A ten percent increase in the number of E-ZPass tags distributed by B&T will result in one time expenditures of $5.4 million as well as recurring costs of $2 million annually to service these new customer accounts.

Table 3
Summary Of MTA Operating Costs
Prior To The Imposition Of The Congestion Charge
October 2008 – March 2009
($ in millions)

Expenditure Category	Operating Cost
Subway Service (train operators, conductors and maintenance personnel)	$2.1
Subway Car Overhauls (one time cost)	8.0
Bus Service (drivers, maintenance storage, fueling, cleaning, repairs, support)	34.0
Bus Overhauls (one time cost for 106 hybrid buses)	6.7
Bus Rapid Transit	6.5
Marketing New Subway & Bus Service & Bus Stop Changes (one time costs)	0.6
Data collection to monitor bus and subway ridership	2.0
Operating Revenue	**$(4.1)**
Total Unfunded Operating Need	**$55.8**

Subsequent to the commencement of the City Plan, services for straphangers and commuters will be fully ramped up. The annual operating expenses to deliver these services will total $153.1 million. These costs will be offset through the collection of an estimated $48.9 million in additional fares from new customers diverting from automobiles. The net recurring costs of $104.2 million are itemized below.

Table 4
Summary Of MTA Annual Recurring Operating Costs
($ in millions)

Expenditure Category	Operating Cost
Subway Service (train operators, conductors and maintenance personnel)	$8.3
Bus Service (drivers, maintenance)	87.6
Bus Depots (2 facilities – storage, fueling, cleaning, repairs and personnel)	23.0
Bus Rapid Transit	13.0
Suburban Service	19.5
Data collection to monitor bus and subway ridership (inside cordon, crossing cordon, outside cordon)	1.7
Subtotal	**$153.1**
Operating Revenue	**($48.9)**
Total Unfunded Operating Need	**$104.2**

4. Concluding Observations

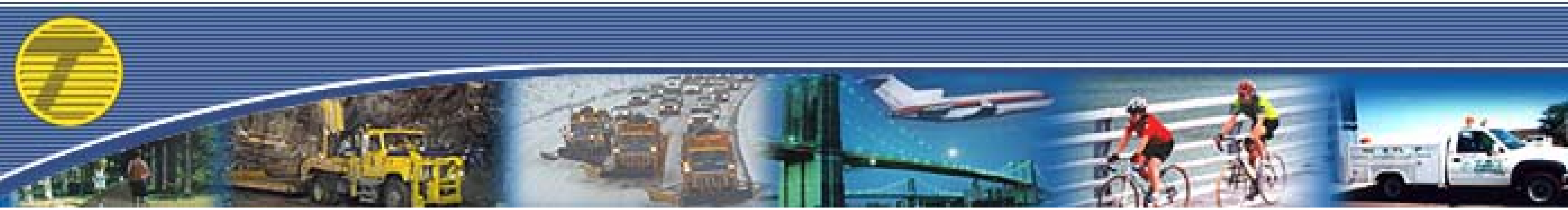
Transit Service Improvements Must Precede Implementation of the City Plan: In order to put in place adequate alternatives to encourage motorists to switch modes, additional transit service will need to be deployed in advance of the imposition or collection of the congestion fee. The early capital commitments and net operating expenses associated with ramping up this service over a six month period are estimated to be $400 million and $55.8 million, respectively.

MTA Costs to Support the City Plan Have Not Yet Been Addressed: The operating and capital costs to implement the full complement of transit services needed to successfully implement the City Plan are not provided for in either the MTA's four-year Financial Plan or the Authority's current five-year Capital Plan.

Capital Needs Total $951 million: After assuming the use of available federal funds provided for by the Urban Partnership Agreement, the unfunded capital costs associated with enhanced transit service total $767 million. Fully capitalizing these costs would add $56 million in additional annual operating debt service expenses.

Recurring Operating Needs Total Over $100 million a Year: Approximately $104 million will be needed annually to operate and maintain service, net of additional revenue gained by new ridership.

Transit and Bridge Crossing Diversions Require Monitoring: It will take considerable time for the changes in travel generated by congestion pricing to stabilize into recurring patterns, as commuters and other travelers identify routes, times and modes that best meet their needs. Consequently, the initial service strategies presented in this report to meet the demand created by the City Plan will require continued monitoring of travel patterns and service adjustments as the program matures.



NEW YORK CITY TRAFFIC CONGESTION MITIGATION COMMISSION

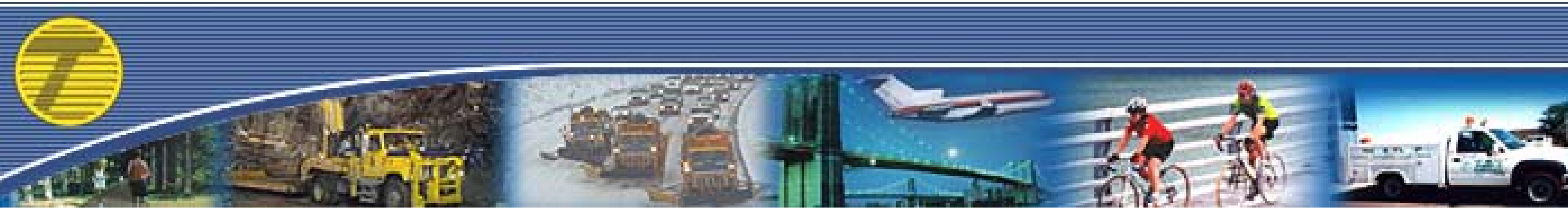
NYSDOT Comments on

New York City Traffic Congestion Mitigation Plan

Bob Zerrillo, Director, Office of Policy, Planning and Performance

Peter King, Director, Planning and Program Management

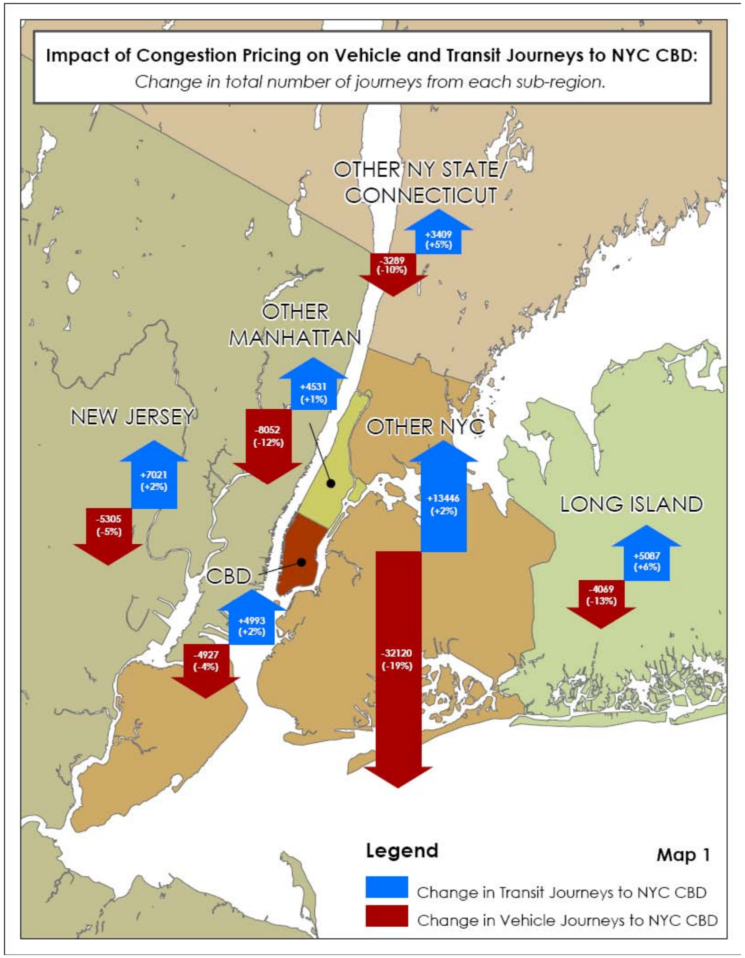
New York State Department of Transportation



NYSDOT Review

- Regional Impacts
- Impact on State Highway System
- Impact on non-MTA Transit Service
- Data Collection
- Capital Needs
- Future Considerations

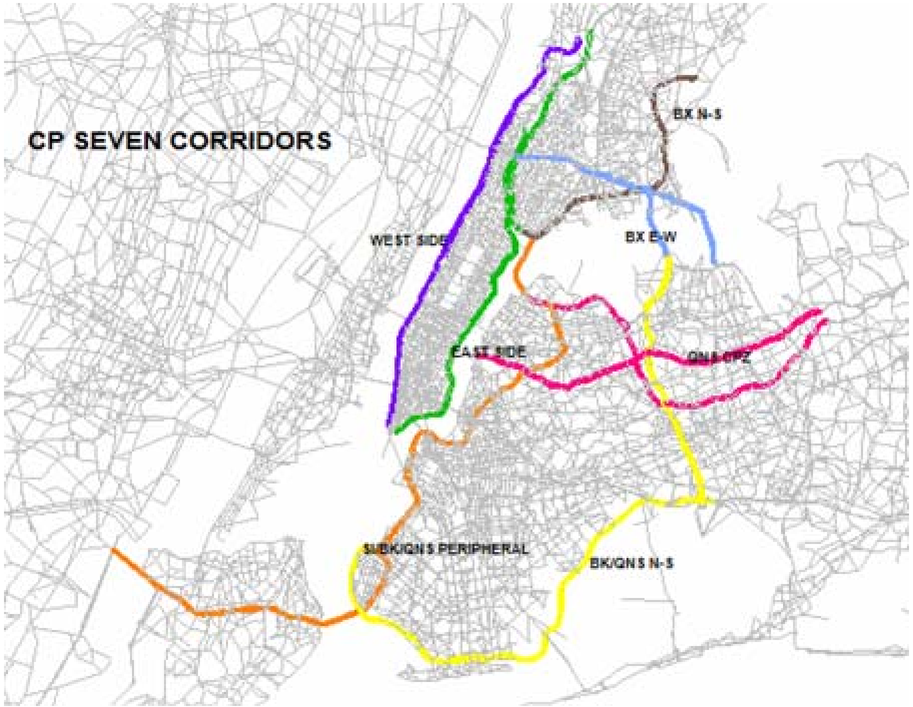
Regional Impacts

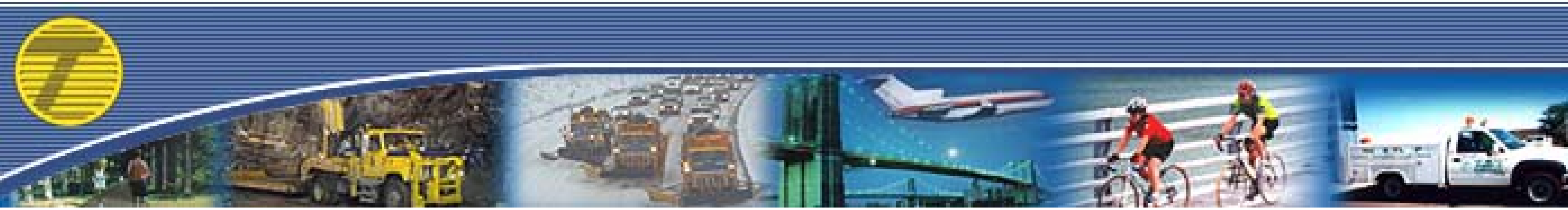


- Reviewed results from NYC Best Practice Model
- Congestion pricing may have impacts beyond City borders
  - Fewer auto trips to Manhattan CBD
  - Increased transit demand to CBD

Impacts on Highway System

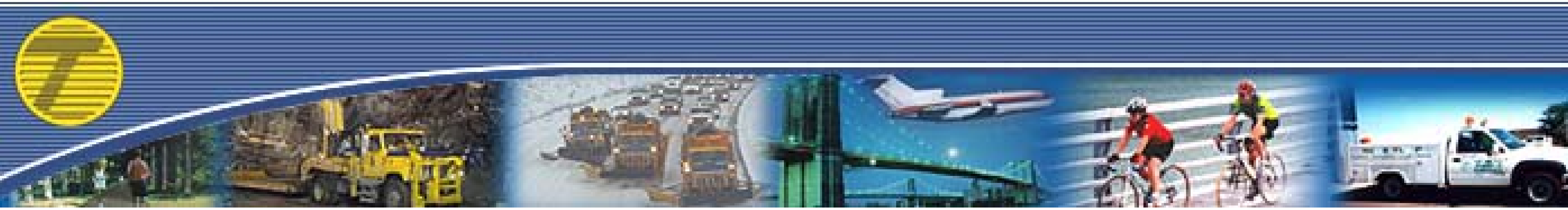
- Reviewed 7 major corridors
- Overall travel improves:
  - Total vehicle mileage drops slightly
  - Travel hours are reduced
  - Overall travel speed increases
- Monitor for Localized impacts





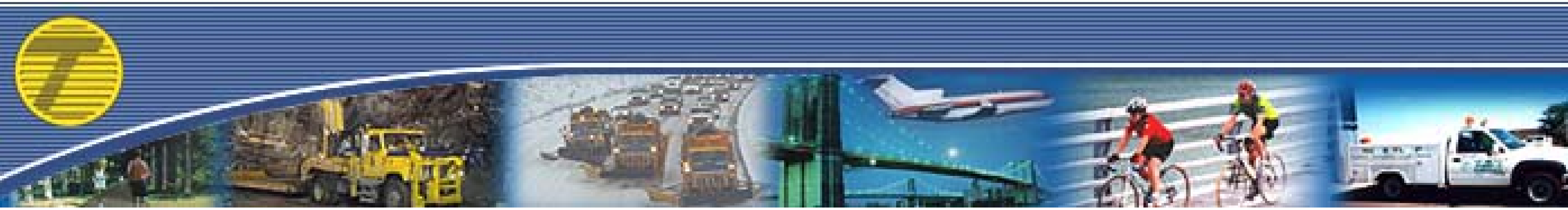
ITS Enhancements

- ITS improves system efficiency
- ITS will support the congestion pricing plan by improving traffic flow
- Recommended Projects:
  - Improve travel information services,
  - Enhance highway performance analysis,
  - Deploy additional ITS infrastructure,
  - Improve Transportation Management Center Operations



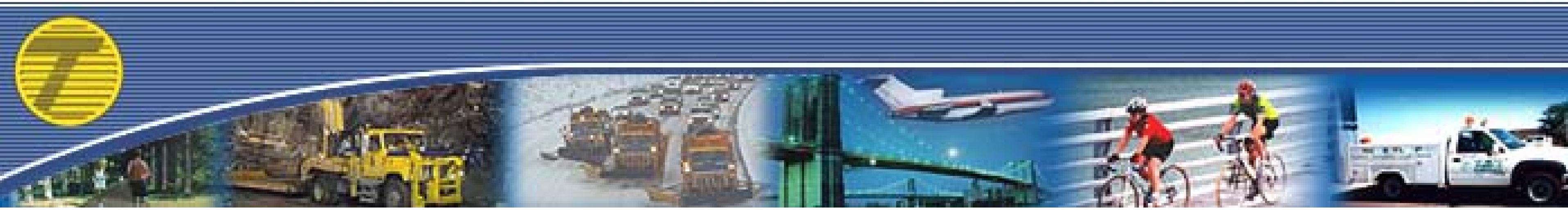
Transit

- Regional transit network will require additional capital and operating investments, and interagency coordination.
- Most transit diversions will be accommodated by MTA system
- NYSDOT will work with the MTA and Counties to support express bus service from areas not well served by commuter rail
- <u>**Operational Needs**</u>: e.g. Parking capacity at rail stations; Feeder bus access to rail stations
- <u>**Commuter and Intercity Bus Service to CBD**</u>: Additional buses; Exemption from congestion fees; Regional fare media



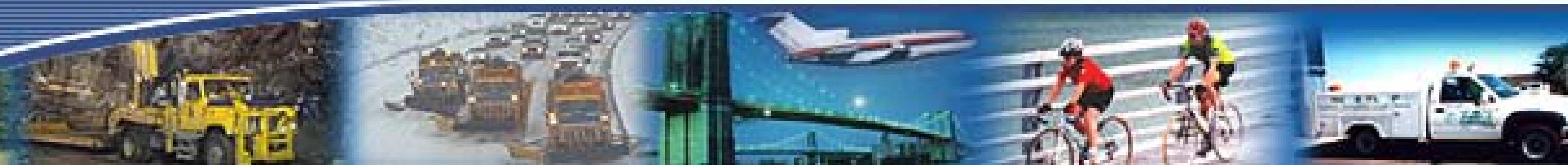
Data Collection

- Establish a systematic, well coordinated initiative among all regional transportation operating agencies
- “Before and after” data collection on the operation and usage of the entire regional transportation system
- Expand collection locations before implementation
- Collect during the pilot period to evaluate actual changes
- Monitor freight movement impacts



Summary of Capital Needs

- <u>Technology and Information</u>:
  - **$98.6M** - Technology and traffic monitoring projects
    - Improving Travel Information Services - $12.5M
    - Enhance Highway Performance Analysis - $28.2M
    - Deploy Additional ITS Infrastructure - $15M
    - Improve Transportation Management Center Operations - $42.9M
  - **$12.5M** - Regional data collection and information sharing
- <u>Transit Services Other than the MTA</u>:
  - **$30M** - Purchase/lease of suburban express bus park and ride facilities and bus shelters
  - **$25M** - Improved traveler information, integrated fare media, and transit technology.



Future Considerations

- Need “before and after” data on actual experience
- Mid-term (18-month) evaluation
- Make adjustments if necessary
- Use congestion pricing revenues for balanced investments in all modes

Report to the New York City Traffic Congestion Mitigation Commission

New York State Department of Transportation
Astrid C. Glynn, Commissioner

October 1, 2007

ELIOT SPITZER
GOVERNOR

DAVID A. PATERSON
LIEUTENANT GOVERNOR

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Introduction

This report is intended to meet the requirement of Chapter 384 of the Laws of 2007, that the New York State Department of Transportation (NYSDOT) provide comments to the New York City Traffic Congestion Mitigation Commission (Commission) by October 1, 2007 on the traffic congestion mitigation plan submitted by the mayor of New York City (NYC). That law also requires that NYSDOT provide to the Commission:

1. a description of the additional capital needs required for implementation of such plan;
2. the proposed utilization of any potential revenues derived from such plan for implementation of such plan; and,
3. the impact of such revenue upon the agency's capital and operating budgets.

In April 2007, Mayor Bloomberg outlined a proposal to implement congestion pricing in Manhattan as part of his PlaNYC initiative. In order to take advantage of federal funding available to implement congestion pricing, the State and City partnered on an application to the United States Department of Transportation (USDOT) under the Urban Partnership Program. In August, USDOT entered into an Urban Partnership with NYSDOT, the Metropolitan Transportation Authority (MTA), and NYC and outlined specific federal funding and other terms and conditions related to this agreement.

Implementation of the NYC Traffic Congestion Mitigation Plan (TCMP) will impact travel on the metropolitan area's regional transportation system. The MTA will address the impacts on their facilities and operations in their report to the Commission. This report will address the anticipated impacts on the region's transportation facilities other than those operated by the MTA, including impacts on the region's highway system, transit needs for areas not served by MTA, and regional transportation technology, data collection, information, and monitoring needs.

This report is based on an analysis and interpretation derived from information made available by NYC from their TCMP. Currently, there is not the level of detailed information available to accurately predict changing traffic patterns on individual highway corridors or facilities and precise diversions to transit services. The impacts on specific interchanges or traffic bottlenecks, and the resulting capital improvements that may be needed to mitigate these impacts, cannot be predicted at this time given the available data. Additional modeling may not yield a major improvement in precision. Given the uniqueness of the TCMP, the best way to be certain of the impacts is to demonstrate the proposal and analyze what occurs. Before and after data collection on the operation and usage of the entire regional transportation system is recommended. The Commission may want to consider funding this activity from congestion pricing revenues.

NYSDOT suggests that as the Commission evaluates the allocation of congestion pricing revenues, the Commission consider retaining the ability to adjust the allocation in the future based on actual results of diversions and traffic changes. Actual results from implementation of congestion pricing may require changes to transit services different than those originally forecasted, or result in traffic flows that vary from those anticipated by the current models. Capital projects necessary to mitigate any problems caused by the implementation on congestion pricing may need funding in the future. The transportation agencies could benefit from the ability to adjust to these changing conditions and revenues available to cover unanticipated costs.

Comments on NYC Traffic Congestion Mitigation Plan

Traffic congestion in the New York Metropolitan area is causing travel delay that increases the cost of doing business, increases pollution from motor vehicles, and reduces the quality of life. The expected increase of 1.5 million residents and nearly one million jobs in New York City by 2030 will exacerbate the growing traffic congestion problem. Mayor Bloomberg's proposal to implement a cordon based congestion pricing program is a significant effort in finding a way to address this problem.

Capital Needs

Following are the capital needs related to NYSDOT programs to support implementation of the TCMP. Although not required to implement the City's plan, these projects complement the TCMP and can mitigate traffic impacts, reduce congestion and improve the level of service on the region's highway network.

<u>Technology and Information</u>:

$98.6M - Technology and traffic monitoring projects that support the implementation of TCMP.

$12.5M - Regional data collection and information sharing.

<u>Transit Services Other than the MTA</u>:

$30M - Purchase/lease of suburban commuter/express bus Park and Ride facilities, bus shelters, and amenities.

$25M - Improved traveler information, integrated fare media, and transit technology.

The Department will work with the MTA to support provision of adequate express bus service from those suburban areas not well served by the MTA Commuter Railroads.

The TCMP proposal depends on a well functioning regional highway system to accommodate vehicular traffic. Much of the region's highway network is old, with increasing costs for maintenance and repair. Highway construction itself can contribute to traffic congestion when the full amount of highway capacity is not available for use during construction periods. Although not addressed in this report, there is a continued need to maintain and improve the state and local highway system to keep it fully operational to serve travel demands resulting from any congestion pricing proposal. Additional highway improvements may be identified in the future to mitigate any potential traffic impacts.

Revenue Utilization

Revenue from implementation of the City's congestion pricing proposal is estimated by NYC to generate $390M annually after funding the costs to operate the system.

The Urban Partnership Agreement with USDOT provided $354M to assist in implementation of the TCMP. Much of this federal aid was for additional/improved bus transit services. Little was provided by USDOT for the startup infrastructure and operations needed to implement the congestion pricing system.

The cost to install and operate the infrastructure and technology necessary to implement congestion pricing was estimated at $224M in PlaNYC and is to be funded either through NYC funds or through revenue generated from congestion pricing. This startup cost may require greater use of congestion pricing resources in the early years, but should diminish over time to the annual cost to operate and maintain the congestion pricing system.

Additional transit services to accommodate vehicular commuters diverted to transit will also require a substantial up front capital cost to purchase vehicles and other infrastructure as well as operate new services. Over time, the need for new resources for transit service should diminish to annual operating and maintenance costs, but may fluctuate if diversion to transit increases and additional transit services are needed. MTA will be providing their own estimate of need for revenue to fund MTA transit capital and operating expenses beyond the resources provided by USDOT. There may also be a need to fund additional transit services for areas not served by MTA as described above.

On the regional highway network, the implementation of congestion pricing would be aided by additional capital and operating investments for technology, intelligent transportation systems, and data collection and monitoring. There were no federal funds provided in the Urban Partnership agreement with USDOT to cover these important projects. The Commission should give consideration to funding the capital and operating costs of the investments listed above that support the efficient operation of the regional transportation network.

Impact on NYSDOT Capital and Operating Budgets

The projects and activities identified above to support the TCMP are above and beyond the current NYSDOT capital program and were not funded in the Urban Partnership Agreement with USDOT. The capital and operating costs are not part of the current NYSDOT capital or operating budgets, or the current multiyear capital program. There are no plans to undertake the recommended projects and activities absent the identification of new funding resources.

The Congestion Pricing legislation includes the submission of new NYSDOT and MTA capital programs by March 31, 2008. Although the implementation of Congestion Pricing may have an impact on NYSDOT and MTA operations, the excess revenues generated from any Congestion Pricing program above those needed for implementation should be devoted to a balanced program of infrastructure investments in all modes.

INTRODUCTION

In July, New York State (NYS) adopted Chapter 384 of the Laws of 2007. That law established the New York City Traffic Congestion Mitigation Commission (the Commission) and required the development of a traffic congestion mitigation plan (TCMP) by the mayor of the city of New York, established criteria that must be met before any congestion pricing plan can be implemented, and changed the timing of the Metropolitan Transportation Authority (MTA), and New York State Department of Transportation (NYSDOT) five-year capital plans.

Chapter 384 was adopted in part because of the U.S. Department of Transportation's (USDOT) National Strategy to Reduce Congestion on America's Transportation Network and the potential for an Urban Partnership Agreement (UPA). Through the UPA, USDOT planned to partner with certain metropolitan areas or ''Urban Partners'' to demonstrate strategies with proven effectiveness in reducing traffic congestion.

In August 2007, USDOT formed a partnership with its New York City Urban Partner comprised of New York City (NYC), the MTA and NYSDOT through a Memorandum of Understanding "MOU". All parts of the MOU agreement are contingent on the State Legislature approving the pilot congestion pricing plan, or an alternative pricing mechanism, within 90 days of the opening of the next legislative session, and making it effective no later than March 31, 2009.

This report is intended to meet the requirements of required by Chapter 384 of the Laws of 2007. By October 1, 2007, NYSDOT is required to provide the Commission comments on the TCMP submitted to the Commission by the mayor of NYC. NYSDOT is required to provide a description of the additional capital needs required for implementation of such plan; the proposed utilization of any potential revenues derived from such plan for implementation of such plan; and the impact of such revenue upon the agency's capital and operating budgets. Mayor Bloomberg's plan is laid out in PlaNYC, the Urban Partnership application, the Urban Partnership Agreement USDOT follow-up questions and Urban Partner answers, and the mobility section of the technical report of the PlaNYC *New York City Mobility Needs Assessment 2007-2030* (pages 9-22).

Congestion Pricing Modeling Issues

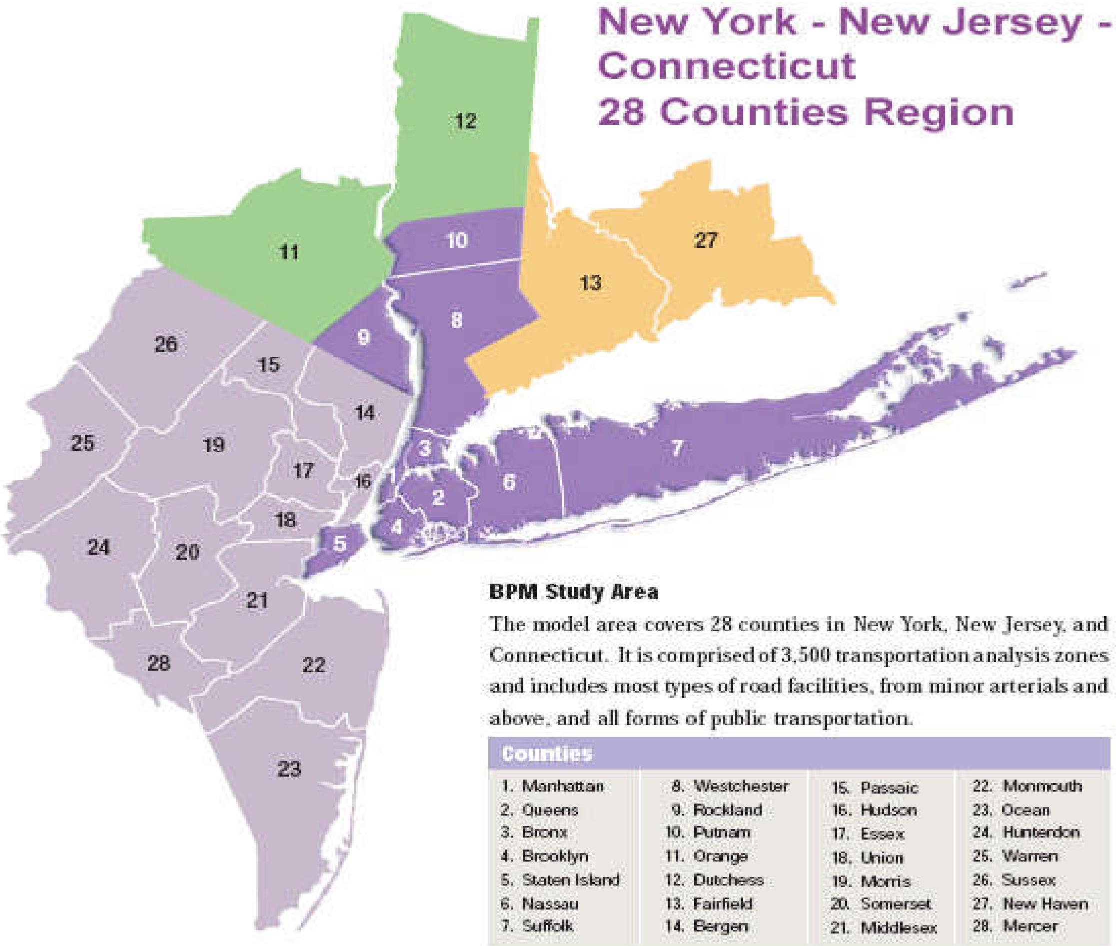
Issues

The New York Metropolitan Transportation Council (NYMTC) Best Practice Model (NYBPM) is an advanced activity-based travel demand model that is being used in the region as a travel demand forecasting tool for air quality transportation conformity analysis, and to analyze transportation projects by NYMTC and its member agencies. The NYBPM has been adapted by New York City to estimate the effects the TCMP on highway and transit trip demand in the region.

The NYBPM study area covers 28 counties in New York, New Jersey, and Connecticut (Figure 1). It is comprised of 3,500 transportation analysis zones and includes most types of road facilities, from minor arterials and above, and all forms of public transportation.

Figure 1

NYBPM Study Area



BPM Study Area

The model area covers 28 counties in New York, New Jersey, and Connecticut. It is comprised of 3,500 transportation analysis zones and includes most types of road facilities, from minor arterials and above, and all forms of public transportation.

Counties			
1. Manhattan	8. Westchester	15. Passaic	22. Monmouth
2. Queens	9. Rockland	16. Hudson	23. Ocean
3. Bronx	10. Putnam	17. Essex	24. Hunterdon
4. Brooklyn	11. Orange	18. Union	25. Warren
5. Staten Island	12. Dutchess	19. Morris	26. Sussex
6. Nassau	13. Fairfield	20. Somerset	27. New Haven
7. Suffolk	14. Bergen	21. Middlesex	28. Mercer

Since the NYBPM is a regional model designed to develop county-to-county and corridor-level travel flow changes, it is reasonable to use the model to test the regional impacts of congestion pricing. While NYBPM was not designed to develop trip volume changes on individual streets and transit stations, the PlaNYC version of the NYBPM allows reasonable 'order of magnitude' changes in traffic volumes and speeds from TCMP to be assessed at the corridor level. In order to more accurately predict the impact of congestion pricing at a more localized level, a more rigorous study would be needed using additional modeling tools to include micro-simulation models that can analyze TCMP impacts at specific interchanges and key local street links.

Because of the lack of specific sub-corridor local level impacts from the currently available analysis tools, it is important to collect necessary traffic and travel data before, during and after the congestion pricing demonstration to quantify the specific impacts on the regional transportation system. This information will allow any necessary adjustments to the congestion pricing program to be made based on actual experience.

NYBPM Analysis

According to the analysis of NYBPM 2007 baseline output, nearly 70% of vehicular journeys to the NYC Central Business District (CBD) come from NYC, including 22% from within the CBD, 13% from the rest of Manhattan, and 33% from the other four boroughs. The remaining 30% originate from New Jersey (19%), Long Island (6%), and north of NYC (6%).

The results of the NYBPM model outputs show the TCMP will include both mode and destination shifts of travelers.

The primary impacts on surrounding areas would be due to modal shift. This will result in a need for increased transit services in these areas to meet new demand, an increase in Park and Ride and transit parking capacity, an improved ridesharing brokerage and public information, as well as transfer arrangements and fare coordination with MTA.

Secondary impacts would include shifting traffic patterns, temporal shifts, shifts in facility usage, shifts in goods movement (temporally and spatially), and newly emerging congestion at different times and locations (with the potential for causing new traffic bottlenecks).

Potential Areas for Future Analysis

A better prediction and understanding of the impacts of the TCMP would require more rigorous study. Additional data such as: data for specific roadway segments; commercial vehicle classification counts; and, additional locations outside the CPZ could be explored to better understand the impacts resulting from the TCMP. Additional evaluation of how TCMP might influence transit levels of service would help in developing transit actions.

Some of the above actions are already being implemented by NYCDOT to serve the needs of the Commission. Additional enhancement of NYBPM may be beneficial in addition to NYCDOT's current modifications.

Impacts of Congestion Pricing: State Arterials and Other Major Roadways

Introduction

The following is a preliminary discussion on the impacts of the TCMP on the State Arterial System (SAS) in New York City. The SAS within NYC consists of approximately 200 centerline miles of primarily limited access parkways and expressways. The discussion below utilizes information developed by the PlaNYC version of the NYBPM to assess impacts. The approach to be taken in this analysis consists of the following:

- A generalized (macroscopic) analysis of overall system impacts utilizing information developed by the NYBPM for seven 'mega-corridors' in NYC. The analysis compares travel per day in each corridor computed both for current (base line) conditions, and after TCMP is implemented. The comparisons use traffic volume, travel time, and travel speed.

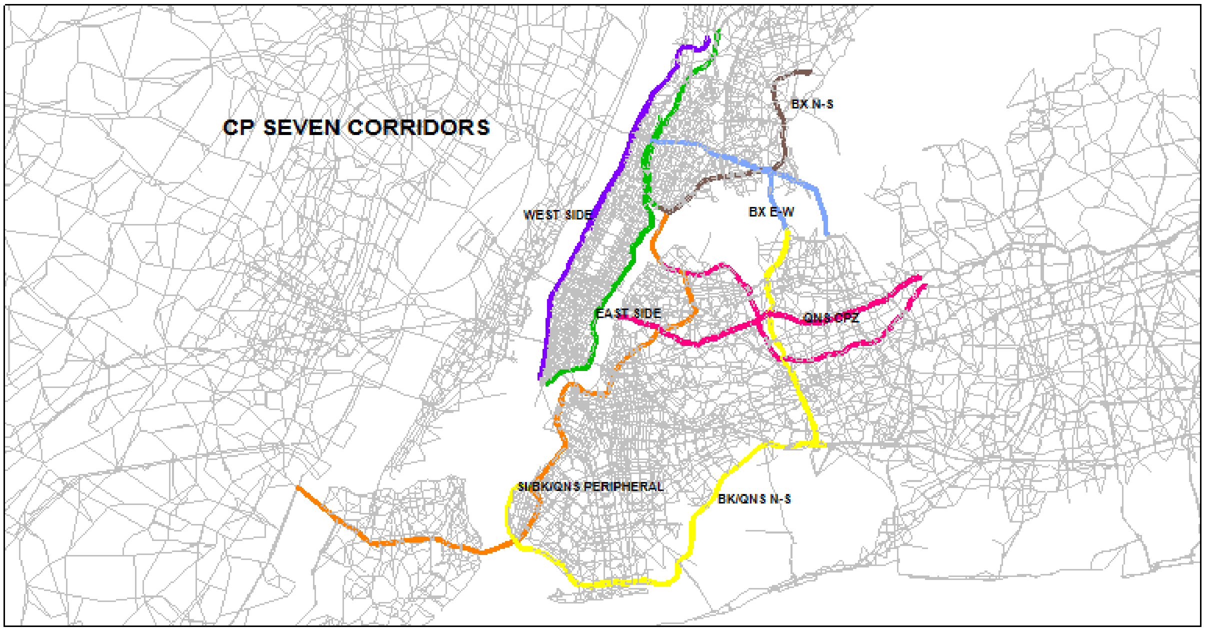
- A discussion of localized impacts due to introduction of TCMP at specific locations where professional and technical judgment suggest there may be significant changes in travel patterns.
- A brief discussion of mitigating measures and suggested next steps.

Corridor Descriptions

NYBPM was used to evaluate trip changes for seven corridors (see Figure 2) which directly impact and are impacted by the TCMP. These corridors consist of the following:

1. East Side Corridor
    a. FDR Drive
    b. Harlem River Drive (HRD)
    c. Major Deegan Expressway (I-87/to the Westchester border)
2. West Side Access
    a. Route 9A
    b. Henry Hudson Parkway (HHP) (to the Westchester border)
3. Staten Island/Brooklyn/Queens (I-278)
    a. Staten Island Expressway (SIE)
    b. Gowanus Expressway
    c. Brooklyn-Queens Expressway (BQE) (to the Triborough Bridge)
4. Queens/East-West
    a. Long Island Expressway (LIE)
    b. Grand Central Parkway (GCP)
5. Bronx/East-West
    a. Cross Bronx Expressway
    b. Interstate Connectors
6. Bronx/North-South
    a. Bruckner Expressway
    b. New England Thruway
7. Brooklyn/Queens/North-South
    a. Shore Parkway (Belt System)
    b. Southern Parkway (Belt System)

Figure 2



Corridor Level Analysis

The tables in Figure 3 show the results of an analysis of all seven corridors. The data was developed from NYC's output from the NYBPM. For each corridor, the model predicts the level of travel (in vehicle-miles of travel) for the 'before TCMP' or Baseline condition, and the post implementation condition after the TCMP is in place. The model also predicts changes in vehicle-hours of travel and travel speed. The data in Figure 3 were computed independently for each highway direction, thus the figure shows separate East-West and North-South directional splits for changes in travel. The one exception is the West Side Corridor for which only total combined North-South data was available for analysis.

Figure 3

Vehicle Miles of Travel (VMT)

Corridor name	2007 'Baseline' values		After Implementation of TCMP		% Change	
	N/E	S/W	N/E	S/W	N/E	S/W
EAST SIDE	830236	834119	794799	809319	-4.27%	-2.97%
WEST SIDE	1003472		963977		-3.94%	
SI/BK/QNS EXP	1278275	1320686	1262457	1309269	-1.24%	-0.86%
QUEENS-CPZ	1606040	1599311	1585791	1612261	-1.26%	0.81%
BRONX E-W	447989	483046	436900	466180	-2.48%	-3.49%
BRONX N-S	454795	481676	448868	474268	-1.30%	-1.54%
BK/QNS N-S	1390574	1441118	1384055	1436104	-0.47%	-0.35%

Vehicle Time Travel (VHT)

Corridor name	2007 'Baseline' values		After Implementation of TCMP		% Change	
	N/E	S/W	N/E	S/W	N/E	S/W
EAST SIDE	40420	44865	34402	39046	-14.89%	-12.97%
WEST SIDE	59368		51396		-13.43%	
SI/BK/QNS EXP	61339	60113	58436	56904	-4.73%	-5.34%
QUEENS-CPZ	80252	81021	75468	80967	-5.96%	-0.07%
BRONX E-W	13345	17642	12601	16482	-5.58%	-6.58%
BRONX N-S	14165	15547	13532	14672	-4.47%	-5.63%
BK/QNS N-S	47686	52839	47417	52153	-0.56%	-1.30%

SPEED

Corridor name	2007 'Baseline' values		After Implementation of TCMP		% Change	
	N/E	S/W	N/E	S/W	N/E	S/W
EAST SIDE	20.54	18.59	23.1	20.73	12.46%	11.51%
WEST SIDE	16.9		18.76		11.01%	
SI/BK/QNS EXP	20.84	21.97	21.6	23.01	3.65%	4.73%
QUEENS-CPZ	20.01	19.74	21.01	19.91	5.00%	0.86%
BRONX E-W	33.57	27.38	34.67	28.28	3.28%	3.29%
BRONX N-S	32.11	30.98	33.17	32.32	3.30%	4.33%
BK/QNS N-S	29.16	27.27	29.19	27.54	0.10%	0.99%

In all cases, travel overall improves in the corridor. Total vehicle mileage drops slightly, travel hours are reduced slightly and overall travel speed goes up slightly. Thus, using the model output, it will be reasonable to expect that overall impact on the arterial system, in terms of mobility, will be positive. This is intuitively what would be expected since the higher fees to enter the CPZ would encourage travelers to do the following:

- Change to public transportation,
- Cancel or defer their trips (not generally an option for work or school trips but possibly an option for discretionary trips),
- Change destination away from the CPZ (generally only for discretionary trips), and
- Shift time of travel to avoid the congestion pricing fee (this decision would not impact vehicle miles of travel but might reduce vehicle-hours of travel and increase average travel speed by shifting travel out of the most congested time periods of the day).

Potential Localized Impacts

While the corridor level analysis is useful, it does not tell the entire story, since implementation of the TCMP could cause changes in both mode and route selection. Discussions have begun with other agencies including the Port Authority of New York and New Jersey (PANYNJ) to better understand these potential changes. Localized impacts could result in changes in traffic patterns and can best be assessed based on actual field data collected as part of the Congestion Pricing demonstration.

Transit Impacts on the Arterial System

The MTA and NYSDOT transit staff have analyzed the additional transit needs to absorb modal shifts from automobiles under TCMP. Many of these buses must be accommodated in whole or in part on the arterial system and may place a burden on the Bus/HOV lanes already in operation. Considering that TCMP will result most likely in an increase in ridesharing (with attendant increases in HOV's) the additional burden on the existing (and proposed) Bus-HOV lanes could be significant and require mitigations to allow these lanes to operate effectively.

Intelligent Transportation Systems (ITS) Enhancements

Intelligent Transportation Systems represent the application of modern technology and information and management systems to address multi-modal transportation needs, in particular to enable the more efficient operation and management of the transportation system. ITS improves transportation safety and mobility and enhances productivity through the use of advanced communications technologies. Although not required to implement the City's plan, these projects complement the TCMP and can mitigate traffic impacts, reduce congestion and improve the level of service on the region's highway network.

Enhancements to ITS would help improve system efficiency and facilitates the level and types of operations anticipated with TCMP, which is predicted to generate major changes to travel patterns in and around NYC. It will become increasingly important to be proactive in managing the transportation system. These ITS projects will help mitigate the traffic impacts resulting from implementation of TCMP. They will also provide enhanced mobility in the NYC metro area on routes surrounding, to, and through the CPZ.

Improving Travel Information Services - $12.5 million

One means for reducing congestion is to provide travelers with information about the transportation system. Several projects that enable transportation system users to make informed decisions about their journeys including mode and route choices are presented below. Improved traveler information systems will provide useful, high quality, comprehensive, readily available travel information for multiple modes of transportation in a timely manner. The intent is to increase choices and satisfaction while reducing congestion and mitigating the impacts of congestion pricing on the State Arterial System. These Travel Information projects include:

- The 511 Traveler Information Program which will allow interested travelers to access information by either telephone or the Internet, Cost: $7M annually (recurring),
- Parking Lot Management Pilot to provide real time availability information, Cost: $1M,
- Update of TRIPS 123, which would feed into the 511 system, Cost: $0.2M,
- Transit ITS, an integration pilot that would not only gather transit information but make that information available via Variable Message Signs, Highway Advisory Radio, and kiosks in stations and parking lots, Cost: $4M , and
- Traveler Information Specialists who would ensure the delivery of high quality information through the 511 system, Cost: $0.3M annually (recurring).

Enhance Data Collection and Analysis - $28.2 million

In addition to sharing information with travelers, it is increasingly important to manage normal traffic flow in addition to managing non-recurring incidents. Suggesting alternative routes is also beneficial to reducing congestion. The following projects will help meet the goal of better managing the transportation system and its users as a means to reduce congestion:

- Analysis of data and evaluation of performance in the context of the demands placed upon the transportation system because of TCMP, Cost: $1.2M, and
- Instrumentation of arterial highways to monitor and manage the changes in travel patterns caused by TCMP, Cost: $2M, and
- Congestion Mitigation/Mobility Enhancing Predictive modeling which would, based on real time information and previous behaviors, predict traffic flows, enabling proactive management of resources, Cost: $25M.

Deploy Additional ITS Infrastructure - $15 million

To supply the best information possible to travelers, existing infrastructure for gathering and sharing information will need to be enhanced. Having better information upon which to base decisions will enable travelers to avoid congested locations and reduce any secondary congestion that may be caused by TCMP. NYSDOT has identified two projects to improve traffic monitoring through additional infrastructure.

- Expansion of Transmit/Travel Time Network would expand the installation of E-Z Pass readers to cover all segments of limited access facilities in New York City, Cost: $10M,
- Expansion of Closed Circuit Television Coverage to all limited access highways complements several other efforts and supports better management of the arterial system, Cost: $5M.

Improve Transportation Management Center Operations - $42.9 million

The integration of the three Transportation Management Centers (TMCs) in the metropolitan New York City region will provide seamless traffic management throughout the downstate area. Information on traffic conditions can be readily available to managers in the adjacent regions to obtain information beyond their regional boundaries for managing traffic. Area-wide information that is consistent and standardized can be disseminated to travelers from any of the centers. This integration will provide better information to travelers, and increase the ability of the entire region to react quickly to changes anywhere on the transportation system including localized congestion and traffic volume changes. Identified improvements to the TMCs consist of nine separate projects, of which $10 million are recurring:

- Improved communication through the deployment of a high bandwidth, secure communication system, Cost: $6M,
- TMC Integration which involves among other things, creating a seamless concept of operations, standardized operational policies and protocols, Cost: $2M,
- HELP Program expansion to cover all critical facilities, Cost: $5M annually (recurring),
- Vehicle Infrastructure Integration Test Bed to create an environment in which vehicle-to-vehicle and vehicle-to roadside communications can enhance transportation management and security functions, and improve safety, Cost: $5M,
- Expanding operations and maintenance to support the other actions being taken to improve TMC operations, Cost: $5M annually (recurring),
- Protocols to guide the expansion of the region’s Integrated Incident Management System (IIMS), Cost: $0.5M,
- Expanded Mobile IIMS Field Utilization by increasing the number and type of field units, Cost: $1.4M,
- HAZMAT/Origin & Destination tracking pilot, Cost: $3M and,
- Optimized Signal Timing through a review of all traffic signals along critical corridors and connect appropriate signals to TMCs to allow remote monitoring, access, and control, Cost: $15M.

Regional Transportation Impact

Implementation of the TCMP will have an impact that reaches beyond NYC boundaries. Earlier sections of this report discussed changes to the transportation system largely within NYS based on best assumptions of how the TCMP will alter individual travel choices. This section looks at the impact on the regional transportation system.

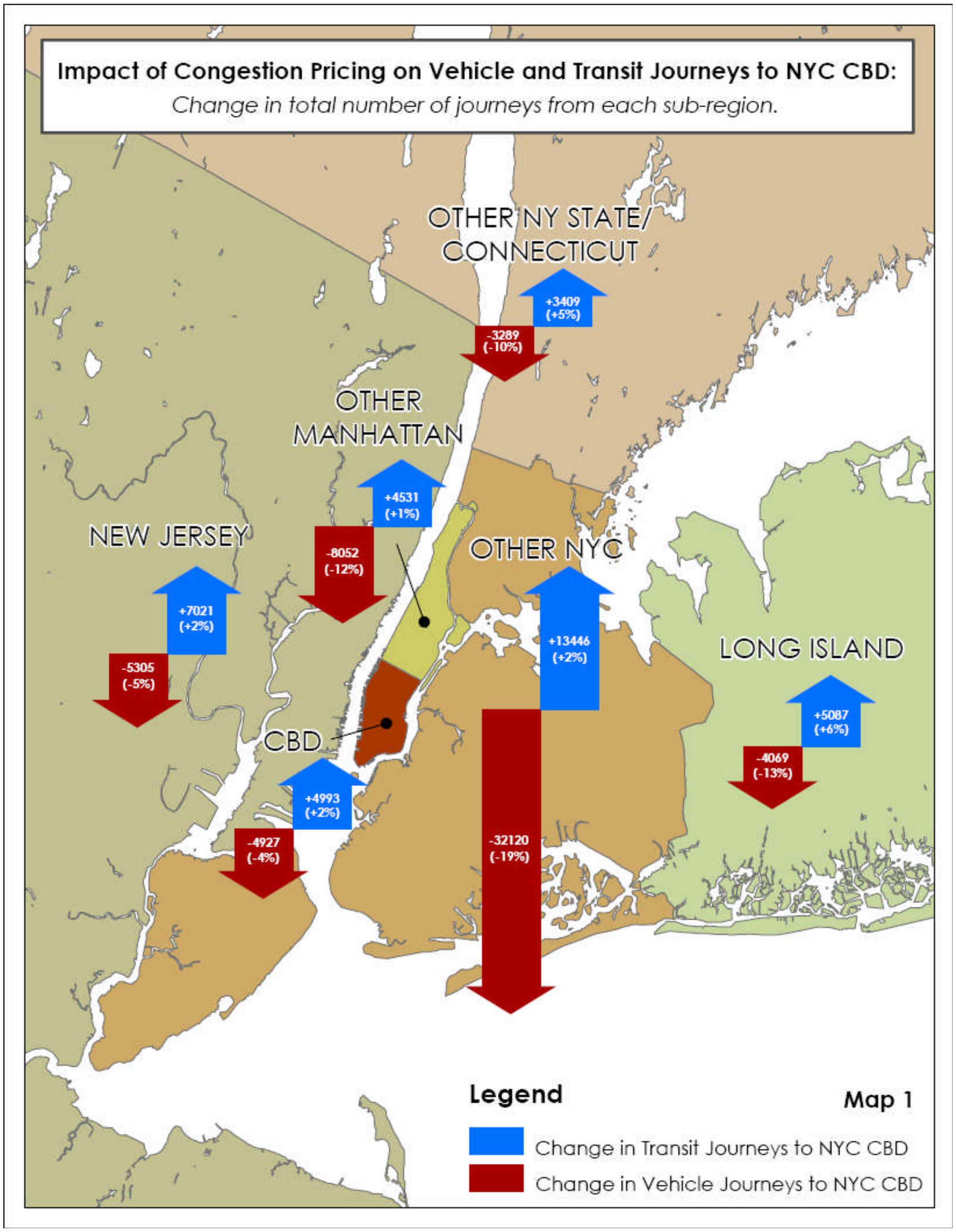
Congestion pricing will have an affect on PANYNJ Hudson River Crossings, which currently employ pricing strategies to influence driver behavior. An example of this is the $1.00 off peak discount available to automobiles with E-Z Pass tag holders using the George Washington Bridge, Lincoln Tunnel, Holland Tunnel, Bayonne Bridge, Goethals Bridge, or Outerbridge Crossing Bridge eastbound into NYC. The TCMP will credit automobile drivers the amount of any tolls paid toward their daily $8.00 fee, making the off-peak discount irrelevant. These types of issues should be researched and understood.

NYC's TCMP will have a considerable impact on the tri-state region's transportation infrastructure and operations. In particular, enhancements to the region's transit services to the Manhattan CBD.

Another consideration is the treatment of private commuter, intercity and charter bus services entering the CPZ. Because public transit services contribute to reducing vehicular traffic, there are reasons to treat them all the same and exempt them from the congestion pricing fee.

The following map (Figure 4) shows anticipated changes in vehicular and transit travel patterns as modeled by the NYBPM.

Figure 4



Impacts on Public Transportation Service Provided by Systems other than the MTA

Operational Issues

Reducing vehicle travel into the CBD is partially dependent upon the availability of safe, convenient, and affordable public transportation alternatives from the outer-borough and suburban commuter markets. The capacity of the diverse, multi-agency public transportation network to attract and absorb additional travel demand is also a critical factor in the success or failure of the TCMP.

Developing and supporting the capacity of the regional public transportation network to address demand will require additional capital and operating investments, supportive policies, and strong interagency coordination and cooperation. The predominant share of trip diversions from automobiles to public transportation will be accommodated by the MTA subsidiaries, particularly via commuter rail, subway, and planned Bus Rapid Transit (BRT) investments. Notwithstanding, given existing station parking constraints on Long Island and the Hudson Valley, an increase in diversions to commuter and express bus services are anticipated.

Beyond those needs identified by the MTA, the following regional public transportation impacts of congestion pricing were identified for consideration to fully equip the region's public transportation network to attain the goals of the Urban Partnership:

- **Parking Capacity -** Parking capacity is a significant constraint on the potential growth of ridership for commuter rail and bus. MTA's Long Island Rail Road (LIRR) and Metro-North Railroad (MNR) station parking facilities are at or over capacity. Limited land availability and development pressures significantly constrain the opportunities for extensive surface lot expansion. Structured parking is being developed in some cases but is limited by cost and community factors. Opportunities to expand Park and Ride facilities for commuter bus operations sponsored by suburban municipalities are similarly limited.

- **Feeder Bus Access to Key Rail Stations -** Feeder bus access to key rail stations, often provided by public transportation systems other than the MTA on Long Island and in the Lower Hudson Valley, have developed and grown over the past decade in response to station parking constraints. With the implementation of congestion pricing, increased demand, coupled with constrained parking, may place greater demands on local carriers to introduce and increase frequencies on rail feeder services.

- **Ferryboat Service to Commuter Rail -** The Haverstraw-to-Ossining and Newburgh-to-Beacon ferry services are operating currently with the objective of relieving station parking constraints. Congestion pricing may induce public interest in increased service and new service elsewhere along the MNR Hudson Line. There are seasonal variation, cost and emissions issues with ferry operations that should be closely evaluated when considering an appropriate role for ferryboats in addressing commuter rail parking capacity constraints.

- **Parking Capacity and Transit Oriented Development (TOD) -** Parking constraints limit the ability of additional riders to access commuter rail or bus services to the Manhattan CBD. State policies and investments that create incentives for integrated TOD in the vicinity of key suburban and outer borough transit hubs may be an effective way of increasing the non-auto accessibility of these facilities and services. Shared parking strategies and improved land use and pedestrian connectivity to these facilities may be effective strategies for building support for increasing access capacity.

Commuter and Intercity Bus Capacity serving the CBD

In the high growth West of Hudson areas of the lower Hudson Valley, commuter bus ridership exceeds MNR ridership to Manhattan. Express bus has also grown on Staten Island, fed by Park and Ride locations along the SIE. Potential ridership increases for these commuter bus services, resulting from the TCMP, may be constrained by the following capacity and policy issues:

- **Bus Capacity** – The estimate of additional bus capacity requirements assume that trip diversions on Long Island and in New York City can be accommodated through commuter rail and subway services and the addition of 58 commuter/express buses provided pursuant to the UPA. Generally, municipally sponsored commuter carriers such as Hudson Transit, Rockland Coaches, and Adirondack Trailways and intercity bus carriers such as Greyhound are running at or close to vehicle capacity during peak commuter periods. The Department would anticipate working with the MTA to support provision of adequate express bus service from those suburban areas not well served by the MTA Commuter Railroads.

    - **Suburban Park and Ride -** NYSDOT, working with local communities and public transportation carriers, has funded the development of a network of Park and Ride facilities for public transportation and rideshare. These sites now exist in the Hudson Valley as well as Long Island and Staten Island. Those facilities that are served by commuter bus, particularly West of Hudson in the Lower Hudson Valley and on Staten Island are at or approaching capacity. NYSDOT is actively pursuing additional parking capacity in these areas in response to trend growth in usage. The TCMP impacts on ridership demand will likely require an expansion of these investments. As noted above, additional capacity for commuter bus Park and Ride facilities is limited based on premium rental/purchase rates for real estate and community concerns.

    - **PANYNJ Midtown Terminal Capacity -** Within the CPZ a constraint on additional commuter bus service from suburban areas, including New Jersey, is the limited capacity of the PANYNJ Midtown Bus Terminal to handle additional buses in the peak periods. The primary structural constraint is ramp capacity entering and exiting the facility. The number of gates/bays and the terminal floor space are generally sufficient to handle additional buses. However the terminal ramps do not permit capacity for significant additional vehicle capacity. There is capacity that can be utilized at the George Washington Bridge Bus Terminal but this may have limited impact given the need to change modes well outside of the CPZ.

- **On-Street Stop Restrictions -** MTA bus stops are owned and managed by NYCDOT and are available only to MTA vehicles. Buses operated by systems other than the MTA may be ticketed/fined for unauthorized use if they pick up or drop off passengers at these stops. In response to the TCMP, a more permissive policy with regard to use of specific on-street stops at key locations within Manhattan might be considered to mitigate the need for major capital investments in expanding ramp capacity at the Midtown Bus Terminal.

- **Bus Staging in Manhattan -** Another constraint on the region's capacity to increase commuter services into CPZ is the shortage of space at existing bus staging areas. With real-estate in Manhattan at a premium, surface parking for bus staging in between scheduled runs in the AM and PM peak is very difficult to secure. This introduces increased expense and logistical difficulty associated with longer distance deadheading of vehicles. The lack of adequate bus staging also impacts the ability of commuter bus operators to clean, fuel and maintain fleets.

- **Lower Manhattan Bus Terminal -** There is an absence of adequate commuter bus passenger terminal facilities in lower Manhattan. (There are no indoor terminals akin to the PANYNJ Bus Terminals. There are common staging areas.) The options for addressing this may be limited given the premium on real estate in the area.

- **Availability BRT Program Components/Transit Priority Infrastructure to Systems other than the MTA -** The street infrastructure envisioned to support Bus Rapid Transit service, as an element of the TCMP, will be needed by all commuter bus operators serving the CPZ. The effectiveness of regional commuter bus in serving the objectives of the TCMP would be greatly enhanced if non-MTA buses were provided access to bus lane and other priority strategies such as signal priority, queue jumps and access to some key BRT stations.

- **Cordon Fees for Public transportation Vehicles, Rideshare and Vanpool:** A policy exempting all buses, including commuter and charter, from incurring the CPZ cordon charge could further the objective of reducing single occupant auto travel to the Manhattan CBD. Similarly, policies and options for exempting or differentially pricing vanpools and carpools may enhance the effectiveness of an integrated element of the TCMP.

- **Regional Fare Policies and Media**: The objectives of congestion pricing would be enhanced and supported by implementation of a universal Regional fare media. The kind of long distance trips that are destined for the CPZ are often multi-agency and intermodal in character, involving payments at parking facilities, feeder buses, commuter bus and rail, ferry, subway and BRT. A single fare media can simplify these transactions dramatically for the customer. In addition fare policies supported by a more robust fare media can support strategies to create incentives consistent with congestion pricing objectives such as time of day differential pricing.

Estimated Public Transportation Actions to Implement the TCMP

The estimated costs related to non-MTA bus services as a result of ridership increases associated with congestion pricing are as follows.

- The UPA provides for the procurement of an additional 58 commuter/express buses for suburban service. Assuming that a portion of these vehicles are made available by the MTA to expand systems other than the MTA, no additional suburban coaches would be required to support trip diversions;
- Purchase/lease additional suburban commuter/express bus Park and Ride facilities - $20M;
- Passenger shelters/amenities - $10M
- ITS/integrated fare media/traveler information/other transit related technology - $25M

Data Collection and Sharing Needs

Data Collection Plan for Congestion Pricing Monitoring

The proposed Data Collection Plan will provide the necessary field information to all agencies to evaluate the impacts of congestion pricing by collecting field information before and after congestion pricing is implemented. It is envisioned to be a systematic, well coordinated initiative among regional transportation system operating agencies. The Data Collection Plan will focus only on the collection of ‘gap’ information (data not readily available from current ongoing data collection efforts) so as to minimize costs to all agencies and expedite the collection and analysis process. It is envisioned that any data collected will not only be directly applicable to the evaluation of congestion pricing but will also be useful for overall programming and planning by local agencies.

Data Collection Approach

The following approach would accomplish the objectives stated above:

- **Identify CPZ impact areas:** The development of baseline information should be facilitated by using a variety of sources such as Census 2000 Journey-to-work, the NYBPM Model, and the National Household Travel Survey (NHTS). Emphasis will be on the development of baseline traffic and transit flows. Data collection will be most intensive near the CPZ boundary (south of 86th street) and proportionately less comprehensive as the ‘ring of impact’ moves further from the City’s core.
- **Identify CPZ impact corridors and facilities:** The data collection plan should identify arterial corridors, tunnels, bridges, and public transportation facilities that may be impacted by CP. Input from various agencies as well as output from the NYBPM will be used to identify those facilities that may be most impacted and to provide ‘first cut’ guidance as to where data needs are most critical.

- **Identify effectiveness measures and methodology to evaluate before/after impacts:**

<u>Figure 5 – Measures of Transportation Impacts and Monitoring</u>

Measure	Methodology	Possible Source(s)
Traffic Volumes	• Cordon counts prior to and after implementation • Use congestion pricing system technology to measure after implementation	• NYSDOT • NYCDOT • PANYNJ • ITS Operators
Auto Occupancy	• Cordon counts prior to and after implementation • Spot checks at major entry points	• NYSDOT • PANYNJ • NYCDOT
Speeds/Delays	• "Floating" car runs • Use of TRANSMIT system • Automated tracking technologies	• NYSDOT • NYMTC • NYCDOT • TRANSCOM
Parking Utilization	• Manual parking utilization surveys • Possible use of mobile autoscope or other automated remote monitoring technology	• NYCDCP • NYCDOT
Transit Usage	• Passenger counts on NJ TRANSIT, PATH, and Staten Island Ferry, and private bus and ferry routes	• MTA, NJ Transit • PATH • PANYNJ, Ferry Operators • NYMTC • NYCDOT
Bicycle/Pedestrian Usage	• Bicycle/pedestrian counts • Possible modification of and/or addition to NYMTC annual cordon count, which now uses 60th Street as northern boundary	• NYCDOT
Truck movements to and through the CPZ	• Congestion Pricing (CP) Data • Shipper surveys	• NYCDOT

Environmental impacts within and adjacent to the CPZ	• Air quality changes based on VMT and vehicular volumes • Noise reduction	• NYBPM Model • Air Quality Monitors – NYSDEC • Air quality monitors-NYCDOH • NYCDOT CP data
Socioeconomic Impacts	• Changes in sales tax receipts • Changes in employment • Business opening/closing data • Additional surveys of commuters and visitors	• NYCDCP • NYC Dept. of Finance

- **Identify locations, type, and frequency of data needs:** The plan should identify specific locations, data types, format, and frequency to support the measures listed in the Figure 5.
- **Inventory existing data collecting efforts and sources:** Transportation operating agencies such as NYSDOT, NYCDOT, the New York State Department of Environmental Conservation (NYSDEC), MTA, PANYNJ, TRANSCOM, ITS Operators, Ferry Operators, New Jersey Department of Transportation, New Jersey Transit, PATH, and others collect a range of data to monitor their system performance. These existing datasets can be used to estimate impact and to monitor congestion pricing.
- **Identify gaps in data:** Based on identified needs and available data, gaps in essential data need to be identified and the data collected in a timely fashion. Also, existing sources that can expand their data collection program to incorporate some of the remaining data sets should be identified and contacted.
- **Develop data standards, formats, and metadata to ensure the effectiveness and efficiency of information sharing:** Data collection and reduction activities are complex operations especially when they are spread across various agencies. A quality control and assurance element can eliminate errors which could lead to false conclusions.
- **Develop cost estimate and implementation plan:** Cost estimates for the collection of the remaining data sets should be developed. The implementation plan should address technical and institutional issues associated with the sharing of existing and new data sets. Issues such as access, data management, ownership, liability, standards, etc. can affect the implementation plan.
- **Develop an information gateway:** Develop an information gateway to serve as the data repository for all of the data assembled or collected for congestion pricing monitoring and impact analysis. If paired with a user-friendly, GIS and browser-based interface, the information gateway will provide effective and efficient information sharing and data analysis for congestion pricing monitoring and impact analysis.

Summary multi-agency (NYSDOT, NYCDOT, NYMTC) estimated data collection and sharing needs to implement congestion pricing

- One-time capital start-up costs - $12.5M;
- Annual operating expenses - $0.5M.

Capital Needs and Revenue Utilization

Capital Needs

NYSDOT has identified a number of technology, information, and operational initiatives that support the TCMP and help ensure that the regional transportation system operates efficiently, which were not funded by USDOT. Implementation of the TCMP will result in both changes in mode and travel patterns of travelers. To support these changing travel patterns and mitigate the impacts of congestion pricing, NYSDOT has identified multimodal capital and operating investments to effectively maintain and operate the regional transportation system and complement the TCMP.

The Department anticipates the following capital projects not included in the current NYSDOT capital program:

Data Collection: Data Collection and sharing will help both to respond to changes in the usage of the transportation system and to evaluate the effectiveness of the TCMP. NYC has indicated that it plans to undertake a data collection effort. However, there will be likely regional data collection needs beyond the NYC effort. It is envisioned that any data collected will be shared among regional transportation system operating agencies. That data will not only be directly applicable to the evaluation of the TCMP, but will also be useful for overall programming and planning by local agencies. That additional effort includes but is not limited to: refinement of NYBPM to enable it to better model congestion pricing and corridors; inclusion of collection points outside both the CPZ and NYC; and, better evaluation of transit impacts. The anticipated full cost to collect, share, and evaluate the data is approximately $12.5M.
Cost - $12.5M
Recurring Annual Costs - $0.5M

Intelligent Transportation System investments: Intelligent Transportation System investments would include development of several means of sharing real-time system conditions with travelers, gathering, and analyzing of additional information about system usage, deployment of additional infrastructure, and integration of Transportation Management Centers. A $36.4M capital need for technology and traffic monitoring projects was submitted in the Urban Partnership Agreement application but was not funded. Total costs for ITS projects are $98.6M, of which $17.3M are recurring annual costs.
One Time Costs - $81.3M
Recurring Annual Costs - $17.3M

Non-MTA Transit Service: Developing and supporting the capacity of the regional public transportation network to address demand will require additional capital investments as follows: $20M would provide for additional Park and Ride facilities; $10M for additional passenger shelters and amenities: and, $25M for improved traveler information, integrated fare and media and transit technology.
One Time Costs - $55M

Revenue Utilization

Revenue from implementation of the City's TCMP is estimated by NYC to generate gross revenue of $624M annually and net $390M after funding the costs to operate the system.

The UPA MOU with USDOT provided $354M to assist in implementation of the TCMP. Much of this federal aid was for additional/improved bus transit services. Little was provided by USDOT for the startup infrastructure and operations needed to implement congestion pricing.

The cost to install and operate the infrastructure and technology necessary to implement the TCMP was estimated in at $233M by NYC and needs to be funded either through NYC funds or through revenue generated from congestion pricing. This startup cost may require greater use of congestion pricing resources in the early years, but should diminish over time to the annual cost to operate and maintain the congestion pricing system.

Additional transit services to accommodate vehicular commuters diverted to transit will also require a substantial up front capital cost to purchase vehicles and other infrastructure as well as operate new services. Over time, the need for resources for transit service should diminish to annual operating and maintenance costs, but may fluctuate if diversion to transit increases and additional transit services are needed. MTA will be providing its own estimate of need for revenue to fund MTA transit capital and operating expenses beyond the resources provided by USDOT. Additional non-MTA transit projects are identified in this report.

On the regional highway network, the implementation of the TCMP will require additional capital and operating investments for technology, intelligent transportation systems, and data collection and monitoring. There were no federal funds provided in the Urban Partnership agreement with USDOT to cover these projects. No resources have been identified to cover the capital and operating costs of these investments that help mitigate the impacts of congestion pricing and support the efficient operation of the regional transportation network.

The Congestion Pricing legislation includes the submission of new NYSDOT and MTA capital programs by March 31, 2008. Although the implementation of Congestion Pricing may have an impact on NYSDOT and MTA operations, the excess revenues generated from any Congestion Pricing program above those needed for implementation should be devoted to a balanced program of infrastructure investments in all modes.

Capital Initiatives/Opportunities Created by the TCMP

During the past several years, NYSDOT has been developing and implementing various capital improvements with the goal of developing a comprehensive mobility system for the limited access highways in NYC. These mobility system improvements address congestion, delays, air quality, safety, and emergency routing. These initiatives also support the TCMP by providing mitigation for highway users as well as providing opportunities for highway users to carpool or choose other modes.

The following mobility improvements have already been implemented:

- Staten Island Expressway E/B & W/B concurrent flow bus lanes (Verrazano Bridge toll

Plaza - Slosson Ave),

- Gowanus Expressway inbound a.m. peak period contra-flow/concurrent-flow bus/HOV lane (Verrazano Bridge to Battery Tunnel),
- Prospect Expressway contra-flow bus/HOV lane,
- Queens Midtown viaduct contra-flow bus/HOV lane (Maurice Avenue to the Queens Midtown Tunnel),
- Park and Ride lot at the Korean War Veterans (KWV)/Arthur Kill Road interchange in Staten Island, and
- Park and Ride lot at the West shore Expressway/KWV Parkway interchange, Staten Island

Additional improvements are currently in the study and/or design stages:

- West Shore Expressway/Arthur Kill Road Park and Ride and NYPD Highway Patrol Headquarters (expected implementation ~2012)
- KWV Parkway/Huguenot Ave. Park and Ride lot Upgrading, Amenities, and expansion (expected completion~ 2010)
- Expansion of KWV Parkway/Arthur Kill Rd. Park and Ride lot
- Extension of the Staten Island Expressway Bus Lanes to Richmond/Victory Blvd.
- Support for the City's Bus Rapid Transit Program. The Department is in discussion with the City regarding possible enhancements to the LIE bus-HOV Lane

The proposed TCMP program presents an opportunity to enhance NYSDOT's partnership with NYCDOT, MTA, and other agencies to provide additional capital improvements on the State Arterial System that will facilitate the goals of the TCMP. Potential additional capital improvements to the State Highway mobility system include:

<u>Park and Ride lots</u>:

- Construction of new Park and Ride lots in outer boroughs (individual sites would be evaluated),
- improvement/expansion at existing Park and Ride lots, and
- leasing of existing commercial parking lots to allow use for commuter parking – shopping center lots, church parking lots (the "Showplace" at West Shore Expressway/Victory Blvd. is an example of a candidate site for leasing).

<u>Managed Use Lanes</u>

NYSDOT has begun a new study to explore managed use lane (MUL) development opportunities on the entire State Arterial System (SAS) in NYC. This study is expected to take approximately 2 years and provide a 'blueprint' for operational enhancements into the next decade. The study is investigating the following MUL strategies:

- HOT Lanes,
- staggered hours of operation for freight and commuters,
- dynamically managed lanes - lanes adjusted in real time in response to changing conditions,
- queue bypass,

- improved intermodal connections, and
- possible development of separate modal corridors.

Intelligent Transportation Systems:

NYSDOT will be completing the full instrumentation of the arterial system over the next 5 years. Completion of this system and its connection to the new Traffic Management Center (TMC) in Long Island City (due to come on line in 2008) will provide comprehensive highway condition information in real time and enhance the ability of the City and State (jointly managing the TMC) to respond to system operation problems.

Freight Movement Issues

The New York metropolitan area is one of the most truck dependent areas in the nation. The proposed congestion pricing fee in the TCMP will likely have an impact on truck movements. Truck trips that cannot change routings or time of day to access the CPZ may pass the congestion pricing fee on to consumers. Other trucks may change travel patterns to avoid the CPZ, which may impact other highway facilities. Collection of additional information on truck movements resulting from TCMP would assist the region's transportation agencies in responding to new traffic patterns.

Transportation Improvement Program (TIP)/Conformity Issues

The congestion pricing plan impacts and is impacted by the Federal metropolitan planning requirements and related air quality conformity regulations. Projects related to the pricing program that are classified as "non-exempt" must appear in the fiscally-constrained element of the Regional Transportation Plan and a fiscally-constrained Transportation Improvement Program (TIP) in order for the projects to be eligible for Federal funding and be included in a regional emissions analysis for an air quality conformity determination. These projects resulting from the TCMP would need to be amended into both the TIP and the Regional Plan.

In order for Federal funding to be obligated in 2009 for any of the elements of the TCMP, the characteristics of the proposal and the specific projects resulting from it must also be included in a regional emissions analysis which leads to an air quality conformity determination. This determination is a requirement in order to be placed on the TIP.

The TCMP projects would need to be submitted for regional emissions analysis on either November 1, 2007 or May 1, 2008. Submission by November 1, 2007 would result in adopted TIP and Plan amendments by May 1, 2008. If submission can not be made by November 1, 2007, the next opportunity for submission would be on May 1, 2008, which would result in adopted TIP and Plan amendments by November 1, 2008. Thus, either submission date would result in the ability for Federal money to be obligated in 2009, assuming that air quality conformity can in fact be demonstrated as part of the amendment process.

Monitoring/Future Considerations

The New York State Legislature, in enacting the legislation to create the Commission, and requiring the mayor of the city of New York to develop a traffic congestion mitigation plan, found that action must be taken to address the problems caused by traffic congestion as soon as possible. NYSDOT supports the goal of reducing congestion and urges the Commission to take appropriate action to evaluate the TCMP proposed by NYC. The alternative to taking action is maintaining the status quo, an option which NYSDOT agrees is not appropriate. PlaNYC cites the costs of congestion for the region at more than $13 billion dollars every year. The cost of congestion and the limited options for addressing it are reasons to put a congestion mitigation plan in place, evaluate, and adjust it appropriately based on actual results.

The TCMP is being implemented as a pilot program. To ensure the flexibility to adjust the components of the TCMP, NYSDOT suggests the establishment of mechanisms to allow for changes to the plan if traffic diversions are significantly different than anticipated. This may be particularly important during the first months of implementation, but minor adjustments should be allowed throughout the pilot period.

The Urban Partnership Application submitted to USDOT by New York City, NYSDOT, and the MTA, and subsequently provided to the Commission by NYC, states that Congestion Pricing will be rolled out as a three-year pilot program with an interim evaluation after 18 months. NYSDOT recommends that whatever implementation plan is ultimately adopted by the Commission, the 18 month evaluation be retained. While the NYBPM can provide a reasonable basis on which to model overall congestion pricing impacts, it may not provide the detailed information on localized impacts. No model can substitute for actual experience. An 18 month interim evaluation will allow better data to be collected and analyzed.

Equally important to monitoring changes to the congestion pricing structure, is having funding available to pay for changes. If all anticipated congestion pricing revenues are allocated at the beginning of the pilot program, it could be very difficult to make necessary adjustments and corrections to the congestion pricing system. While the initial implementation of congestion pricing results in a more capital intensive use of resources, over time the balance will shift to increased operating needs. To allow for maximum flexibility, a portion of anticipated revenues could be held in reserve to meet future needs. This would allow for changes that could benefit the entire transportation system, the transportation system users, and the region as a whole.

Report on the Traffic Congestion Mitigation Commission Public Hearings

The New York City Traffic Congestion Mitigation Commission (the "Commission") was established pursuant to Chapter 384 of the Laws of 2007 to undertake a review and study of plans to reduce traffic congestion and other related health and safety issues within the City of New York.

As part of its statutory mandate, and to provide the opportunity for the public to participate and comment, the Commission conducted a series of public hearings in each borough of the City of New York (Manhattan, Queens, the Bronx, Brooklyn, and Staten Island), on Long Island, and in Westchester County.

The Commission heard testimony from numerous witnesses, including State and local elected officials; various transportation, environmental, and community-based organizations; and private citizens. Other individuals who did not present oral testimony at the hearings submitted written testimony.

Written testimony received by the Commission will be available on the Commission website at:

https://www.nysdot.gov/portal/page/portal/programs/congestion_mitigation_commission

The following pages provide a brief review of the seven hearings held between October 24th and November 5th, including the public's suggestions for reducing congestion and pollution, and improving mass transit, health and safety.

Summary of Public Hearings

Long Island
Hofstra University
Wednesday, October 24, 2007, 6:00 pm

There were 8 registered speakers.

Westchester
Westchester County Center
Thursday, October 24, 2007, 6:00 pm

There were 6 registered speakers.

Manhattan
Hunter College, City University of New York
Thursday, October 25, 2007, 6:00 pm

There were 82 registered speakers.

Queens
York College, City University of New York
October 30, 2007, 6:00 pm

There were 31 registered speakers.

Bronx
Hostos Community College, City University of New York
October 31, 2007, 6:00 pm

There were 26 registered speakers.

Brooklyn
New York City Tech, City University of New York
November 1, 2007, 6:00 pm

There were 39 registered speakers.

Staten Island
College of Staten Island, City University of New York
November 5, 2007, 6:00 pm

There were 28 registered speakers.

There was a broad range of public comment provided at the Commission's hearings on traffic congestion and mitigation in the City of New York. The seven hearings were well attended by the public, and the Commission heard approximately 25 hours of testimony. Witnesses provided their views on the current amount and type of congestion in the City and the region, and the impact of congestion and various mitigation options on the economy, the environment, quality of life, public health, and the transportation infrastructure. A number testified about a current lack of mass transit options, as well as concerns about the adequacy of existing mass transit systems and financing for addressing transit needs. Some raised equity, fairness, privacy, and/or feasibility issues with the concept of, and proposals for, charging for the use of public facilities, such as traffic, parking and health impacts on adjacent neighborhoods, burdens on those of lesser means, the disabled and the elderly, and the high cost of constructing and maintaining a pricing system. Others indicated their support of Mayor Bloomberg's congestion pricing proposal for entering the Manhattan Central Business District, stating it would reduce congestion, finance public transportation improvements and improve public health and air quality in the region.

A variety of witnesses spoke of the regional nature of transportation and their concerns about the impact that congestion mitigation proposals could have on commuters, residents, and the transportation infrastructure regionally. Many witnesses provided specific options to address congestion including mass transit and highway/bridge improvements, freight movement, modifications to pricing for the use of roadways, the use of technology, alternative transportation modes, traffic and parking enforcement, telecommuting, and more. Appendix A provides a list of suggestions that the Commission received through the hearing process.

Appendix A:
Suggestions Received through the Hearing Process

Traffic Mitigation

- License plate rationing
- Congestion rationing techniques
- Alternate day charging based on license plates or place of residence
- Implement variable tolls on select existing tolled facilities
- Impose tolls on select free crossings
- Additional taxi stands; reduction in cruising for fares
- $1 surcharge for all taxi trips within or crossing the zone
- Institute one side of avenue hailing for taxis
- $2 charge for all livery car trips into the zone
- Reduce congestion from black cars and other for hire vehicles
- Regulate the number of livery cars
- Two-way tolls on the Verrazano Bridge
- Real-time traffic information for drivers
- More allocated curb space for loading and unloading in busiest commercial areas
- Technological (e.g., electronic / camera) enforcement of violations contributing to congestion
- Enable Traffic Enforcement Agents (TEAs) to write “blocking the box” tickets
- Enforcement of parking and traffic laws and rules
- Regulation of the use of the streets for construction projects
- Modernizing traffic signals
- Expansion of Lower Manhattan traffic management program to Midtown
- Adequate space for off-street loading/unloading in new large commercial buildings in Manhattan Central Business District
- Relief of chokepoints in road system
- Extension of the Verrazano Narrows Bridge to Perth Amboy
- Open the Landfill Roads to two-way traffic
- Increase capacity of Staten Island and West Shore Expressways, build highways on Richmond and Willowbrook Parkway rights-of-way
- Implement 8 to 12 month pilot program consisting of gridlock cameras
- Integrate drive-thru loading docks in new building constructions
- Increase construction permit fee
- Surcharge for limousines
- Fund adequate training for Traffic Enforcement Agents (TEAs)
- Implement tolls at entry points of 59th Street, Williamsburg, Brooklyn, Manhattan, Queensboro, and 3rd Street Bridges
- Encourage small businesses to form a consortium to coordinate daily private garbage pickup
- Midtown access passes

- Implement a flex-car concept
- Increase tolls and parking meter rates during peak hours
- Extend goal of congestion reduction to 24 hours a day, 7 days a week
- Simplify Manhattan road pricing cordon to apply to all vehicles entering the Manhattan Central Business District
- Uniform toll charges for entering Manhattan ($8) payable on entering Manhattan from 6AM-6PM Mon-Fri, no cost to exit during this time, and $4 to exit out of peak times
- Fewer street vendor vans that block roadways
- Replace toll plazas with High Speed E-ZPass

Vehicle Reduction

- Carpooling incentives
- Telecommuting and incentives therefore
- Strictly-enforced 3-person HOV Zone below 60th Street
- Upgrade and expansion of bike lanes, dedicated bike paths and greenways – implementation of 1997 NYC Master Bike Plan
- Protected bike lanes throughout Manhattan
- Encouraging use of bicycle transportation
- Bicycle/pedestrian infrastructure
- Institute self-organizing jitney system
- Move City agencies outside of the CBD
- Provide tax incentives for commuters who switch to mass transit, for employers who subsidize mass transit, and for companies that switch deliveries to off-peak times
- Investigate best practices in other countries to help make biking safer
- Implement pedestrian safety improvements (light signal timing changes and sidewalk repair)
- Pedestrian only cross-town streets every 20 or so blocks, perhaps also with trolleys or streetcars for faster cross-town transit
- Creation of HOT lanes

Public Transportation

- Defer the MTA fare hike
- Need for mass transit improvements
- Lower Manhattan bus depot
- Feasibility of double decker buses and trains
- MTA minivans for areas where full bus service is not viable
- Expand ferry service; fast ferry service
- Dedicate congestion pricing revenues to mass transportation improvements (“Lock Box”)
- Create dedicated fund to study mass transit problems and solutions for areas west of Hudson

- Light Rail
- Programs to encourage public employees to use mass transit
- Increase in monthly cap on transit subsidies that employers can provide as tax-free employee benefits
- Bus Rapid Transit (BRT)
- Increase the number of buses, bus routes, and system capacity (bus depots)
- Bus/congestion pricing lanes on Staten Island highways
- Increase express bus lanes and service
- North Shore Passenger Rail
- West Shore Rail
- Staten Island monorail
- Free public transportation
- Improve LIRR access to Queens
- Operate non-polluting fuel buses
- Restore closed LIRR and MTA stations
- Complete Third Branch of LIRR and building of the East River Tunnel to complete JFK-Lower Manhattan Rail Link
- Regional Payroll Tax to finance tunnels and mass transit improvements
- Restore service at the 69th Street Pier in Bay Ridge
- Dedicate funds to the ‘G’ train subway line
- Accelerate planned bus, subway, and commuter rail service and capacity improvements
- Maintain current and future MTA 5-Year Capital Plan funding
- Increase MTA service to absorb potential ridership increases
- Bring Downtown Brooklyn subway stations to a state of good repair
- Reform the MTA
- Grant MTA authority to select and prioritize projects to be funded with revenue
- Replace the Gowanus Express Viaduct with a tunnel encompassing a dedicated BRT lane
- Integrated enhanced service on the ‘F’, ‘V’, and ‘G’ subway lines
- Remake commuter rail lines in NY/NJ/CT metropolitan area into a Regional Rail system
- City should have a larger role in the MTA budgeting process

<u>Freight and Commercial Vehicles</u>

- Incentives for nighttime or off-peak deliveries
- Increased water transport of freight
- Construct the Cross Harbor Rail Freight Tunnel, the Trans-Narrow Tunnel, and the Gowanus Expressway Tunnel
- Truck congestion charge based on vehicle weight and classification
- Facilitating rail freight movement, shift truck traffic to rail

- Reopen the Staten Island freight line
- Free truck zones
- Limit trucks to certain times of day
- Conduct a study of loading dock management
- Restricted delivery zone in Midtown during rush hour
- Incentives for deliveries during non-business hours
- Create more loading zones and off-street loading docks
- Eliminate tolls for commercial motor vehicles between 9 pm and 6 am
- Two-way tolls for trucks on all crossings out of New York City
- Organize and coordinate truck deliveries
- European-style Freight Villages
- Truck ferries – decongest bridges and tunnels
- Truck Only Lanes
- Rail Floats
- Utilize barges or small ships to transport freight between Florida and Maine
- Trucks charged on a sliding-scale tied to weight / no. of axles (like Port Authority & MTA tolls)
- Ticketing immunity for delivery vehicles between 10PM and 10AM every weekday

Parking

- Increase cost of parking in Central Business District
- Value pricing for curbside parking in the Central Business District
- Reform the issuance, use and enforcement of parking placards
- Additional parking at commuter rail stations
- Fee-based residential parking permits
- Develop additional, and maintain/replace existing, park and ride facilities outside the Manhattan Central Business District
- Additional Muni-Meters
- Use parking fines for transportation-related expenses
- Increase garage tax
- Create multi-level parking garages
- Reduce alternate side of the street parking regulations
- Consider using existing sites (such as, Belmont Park and Aqueduct Raceway) as commuter park and ride facilities
- Zoning restrictions to discourage new commuter parking garages
- Parking pricing scheme
- More off-street bus parking for tourist and charter buses in Lower Manhattan

Exemptions / No Exemptions

- Exempt hybrid, low-emission and clean-fueled vehicles

- Exemptions for medical hardship / hospital visits
- Exempt Senior Citizens
- Exempt commercial motor vehicles
- Exempt charter buses
- Exempt commuter buses
- Exemption for residents of the zone
- Exempt Manhattan residents
- Exempt disabled population
- Exempt emergency vehicles
- Subsidies and exemptions for low-income residents and non-profit agency vehicles
- No exemptions for taxis, surcharge on taxi fares

<u>Other</u>

- Regional approach to congestion, transportation, and projects
- Consider spending funds in places it could make a difference in getting commuters out of their cars
- Change northern boundary (e.g., 60th Street)
- Eliminate intra-zonal charge
- Variable pricing based on time of day
- Extend congestion zone to other neighborhoods
- Conduct an Environmental Impact Statement
- 50% year-end rebate of charges for families earning $46,000 or less
- An oversight board representing the Mayor, Governor, Assembly Speaker, Senate Majority Leader, City Council or Borough Presidents, to evaluate the pilot and decide on extension
- Create a multi-state planning agency
- $5 fee for City residents, $10 fee for non-residents, with credit for any tolls
- Address congestion and solutions on a city-wide basis
- Perform a comprehensive congestion study for all five boroughs
- Implement a pollution credit system
- Implement “Green Zones”
- Radio Frequency Transmitter technology to identify unlicensed drivers and uninsured / unregistered vehicles
- Midtown Development Plan
- Replace all City/State vehicles, buses, and taxis with hybrid or low-emission vehicles
- Reduce the number of cameras proposed
- Encourage use of hydrogen fuel cell vehicles
- Prepare an Environmental Assessment Statement (EAS) in lieu of an EIS
- Examine benefits/costs of combining cordon road pricing with reduced/free transit fares
- Mandate cleaner trucks and institute tougher emission standards

- Guarantee that the congestion charge will not rise beyond $8/$21 in the near future
- Discount for smaller cars
- Increase number of pedi-cabs in Manhattan
- No free thruways
- Raise cab fares and fee charged to cabs
- Changes to the toll rebate policy
- Better air quality monitoring
- Monitoring and benchmarks

planYC

A GREENER GREATER NEW YORK

Travel Demand Modeling for analysis of Congestion Mitigation policies

October 24, 2007

Analyzing congestion mitigation measures

- How would alternative policies impact:
  - Amount of driving in Manhattan (both trips and VMT)?
  - Mode shift of drivers to transit?
  - Air quality?
  - Revenue available for transit capital expansion?

Analyzing congestion mitigation measures

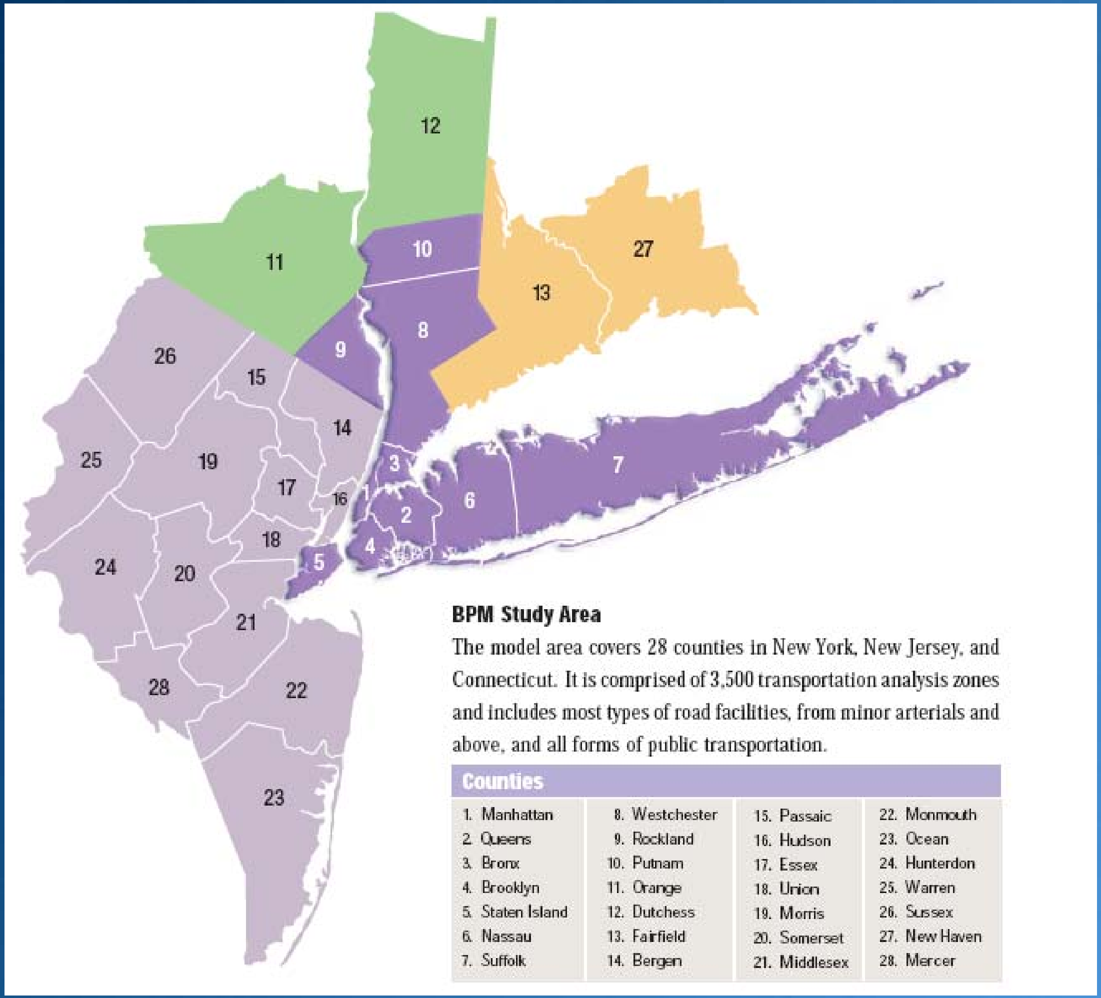
- Only a regional travel demand model like NYMTC's Best Practices Model (BPM) can answer these questions
  - *Regional Travel Demand Models:* Show how regional traffic and transit flows respond to changing land use, infrastructure and toll policy conditions.
- Modeling tools commonly used in EIS and site-specific studies
  - *Microsimulations:* Show how a fixed amount of traffic flows through a corridor or network.
  - *Intersection level analyses:* Show the detailed operation of individual intersections.

Best Practice Model (BPM) Development

- Developed by New York Metropolitan Transportation Council (NYMTC), the metropolitan planning organization, to meet the federal requirements for long-range planning.
  - Air quality conformity analysis
  - Modeling impact of major infrastructure projects such as:
    - Tappan Zee Bridge and I-287 Corridor Study
    - Goethals Bridge Modernization DEIS

History of BPM

- 28 counties in New York, New Jersey and Connecticut
- Model released 2002, updated 2005
- State-of-the-art travel model
- Only travel model in NY region



Key inputs

- Highways
- Arterial streets
- Transit
- 4,000 zones for trip origins and destinations

Key inputs

- 2005 population and employment by zone
- 2005 transit network
- Tolls and fares and other travel costs
- Travel diary survey
  - 11,264 households
  - 27,369 persons
  - 90,764 trips

BPM structure and processes

- Populates each zone with households and jobs
- Based on:
  - 2005 population and employment

BPM structure and processes

- Creates daily "tours" and time period for each trip within the tour
  - Purposes:
    - Work
    - University
    - School
    - Household maintenance (errands)
    - Discretionary activities (leisure)
    - Work-based (meetings, etc)
  - Time periods:
    - AM Peak (6am-10am)
    - Midday (10am-4pm)
    - PM Peak (4pm-8pm)
    - Night (8pm-6am)
- Based on:
  - Household characteristics (age, income, car ownership, etc.)
  - Employment levels
  - School enrollment
  - Travel diary survey

BPM structure and processes

- Determines destinations for each tour
- Based on:
  - Employment locations
  - Other destinations (shopping, etc.)
  - Travel time, fares, congestion, tolls involved in reaching each destination

BPM structure and processes

- Determines mode for each leg of tour
  - SOV
  - HOV2, HOV3, HOV4+
  - Walk to transit
  - Drive to transit
  - Walk to commuter rail
  - Drive to commuter rail
  - Taxi
  - School bus
  - Non-motorized
- Based on:
  - Transit service levels
  - Fares, tolls, parking and other driving costs
  - Travel diary survey

BPM structure and processes

- Determines route
- Based on:
  - Transit frequency
  - Travel time
  - Congestion

BPM outputs

- County-to-county trip flows
  - Trip purpose
  - Time of day
  - Mode
- Traffic speeds and vehicle miles traveled (VMT)
- Air quality based on changes in vehicle volumes
- Results validated to:
  - Ground counts of traffic volumes
  - Transit ridership

BPM outputs

	SOV	HOV2	HOV3+	External	Truck	Commercial	Taxi	Bus	Total
	Vehicle Miles Traveled (VMT)								
CBD (Downtown, Valley, Midtown)	1,180,708	709,168	72,045	33,012	99,790	187,459	1,113,128	47,061	3,442,371
86th Street to 60th Street	314,542	187,083	22,869	6,973	24,578	41,533	395,282	11,885	1,004,746
Congestion Pricing Zone	**1,495,250**	**896,250**	**94,914**	**39,985**	**124,369**	**228,992**	**1,508,410**	**58,947**	**4,447,117**
Upper Manhattan North of 86th	1,647,391	806,377	107,319	166,417	96,128	123,824	1,024,960	24,825	3,997,240
Other	192,124,259	53,532,233	10,267,526	63,871,565	14,080,724	5,359,841	2,782,433	515,269	342,533,849
Regional	195,266,900	55,234,861	10,469,758	64,077,967	14,301,220	5,712,657	5,315,802	599,041	350,978,207
	Vehicle Hours Traveled (VHT)								
CBD (Downtown, Valley, Midtown)	153,448	90,571	9,044	3,749	13,636	24,048	130,049	7,624	432,169
86th Street to 60th Street	34,979	20,759	2,504	623	2,658	4,551	43,214	1,459	110,746
Congestion Pricing Zone	**188,426**	**111,330**	**11,548**	**4,372**	**16,293**	**28,599**	**173,264**	**9,083**	**542,915**
Upper Manhattan North of 86th	92,907	44,518	5,657	7,003	4,958	6,284	57,786	1,691	220,804
Other	8,678,935	2,399,587	462,486	2,004,965	478,804	182,748	-7,717	23,215	14,223,024
Regional	9,148,694	2,666,765	491,240	2,020,713	516,349	246,229	396,596	43,072	15,529,657
	Average Speed								
CBD (Downtown, Valley, Midtown)	7.7	7.8	8.0	8.8	7.3	7.8	8.6	6.2	8.0
86th Street to 60th Street	9.0	9.0	9.1	11.2	9.2	9.1	9.1	8.1	9.1
Congestion Pricing Zone	**7.9**	**8.1**	**8.2**	**9.1**	**7.6**	**8.0**	**8.7**	**6.5**	**8.2**
Upper Manhattan North of 86th	17.7	18.1	19.0	23.8	19.4	19.7	17.7	14.7	18.1
Other	22.1	22.3	22.2	31.9	29.4	29.3	-360.6	22.2	24.1
Regional	21.3	20.7	21.3	31.7	27.7	23.2	13.4	13.9	22.6

BPM outputs

- 6.3% reduction in vehicle miles traveled (VMT) in charging zone
- 7.2% increase in speeds in zone
- 11.3% reduction in vehicle trips entering the charging zone
- 6% -12% reduction in key pollutants and greenhouse gases

planYC

A GREENER GREATER NEW YORK

White Papers on Congestion Mitigation Strategies

New York City Traffic Congestion Mitigation Commission
November 20, 2007

Overview of presentation and research

- **Technical Reports**:
  - Alternatives to Mayor's plan
  - Supplements to Mayor's plan
  - Modifications to Mayor's plan
- **Presented today**:
  - Night deliveries (alternative or supplement)
  - Telecommuting (alternative or supplement)
  - Hybrid exemption (modification)

Congestion Mitigation Strategies

1. Incentives for night-time deliveries

1. Incentives for night-time deliveries

- **Option**: Use incentives and regulations to shift truck deliveries to off-peak periods
  - Per-axle charge
  - Tax incentives
  - Peak period truck ban

- **Applies to:** Trucks and commercial vehicles

1. Incentives for night-time deliveries

- **Case studies:**
  - Atlanta – 1996 Olympics
  - Port of Los Angeles-Long Beach Pier Pass Off-Peak Program
  - London Congestion Charging
  - PANYNJ's Value Pricing Initiative in NYC
  - Tappan Zee Bridge 1997 Variable Pricing Initiative for Commercial Vehicles

1. Incentives for night-time deliveries

- **Findings from case studies:**
  - Tolls have almost no impact on time of truck operations
  - Truckers constrained by receivers' operating hours and practices
  - Incentive programs for carriers AND receivers have potential for greatest success
- **VMT reduction:**
  - **0%** over 24 hours (truck travel shifts to overnight hours)
  - Daytime (6 am – 8 pm):
    - **0.1%** (Per-axle charge)
    - **1.0%** (Per-axle charge + tax incentive)
    - **8.05%** (Ban trucks and commercial vehicles from CBD, 6 am – 8 pm)

Congestion Mitigation Strategies

2. Incentives for telecommuting

2. Incentives for telecommuting

- **Option:** Encourage and provide incentives to commuters for telecommuting.
- **Applies to:** all commuters with the opportunity to telecommute

2. Incentives for telecommuting

- **Case studies**
  - United States Federal Government
  - New York City
  - Connecticut
  - Washington State
  - Atlanta, Georgia
  - Phoenix, Arizona
  - Denver, Colorado
  - International: Stockholm, Sweden and Wellington, New Zealand

2. Incentives for telecommuting

- **Findings from Case Studies**:
  - Existing incentive programs do not impact rates of telecommuting or VMT
  - Institutional and technological barriers
- **VMT Impact**:
  - Short-term: - 0.03 - 0.21%
  - Long-term: No anticipated reduction

Congestion Mitigation Strategies

3. Exempt hybrids from the congestion charge

3. Exempt hybrids from congestion charge

- **Option:** Allow free travel for hybrids in the pricing zone
- **Applies to:** Drivers of hybrid and low-emission vehicles

3. Exempt hybrids from congestion charge

- Case studies
  - New York State Clean Pass & Green Pass Programs
  - Virginia Clean Special Fuel HOV Program
  - California Clean Air Vehicle Program
  - London Congestion Charge Zone Emissions-Related Charges

3. Exempt hybrids from congestion charge

- **Findings from case studies**:
  - Incentives can influence travel behavior and vehicle purchasing
  - Participation enhanced when program requirements include more vehicles
  - Higher participation, more exemptions, smaller reduction in congestion
- **VMT Impact**:
  - Short-term: - 5.3 - 6.1% VMT reduction with congestion charge (compared to - 6.3% reduction with no hybrid exemption)
  - Long-term: Smaller reduction in congestion

VMT summary

Strategy	VMT Change
1. Incentives for night-time deliveries	0%
2. Incentives for telecommuting	0.03 - 0.21% Reduction
3. Congestion pricing, with hybrids exemption	0.2 – 1.0% Increase
Congestion pricing (Mayor's Plan)	6.3 % Reduction

Congestion Mitigation Strategies: Alternatives to the City's plan

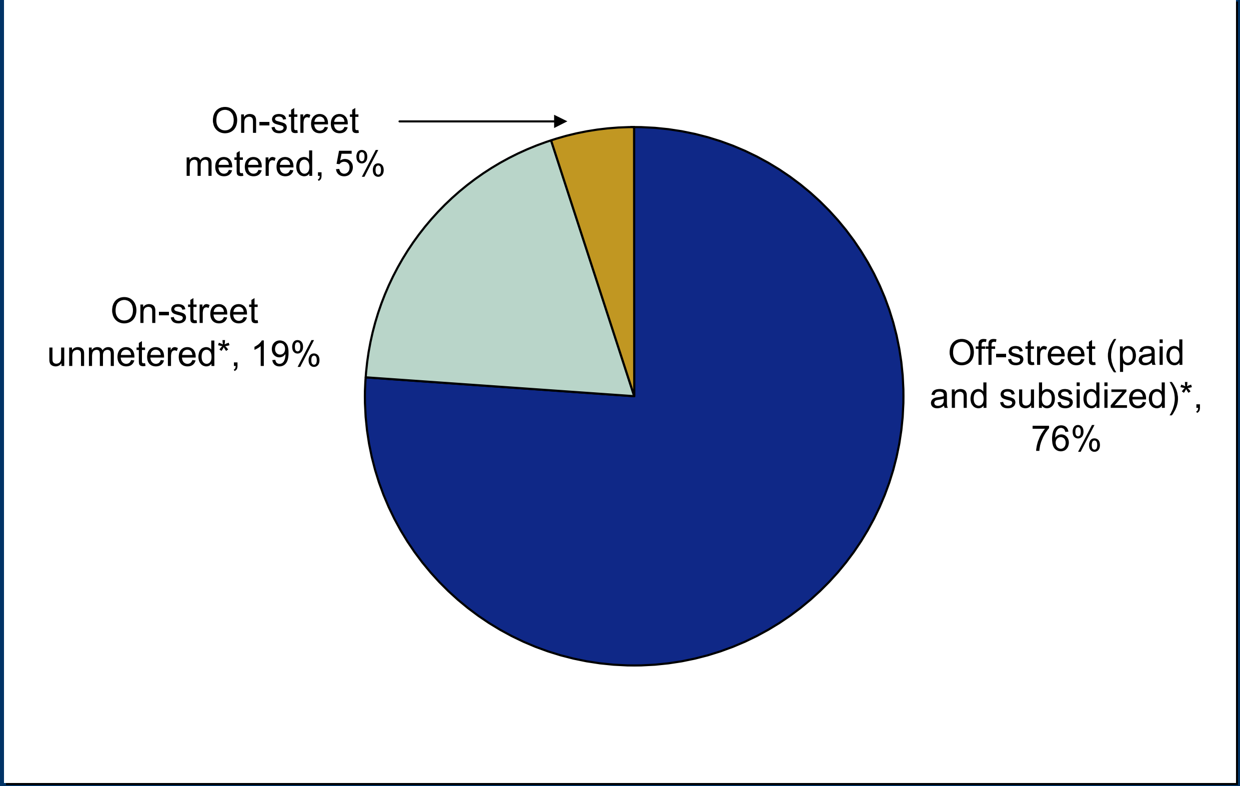
New York City Traffic Congestion Mitigation Commission
December 10, 2007

Overview of presentation and research

	Alternative to the City's Proposal	*Supplement to the City's Proposal*	*Modification to the City's Proposal*
Night delivery incentives	√	√	
Telecommuting incentives	√	√	
Increase cost of parking in the Manhattan central business district (CBD)	√	√	
Reduce use of parking placards by public employees	√	√	
Additional taxi stands	√	√	
Surcharge on taxi and livery fares	√	√	
Implement tolls on East River Bridges	√		
License plate rationing	√		
Required carpooling	√		
Creation of High-Occupancy Toll ("HOT") lanes	√		
Change northern boundary			√
Eliminate the intrazonal charge/Charge FDR and West Street			√
Change hours of the charge/variable charges			√
Changes to the toll credit policy			√
Exempt hybrids			√

Parking: Increase the cost of parking in the CBD

The current market for parking in the CBD:



- * Includes public employees using placards

Source: 2007 survey of 1,600 drivers in the Manhattan CBD

Parking: Policy options studied

- Three options with VMT impact:
  - Eliminating resident exemption for parking tax or raise parking tax
  - Increase rates for metered on-street parking
  - Introduce overnight on-street parking fee
  - Reduce use of parking placards by public employees
- Three options have essentially no VMT impact:
  - Parking "freeze"
  - Tax off-street parking as income
  - Parking "cash-out"

Parking: Eliminate Manhattan resident parking tax exemption

- Option: Charge Manhattan residents the same parking tax (18⅜%) as other parkers.
  - Currently residents receive an exemption that reduces their parking tax to 10⅜%.
- Applies to: Manhattan residents that currently receive exemption
- VMT Impact
  - 0.05% reduction
- Revenue: $22 million

Parking: Raise the parking tax

- Option: Raise parking tax to 28⅜% or 38⅜% for all parkers
- Applies to: All parkers who pay to park off-street
- VMT Impact
  - 0.2% (if tax rises to 28⅜%)
  - 0.3% (if tax rises to 38⅜%)
  - Parking garage operators might absorb the cost of the tax, resulting in smaller VMT reduction
- Revenue: $71 million (28⅜%) or $120 million (38⅜%)

Parking: Raise the parking tax

- Recap:

	Tax rate		Change in:	
	Manhattan residents	All other	VMT	Revenue
Current	10⅜%	18⅜%		
Eliminate Manhattan resident exemption	18⅜%	18⅜%	-0.05%	$22 m
10% point increase	28⅜%	28⅜%	-0.2%	$71 m
20% point increase	38⅜%	38⅜%	-0.3%	$120 m

Parking: Increase rates for on-street parking

- Option: Increase the price of all metered parking spaces in the CBD. Prices could be determined by time of day or location.
- Applies to: on-street, metered parking in the CBD
- VMT Impact
  - 0.5% VMT reduction
- Revenue: $17 million

Parking: Introduce overnight on-street parking fee

- Option: Implement a $2 fee for overnight on-street parking in the CBD during the week.
- Applies to: on-street, metered and unmetered parking in the CBD
- VMT Impact
  - 0.4% VMT reduction (most of this reduction would take place at night)
- Revenue: $7 million

Parking: Reduce use of parking placards by public employees

- Option: Remove free on-street parking for government employees currently commuting to Manhattan jobs
- Applies to: on-street parking for government employees with placards
- VMT Impact
  - 0.10% VMT reduction for 3,000 placards
  - 0.17% VMT reduction for 5,000 placards
  - 0.33% VMT reduction for 10,000 placards
- Revenue: $0

Taxi: Additional taxi stands to reduce cruising

- Option: Require that passengers be picked up at designated taxi stands
- Applies to: all medallion (yellow) taxis
- VMT impact
  - VMT may rise or fall depending on how far taxis travel back to a taxi stand after discharging a passenger, so VMT cannot be estimated reliably
- Revenue: $0

Taxi: Apply surcharge to taxi and livery fares

- Option: Apply $1 or $2 fare surcharges for taxi and for-hire-vehicle travel within Manhattan south of 86th Street
- Applies to: Medallion taxis, black cars, neighborhood car services and limousines
- VMT impact:
  - $1 Surcharge: 0.3% reduction
  - $2 Surcharge: 0.6% reduction
- Revenue:
  - $1 surcharge: $70 million
  - $2 surcharge: $140 million

License Plate Rationing

- Option: Prohibits vehicles from entering based on license plate
- Applies to: all passenger vehicles
- VMT impact:
  - 3.1 % reduction (restriction applied 1 in 10 days)
  - 6.2 % reduction (restriction applied 1 in 5 days)
- Revenue: $0.
  - Will reduce MTA and PA toll revenues that subsidize transit

Required Carpooling

- Option: Prohibit single-occupant vehicles (SOVs) from entering Manhattan south of 60th Street weekdays, 6 a.m. to 10 a.m.
- Applies to: SOVs. Does not apply to taxis, commercial vehicles, and motorcycles
- VMT Impact:
  - Given that SOVs comprise 59% of vehicles entering CBD, expect VMT reduction, though magnitude is unclear
- Revenue: $0.
  - Will reduce MTA and PA toll revenues that subsidize transit

Creation of High-Occupancy Toll ("HOT") lanes

- Option: Create HOT lanes for passenger cars on major crossings into Manhattan and highways leading to Manhattan CBD
- Applies to: all vehicles
- VMT impact:
  - 0%, unless a substantial number of general travel lanes are reallocated to buses, ridesharing vehicles and/or goods movement
- Revenue: Uncertain

Congestion Mitigation Strategies: Modifications to the City's plan

New York City Traffic Congestion Mitigation Commission
December 17, 2007

Overview of presentation and research

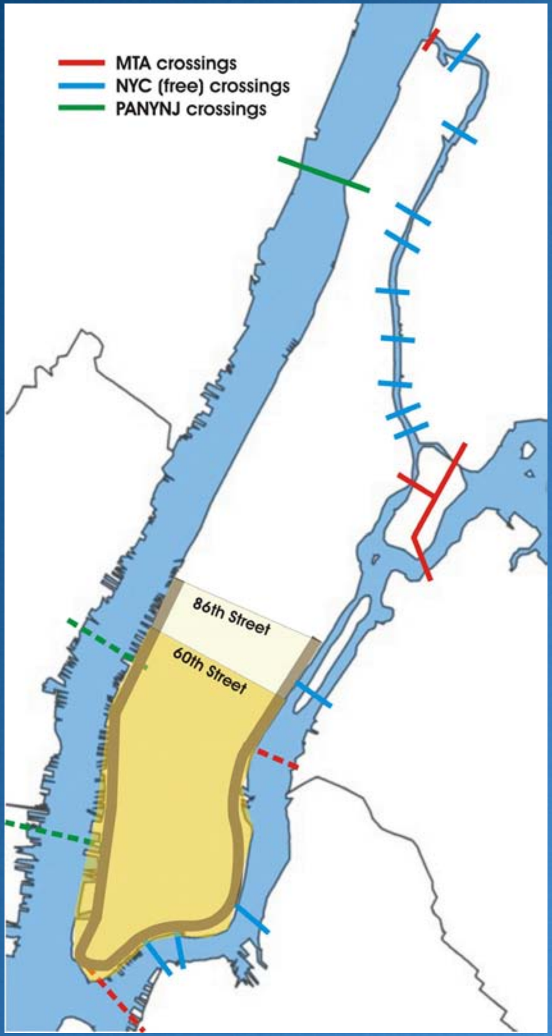
	Alternative to the City's Proposal	*Supplement to the City's Proposal*	*Modification to the City's Proposal*
Night delivery incentives	√	√	
Telecommuting incentives	√	√	
Increase cost of parking in the Manhattan central business district (CBD)	√	√	
Reduce use of parking placards by public employees	√	√	
Additional taxi stands	√	√	
Surcharge on taxi and livery fares	√	√	
License plate rationing	√		
Required carpooling	√		
Creation of High-Occupancy Toll ("HOT") lanes	√		
Exempt hybrids			√
Change northern boundary			√
Eliminate the intrazonal charge/Charge FDR and West Street			√
Change hours of the charge/variable charges			√
Changes to the toll credit policy			√
Implement tolls on East River Bridges	√		

Objectives

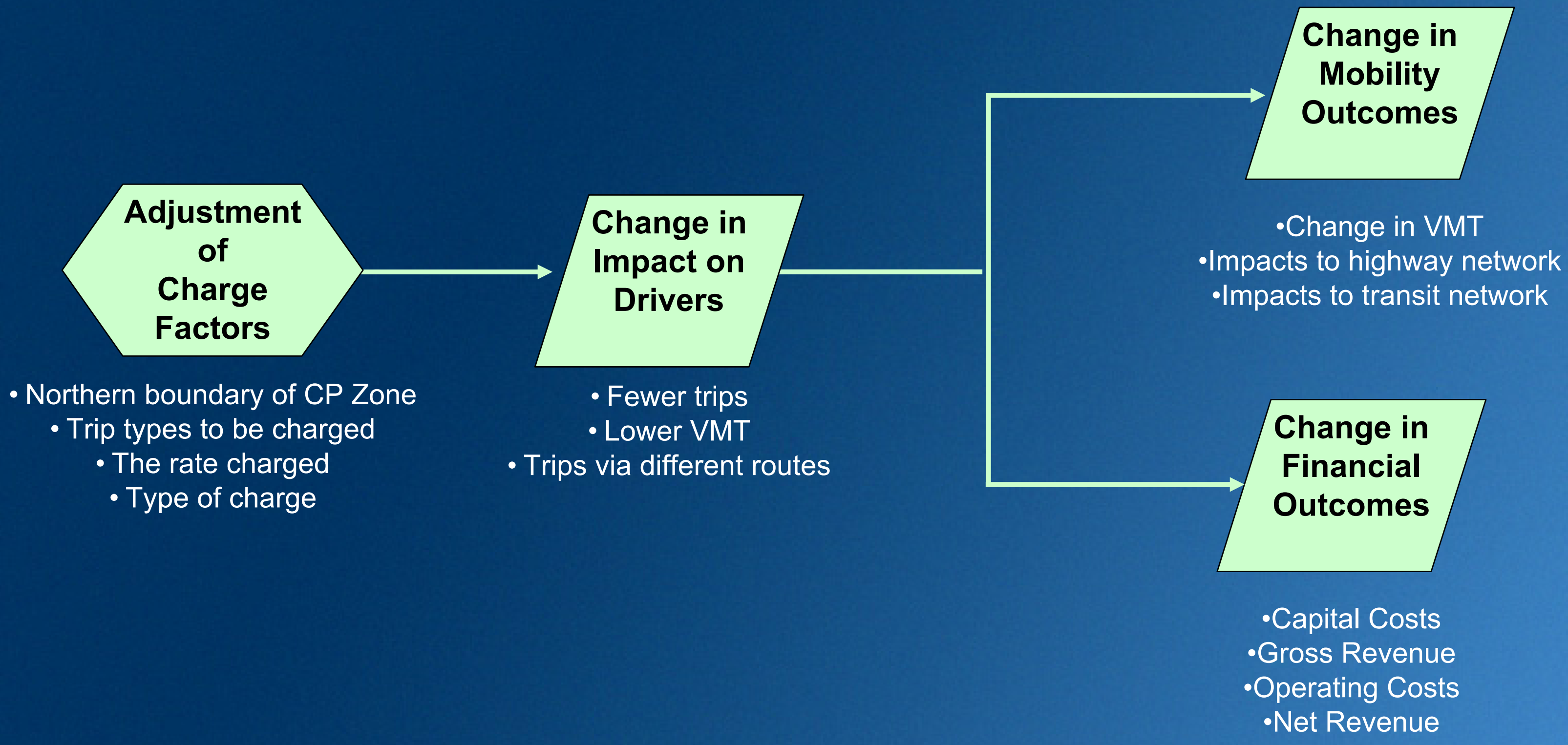
- Important to return the Commission's focus to strategies that directly affect motorists' movements into the CP zone
- This presentation is offered to promote the Commission's understanding of choices available using the City's plan as a base as the Commission takes up the decision of what to recommend to achieve the goals of the City's Plan

The Dials to Turn

- **Northern boundary of CP zone**
  - 86th St
  - 60th St
- **Trip types**
  - Staying in the zone
  - Through trips on FDR and Rt. 9A
  - 2-way (inbound and outbound)
  - 1-way (inbound only)
- **The rate charged**
  - Amount charged: Toll offset or LPR Surcharge
  - Flat vs. variable time of day
  - 12 hour or 24 hour
- **Type of Charge**
  - Fee (once a day)
  - Toll (recurring)



Analytic process



City's Plan

	City's Plan
Northern Boundary	86 St
Intrazonal Charge	Yes
Through Trips	Free
Direction of Charge	2-Way
Flat or Variable	Flat $8
12 Hour or 24 Hour	12 hour
Toll Offset	Yes
LPR Surcharge	None
Fee or Toll	Daily Fee

VMT Change	6.7%
Capital Cost	$224
Gross Revenue	$649
Operating Cost	$229
Net Revenue	$420

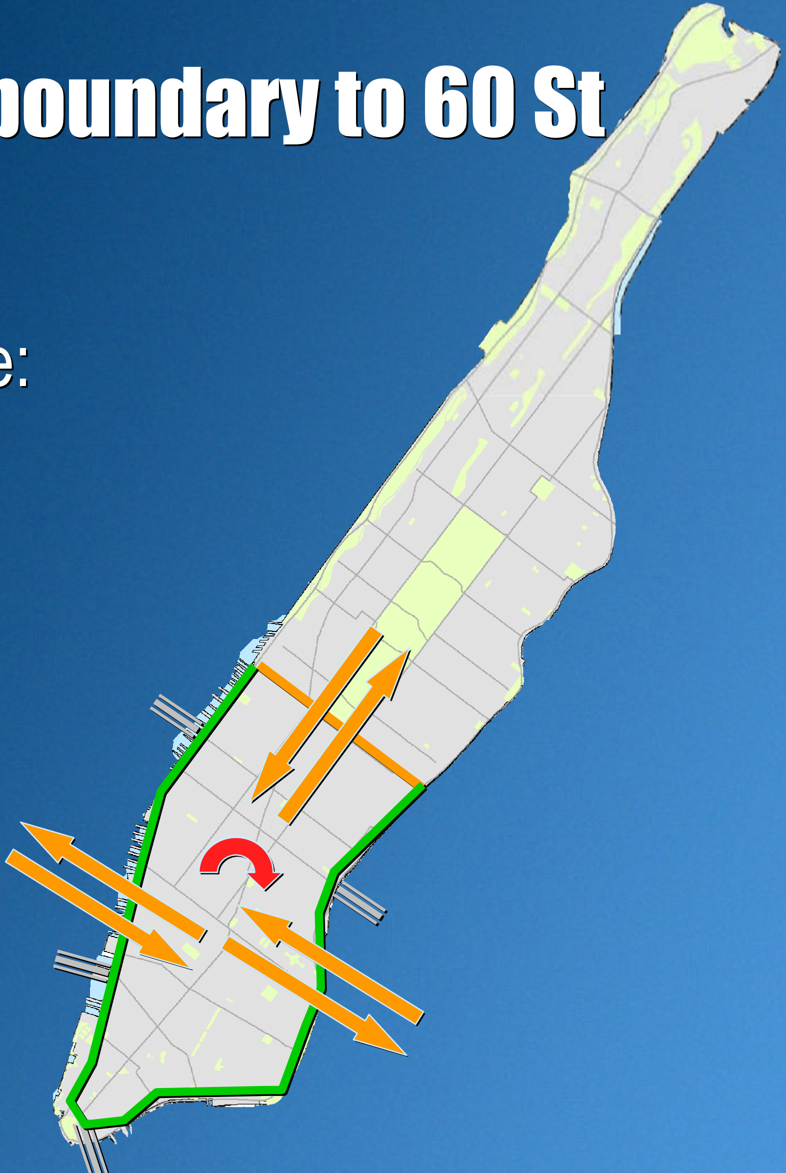
- 6.7% VMT reduction
- $224m capital cost
- $649m gross revenue (annual)
- $229m operating costs
- $420m net revenue

	#1
Northern Boundary	**60 St**
Intrazonal Charge	**Yes**
Through Trips	**Free**
Direction of Charge	2-Way
Flat or Variable	Flat $8
12 Hour or 24 Hour	12 hour
Toll Offset	Yes
LPR Surcharge	None
Fee or Toll	Daily Fee

VMT Change	6.2%
Capital Cost	$219
Gross Revenue	$585
Operating Cost	$198
Net Revenue	$387

1. Move northern boundary to 60 St

- 6.2% VMT reduction
- Impact of this change:
  - Smaller VMT reduction: 0.5%
  - Lower capital cost: -$5m
  - Lower net revenues: -$33m



	#2
Northern Boundary	**60 St**
Intrazonal Charge	**No**
Through Trips	**Free**
Direction of Charge	2-Way
Flat or Variable	Flat $8
12 Hour or 24 Hour	12 hour
Toll Offset	Yes
LPR Surcharge	None
Fee or Toll	Daily Fee

VMT Change	5.9%
Capital Cost	$125
Gross Revenue	$475
Operating Cost	$63
Net Revenue	$412

2. Eliminate intrazonal charge

- 5.9% VMT reduction
- Impact of this change:
  - Smaller VMT reduction: 0.3%
  - Lower capital cost: -$94m
  - Higher net revenues: +$25m

3. Charge thru trips using periphery

	#3
Northern Boundary	**60 St**
Intrazonal Charge	**No**
Through Trips	**Charged**
Direction of Charge	2-Way
Flat or Variable	Flat $8
12 Hour or 24 Hour	12 hour
Toll Offset	Yes
LPR Surcharge	None
Fee or Toll	Daily Fee

VMT Change	6.1%
Capital Cost	$73
Gross Revenue	$497
Operating Cost	$58
Net Revenue	$439

- 6.1% VMT reduction
- Impact of this change:
  - Larger VMT reduction: 0.2%
  - Lower capital cost: -$52m
  - Higher net revenues: +$27m

4. Charge in-bound trips only

	#4
Northern Boundary	60 St
Intrazonal Charge	No
Through Trips	Charged
Direction of Charge	Inbound
Flat or Variable	Flat $8
12 Hour or 24 Hour	12 hour
Toll Offset	Yes
LPR Surcharge	None
Fee or Toll	Daily Fee

VMT Change	6.0%
Capital Cost	$73
Gross Revenue	$498
Operating Cost	$62
Net Revenue	$436

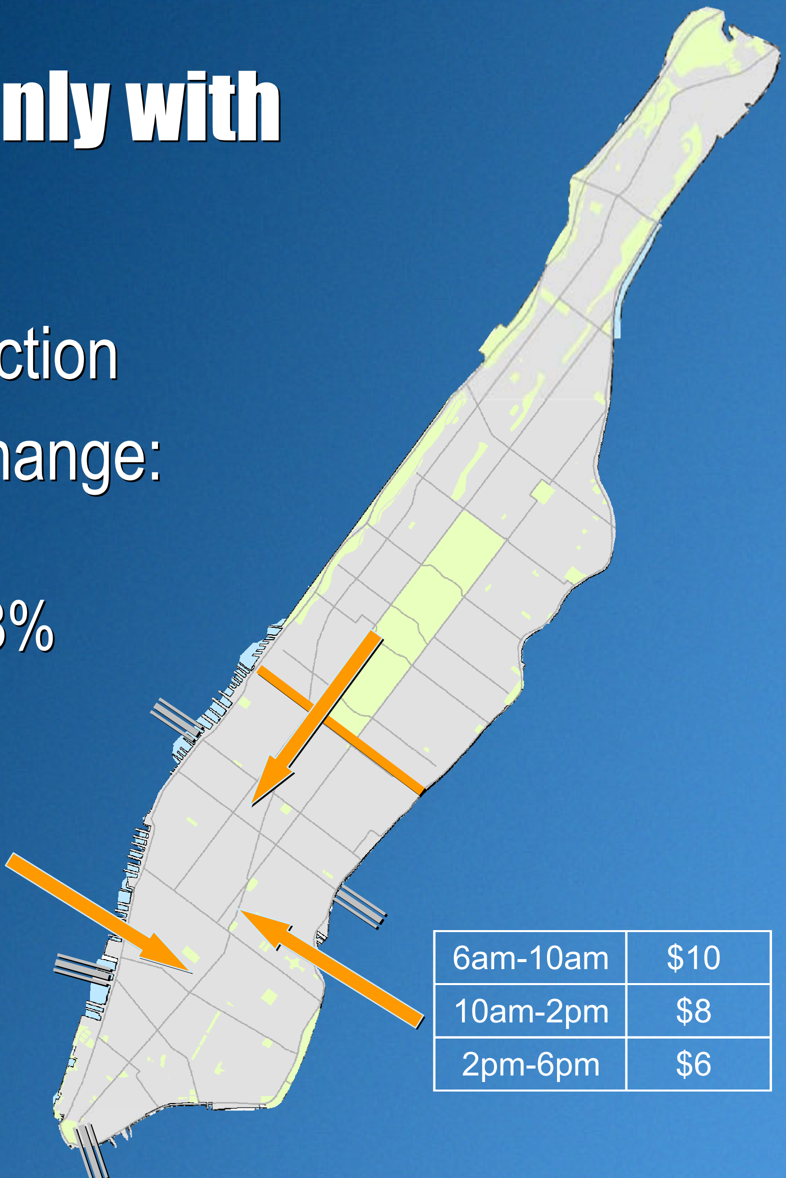
- 6.0% VMT reduction
- Impact of this change:
  - Smaller VMT reduction: 0.1%
  - Same capital cost
  - Lower net revenues: +$3m

4a. In-bound only with variable fee

	#4	#4A
Northern Boundary	60 St	60 St
Intrazonal Charge	No	No
Through Trips	Charged	Charged
Direction of Charge	Inbound	Inbound
Flat or Variable	Flat $8	$10/$8/$6
12 Hour or 24 Hour	12 hour	12 hour
Toll Offset	Yes	Yes
LPR Surcharge	None	None
Fee or Toll	Daily Fee	Daily Fee

VMT Change	6.0%	6.8%
Capital Cost	$73	$73
Gross Revenue	$498	$526
Operating Cost	$62	$62
Net Revenue	$436	$464

- 6.8% VMT reduction
- Impact of this change:
  - Larger VMT reduction: 0.8%
  - Same capital cost
  - Higher net revenues: +$28m



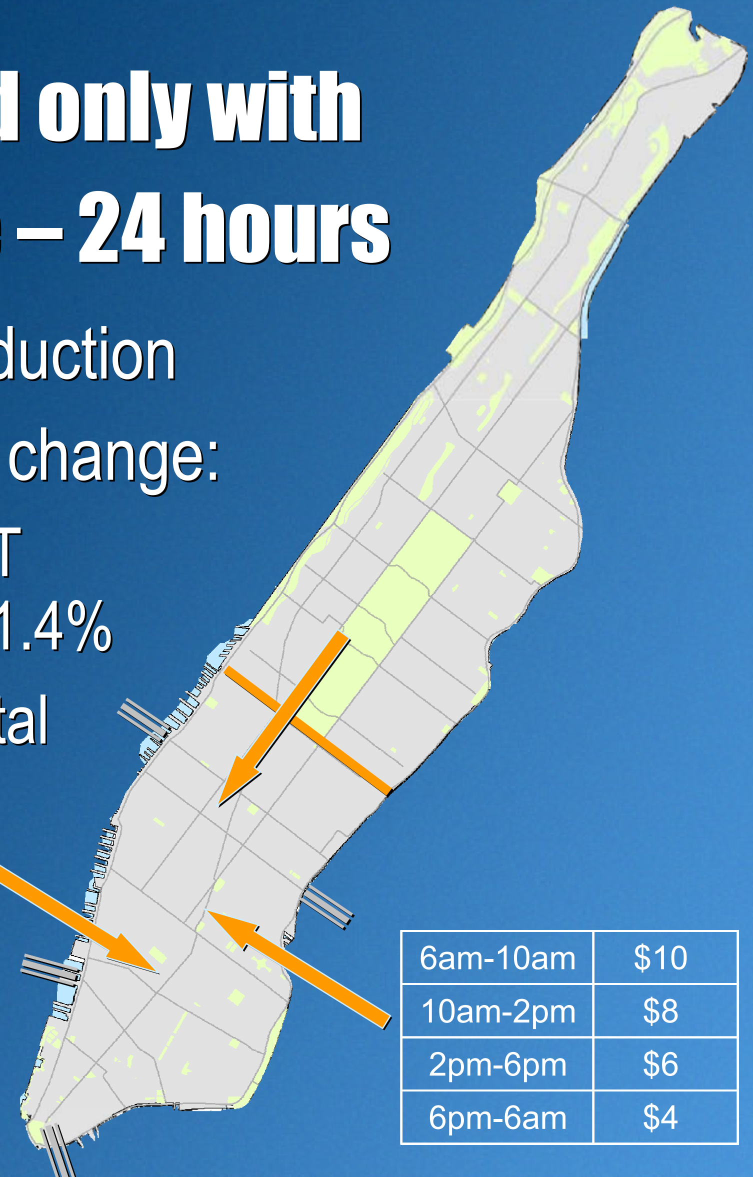
6am-10am	$10
10am-2pm	$8
2pm-6pm	$6

	#4	#4A	#4B
Northern Boundary	60 St	60 St	60 St
Intrazonal Charge	No	No	No
Through Trips	Charged	Charged	Charged
Direction of Charge	Inbound	Inbound	Inbound
Flat or Variable	Flat $8	$10/$8/$6	$10/8/6/4
12 Hour or 24 Hour	12 hour	12 hour	24 hour
Toll Offset	Yes	Yes	Yes
LPR Surcharge	None	None	None
Fee or Toll	Daily Fee	Daily Fee	Daily Fee

VMT Change	6.0%	6.8%	8.2%
Capital Cost	$73	$73	$73
Gross Revenue	$498	$526	$618
Operating Cost	$62	$62	$99
Net Revenue	$436	$464	$519

4b. In-bound only with variable fee – 24 hours

- 8.2% VMT reduction
- Impact of this change:
  - Larger VMT reduction: 1.4%
  - Same capital cost
  - Higher net revenues: +$55m



6am-10am	$10
10am-2pm	$8
2pm-6pm	$6
6pm-6am	$4

5. Eliminate or reduce toll offset

	#5
Northern Boundary	60 St
Intrazonal Charge	No
Through Trips	Charged
Direction of Charge	2-Way
Flat or Variable	Flat $8
12 Hour or 24 Hour	12 hour
Toll Offset	No
LPR Surcharge	None
Fee or Toll	Daily Fee

VMT Change	8.3%
Capital Cost	$73
Gross Revenue	$672
Operating Cost	$57
Net Revenue	$615

- 8.3% VMT reduction
- Impact of this change:
  - Larger VMT reduction: 2.2%
  - Same capital cost
  - Higher net revenues: +$176m

6. $1 surcharge for License Plate Recognition customers (non-E-ZPass)

	#6
Northern Boundary	60 St
Intrazonal Charge	No
Through Trips	Charged
Direction of Charge	2-Way
Flat or Variable	Flat $8
12 Hour or 24 Hour	12 hour
Toll Offset	Yes
LPR Surcharge	$1
Fee or Toll	Daily Fee

VMT Change	6.3%
Capital Cost	$73
Gross Revenue	$513
Operating Cost	$58
Net Revenue	$455

- 6.3% VMT reduction
- Impact of this change:
  - Larger VMT reduction: 0.2%
  - Same capital cost:
  - Higher net revenues: +$16m

Toll options

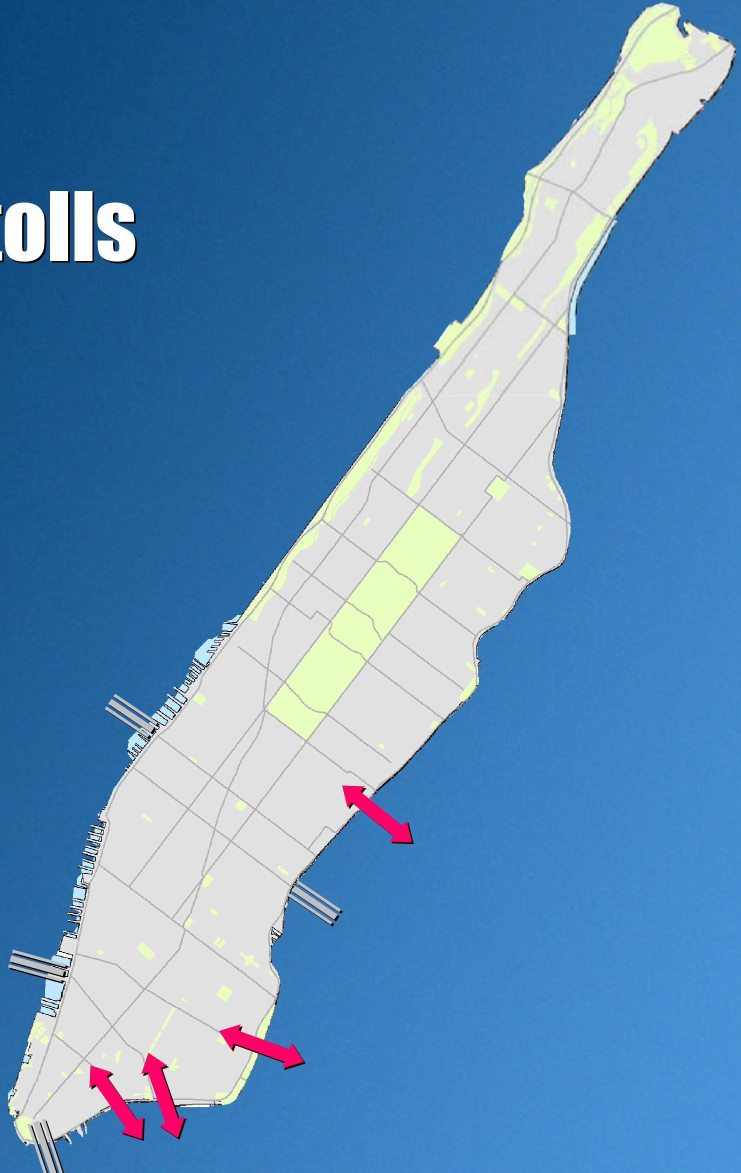
- Applied to untolled bridges and avenues
- Per trip toll instead of daily fee – pay every time you cross
- No credit or offset for PA or MTA tolls
- May be 24/7/365

Alternative:
East River bridge tolls

Northern Boundary	N/A
Intrazonal Charge	No
Through Trips	Charged
Direction of Charge	2-Way
Flat or Variable	MTA
12 Hour or 24 Hour	24 hour
Toll Offset	No
LPR Surcharge	None
Fee or Toll	Toll

VMT Change	5.6%
Capital Cost	$62
Gross Revenue	$570
Operating Cost	$39
Net Revenue	$531

- 5.6% VMT reduction
- $62m capital cost
- $570m gross revenue (annual)
- $39m operating costs
- $531m net revenue

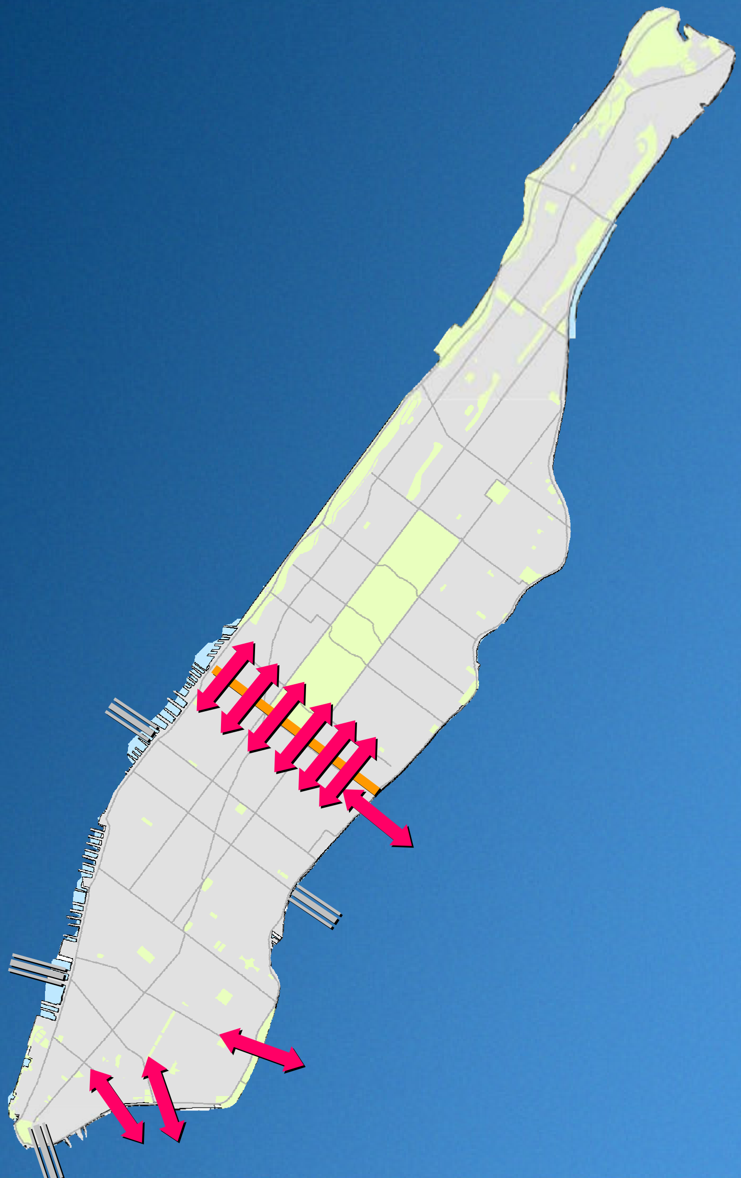


Cordon toll

Northern Boundary	60 St
Intrazonal Charge	No
Through Trips	Charged
Direction of Charge	2-Way
Flat or Variable	MTA
12 Hour or 24 Hour	24 hour
Toll Offset	No
LPR Surcharge	None
Fee or Toll	Toll

VMT Change	13.4%
Capital Cost	$72
Gross Revenue	$1,155
Operating Cost	$96
Net Revenue	$1,059

- 13.4% VMT reduction
- $72m capital cost
- $1,155m gross revenue (annual)
- $96m operating costs
- $1,059m net revenue



Methodology for Analysis of Alternatives to City's Congestion Pricing Plan

	Modeling methodology
Eliminate parking tax exemption for Manhattan residents	Spreadsheet analysis: Models the impact of off-street parking tax rate on parking behavior, based on the current and proposed tax rates and price elasticity of parking demand. BPM does not model on-street parking separately from off-street parking.
Raise parking tax to 28.375% (applies to all drivers)	
Raise parking tax to 38.375% (applies to all drivers)	
Increase rates for on-street parking	Spreadsheet analysis: Models the impact of increased on-street parking cost and applies documented price elasticities to estimate the change in demand for curb parking from higher parking meter rates. BPM does not model on-street parking separately from off-street parking.
Overnight on-street parking fee ($2 in CBD)	
Parking freeze	Case study analysis: Parking freeze impacts would be expected several years in the future.
Treat value of employer-provided parking as income, for city income tax purposes	Spreadsheet analysis: Models the interaction between parking cost, tax implications and employee benefits. BPM does not model impacts of tax incentives and employee benefits.
Parking cash-out	
Reduce free on-street parking for government employees currently commuting to Manhattan jobs	BPM: Models the reduced number of commuters that were assigned free parking in the CBD. Affects work trips and any stops made during the workday. Modeling assumes that few non-work trips into the CBD are incentivized by having a placard.
Reduce by 5,000 placards	
Reduce by 10,000 placards	
Additional taxi stands	Case study analysis: Assess impacts of changes to taxi operations from taxi stand and no-hail requirements.
Surcharge on taxi and livery fares	
$1 surcharge	Spreadsheet analysis: Models the impact of taxi surcharges on a fixed number of taxis and unregulated number of for-hire vehicles. Based on documented price elasticities for taxicab fares, historical relationship between overall growth in taxi/for-hire market and changes in taxi and for-hire trips and number of licensed vehicles. See white paper for additional details on methodology.
$2 surcharge	
Implement tolls on East River bridges	BPM: Models the effect of per-trip tolls.
License plate rationing	
1 in 10 days	BPM: Models the effects of rationing. Drivers were assigned a probability of being affected by rationing. This value based on 10% (for 1 day in 10 rationing) or 20% (for 1 day in 5 rationing), the number of vehicles available in the household and the probability that drivers could shift their day of travel.
1 in 5 days	

	Modeling methodology
Required carpooling	Case study analysis: Insufficient experience with carpooling to construct model.
Creation of High-Occupancy Toll ("HOT") lanes	Case studies analysis: a defined network of HOT lanes will be developed in NYS DOT's Managed Use Lanes (MUL) study.
Night delivery incentives	
Per-axle charge and tax incentive	Spreadsheet analysis: Models impacts of tax incentives to firms or shippers. BPM does not model impact of tax incentives.
Daytime delivery ban	Spreadsheet analysis: Models results of wholesale mode shift. BPM does not capture impacts of large-scale time-shifting.
Telecommuting incentives	Spreadsheet analysis: Models impacts of tax incentives to firms and commuters. BPM does not model impact of tax incentives.

Mean and Median Earnings for Workers in Manhattan by Where they Live
By Means of Transportation to Work, Travel Time and Availability of Vehicle in Household
New York, New Jersey and Connecticut
2006 ACS PUMS 5%

	Total Workers in Manhattan	Manhattan	Bronx	Brooklyn	Queens	Staten Island	Long Island	Hudson Valley	New Jersey	Connecticut
Total Workers	2,141,105	624,712	182,844	359,608	354,795	53,151	135,873	118,280	276,903	31,471
Mean earnings	$75,112	$89,563	$35,353	$48,412	$43,318	$58,347	$99,947	$131,664	$95,976	$205,307
Median earnings	$46,416	$50,784	$29,759	$35,549	$35,549	$50,784	$72,113	$79,223	$69,066	$121,881
Travel mode										
Drove to work	292,454	28,249	24,525	30,469	51,681	**8,883**	31,464	39,267	69,375	**7,143**
Mean	$88,532	$96,248	$58,564	$61,181	$52,024	**$64,406**	$98,391	$108,549	$111,866	**$191,687**
Median	$60,941	$60,941	$42,151	$44,893	$42,252	**$53,831**	$74,144	$76,176	$71,097	**$69,066**
Other means	1,848,651	596,463	158,319	329,139	303,114	44,268	104,409	79,013	207,528	24,328
Mean	$72,989	$89,247	$31,757	$47,229	$41,834	$57,132	$100,416	$143,152	$90,665	$209,306
Median	$45,705	$50,784	$28,033	$35,549	$35,549	$49,768	$71,097	$81,254	$67,035	$137,116
Travel time										
Less than 30 minutes	445,373	337,913	15,537	28,751	28,543	**1,380**	**5,471**	**5,256**	19,917	**1,861**
Mean	$90,792	$101,906	$34,777	$55,300	$44,437	**$43,595**	**$84,656**	**$84,743**	$71,357	**$97,108**
Median	$51,799	$60,941	$24,376	$40,627	$36,056	**$45,705**	**$47,737**	**$45,705**	$50,784	**$63,988**
30-59 minutes	861,515	252,322	85,401	189,857	169,722	11,507	20,368	35,964	92,235	**3,071**
Mean	$66,557	$80,080	$35,840	$53,336	$43,781	$62,462	$95,878	$140,216	$88,048	**$197,826**
Median	$41,643	$48,752	$29,251	$39,611	$35,549	$53,831	$66,019	$79,223	$60,941	**$91,411**
60 minutes or more	834,217	34,477	81,906	141,000	156,530	40,264	110,034	77,060	164,751	26,539
Mean	$75,575	$37,995	$34,954	$40,376	$42,613	$57,677	$101,461	$130,874	$103,391	$213,760
Median	$50,581	$30,470	$30,470	$32,502	$35,549	$50,784	$74,144	$81,254	$76,176	$127,975
Vehicles in household										
No vehicles	901,233	461,022	95,293	177,090	125,899	**4,759**	**3,550**	**4,132**	28,523	**609**
Mean	$59,232	$79,492	$26,675	$40,698	$36,083	**$37,830**	**$67,420**	**$56,585**	$57,147	**$32,993**
Median	$36,564	$49,768	$23,361	$30,470	$30,470	**$33,517**	**$36,564**	**$50,784**	$40,627	**$13,712**
One or more vehicles	1,239,872	163,690	87,551	182,518	228,896	48,392	132,323	114,148	248,380	30,862
Mean	$86,655	$117,929	$44,798	$55,896	$47,298	$60,365	$100,820	$134,382	$100,435	$208,707
Median	$54,846	$62,972	$37,580	$40,627	$40,627	$50,784	$74,144	$81,254	$71,097	$126,959

Workers include members of the Armed Forces and civilians who were at work last week. Excluded from this analysis are workers in group quarters and workers who worked at home.

NOTE: Columns will not add to total due to 3,468 Manhattan workers who live in rest of New York State

Congestion Mitigation Commission Technical Analysis

Telecommuting Incentives

technical

memorandum

prepared for

New York City Economic Development Corporation
New York City Department of Transportation

prepared by

Cambridge Systematics, Inc.

December 10, 2007

Technical memorandum

Congestion Mitigation Commission Technical Analysis

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Cambridge Systematics, Inc.
33 East 33rd Street, Suite 804
New York, New York 10016

date

December 10, 2007

Table of Contents

List of Tables

List of Figures

Executive Summary

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

Telecommuting is a congestion management strategy that has been embraced by states, MPOs, and local jurisdictions nationwide. Generally, telecommuting participants work from an alternative location instead of traveling to the workplace. Most employers are knowledgeable about telecommuting as an employee benefit and many public and private employers offer some level of telecommuting to their employees.

A number of governments at the state, county, or regional level provide incentives such as free technical assistance for telecommuting program development and financial reimbursement of, or tax credits for, telecommuting costs to help boost telecommuting participation. New York City offers some financial and technical incentives for employers but the question remains: would the implementation of more powerful or better incentive programs increase telecommuting participation rates? Even if incentive programs can increase participation and decrease congestion, would it decrease congestion enough to make a difference?

For such incentives to have an impact, there first must be latent demand for telecommuting. Available survey data show that there is indeed some latent demand for telecommuting. However, even if all of the potential latent demand was realized, only between 0.2 and 1.3 percent of New York City commute trips or 0.03 to 0.21 percent of all vehicle-miles of travel (VMT), or 1,500 to 10,000 daily VMT, would be reduced.

Furthermore, there has been no conclusive evidence that implementing any sort of incentive program has made any measurable impact on telecommuting participation rates. Analysts and academics have inspected telecommuting participation rates around the country and found that telecommuting levels range from 5 to 15 percent of the workforce. However, they have not been able to connect differences in telecommuting levels to the presence or strength of an incentive program. Surveys have found that only a small percentage of employers and employees have taken advantage of such programs. Table ES.1 summarizes the set of case studies reviewed for this study and reports the telecommuting participation levels, the frequency at which an employee telecommutes, the entity that administers the telecommuting incentive program, and the incentives that the entity offers.

Telecommuting participation has been rising with or without incentives in place. The force behind this rise has been left unexplained but it seems likely that market forces such as changes in work to an information society, better technology, and a younger generation of managers who are comfortable with the new way of thinking have been at its root. Telecommuting incentives, though, have had very little tangible impact on telecommuting levels. As a result, this study does not anticipate that offering additional incentives in New York City would measurably reduce work-trips or vehicle-miles of travel (VMT).

Table ES.1 Summary Telecommuting Programs and Incentives Offered

Geography	Telecommuting Levels	Telecommuting Frequency	Program Administrator	Incentives Offered
Baseline National	8% (2000)	0.9-1.8 days per week	N/A	N/A
Federal	6.6%	1.6 days per week	Federal Government	Telework Enhancement Act of 2007 including: • Dedicated telecommute manager; • Less stringent guidelines for eligibility; and • Increased training and education
New York – Long Island	10.5%[a]	1.6[c] days per week	Long Island Transportation Management	Grant Program for Telecommuting program design and implementation. $1,000 per employee with $100,000 max payout
New York – Westchester County	10.5%[a]	1.6[c] days per week	Smart Commute	Marketing and outreach including site visits and recommending telecommuting as TDM measure
New York – New York City	10.5%[a]	1.6[c] days per week	Commuter Link	Grant Program for TDM, including telecommuting, with graduated payment by size of employer and a $10,000 max payout
New York – Metro Connecticut and New York	15.4%[b]	1.6[c] days per week	MetroPool	Free Consulting
State of Connecticut	8.9%	1.79 days per week	Telecommute Connecticut!	Free Consulting State Tax Credit of $250 per employee (only available when a county is in a severe nonattainment area)

Geography	Telecommuting Levels	Telecommuting Frequency	Program Administrator	Incentives Offered
State of Washington	7-8%	1.4-2.5 days per week	Department of Transportation	Commute Trip Reduction Program mandates trip reduction Trip Reduction Performance Program buys annual reduced trips State Tax Credit of $60 per employee
Denver Metro Area, Colorado	N/A	1.84 days per week	Denver Regional Council of Governments	Marketing and outreach Free Consulting
Phoenix Metro Area, Arizona	5-13%	1.9-2.1 days per week	Valley Metro	Free Consulting Trip Reduction Program mandates trip reduction
Atlanta Metro Area, Georgia	N/A	2.46 days per week	Clean Air Campaign	Cash for Commuters pays commuters for not driving alone Commuter Prize pays commuters who use alternative mode most often Telework Leadership Initiative provides free consulting State Tax Credit of $1,200 per employee and $20,000 per employer

[a]Based on data from RT-HIS survey for entire city of New York.

[b]Based on data from RT-HIS survey for portion of Connecticut in the metro New York area.

[c]Based on data from RT-HIS survey for entire New York City metro area.

1.0 Introduction

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

According to Texas Transportation Institute's Urban Mobility Report, New York City ranks second in the nation in terms of annual delay. The majority of the delay is spent during the peak hour, with travelers experiencing 46 hours of annual delay (per traveler) in 2005, up from 34 hours in 2000, a 35 percent increase. This congestion costs the City and its residents over $7 billion in 2005, costing each peak traveler approximately $888.

By 2030, nearly a million more residents, 750,000 more jobs, and millions more visitors are expected to further strain the City's transportation system. The current system cannot handle the anticipated increase in traffic and meaningful infrastructure-based solutions are challenging, costly, and lengthy to implement. A comprehensive and innovative set of strategies must be implemented to make a profound change in travel behavior.

Telecommuting is a congestion management strategy that has been embraced by states, MPOs, and local jurisdictions nationwide. Generally, telecommuting participants work from an alternative location instead of traveling to the workplace. Most employers are knowledgeable about telecommuting as an employee benefit and many public and private employers offer some level of telecommuting to their employees. A number of governments at the state, county, or regional level provide incentives such as free technical assistance for telecommuting program development and financial reimbursement of, or tax credits for, telecommuting costs to help boost telecommuting participation. New York City offers some financial and technical incentives for employers but the question remains: would the implementation of more powerful or better incentive programs increase telecommuting participation rates? Even if incentive programs can increase participation and decrease congestion, would it decrease congestion enough to make a difference?

The objective of this memorandum is to provide information about existing telecommuting programs and participation, identify existing and potential telecommuting incentives for New York City, and discuss potential telecommuting participation increases from the implementation of the incentives.

The report begins with a general review of telecommuting (definitions, barriers, benefits, levels and frequency of telecommuting, and demographics of telecommuters) in Section 2.0; followed by a review of existing telecommuting programs in New York City along with an expanded look at telecommuting programs in Federal executive offices, states, and metro regions in Section 3.0; a synthesizes of lessons learned as they apply to New York City in Section 4.0; and finally Section 5.0 provides conclusions and key findings.

2.0 Telecommuting

2.1 Defining Telecommuting

Telecommuting is a term that can, very generally, mean working from home instead of at the workplace. It is a word, however, that tends to defy definition. Jack Nilles, the father of telecommuting, coined the phrase after attempting to explain his 1973 Telecommunications-Transportation Tradeoff Project. The project focused on the tradeoffs between telecommunications and transportation.[1] Nilles himself defines telecommuting as "moving the work to the workers instead of moving the workers to the work."[2] The term telecommuting is often used interchangeably with the term teleworking, which Nilles also coined. Teleworking is defined as "any form of substitution of information technologies (such as telecommunications and computers) for work-related travel."[3] Teleworkers, by this definition, can have a webcast meeting in lieu of traveling to a client's office. Telecommuters are a specific subset of these workers who work from any location (home, hotel, etc.) instead of traveling to the workplace.

These definitions are general and open ended. This generality has led to different interpretations by academics, consultants, and researchers who work to understand telecommuting. This, in turn, has made it difficult to compare results across studies. Mokhtarian, Salomon, and Choo (2005)[4] define telecommuting with a focus on transportation impacts of telecommuting as "…that subset of teleworking in which salaried employees of an organization replace or modify the commute by working at home or a location closer to home than the regular workplace, generally using ICT to support productivity and communication with the supervisor, co-workers, clients, and other colleagues," where ICT is information and communications technologies. Mokhtarian's definition of telecommuting is appropriate for a study of potential transportation impacts from the implementation of incentive programs.

People who work at home when there is no other workplace are not telecommuters because they do not substitute telecommunications for travel. These people are either home-based workers or workers who work in homes

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[1] http://www.networkworld.com/news/2007/051507-telecommuting-nilles-security.html?page=2.

[2] http://www.jala.com/faq.php.

[3] Ibid.

[4] Patricia L. Mokhtarian, Ilan Salomon, and Sangho Choo, *Measuring the Measurable: Why can't we Agree on the Number of Telecommuters in the U.S.?*, Quality and Quantity.

such as plumbers or housekeepers. This is an important distinction to make. The home-based worker who does not reduce a trip should not be counted as a telecommuter for trip reduction studies. Some studies do count home-based employees and it is not always clear how many.

Telecommuting, by Mokhtarian's definition, describes the commute pattern of people who work at home anywhere from one day a year to five days a week instead of traveling into the workplace. In some cases, however, telecommuters are only counted if they telecommute more than one day per week, in others they are counted if they telecommute more than one day per month.

Finally, surveys do not always include telecommuters who travel to telework centers as telecommuters. A telework center is a location closer to the employee's home that provides connectivity and office equipment required for work style productivity. These workers should also be counted in the total for telecommuters.

The definitional issues can lead to over counting of telecommuters (by counting home-based employees or employees who work in homes) or undercounting of telecommuters (by not counting those who work at telework centers or those who telecommute below the threshold). It is not clear in the literature how much impact these issues have on the telecommuting results.

Telecommuting, as defined for this report, will include all telecommuters who travel to telework centers and those who telecommute from home instead of traveling to their workplace. These people will count as telecommuters with no minimum cut-off.

2.2 Barriers to Telecommuting

Barriers to telecommuting impact how many employers offer telecommuting and how many employees participate in telecommuting programs.

Institutional Barriers

Telecommuting is a feasible option for any employee who has information-based work tasks such as reading, writing, research, data entry, and talking on the phone. Telecommuting, on the other hand, is not a feasible option for those employees who require face-to-face contact or on-site labor.

Employees who can telecommute because they work with information and have the required technology to perform these duties face barriers to telecommuting, some internal and some external. Internal barriers include lack of awareness of telecommuting and/or lack of drive to telecommute. External barriers to telecommuting include management reluctance and generational understanding. Finally, some employees who have none of these barriers simply just do not choose to telecommute.

Historically, management has been reluctant to allow telecommuting. Middle management support among organizations that allow, did allow, or will allow telecommuting in the Phoenix metro area in 2006 sits at 54 percent.[5] Managers fear the loss of direct eyes-on supervision will negatively impact their employees' productivity, reduce their control over employees, or precipitate the loss of company spirit.

A manager's lack of trust for his or her employees marks one of the largest barriers to telecommuting. A recent survey[6] found that the most significant institutional barrier to telecommuting was management resistance. Recent case studies of employers with significant telecommuting programs in New York City have shown that, contrary to the common belief of management, productivity increases by 10 to 40 percent when people telecommute.[7] Additionally, control is being regained by management as technology increases connectivity.

Lack of management support could be caused by a generational rift – today's veteran managers learned to manage in another mold. Telecommuting requires managers to relearn and rework their management styles to fit the new work techniques and to judge results over process. This has met some apparent resistance. As management learns to work within the new technology framework, and there is a generational succession, this problem should be alleviated.

Employers and employees must also be aware of the telecommuting option to make use of it. A recent survey of Phoenix metro area employers shows that the great majority (91 percent) of employers are familiar with the term telecommuting.[8]

Still, not all employees embrace telecommuting as an alternative to office work. Employees who have the drive to telecommute cite work, family, leisure or independence, commuting, and ideology (clean commute) for reasons why they telecommute. Other employees who lack this drive or whose drive is outweighed by personal constraints such as risk aversion, interpersonal interaction needs, or perceived benefit of the commute (physical and mental separation between home and work) will not telecommute.[9] In fact, Mokhtarian estimates that about 50 percent of employees who can telecommute actually

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[5] WestGroup Research, Employer Telecommuting Study, For Valley Metro, June 2006.

[6] Ibid.

[7] Elham Shirazi, *An Assessment of Telework in the New York Metropolitan Area*, U.S. DOT, December 2001.

[8] Ibid.

[9] Patricia Mokhtarian, *A Synthetic Approach to Estimating The Impacts of Telecommuting on Travel*, Urban Studies 35(2), 1998 pp. 215-241.

want to.[10] Furthermore, Phoenix survey results show that in 2006 only 74 percent of employees who were allowed to telecommute actually did.[11]

These employees feel that lack of face time will leave their managers with the impression that they are not working hard or effectively which may, in turn, cause their managers to pass them over for promotions. Some people feel that being present at the place of work allows for better team dynamics, brainstorming, and relationship building. Many people do not like working at home due to lack of appropriate space and the distractions of family, errands, etc.

As managers become more comfortable with telecommuting and learn to manage in this new way, employee fears regarding promotions and impressions should wane. However, interpersonal relationships and a lack of drive for telecommuting will remain as reasons why employees choose not to telecommute. Finally, it takes the combination of a willing manager, a willing employee, an employee's disposition to work well alone, and an employer who is able to recognize the employee's work from afar for an employee to actually telecommute.

Technology Barriers

The lack of technology or, more specifically, the lack of speedy technology hampers telecommuting. If, for example, a worker requires particular software that is only licensed at the office, he or she cannot telecommute. If workers cannot access files at the office, have slow connection speeds, have unreliable connectivity, cannot access e-mail, or have difficulty staying abreast of client and home office needs, it is likely that telecommuting will not provide a viable replacement for office work. In fact, a survey of AT&T employees found the most significant technology barrier to telecommuting was slow access to corporate systems, followed by difficulties with downloading large files and applications that do not run well at home.[12]

Security is another technology barrier. It can be especially difficult for small companies and branch offices without dedicated information technology staff to implement security features necessary to ensure the safety of potentially confidential data.

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[10] Ibid.

[11] WestGroup Research, for Valley Metro, Employer Telecommuting Study, June 2006 Here we assume that if an employee was allowed to telecommute that they also wanted to telecommute based on the assumption that an agreement was likely made between the two parties before the decision to actually telecommute was made.

[12] Brad Allenby and Joseph Roitz, Telework Technology and Policy, AT&T Telework White Paper, March 22, 2002 as cited in Ted Balaker, *The Quiet Success: Telecommuting's Impact on Transportation and Beyond*, Reason Foundation, November 2005.

Technology barriers are fast disappearing as more Americans are gaining access to broadband and high-speed Internet access, remote desktop software and virtual private networks (VPN) are becoming more prevalent, and a mobile economy is forcing companies to secure their connections for reasons other than telecommuting.

Zoning

The zoning barrier could impact both the employee's decision to telecommute and the employer's decision to offer telecommuting. Zoning ordinances exist that prohibit working from the home. These ordinances include restricting any use of home business or limiting the number of packages that may be delivered to a home office. These ordinances were enacted long before the technology revolution and were meant to prohibit undesirable uses from being constructed near residential development.

Minimum parking requirements also impact telecommuting participation. Often, the cost of a parking space is included in the cost of rent for an office building. If the lessee is paying for the parking space, they may not be as willing to offer work from home options that might cost more money. However, over time, employers should be able to adjust lease arrangements to better reflect changing work styles.

OSHA

The Occupational Safety and Health Administration (OSHA) regulates workplace safety and health standards. If injuries that occur at home while an employee is telecommuting, employers are concerned they would be considered at "the workplace." OSHA does not require home inspections but employers have been proactive and have conducted home inspections or provided guidelines for home office setup.

Taxes

Some states have tax laws that can lead to the double taxation of telecommuters. Generally, an employee pays taxes to the state where work is performed and sometimes an employee's home state also taxes the income. In this case, employees that live in New Jersey and work in New York are responsible for paying taxes to both states.

This creates grey area for telecommuters since an employer's home office is in one location but the actual work is done at another – creating a situation where an employee has two simultaneous workplaces. If an employee telecommutes to an office located in the State of New York, she does not physically perform her work in New York but is still taxed by New York for that income. This is allowed under the New York tax rule known as the "convenience of the employer" rule. This rule allows the state where the employer is located to tax the telecommuter for days when he or she is not physically at the workplace unless the employee is telecommuting for "the convenience of the employer." It is very difficult for telecommuters to prove that they are telecommuting for the convenience of the employer. As such, this tax rule allows both the employer's state and the employee's state to tax the telecommuter for the same income even when work is not physically performed in both. A telecommuter who lives in Connecticut and works in New York State will have to pay taxes for 100 percent of their income in New York on top of the taxes on the portion of his or salary earned while working in Connecticut.

In May 2006, New York amended its application of the convenience rule. It now allows telecommuters to avoid the tax if they could prove that their work days were normal" and their home offices qualify as "bona fide employer" offices. These requirements are very difficult to meet, which leaves telecommuters open to double taxation.[13]

In March 2007, Representative Christopher Shays (R-CT) reintroduced the Telecommuter Tax Fairness Act (H.R. 1360). It has also been reintroduced in the Senate (S.785) by Senator Christopher Dodd (D-CT). The Telecommuter Tax Fairness Act of 2007 is designed to protect telecommuters against double taxation.

2.3 BENEFITS OF TELECOMMUTING

Fewer Cars on the Road

One study conducted in 1996 reviewed the trip and VMT reductions of employees who participated in the State of California Telecommuting Pilot Project in the early 1990s. They found that telecommuters reduced their total number of trips by 27 percent and their VMT by 77 percent on days that they telecommuted.[14] Other studies found that the average number of trips taken on telecommuting days by telecommuters is lower by between 27 percent and 51 percent, and that VMT is lower by between 53 percent and 77 percent.[15] Overall, on any given day, 2 percent of employees are telecommuting. Reductions in both trips and VMT lead to a direct reduction in emissions, improvement in safety, and energy conservation, all significant social benefits.

The peak-hour commuter trips to dense work locations such as central and edge cities are replaced by shorter, more frequent trips in the vicinity of the

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[13] legalnews.tv/commentary/taxing_telecommuters_what_should_congress_do.

[14] Brett Koenig, Dennis Henderson, and Patricia Mokhtarian. *The Travel and Emissions Impacts of Telecommuting for the State of California Telecommuting Pilot Project.* Transportation Research C 4(1): 13-32.

[15] Margaret Walls and Elena Sofirova, *A Review of the Literature on Telecommuting and Its Implications for Vehicle Travel and Emissions*, Resources for the Future, December 2004.

employees' home to purchase office supplies, send packages, and perform other household errands. In fact, a 77 percent reduction in VMT implies that an employee makes these shorter trips on days that he telecommutes. These trips, though, consist of only 23 percent of the distance that he would have driven had he commuted to work.

The VMT reductions are representative of a population of telecommuters that lives further away from work than the nontelecommuting worker. The telecommuter in Connecticut lives 18 miles away from the workplace, 5 miles more than the nontelecommuting employee.[16]

The trip reduction estimates above account for the extra trips that telecommuters make during the days that they telecommute. Tempering these reductions, however, is the "induced demand" and increased urban sprawl. The basic theory of induced demand states that more people drive when additional capacity is created. This holds true for telecommuting as well, as more people are taken off of the road, especially during commute times, capacity is increased, travel time is decreased, and more people decide to drive.

Sprawl is induced because telecommuting can free people from the restriction of location and makes it easier to live further away from the workplace. Researchers have estimated that the increase in travel from induced demand and from increased sprawl is more than offset by the decrease in travel, resulting in a net decrease (Figure 2.1).[17]

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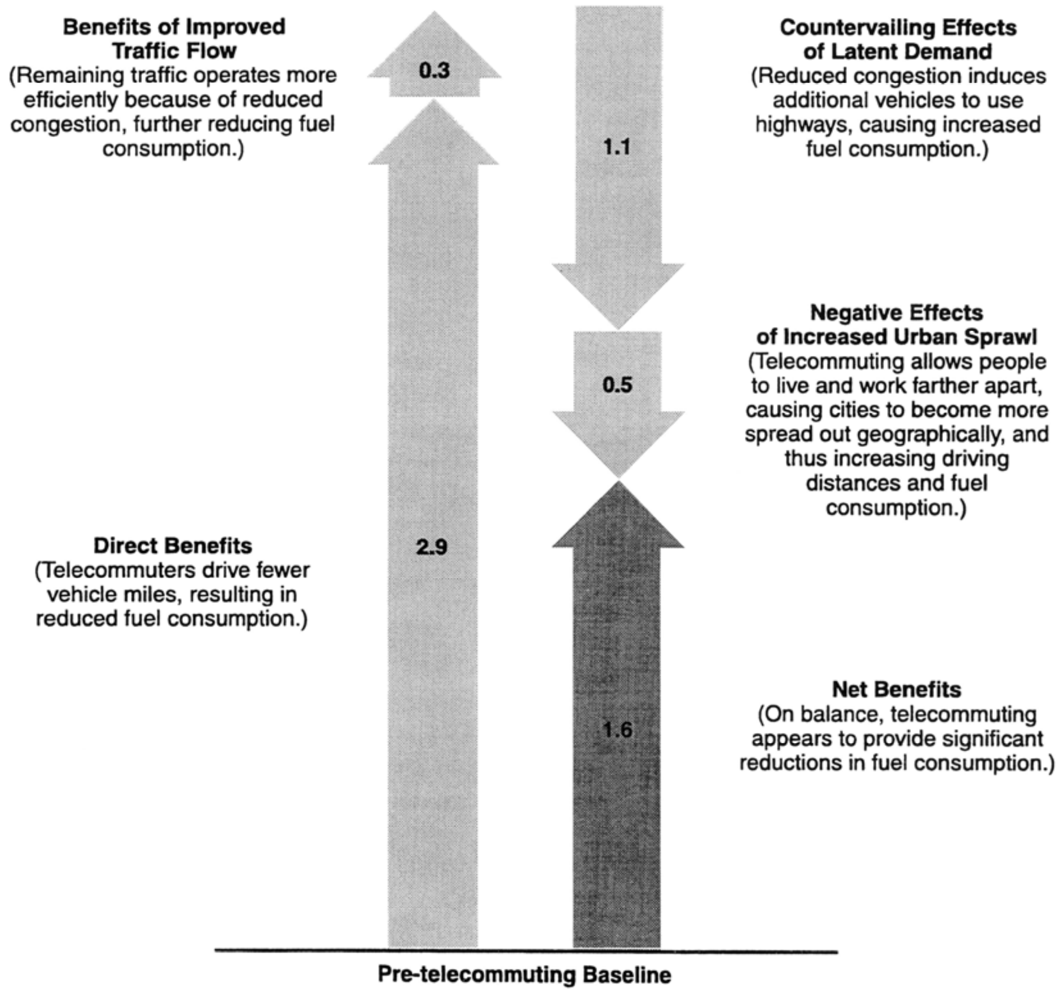
[16] Telecommute Connecticut!, 2007 Survey of Connecticut Telecommuters, March 2007, http://www.telecommutect.com/employers/pr_3_26_07_p2.php.

[17] Edward Weiner and Robert Stein, *The Evolving Federal Role in Telecommuting*, U.S. DOT, February 2005.

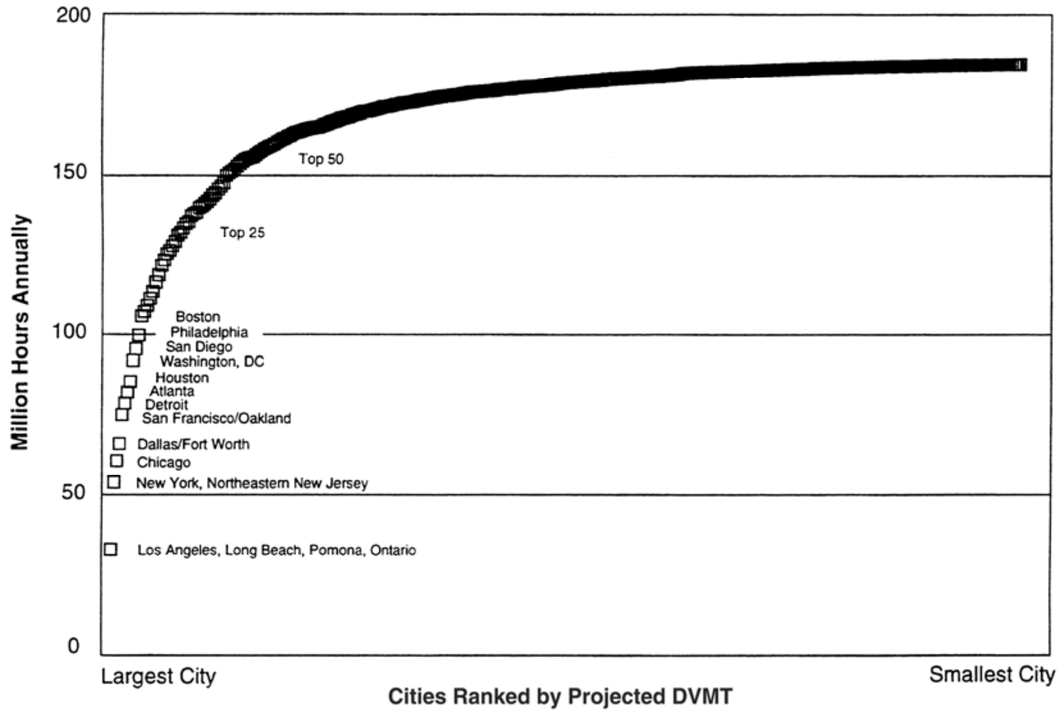
Figure 2.1 Telecommuting Net Benefits



Source: U.S. Department of Energy, 1994 as cited in Edward Weiner and Robert Stein, *The Evolving Federal Role in Telecommuting*, U.S. DOT, February 2005.

A study by the U.S. Department of Energy (DOE) found that the delay would be reduced most in areas where there is currently the most congestion. In other words, they found that the biggest time savings from telecommuting could come in the largest metropolitan areas. In 1994, when the study was published, the Metro New York area ranked second only to the Los Angeles area when estimating the potential delay reductions. Figure 2.2 depicts the curve of cities ranked by projected benefit.

Figure 2.2 Cities Ranked by Projected Reduction in Vehicle Miles Traveled



Source: U.S. Department of Energy, 1994 as cited in Edward Weiner and Robert Stein, *The Evolving Federal Role in Telecommuting*, U.S. DOT, February 2005.

Benefits for Workers

Workers enjoy more benefits than relief from commuting congestion when they telecommute. The time an employee formerly spent commuting can now be spent more productively on work or leisure activities. New York City telecommuters would save 23 work days per year if they telecommuted three or more days per week based on a 76.6-minute roundtrip commute time.[18] Telecommuting frees the commuter to use local services like grocery stores, post offices, etc., in the off-peak period, which also saves time.

Telecommuters also save on spending. The average work trip length made by auto in the New York metro region as collected in 1998 is 10.9 miles[19] and the average cost per mile based on national reimbursement is $0.485 per mile,[20] then

[18] 2003 American Community Survey as calculated in Ted Balaker, *The Quiet Success: Telecommuting's Impact on Transportation and Beyond*, Reason Foundation, November 2005.

[19] PB for New York City Metropolitan Transportation Council and North Jersey Transportation Planning Authority, RT-HIS Regional Travel – Household Interview Survey General Final Report, February 2000.

[20] www.irs.gov/taxpres/article/0,,id=156624,00.html.

telecommuters save $5.29 per trip in gasoline, vehicle maintenance, and other operating costs. This example assumes that telecommuters make no other trips during the day, but it highlights the savings potential of telecommuting. Employees who are required to pay for parking at work would save even more by telecommuting from home. Telecommuting also provides opportunities for disabled workers.

Benefits for Employers

Employers can also benefit when they allow their employees to telecommute for the following reasons:

- Telecommuters can be more productive than their office counterparts;
- Prospective employees can come from a much larger commute shed;
- Recruitment improves;
- Turnover drops;
- Office costs drop;
- Absenteeism drops; and
- Work can continue during emergencies.

Shirazi compiled case studies from New York City employers with telecommuting programs in place and found that telecommuting employees enjoyed productivity gains between 10 and 40 percent.[21] A recent telecommuting survey shows that at least half of participating employers experienced positive impacts in morale, productivity, retention, customer service, absenteeism, recruiting employees, and office space costs.[22]

2.4 TELECOMMUTING LEVELS AND FREQUENCY

Telecommuting levels describe how many employees telecommute or, alternatively, how many employees participate in telecommuting activities. Telecommuting frequency, on the other hand, describes how often employees telecommute and is generally described in terms such as days per week, hours per month, or percent of total time. Finally, telecommuting is also commonly described in terms of the amount of telecommuting employees on any given day which is a synthesis of telecommuting levels and frequency.

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[21] Elham Shirazi, *An Assessment of Telework in the New York Metropolitan* Area, U.S. DOT, December 2001.

[22] WestGroup Research, Employer Telecommuting Study, For Valley Metro, June 2006.

National Telecommuting Levels and Frequency

National Levels – A Synthetic Approach

An estimated 30 to 40 percent of all employees have jobs suitable for telecommuting yet telecommuting levels remain low. Researchers and program administrators have not been able to fully tap into this potential. Section 2.2 outlines the forces that act against the adoption of telecommuting as a replacement or modification to a normal commute trip.

Barriers to telecommuting inhibit the overall potential of telecommuting. Some of these barriers might change over time such as zoning, technology, and management barriers while others will likely remain like personal drive to telecommute. The combination of the impact of these barriers is defined by Mokhtarian.[23] She models the participation in telecommuting as the combination of three factors:

- **Ability to Telecommute –** Those whose job is eligible for telecommuting, whose manager is willing to allow telecommuting, and whose external constraints do not inhibit telecommuting;
- **Wanting to Telecommute –** Those who have the ability to telecommute that want to telecommute; and
- **Choosing to Telecommute –** Those who both have the ability to telecommute and want to telecommute that actually do telecommute.

Telecommuting is a feasible option for any employee who has information-based work tasks such as reading, writing, research, data entry, and talking on the phone. Telecommuting is not a feasible option for those employees who require face-to-face contact or on-site labor. The employees with telecommuting feasible, or eligible, jobs make up the telecommuting universe.

It is difficult to describe the number of employees in the telecommuting universe because the employment data is aggregated by industry rather than by job type. As a proxy, researchers have defined the telecommuting universe in terms of industry, selecting all employees in information-related industries. Mokhtarian cites estimates that between 50 and 70 percent of all employees are information workers.[24] A 1996 survey of information workers found that 56 percent of employees felt that their tasks were appropriate for telecommuting.[25]

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[23] Patricia Mokhtarian, *A Synthetic Approach to Estimating The Impacts of Telecommuting on Travel*, Urban Studies 35(2), 1998 pp. 215-241.

[24] Patricia Mokhtarian, *A Synthetic Approach to Estimating The Impacts of Telecommuting on Travel*, Urban Studies 35(2), 1998 pp. 215-241.

[25] Ibid.

Combining the estimate of information workers with the number of information employees who feel that they have work tasks eligible for telecommuting implies that between 28 and 39 percent of all workers are eligible for telecommuting. The Federal government estimates that 70 percent of the Federal workforce in 2005 was eligible for telecommuting. However, from 2001 through 2004, they estimated that between 30 and 41 percent of Federal employees were eligible for telecommuting.[26]

The dramatic shift in Federal telecommuting eligibility stems from a change in eligibility definition between survey year 2004 and 2005. In 2004, an employee was defined as eligible if "regularly or occasionally, some or all of duties could be performed away from the principal place of duty."[27] In 2005, on the other hand, an employee was defined as eligible if they did not handle secure materials, have on-site activity that cannot be handled remotely or at an alternate worksite, or was rated poorly for conduct or success in the previous year.[28]

In 2004, an employee was considered eligible if tasks seemed suitable and in 2005 an employee was considered eligible if they or their tasks were not unsuitable. It is not clear why the change in definition changed eligibility levels so drastically, but since other estimates are in the range of 30 to 40 percent of all employees, it seems likely that the original definition resulted in a more accurate estimate. Table 2.1 provides a summary of employees eligible for telecommuting. An estimate of between 30 and 40 percent of all employees is reasonable based on the available data.

Table 2.1 Summary of Telecommuting Eligible Employees

Estimated by	Year	Eligible Employees
Mokhtarian	1996	28-39%
Federal Government	2001	30%
Federal Government	2002	35%
Federal Government	2003	42%
Federal Government	2004	41%
Federal Government	2005	70%

[26] *Status of Telework in the Federal Government 2006*, United States Office of Personnel Management, June 2007.

[27] *Status of Telework in the Federal Government 2005*, United States Office of Personnel Management, 2006.

[28] *Status of Telework in the Federal Government 2006*, United States Office of Personnel Management, June 2007.

The data described here and in Section 2.2 outline the reasons and background data for each of these three factors. Those with the ability to telecommute can do so because they have no barriers to telecommuting, this is a combination of manager willingness (managers are willing 56 percent of the time), job suitability (the job is suitable 30 to 40 percent of the time), and lack of other external constraints (9 percent of employers are unaware of telecommuting). It is possible for all three of these factors to overlap, for example, when the job is not suitable and the manager is not willing. Given the overlap, Mokhtarian found that approximately half of those employees that are suitable are actually able to telecommute. Based on the estimated 30 to 40 percent of suitable employees and Mokhtarian's estimate that half of these employees would have the ability to telecommute based on a set of constraints the available data imply that between 15 and 20 percent of all employees have the ability to telecommute.

Furthermore, the data in Section 2.2 show that 50 percent of employees who have the ability to telecommute actually do not want to telecommute, mostly for interpersonal reasons or a lack of interest in telecommuting. Finally, of those employees that both have the ability and desire to telecommute, only 74 percent actually choose to telecommute. Table 2.2 summarizes the factors that impact telecommuting levels. The resulting level of expected telecommuting in the general population, between 5.5 and 7.4 percent, is estimated by multiplying these three factors.

Table 2.2 Impact of Telecommuting Barriers

Factors		Percent of Employees	Combined Percent of Employees	Total Percent of Employees (AXBXC)
Ability (A)	Suitability	30% – 40%	15%-20%	5.5%-7.4%
	Manager Willingness	54%		
	Other External Constraints	9%		
Wanting (B)		50%	50%	
Choosing (C)		75%	74%	

National Levels – Survey Evidence

Sources of telecommuting data employ different definitions of telecommuting which complicates comparison over years. As a reminder, for the purposes of this report, telecommuting is basically defined as someone who works at home instead of commuting to a place of work. Furthermore, a telecommuter is counted as such when she telecommutes at any frequency – once a year to 4 times per week.

The U.S. Census indicates that the percentage of workers who usually work at home has increased from 2.3 percent of total employees or 2.2 million employees in 1980 to 3.0 percent of total employees or 3.4 million employees in 1990 to 3.3 percent or 4.2 million total employees in 2000. The American Community Survey by the U.S. Census Bureau estimates that in 2005 that 3.6 percent of all employees or 4.8 million worked from home and in 2006 3.9 percent of employees worked from home or 5.4 million. While this provides some indication of telecommuting levels, employees who have home-based businesses, including retirees and homemakers who are taking advantage of a full employment economy, do not replace trips to the office and so should not count by the definition employed in this report. On the other hand, the Census definition does not include people who telecommute only one or two days a week. As a result, the Census does not provide a reliable indicator of telecommuting levels.

Market research documented that telecommuting has grown from 2.2 million employees in 1988 to 18.5 million employees in 2001.[29] Using the U.S. Census for total employment numbers, the market research indicates that 3.5 percent of employees were telecommuting in 1990 and that 8 percent of employees were telecommuting in 2000. This research defined telecommuters as company employees or contract workers who telecommute more than one day per month. This definition fits well with the definitions of this report. However, the results of these studies are based on much smaller sample sizes than the census and there has been concern that the data might include non commute reducing telecommuters so the results should be considered with caution.[30]

The results of the Census and the market research indicate that the sheer numbers of employees that telecommute are increasing over time and the telecommuting share has been increasing over time. Table 2.3 shows the telecommuting levels as described by these two sources over time. A conservative estimate in the year 2000 suggested that approximately 8 percent of employees and contract workers nationwide telecommuted. Since telecommuting was trending upward, the current value is probably higher.

[29] Reported in Patricia Mokhtarian, Ilan Salomon, and Sangho Choo, *Measuring the Measurable: Why can't we Agree on the Number of Telecommuters in the U.S.*, 2005 (market research by Cyber Dialogue).

[30] Ibid.

Table 2.3 National Telecommuting Levels

Year	Census Data	Market Research
1980	2.2 Million (2.3%)	
1988		2.2 Million
1989		3.0 Million
1990	3.4 Million (3.0 %)	4.0 Million (3.5%)
1991		5.5 Million
1992		6.6 Million
1993		7.3 Million
1994		9.1 Million
1995		8.5 Million
1996		9.7 Million
1997		11.1 Million
1998		15.7 Million
1999		16.3 Million
2000	4.2 Million (3.3%)	10.3 Million (8.0%)[31]
2001		18.5 Million (14.4%)
2005	4.8 Million (3.6%)	
2006	5.4 Million (3.9%)	

Potential Telecommuting Levels

Experience from surveys in two different metropolitan areas can help to guide the establishment of an upper bound for levels of *employers* who offer telecommuting. Employer levels and employee levels have some synergy, if more employers allow employees to telecommute, more employees will likely telecommute. Finding the upper bound for one, however, does not necessarily mean finding the upper bound for another – the employer industry mix as well as each particular workplace employee mix will play a large role in determining how many of each embraces telecommuting. Still, by making the assumption that employees who work for employers who currently offer telecommuting and employees who work for employers who have potential to offer telecommuting

[31] The lower levels in 2000 compared to adjacent years may be a result of different definitions used in the various surveys. In particular, the 2000 survey excluded self-employed workers. Since this exclusion is consistent with the definition we are employing in this paper, the figure of 8 percent is cited as an estimate of the number telecommuters nationwide at the time.

are essentially identically mixed – they have same propensity to telecommute – it follows that potential employer levels are transferable directly to potential employee levels.

A 2006 telecommuting study[32] conducted in Phoenix, Arizona showed that among the employers who do not currently offer telecommuting to their employees (69 percent of all employers do not offer telecommuting to their employees), 63 percent claim that nothing can convince to do so. The remaining 37 percent would consider implementing a telecommuting program in the future.

This leaves 26 percent of all employers who would potentially offer telecommuting of those who do not currently. Table 2.4 provides a summary of the employer willingness to offer telecommuting.

Table 2.4 Summary of Phoenix Area Employers who Might Consider Telecommuting Programs

Employer Type	Percent (A)	Might Consider Program?	Percent (B)	Percent of All Employers (A X B)
Offers Telecommuting	31%	Yes	100%	31%
Does Not Offer Telecommuting	69%	Yes	37%	26%
		No	63%	43%

Source: WestGroup Research, Employer Telecommuting Study, Valley Metro, June 2006.

It is likely that a portion of employers would say that they would consider implementing a telecommuting program but would not act on that consideration. In fact, 25 percent of all employers who considered telecommuting decided not to offer a telecommuting program to their employees.[33] There are likely to be some employers who claim that they would consider telecommuting but never act on the impulse. Here, we make an arbitrary estimate of employers who would not actually consider telecommuting of 25 percent.

The remaining 50 percent of all employers who do not currently offer a telecommuting program but claim they would consider implementing a telecommuting program in the future would actually implement a telecommuting program or 13 percent of all employers. Table 2.5 describes this process.

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[32] WestGroup Research, Employer Telecommuting Study, Valley Metro, June 2006.

[33] Ibid.

Table 2.5 Summary of Phoenix Area Employers Who Would Actually Implement a Telecommuting Program

Employer Type	Percent (A)	Might Consider Program?	Percent (B)	Implement?	Percent (C)	Percent of All Employers (A X B X C)
Does Not Offer Telecommuting	69%	Yes	37%	No – Consider and decide against	25%	6.5%
				No – Not actually consider	25%	6.5%
				Yes	50%	13%
		No	63%	No	100%	43%

Source: WestGroup Research, Employer Telecommuting Study, Valley Metro, June 2006.

Finally, comparing the number of employers that currently offer telecommuting to the number of employers that might actually implement a program reveals the total potential for telecommuting participation by employers. The survey shows that 31 percent of employers have already implemented programs and the estimates imply that an additional 13 percent of employers could implement programs. This would mean that 44 percent of all employers have implemented or would implement telecommuting programs. The increase from 31 percent of all employers to 44 percent of all employers represents an increase of 41 percent. In other words, 41 percent of all demand for telecommuting program implementation is latent.

Another survey from Arlington, Virginia[34] found that 55 percent of all employers offer telecommuting and 10 percent of the remaining employers would consider offering this as a benefit. Using the same logic from the first survey results would imply that half of the 10 percent would actually implement a telecommuting program. This would bring the total employers who offer telecommuting from 55 percent to 60 percent, an increase of about 9 percent.

It is likely that current and potential telecommuting levels vary among metropolitan areas as a result of differences in the employment mix as well as other factors such as congestion levels. The results of the two surveys cited here are inconclusive, but do help to bound the range of potential impacts. One shows that, at a maximum, 44 percent of all employers would offer telecommuting to their employees. The other shows that 55 percent of employers already offer telecommuting to their employees and that, at a maximum, 60 percent would offer this benefit. With the assumption that new telecommuters from these programs would act identically to current

[34] Southeaster Institute of Research, Arlington County Virginia, Presentation.

telecommuters from existing programs, it is possible to extend the employer telecommuting levels to project employee telecommuting levels.

The Arlington County survey also asked specifically about employers' use of telecommuting assistance provided by the County and the State of Virginia. Only three to four percent of respondents reported that they are aware of, or have used, telework consulting services or incentives.

Frequency

There are multiple academic studies that seek to identify telecommuting frequencies, or how much people telecommute. One study finds that employees who telecommute do so between 0.9 days per week and 1.4 days per week.[35] A second finds that employees telecommute 1.6 days per week, on average.[36] Another study shows that employees who telecommute do so 1.5 days per week, on average.[37] The frequency has been declining over time with the most likely reason that early adopters telecommute more often and the newer telecommuters are bringing the frequency down.[38] Finally, market research indicates that employees telecommute between 1.6 and 1.8 days per week.[39] The composite results of the studies indicate that a national average telecommuting frequency range of 0.9 to 1.8 days per week is reasonable.

New York City Telecommuting Levels and Frequency

Current Telecommuting Levels

In the late 1990s, the New York Metropolitan Transportation Council (NYMTC) and the New Jersey Transportation Planning Authority (NJTPA) conducted the Regional Travel-Household Interview Survey (RT-HIS). The survey included travel diaries from February of 1997 through May of 1998. While the data is now 10 years old, it is one of the larger datasets available nationally and presents results specific to New York City. The data represents 27,369 individuals in 11,264 households and 90,764 trips. This database includes those workers who are home-based workers. This inclusion therefore inflates telecommuting levels

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[35] Patricia Mokhtarian, Ilan Salomon, and Sangho Choo, *Measuring the Measurable: Why can't we Agree on the Number of Telecommuters in the U.S.*, 2005.

[36] Margaret Walls, Elena Safirova, and Yi Jiang, *What Drives Telecommuting? The Relative Impact of Worker Demographics, Employer Characteristics, and Job Types*, Resources for the Future, October 2006.

[37] Gustavo Collantes and Patricia Mokhtarian, *Telecommuting and Residential Location: Relationships with Commute Distance Traveled for State of California Workers*, 2003.

[38] Ibid.

[39] Patricia Mokhtarian, Ilan Salomon, and Sangho Choo, *Measuring the Measurable: Why can't we Agree on the Number of Telecommuters in the U.S.*, 2005.

as defined in this report. In the greater New York Metro area, approximately 11.9 percent of workers telecommute at least one day per week.[40]

Census data from the American Community Survey indicate that in 4 percent or 142,000 of New York City employees worked at home most of the time in 2006 while data from the Decennial Census indicate that 2.5 percent or 92,000 of New York City employees worked at home most of the time in 2000.

Potential Levels

It is possible to estimate the potential levels of telecommuting in New York City based on the analysis of potential levels described in the National Telecommuting Levels and Frequency above. Using both of the estimated upper bounds from this section will, at the very least, give an idea based on stated-preference surveys, what a reasonable range of potential telecommuting might look like.

The first survey implies that telecommuting levels have the potential to increase by 41 percent over existing levels while the second implies a smaller 9 percent increase. Previously, New York City metro area telecommuting levels (percent of total employees who telecommute) were found to be 10.5 percent.

If the level of telecommuter were to grow by 41 percent, telecommuting levels would increase from 10.5 percent to 14.8 percent. If the level were to grow by 9 percent, on the other hand, telecommuting levels would grow from 10.5 percent to 11.4 percent.

Frequency

RT-HIS data indicate that telecommuters used this mode one day a week 54 percent of the time, two days a week 14.5 percent of the time, three days a week 8.3 percent of the time, and four or more days a week 23.2 percent of the time.[41] The data are presented in Table 2.6. The overall frequency as measured by this survey is 1.6 days per week.

Table 2.6 RT-HIS Telecommuting Frequency

Days Per Week	Percent of Telecommuters
One	54.0%
Two	14.5%
Three	8.3%
Four or more	23.2%

[40] Elham Shirazi, *An Assessment of Telework in the New York Metropolitan Area, U.S. DOT*, December 2001.

[41] Yasasvi D. Popuri and Chandra R. Bhat, *On Modeling the Choice and Frequency of Home-Based Telecommuting*, TRB 2003 Annual Meeting.

2.5 DEMOGRAPHICS OF TELECOMMUTERS

There are very few large datasets available that have the socioeconomic data required to develop econometric models designed to estimate likelihood for telecommuting. These models are designed to give information on the specific impacts of each demographic variable. The models can estimate how much, all else being equal, demographic factors such as age, income, sex, race, etc., impact the likelihood of telecommuting. Two such models have been estimated using data in from the RT-HIS survey in New York City and data collected by the San Diego Association of Governments (SANDAG). The SANDAG data gives unique and valuable insights into the type of employee that is likely to telecommute.

Popuri and Bhat (2003) estimated the impact of socioeconomic data on the RT-HIS dataset for New York City. They estimate the following with respect to likelihood to telecommute and the likelihood for frequency of telecommuting:

- Women are less likely to telecommute if there are no children in the household;
- If there are children, women and men are about equally likely to telecommute;
- Age per se is not a determinant of propensity to telecommute, but older people are more likely to telecommute more frequently;
- Married people are more likely to telecommute and to telecommute more frequently;
- College educated people are more likely to telecommute; individuals in households with several vehicles, individuals who drive to work, and individuals with a driver's license are less likely to telecommute:
- Private sector employees are more likely to telecommute than their public sector counterparts;
- Workers requiring face-to-face contact tend to be less likely to telecommute but this factor has no impact on telecommuting frequency; part-time employees are more likely to telecommute and telecommute more frequently;
- Individuals who have to pay to park at the workplace are more likely to telecommute and are more likely to telecommute more frequently; and
- Individuals in households with higher incomes are more likely to telecommute and telecommute more frequently.

Walls, Sofirova, and Jiang (2006)[42] estimated a similar model as Popuri and Bhat, but did so with SANDAG data collected in 2002. They estimate the following with regard to likeliness to telecommute:

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[42] Margaret Walls, Elena Safirova, and Yi Jiang, *What Drives Telecommuting? The Relative Impact of Worker Demographics, Employer Characteristics, and Job Types*, Resources for the Future, October 2006.

- The transportation and communication industry is 11.3 percent less likely to telecommute;
- The retail trade industry is 10.3 percent less likely to telecommute;
- The entertainment industry is 9.5 percent more likely to telecommute;
- The consulting industry is 9.9 percent more likely to telecommute;
- The construction, maintenance and repair, and production industries are 7.3 percent less likely to telecommute;
- The architecture, engineering, or other professionals are 10.4 percent more likely to telecommute;
- The education and training industries are 11.2 percent more likely to telecommute;
- The health services industry is 8.8 percent less likely to telecommute;
- The sales industry is 14.3 percent more likely to telecommute;
- Senior or middle management is 11 percent more likely to telecommute;
- College makes one 17.8 percent more likely to telecommute;
- Kids between 6 and 17 makes people 4.5 percent less likely to telecommute;
- Age (older than 30) makes people 10.9 percent less likely to telecommute;
- Age (older than 30) makes people 35.1 percent less likely to telecommute frequently;
- College makes people 37.9 percent more likely to telecommute frequently;
- Full-time workers are 68.4 percent less likely to telecommute frequently;
- Office workers are 39 percent more likely to telecommute frequently;
- Formal telecommute programs make people 66.3 percent more likely to telecommute frequently;
- Commute time makes people 0.3 percent more likely to telecommute frequently;
- Days that people work make people 33.2 percent more likely to telecommute frequently; and
- Having more than two jobs makes people 54.7 percent more likely to telecommute frequently.

3.0 Case Studies

Telecommuting levels remain stubbornly low when compared to the estimates of employees who are eligible to telecommute or even those that have the potential to telecommute. To remedy that, and to realize the full potential benefits of telecommuting, it is important to remove the barriers described in section 2.2 of this report. To that end states, regional planning bodies, counties, and the Federal government are offering numerous incentives ranging from access to information to significant financial benefits and legal requirements.

The following case studies outline a number of telecommuting incentive programs and focus primarily, due to availability of data, on how effective these programs are at increasing telecommuting participation levels specifically in the private sector. The case studies survey both national and international programs and their effectiveness.

As just one example of an incentive or mandate not listed in the case studies, companies which do substantial government work may be required to institute formal telecommuting policies to meet the requirements of government auditors. For example, Cambridge Systematics was recently required by its Federal Highway Administration auditors to implement such policies, and to require both regular and occasional telecommuters to sign such policy statements. Such requirements impose additional administrative burdens on both employers and employees.

3.1 United States Federal Government

In October of 2000 the Federal Department of Transportation Appropriation Act was amended (Section 359 of Public Law 106-346) to require all eligible employees of the executive offices to telecommute at least once a month. It mandated that the executive offices develop criteria for telecommuting programs and to remove barriers to telecommuting. Even considering that public employees are less likely to telecommute than private sector employees, the results of the mandate were disappointing. While this program is not an incentive, it provides useful corollaries to incentive programs. Incentive programs and Federal mandates both aim to increase telecommuting through external forces. This case is used to highlight the challenges faced when attempting to break the barriers to telecommuting, even with strong incentives.

In 1993 the GSA, in partnership with state and local officials in the Washington, D.C. area, funded and built several Federal telework centers close to large populations of Federal employees. Telecommuters could either work from home or travel to a telework center.

In July of 1994, President Clinton sent a memo to all Federal agencies directing that each agency establish a program to support alternative work arrangements and to reduce the barriers to such programs. In response, the U.S. Department of Transportation (DOT) and General Services Administration (GSA) developed education manuals to help agencies implement the programs.

The National Telecommuting Initiative in 1996 set objectives to increase the number of Federal telecommuters to 60,000 by October 1998 and 160,000 by the end of 2002. The results of the program were disappointing. Participation languished at 25,000 in 1998, far below the goal. The result was that 1.6 percent of the entire Federal work force was telecommuting in 1998.

In 2001, the Federal government required that each executive agency establish a policy that allowed employees to telecommute "to the maximum extent possible without diminished performance."[43] The policy included a graduated requirement that in four years time, 100 percent of the eligible Federal workforce would be telecommuting at least one day per week. The U.S. Office of Personnel Management (OPM) surveyed the results and found that telecommuting by Federal employees had increased from 45,300 in 2001 (4.2 percent of the Federal workforce) to 102,900 in 2003 (5.0 percent of the Federal work force). The most recent OPM survey (2005)[44] indicates that 119,248 employees telecommute at least one day a month or 9.5 percent of total eligible Federal employees and 6.6 percent of all Federal employees. Table 3.1 summarizes this data. Additionally, in 2005, Federal employees telecommuted 1.74 days per week.

Table 3.1 Telecommuting in the Federal Workforce

Year	Levels
1998	25,000 (1.6%)
2001	45,300 (4.2%)
2003	102,900 (5.0%)
2005	119,248 (6.6%)

Source: Edward Weiner and Robert Stein, The Evolving Federal Role in Telecommuting, U.S. DOT, February 2005; U.S. OPM, *Status of Telework in the Federal Government – Report to Congress*, June 2007.

Federal telecommuting levels have reached 6.6 percent and frequency of 1.74 days per week. These numbers are comparable to the National data described in Section 2.4. In that section, telecommuting levels were between 5 and 8 percent and frequency was between 1 and 1.8 days per week. Federal employees have

[43] Edward Weiner and Robert Stein, *The Evolving Federal Role in Telecommuting, U.S. DOT*, February 2005.

[44] U.S. OPM, *Status of Telework in the Federal Government – Report to Congress*, June 2007.

enjoyed growth in their telecommuting levels over time but that the growth has not exceeded national averages implies that Federal mandates have not been able to coax their employees to telecommute.

The Telework Enhancement Act of 2007 (S-1000) is intended to increase the number of Federal employees who telecommute through less stringent guidelines on eligibility, the introduction of a full-time telecommuting program manager, and an increased emphasis on training and education. It is not clear whether this will indeed increase the telecommuting levels in the Federal government or if they will remain steady with national rates as a whole.

3.2 International (Stockholm, Sweden and Wellington, New Zealand)

The City of Stockholm, Sweden implemented a trial congestion pricing scheme. Detailed records of changes in travel patterns were maintained, including changes in mode shift throughout the trial. Based on interviews of two large employers (one inside and one outside the cordon both before and during the pricing trial) the implementation of a cordon fee congestion pricing scheme in downtown Stockholm resulted in no increase in telecommuting. The researchers conceded that the trial was perhaps too short to observe any change in certain behaviors. Furthermore, it is not clear whether the chosen employers had a formal telework program or what a priori telecommuting levels were.

In Wellington, New Zealand, the Greater Wellington Regional Council launched a telecommuting marketing campaign including billboards, press releases, a web site, a series of workshops, a leaflet delivery to all 18,228 households, and technical and marketing support.[45] The program, called Close2: Kapiti, was deemed a failure and funding was stopped five months into the 12-month trial period. However, a survey of 400 random commuters showed that 6 percent of commuters began telecommuting as a direct result of the Close2: Kapiti marketing campaign.[46] In the end the program developed 40 new teleworkers and 3 peak-period trips per week.

3.3 New York City

There are several organizations in the New York City metro region which provide various incentives to increase telecommuting. Among them are Commuter Link in New York City, Smart Commute in Westchester County,

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[45] Joe Hewitt, Report 03.264 to the Regional Land Transport Committee, Greater Wellington Regional Council.

[46] Travel Behaviour Change Evaluation Procedures and Guidelines: Literature Review, December 2004.

Long Island Transportation Management, and MetroPool in certain counties in Connecticut and New York. Each is described below.

Commuter Link[47]

Commuter Link is a transportation demand management (TDM) agency that is funded by the New York State Department of Transportation and is supported by the New York City Department of Transportation. It covers employers in New York City. It has a grant program that provides funds to companies which implement transportation demand measures (TDMs). It is a graduated program that gives more funding to larger companies (up to a maximum of $10,000). The money can be used for telecommuting equipment or training.[48]

Commuter Link's grant program has given no money for telecommuting programs to date with anecdotal evidence that the funds offered in the grant program are not significant enough to make an impact on employers. Overall, in the two-year availability of the grant program, six companies have used or been processed through the grant program.

Commuter link had a telecommuting program on the table in 2002 that would have provided free consulting services to implement telecommuting programs for local employers but was canceled due to lack of support from New York City.

Smart Commute[49]

Smart Commute is a TDM agency that covers Westchester County, New York and is sponsored by the New York State Department of Transportation. It markets TDM techniques including telecommuting, and provides free services to help set up such TDM programs for local employers. Their services include surveying employees and tailoring TDM programs based on the results. Smart Commute always includes telecommuting as a recommendation for travel demand management. Smart Commute does not collect data on the effectiveness of these programs, however, over the past five years, 14 worksites have worked with Smart Commute to implement travel reduction programs[50].

Long Island Transportation Management[51]

The Long Island Transportation Management (LITM) on Long Island, New York provides free services to help employers implement telecommuting programs

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[47] www.commuterlink.com.

[48] Interview with John Galgano of Commuter Link New York, September 14, 2007.

[49] www.westchestergov.com/smartcommute.

[50] Interview with Tony-Pascal Offurum of Smart Commute, September 14, 2007

[51] www.litm.org.

under the Commuter Choice program. They offer the Long Island Region Improving Commuting (LIRIC) Grant Program, which provides funding for TDM program development of $1,000 per employee, up to $10,000 total. The program requires that employers have 30 employees or more, that they are part of LITM's Commuter Choice program, and that LITM completed a survey that indicates specific TDM schemes. The development or expansion of telecommuting programs are eligible under this grant program but the purchase of capital equipment is not.

The LIRIC grant program offers telecommuting programs as an eligible expense. They do not, however, keep data on how many trips are reduced from this program. Data indicating how many employers apply for or receive these grants are not readily available.

MetroPool[52]

MetroPool provides services to commuters traveling to destinations in Fairfield County in Connecticut and Westchester, Rockland, Orange, and Putman Counties in New York. They offer free consulting services to employers that are designed to identify, implement, and support mobility options for each worksite. MetroPool includes telecommuting as an available commute option. MetroPool currently supports alternative mobility programs for close to 300 employers. Data indicating how many trips are reduced from this program are not available.

3.4 CONNECTICUT[53]

The State of Connecticut instituted the Telecommute Connecticut! program 10 years ago. Telecommute Connecticut! is a commuter service provided by the Connecticut Department of Transportation for employees in the State of Connecticut. The program offers free assistance to develop and implement telecommuting programs to employers in the State.

Telecommute Connecticut! has provided information or provided consulting services to approximately 200 existing employers to date. A 2000 survey found that between the years of 1997 and 2000:[54]

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[52] http://www.metropool.com/aboutus/about_overview.html.

[53] www.telecommutect.com.

[54] Elham Shirazi, An Assessment of Telework in the New York Metropolitan Area, U.S. DOT, December 2001.

- The number of employers offering telecommuting remained at 8 percent;
- There was a 74 percent increase in the number of telecommuters per worksite; and
- There was a 91 percent increase in telecommuting days per week.

A recent survey, performed in August of 2006[55] found that:

- More than 158,000 employees telecommute in Connecticut in 2006, up from 85,260 in 2001;
- 53 percent of telecommuters work at home less than five days a month, spending on average 17 percent of their work hours at home;
- 47 percent of telecommuters work at home at least five days a month, spending on average 57 percent of their work hours at home;
- An estimated 60,000 vehicles are removed from the road on an average day; and
- 23 percent of telecommuters started in the past six months.

The Telecommute Connecticut! survey defines telecommuters as those employees who work at home one or more days per month during normal business hours and exclude home-based businesses and employees who take work home after hours. This definition is in line with the definition employed in this report.

It is possible to calculate the telecommuting frequency and levels using the data in the Connecticut survey results and U.S. Census results. To calculate telecommuting frequency, convert the percent of the work hours at home to days of the week (17 percent of work hours at home is 0.85 days per week) and take a weighted average of the results. Table 3.2 provides a summary of the calculations. The telecommuting frequency in Connecticut in 2006 was 1.79 days per week.

Table 3.2 Telecommuting Frequency in Connecticut

Percent of Work Hours at Home	Converted to Days of the Week (Hours X 5 Days)	Percent of Total Employees	Weighted Average
17%	0.85 days per week	53%	1.79 days per week
57%	2.85 days per week	47%	

Source: www.telecommutect.com/employers/pr_3_26_07_p2.php.

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[55] www.telecommutect.com/employers/pr_3_26_07_p2.php.

It is possible to calculate the percent of employees telecommuting in Connecticut by using the total employment values for the State of Connecticut from the U.S. Census American Community Survey in conjunction with the Connecticut survey results. Table 3.3 shows the calculations and results. In 2006 8.9 percent of Connecticut employees telecommuted compared to 5.1 percent of employees in 2001.

Table 3.3 Telecommuting Levels in Connecticut

Year	Census Employment	Connecticut Telecommuters	Percent Telecommuting
2001	1,672,798	85,260	5.1%
2006	1,764,288	158,000	8.9%

Source: www.telecommutect.com/employers/pr_3_26_07_p2.php and U.S. Census.

It is not clear what impact Telecommute Connecticut! has had on the overall increase in telecommuting in Connecticut. It has given information to approximately 200 employers over the 10 year life of the program. It has no way of knowing whether these employers would have implemented telecommuting programs without the use of the available incentives. Further, Telecommute Connecticut! has no information regarding the total number of trips reduced due to the incentive program. However, it has documented substantial increases in telecommuting at the participating companies.

In addition to the telecommuting program, Connecticut offers a Traffic Reduction Tax Credit to employees with more than 100 employees. The credit program, implemented in 1997, was designed to encourage employees to use alternative modes. To be eligible, the employer must be located in Fairfield County, a severe air quality nonattainment area. The Traffic Reduction Tax Credit gives employers 50 percent of "direct costs of traffic reduction programs and related services,"[56] up to $250 per employee. The credit is limited to $1.5 million per year.[57] The credit, though, is currently inactive due to the downgrade of most towns in Fairfield County from severe to moderate nonattainment areas. No information is available about the impacts of the tax credit program on alternative mode use in general, or on telecommuting in particular.

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[56] http://www.ct.gov/ecd/lib/ecd/drs/ct_tax_credit_guide_2006.pdf.

[57] www.cga.ct.gov/2005/pub/chap208.htm#sec12-217s.htm.

3.5 WASHINGTON STATE[58]

Washington State does not have any specific telecommuting programs but offers incentives and mandates that may involve telecommuting through its trip reduction program.

Washington State has a Commute Trip Reduction (CTR) program that requires employers in the 10 largest counties in the state with over 100 employees to implement TDM programs. Telecommuting is specifically recommended as one of the TDM strategies. The CTR program includes 1,114 worksites and 560,000 employees. While employers are required to develop and implement trip reduction plans, they are not penalized for failure to meet state-established trip reduction targets.

The CTR program in King County, for example, reduced 1,583 trips in 1995 and 12,075 in 2007 with between a 2 and 4 percent of all trips reduced by telecommuting on an average day. In the entire state, as of 2005, the CTR program had achieved a reduction of 20,000 vehicle trips during each average morning commute. Telecommuting levels in 2001 were 7 percent and grew to 8 percent by 2003.[59]

We can calculate telecommuting frequency from telecommuting levels (7 to 8 percent of employees) and the total trip reduction rates (2 to 4 percent of all trips). Table 3.4 summarizes the calculation. It is important to understand that percent of telecommuting trips is calculated by multiplying frequency by levels. Telecommuting frequency, then, is calculated by dividing total trips (2 to 4 percent) by levels (7 to 8 percent). Telecommuting frequencies in Washington based on the available data are between 1.4 days per week and 2.5 days per week.

Table 3.4 Washington Telecommuting Frequency

Low/High	Telecommuting Levels	Percent of Telecommuting Trips	Telecommute Frequency = Trips/Levels (as Percent of Total Time)	Telecommuting Frequency (as Days per Week)
Low	7%	2%	28%	1.4 days per week
High	8%	4%	50%	2.5 days per week

Source: http://www.wsdot.wa.gov/NR/rdonlyres/E12C9B40-FD81-4EA2-80E2-A01E645E8931/0/CTR_Report_03.pdf.

58 www.wsdot.wa.gov/tdm.

59 http://www.wsdot.wa.gov/NR/rdonlyres/E12C9B40-FD81-4EA2-80E2-A01E645E8931/0/CTR_Report_03.pdf.

In combination with this program, the State offers a CTR tax credit for employers who give subsidies to their employees to shift transportation mode (although this does not include telecommuting). The tax credit program provides a credit of 50 percent of the amount paid to or on behalf of each employee for ridesharing, carsharing, using public transportation, or using nonmotorized commuting.[60] The credit is capped at $60 per employee and $200,000 per employer per year up to a maximum tax credit of $2.75 million.

Washington also offers a Trip Reduction Performance Program (TRPP). The program allows the state to purchase annualized reduced trips at market value (if one person switched from full-time commuting to full-time telecommuting he or she would create one annualized reduced trip).

The program is designed in a proposal format. The State of Washington releases a request for proposals (RFP) and any entity (private, schools, public agencies, TDM agencies, etc) can respond with a proposal to reduce annual trips for a price. For example, Seattle Central Community College proposed a telecommuting trip reduction program for $10,000 that would reduce a total of 25 annualized trips (at a cost of $400 per trip) by having eligible staff telecommute at least one day a week. The state reviews and accepts the proposals into the program for funding.

The program pays 50 percent of the proposed cost of implementing the trip reduction program up front ($5,000 to the Community College, for example[61]) and pays the remainder pending proof of actual achieved trip reduction. If the Community College were to reduce 15 annual trips with this program instead of the proposed 25, they would receive a total of $6,000 (15 trips times $400 per trip). However, if they were to reduce 50 annualized trips, they would be paid $20,000 (50 trips X $400). The Community College proposal was set to begin in July 2007 and results should be available after a year-long trial.

The CTR, TRPP, and tax programs provide the carrot and the stick for TDM. Washington provides financial incentives to employers through tax credits and funding programs while requiring by law that trips be reduced. Despite these measures, telecommuting levels remain consistent with those at the national level.

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[60] dor.wa.gov/Docs/Pubs/Special Notices/2005/sn_05_CommuteTripProgChgs.pdf.

[61] www.wsdot.wa.gov/TDM/default.htm for reports, data, and further background regarding CTR, TRPP, and tax programs available in Washington.

3.6 ATLANTA, GEORGIA[62]

The Clean Air Campaign is a nonprofit TDM agency that is funded through the Georgia Department of Transportation and is supported by the Georgia Environmental Protection Agency, The Atlanta Regional Commission (Atlanta's Metropolitan Planning Organization), Georgia Regional transportation Authority, the Metro Atlanta Chamber of Commerce, and other private corporations. It offers a variety of incentive programs to both employers and employees in the Atlanta metro region. It offers assistance to employers to design and implement travel reduction programs, Cash for Commuters (CFC), Commuter Prizes, and the Telework Leadership Initiative. Each program is discussed below.

The CFC program started in 2002 to target employees as a complement to the efforts that target employers specifically such as free consulting assistance for the design and implementation of TDM programs. Only commuters who currently drive alone and work in an air quality nonattainment area are eligible for the CFC program. The employee, therefore, must live in the Atlanta metro area. Participating employees must record their travel for a 90-day period after which they are paid $3 a day for each day they used an alternative commute mode, up to a maximum of $180. The commuter must use an alternative mode at least 13 times during the 90-day period. Telecommuting counts as an eligible alternative mode of travel.[63]

The CFC program reported a total of 8,600 participants through three implementation phases. On average, participants were paid $140. Only 6 percent of all program participants chose telecommuting as the alternative mode of commuting.[64] Also, participation in the program has declined somewhat over time, with less than two-thirds of original participants continuing in the program after one year. After the 90 days were over, the participation in all alternative modes diminished to between 71 and 74 percent of "in program" levels after 3 to 6 months and to 64 percent of "in program" levels after 9 to 12 months. Table 3.5 summarizes the estimation of telecommuting participation decline, assuming that telecommuting follows a similar progression to overall alternative mode participation. The percent of program participants who were still telecommuting after 3 to 6 months was between 4.3 and 4.4 percent and was 3.8 percent after 9 to 12 months. It is not known whether this trend will continue downward or whether ex-participants would tend to stay with one alternative mode over another. It may be inferred, therefore, that the program permanently encouraged around 300 employees in the Atlanta

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[62] www.commuterrewards.com/commuter_prizes, www.cleanaircampaign.com.

[63] Ellen Macht, Cash for Commuters, a web presentation in November 2004.

[64] Ellen Macht, Cash for Commuters, a web presentation in November 2004.

metro area to telecommute – just under 0.1 percent of all employment just in the City of Atlanta and 0.02 percent of regional employment.

Table 3.5 Participation in the Atlanta Cash for Commuters Program

Mode	Using Mode "in Program"	Using Mode 3-6 Months "after Program"	Using Mode 9-12 Months "after Program"
All Modes	100%	71-74%	64%
Telecommuting	6%	*4.3%-4.4%*[a]	*3.8%* [a]

Source: Ellen Macht, Cash for Commuters, a web presentation in November 2004.

[a] These values are estimated.

The Commuter Prize program was introduced in 2005 to offer financial incentive to employees who work in the Atlanta metro area. Participants are entered into monthly drawings for $25 gift cards with each alternative commute earning one entry into the drawing. Additionally, participants who meet certain criteria such as the most number of reports or most days with an alternative commute mode are eligible to win a $100 gift card. Data are not available showing the effectiveness of the Commuter Prize program.

The Telework Leadership Initiative (TLI) provides employers in the Atlanta metro area with free consulting services to start or expand telecommuting programs, up to $20,000 in value. The TLI initiative provided assistance to 13 employers to develop or expand their telecommuting programs. Almost 1,800 employees began telecommuting as a direct result of this program.

In addition to the other ongoing incentive programs in Atlanta, the State of Georgia has implemented a telework tax credit. The program offers two types of tax incentives, both credits apply to the employer. The first credits employers up to $1,200 per employee for the cost of equipment, connectivity, software, etc. The credit is graduated depending on how often the employee telecommutes (25 percent based on 5 or more days per month, 75 percent based on 12 or more days per month, and 100 percent based on 12 or more days per month if the employer is in a nonattainment county.) The second credits employers up to $20,000 for expenses related to the design and implementation of telecommuting programs.

3.7 PHOENIX, ARIZONA[65]

Valley Metro is a regional transit authority that is funded by sales tax and local transportation assistance funds. The transit authority runs a program to help

[65] www.valleymetro.org.

implement TDM measures and offers employers in the Phoenix metro area incentives to telecommute. The agency surveys telecommuters every two years to learn about levels, awareness, perception, support, and why employers choose not to telecommute. Maricopa County also administers a Trip Reduction Program.

Valley Metro offers employers free consulting services to design and implement telecommuting programs, but has canceled a program offering funding for telecommuting equipment due to lack of interest. Valley Metro received only one request in two years. The free consulting services have had very few takers for several years.

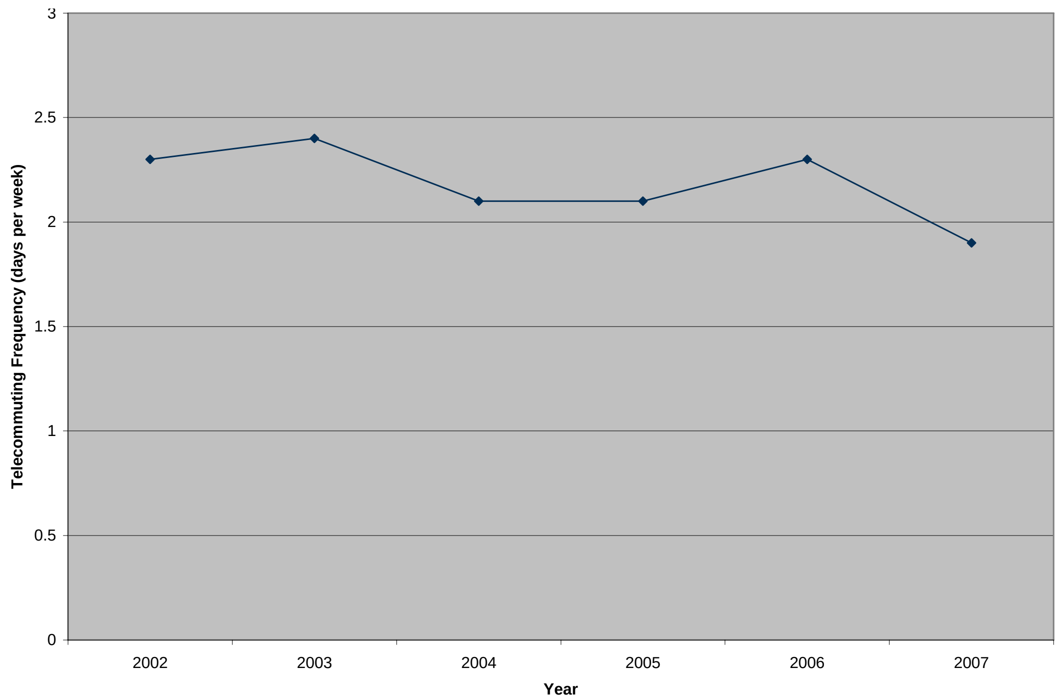
Valley Metro data from regional surveys show that 13 percent of employees were telecommuters in 2007. The average telecommuting frequency from 2002 through 2007 was between 2.1 days per week and 1.9 days per week.[66] Figure 3.1 illustrates the trend of telecommuting frequency over time in Maricopa county. The participation rates in telecommuting are similar or better in Phoenix as compared to the nation as a whole, yet the incentive programs that Valley Metro provides are poorly used.

In a separate program, Maricopa County requires employers or schools with more than 50 employees or students to participate in the Trip Reduction Program. The Trip Reduction Program requires participants to reduce single occupancy vehicle trips by 10 percent per year for the first 5 years and 5 percent per year thereafter until no more than 60 percent of trips are made by single occupancy vehicle.[67] While employers are required to conduct annual surveys to measure success, no enforcement actions are taken if trip reduction goals are not met.

[66] WestGroup Research, 2007 TDM Annual Survey, 2007.

[67] www.valleymetro.org/Rideshare/Employer_Services/Trip_Reduction_Program/index.htm.

Figure 3.1 Average Telecommuting Frequency in Maricopa County



3.8 DENVER, COLORADO[68]

Two telecommuting incentive programs are in effect in Denver, Colorado. One program at the regional level involves consulting support and information technology (IT) services, while the second is a tax break offered by the State of Colorado.

The Denver Regional Council of Governments (DRCOG) offers free consulting to businesses to design and implement telecommuting programs. Telecommuting education is made available as well through monthly lunch meetings.

DRCOG has helped 140 companies with its free consulting services and usually gains a few new employers at each monthly lunch event. They keep data for the 140 employers in their program, but not for the entire Denver metro region.[69] The average commuter in this program telecommutes 1.84 days per week, which is within the range of values observed in other areas. As of August 2007, DRCOG began offering an additional incentive – free IT support to companies that already have or are in the process of designing a telecommuting program. The free IT support program is enjoying early success as the program consultant

[68] http://www.drcog.org/index.cfm?page=Telework.

[69] Interview with Donna Dailey, Denver Region Council of Governments, September 14, 2007.

has already been deployed to help three employers with their IT needs in the first month.

Estimated VMT savings are reported by DRCOG to the Colorado Department of Transportation, however the information is not available. DRCOG is currently developing surveys that will better estimate the effectiveness of the programs.

DRCOG experienced a great deal of marketing luck. A news team approached DRCOG for a story, goaded by rising gas prices. This led to additional newspaper stories and morning talk show appearances. These events generated most of the program's participants.

Colorado has tax incentives in place or in the planning stages. DRCOG is currently developing a proposal to the Governor's Energy Office to offer tax incentives for telecommuting while the State of Colorado has placed a state tax moratorium on telecommunications taxation with the intent to provide incentives, in part, to telecommuters.

3.9 The Telecommuting Incentive Toolbox and Impact

Nationally, the range of strategies to promote telecommuting has included:

- Marketing campaigns;
- Free consulting services for the design and implementation of telecommuting programs;
- Education and outreach;
- Cash for choosing an alternative mode of travel;
- Prizes for using an alternative mode the most;
- Tax moratoriums on telecommunications fees;
- Tax credits;
- Markets for the purchase of annual trip reductions; and
- Funding for the design and implementation of telecommuting programs.

The effectiveness of these programs is rarely measured. While there is no formal measurement of the increase in telecommuting from any of these programs, a reasonable proxy might be the comparison of local and national telecommuting levels. This is a difficult comparison to make for a number of reasons. It assumes that all sources have identical definitions of telecommuting, that there are no regional effects of telecommuting, and that telecommuting levels and frequency are fairly stable over time. However, the comparison of these values can provide a first order approximation of the effectiveness of telecommuting incentive programs. Table 3.6 shows each case study, the local telecommuting levels, the local telecommuting frequency, the program administrator, and the specific incentives offered in that locale.

Table 3.6 Summary Telecommuting Programs and Incentives Offered

Geography	Telecommuting Levels	Telecommuting Frequency	Program Administrator	Incentives Offered
Baseline National	8% (2000)	0.9-1.8 days per week	N/A	N/A
Federal	6.6%	1.6 days per week	Federal Government	Telework Enhancement Act of 2007 including: • Dedicated telecommute manager; • Less stringent guidelines for eligibility; and • Increased training and education
New York – Long Island	10.5%[a]	1.6[c] days per week	Long Island Transportation Management	Grant Program for Telecommuting program design and implementation. $1,000 per employee with $100,000 max payout
New York – Westchester County	10.5%[a]	1.6[c] days per week	Smart Commute	Marketing and outreach including site visits and recommending telecommuting as TDM measure
New York – New York City	10.5%[a]	1.6[c] days per week	Commuter Link	Grant Program for TDM, including telecommuting, with graduated payment by size of employer and a $10,000 max payout
New York – Metro Connecticut and New York	15.4%[b]	1.6[c] days per week	MetroPool	Free Consulting
State of Connecticut	8.9%	1.79 days per week	Telecommute Connecticut!	Free Consulting State Tax Credit of $250 per employee (only available when a county is in a severe nonattainment area)
State of Washington	7-8%	1.4-2.5 days per week	Department of Transportation	Commute Trip Reduction Program mandates trip reduction Trip Reduction Performance Program buys annual reduced trips State Tax Credit of $60 per employee

Geography	Telecommuting Levels	Telecommuting Frequency	Program Administrator	Incentives Offered
Denver Metro Area, Colorado	N/A	1.84 days per week	Denver Regional Council of Governments	Marketing and outreach Free Consulting
Phoenix Metro Area, Arizona	5-13%	1.9-2.1 days per week	Valley Metro	Free Consulting Trip Reduction Program mandates trip reduction
Atlanta Metro Area, Georgia	N/A	2.46 days per week	Clean Air Campaign	Cash for Commuters pays commuters for not driving alone Commuter Prize pays commuters who use alternative mode most often Telework Leadership Initiative provides free consulting State Tax Credit of $1,200 per employee and $20,000 per employer

[a]Based on data from RT-HIS survey for entire city of New York.

[b]Based on data from RT-HIS survey for portion of Connecticut in the metro New York area.

[c]Based on data from RT-HIS survey for entire New York City metro area.

The data suggest that New York City already has higher than average telecommuting levels and frequency. As discussed in Section 4.0, however, the New York City survey used a somewhat more liberal definition of telecommuting than most other surveys. It also is possible that higher telecommuting levels could be a direct consequence of congestion levels and having an unusually high proportion of longer-distance commuters, as well as other demographic and economic factors.

The data also suggest, when compared with the existing toolbox of telecommuting incentives, that telecommuting incentives do not yet have a tangible demonstrable impact on telecommuting levels or frequency. This suggests that telecommuting is largely market driven and organic, meaning that employers and employees will decide to telecommute based on their own definitions of self-interest regardless of external incentives, assistance or mandates. Some programs have helped a small number of employers or employees adopt telecommuting, but the number of participants has not been large enough to make a measurable impact on work trips or VMT at the regional level.

4.0 Application to New York City

As discussed in Section 3.0, the New York City metro area already has some incentive programs in place for employers and employees including grant programs, outreach, and marketing. Table 4.1 provides a summary of TDM programs in the New York City metro area and provides a description of incentives that they offer.

Table 4.1 Summary of New York City Telecommuting Programs and Incentives Offered

Geography	Telecommuting Levels	Telecommuting Frequency	Program Administrator	Incentives Offered
Baseline National	5-8%	0.9-1.8 days per week	N/A	N/A
New York – Long Island	10.5%[a]	1.6[c] days per week	Long Island Transportation Management	Grant Program for Telecommuting program design and implementation. $1,000 per employee with $100,000 max payout
New York – Westchester County	10.5%[a]	1.6[c] days per week	Smart Commute	Marketing and outreach including site visits and recommending telecommuting as TDM measure
New York – New York City	10.5%[a]	1.6[c] days per week	Commuter Link	Grant Program for TDM, including telecommuting, with graduated payment by size of employer and a $10,000 max payout
New York – Metro Connecticut and New York	15.4%[b]	1.6[c] days per week	MetroPool	Free Consulting

[a]Based on data from RT-HIS survey for entire city of New York.

[b]Based on data from RT-HIS survey for portion of Connecticut in the metro New York area.

[c]Based on data from RT-HIS survey for entire New York City metro area.

Telecommuting levels in the New York metropolitan area are above the national range while the telecommuting frequency is within the national range. The RT-HIS data upon which the telecommuting levels and frequency are based include home-based workers, which are not included in the definition of telecommuting employed in this study. As a result, the levels reported for the New York City metro area are likely to be closer to the national range.

As a cross-reference of telecommuting levels, we can compare the Census "work at home" results. While the Census data both undercounts and over counts, to varying degrees, telecommuters (see Section 2.4 for a discussion of Census data) it provides a consistent definition with which to compare across geographic areas. Table 4.2 shows the comparison of New York Census levels of working at home to National levels of working at home. The results show that New York City and the nation have similar (4.0 percent compared to 3.9 percent) levels of working at home. This implies that data from the RT-HIS survey do, in fact, over estimate telecommuting levels in New York City compared to levels observed in other cities.

Table 4.2 Comparison of Census Data

Census Year	National Levels	New York City Levels
2000	3.3%	2.5%
2006	3.9%	4.0%

Source: U.S. Census.

The data show that levels of telecommuting are similar to those in the country as a whole. The national values represent those areas that offer telecommuting incentives as well as those that offer none. This result combined with the weak program participation in New York City Commuter Link telecommuting incentive program (Section 3.3) implies that these levels of telecommuting have not increased with incentive programs. Section 3.9 outlined other telecommuting incentive programs and their impact on telecommuting levels in other areas of the country. The results were similar. Areas that implement telecommuting incentive programs fail to have significantly higher than normal telecommuting levels, and no evidence is available to directly link telecommuting incentive programs to high rates of telecommuting.

This result suggests that telecommuting is primarily a market driven and organic force that could potentially take huge incentives to overcome. It implies that sea changes in type of work, technology, socioeconomic makeup, generation, and culture have a much larger impact than education and incentives such as free consulting assistance or tax credits.

4.1 Estimated Impact on VMT in the New York City CBD

Section 2.4 estimated that the ultimate potential for telecommuting levels in New York City ranges from 11.4 percent to 14.8 percent of all employees compared to the existing level of 10.5 percent. Combining these values with the existing telecommute frequency of 1.6 days per week in New York City, it is possible to define the transportation reductions on an average day, if this ultimate level of telecommuting could be achieved.

If 11.4 percent of all employees were to telecommute 1.6 days a week then 3.6 percent of all trips would be made by telecommuting on an average day [11.4 percent multiplied by (1.6 days per week divided by 5 days per week) equals 3.6 percent]. If 14.8 percent of all employees were to telecommute 1.6 days per week, then 4.7 percent of all trips would be made by telecommuting on an average day. Currently, 3.4 percent of all trips are reduced by telecommuting. The results of the two surveys, then, imply that telecommuting in New York City can be expected to impact traffic, as a percent of total commute trips, between 0.2 and 1.3 percent at best. Table 4.3 shows the potential reduction in VMT from additional telecommuting. Assuming that commute trips make up 27 percent of all VMT (per the 2001 National Household Travel Survey), this equates to a reduction of 1,500 to 10,000 daily VMT, or 0.03 to 0.21 percent of all VMT in the New York CBD.

Table 4.3 Potential Reduction in New York City VMT from Additional Telecommuting

Additional Telecommuting Potential	Total Daily VMT in New York City CBD		Reduction in Commute VMT from Telecommuting		Percent of All VMT Reduced
	Passenger Vehicle	Total	Percent	Daily VMT	
Low	2,864,000	4,749,000	0.2%	1,547	0.03%
High			1.3%	10,053	0.21%

Furthermore, experience from other areas suggests that public sector programs and incentives to encourage telecommuting have not had a significant impact on telecommuting levels. Most people and employers are aware of the possibility of telecommuting, but many have chosen not to implement it at this time for a variety of reasons. While levels of telecommuting are likely to increase in the future as technology improves and people become more comfortable with the concept, technical assistance and modest financial incentives have not been sufficient to overcome other barriers to telecommuting. Therefore, this study concludes that additional telecommuting programs offered by the City would not have a measurable impact on overall vehicle-trips or VMT within the New York CBD.

4.2 PROGRAM COSTS

The costs of a telecommuting outreach and incentive program could vary greatly depending upon the specific approach taken and level of utilization of incentives. Outreach and/or technical assistance activities to promote telecommuting and assist businesses with setting up programs could probably be done with one or two new program staff persons or equivalent consultant assistance on technical matters.

The public sector cost of tax or other fiscal incentives would depend on the amount of incentive provided, level of utilization, and also the extent to which existing telecommuters might be able to take advantage of the incentive (as opposed to only incremental new telecommuters). A program such as a tax credit for telecommuting could potentially be utilized by many people or employers, with no guarantee that people would be "new" telecommuters. Greater outreach to publicize the incentive would increase the likelihood that additional people would choose to telecommute to take advantage of the incentive, but also would increase costs associated with existing telecommuters using the incentive. An incentive specifically targeted towards encouraging new telecommuters – such as Atlanta's Cash for Commuters program – would have much more limited costs, and these costs would increase in direct proportion to the program's effectiveness.

5.0 Key Findings and Conclusions

Telecommuting is a promising congestion management strategy that has many benefits, but faces many significant barriers to acceptance. Telecommuting levels and frequencies throughout the country are remarkably similar regardless of whether or not an incentive program is in place.

Transportation demand management staff has long attempted to overcome the barriers to telecommuting participation by implementing various telecommuting incentive programs from simple education and marketing to prizes and tax incentives. The data suggest, however, that these incentive programs have not been successful. It seems as though telecommuting is driven more by underlying market forces, generational understanding, technology, the changing nature of work, and socioeconomic makeup than by the relatively marginal incentives offered to employers. Interestingly, even as technology expands to allow more telecommuting, it creates a world in which travel for meetings becomes more prevalent.

Even if telecommuting levels were to reach their upper bound, it does not seem likely that it would make a significant impact on congestion in New York City. Nevertheless, it may contribute to congestion management as one of a larger set of transportation demand management strategies.

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Congestion Mitigation Commission Technical Analysis

Night Delivery Incentives

technical

memorandum

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Table of Contents

List of Tables

List of Figures

Executive Summary

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

A possible approach to reduce congestion in New York is to target truck traffic. This document reviews previous experiences in utilizing incentives and regulations that aim to reduce truck traffic or shift deliveries to off-peak periods including costs, benefits, and lessons learned for New York City. The research also incorporates negative impacts for consideration, such as economic impacts on businesses and trucking companies. The case studies include the 2001 Value Pricing Initiative carried out by the Port Authority of New York and New Jersey, the 1997 commercial vehicle variable pricing initiative at the Tappan Zee Bridge, London's Congestion Pricing Program, the 1996 Atlanta Olympic Games, the Port of Los Angeles/Long Beach's PierPass Off-Peak program, and results from empirical research conducted in New York City.

Theses case studies suggest that commercial vehicles are not prone to shift their time of operations as a result of toll increases during the peak hours of the day. The main reason for this is that the receivers tend to dictate the time of delivery, and for the most part are open only during regular business hours. Accepting off-peak deliveries would require establishments to incur additional costs in terms of personnel, security, and utilities necessary to keep the business open. Hence, the success of any off-peak delivery program hinges on the receivers' willingness to accept it, which would require that they obtain economic benefits higher than the marginal costs incurred. Research shows that financial incentives for receivers such as tax deductions for employees working the off-peak shifts or reductions in shipping costs have a greater impact on the market for off-peak deliveries than just tolls. Programs targeting both carriers and receivers, such as the PierPass Off-Peak program, seem to have a better success rate than those targeting a single entity.

1.0 Introduction

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

According to Texas Transportation Institute's Urban Mobility Report, New York City ranks second in the nation in terms of annual delay. The majority of the delay is spent during the peak hour, with travelers experiencing 46 hours of annual delay (per traveler) in 2005, up from 34 hours in 2000, a 35 percent increase. This congestion costs the City and its residents over $7 billion in 2005, costing each peak traveler approximately $888.

By 2030, nearly a million more residents, 750,000 more jobs, and millions more visitors are expected to further strain the City's transportation system. The current system cannot handle the anticipated increase in traffic and meaningful infrastructure-based solutions are challenging, costly, and lengthy to implement. A comprehensive and innovative set of strategies must be implemented to make a profound change in travel behavior.

A possible approach to reducing congestion in New York is to target truck traffic, which has been increasing at a high rate over the last decade. New York City's bridges and tunnels handled 35.5 million trucks in 2006, a 31 percent increase over 1997 volumes; these facilities have experienced an annual increase of 2.7 percent, or 835,000 more trucks every year during that period.[1] This figure is expected to continue increasing at an even higher rate for the next 25 years.[2] A major factor is that trucks handle nearly 70 percent of the freight going to and from the New York City-Newark-Bridgeport statistical area. This market share is projected to increase to 76 percent by 2035, presenting a significant challenge given the available infrastructure.[3] Due to limited connections to the national rail network, New York City is unusually truck dependent as documented in NYMTC's Regional Freight Plan (June 2004) and the Cross Harbor Tunnel Draft

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[1] New York Metropolitan Transportation Council (MTA and PANYNJ facilities only), http://www.nymtc.org/data_services/TTV.html.

[2] Federal Highway Administration, Freight Analysis Framework 2 (FAF2). http://ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm.

[3] Ibid.

EIS (April 2004). In general, freight traffic is growing at higher rates than passenger vehicles, population, or general economic growth.[4]

A large portion of truck traffic in the City occurs during the peak hours of the day, exacerbating the City's congestion problems.[5] Hence, a potential source of relief could be to encourage truckers to shift their operations to off-peak hours (either nighttime or very early morning) through tolling. However this idea presents several challenges: Do truckers have the flexibility to shift the time of their operations? What level of toll rates would be required for carriers to consider this? Are businesses willing to accept deliveries and have their shipments picked up during off-hours? Are other incentives, in addition to or in lieu of tolls, required in order for both carriers and receivers to change their logistics patterns? What impacts will night-time truck traffic have on the city's residents? This document addresses these questions through the evaluation of similar cases in the United States and around the world, and studies other alternatives for addressing these issues.

This document consists of five sections:

- **Section 1.0** presents a definition of the problem at hand;
- **Section 2.0** provides an overview of case studies in the United States and around the world;
- **Section 3.0** discusses how these case studies might translate to New York City; and
- **Section 4.0** presents a summary of the key findings; and
- **Section 5.0** presents references and sources of additional information.

The document studies the idea of congestion pricing for trucks in addition to other alternatives implemented worldwide to understand the benefits and issues associated with each. Congestion pricing is the practice of charging motorists more to use a roadway, bridge, or tunnel during periods of the heaviest use. Its purpose is to reduce automobile use during periods of peak congestion, thereby easing traffic and encouraging commuters to walk, bike or take mass transit as an alternative. This is a powerful policy tool that has the potential to: reduce congestion and improve travel times; generate revenues that can be dedicated to improving the City's transportation infrastructure (roadways and transit facilities); and stem the amount of pollution spewed from tailpipes on City streets, helping the City reduce greenhouse gas emissions and achieving cleaner air.

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[4] *New York City Keeps Trucking – A Lot: A Study of Truck Traffic in NYC 1998-2007.* Office of Congressman Anthony D. Weiner. (http://www.house.gov/weiner/report38.htm).

[5] Ibid.

Most studies and implementations of congestion pricing thus far relate primarily to passenger traffic, which has proven to be more responsive to changes in tolls rates than commercial vehicles. Commercial vehicles present different challenges. Truck delivery and pickup logistics are much more complicated and require more planning and punctuality than passenger travel. Many truckers travel from all over the Northeast, East Coast, and points west to make deliveries into New York City, thus making it harder to change the entire logistics chain for a potential toll saving (generally not higher than $30 for large trucks). Nonetheless, there exists a potential pool of carriers who might be willing to alter their operations given the right circumstances.

The primary challenge is that truckers are not always in control of their schedule; they generally have to cater to the convenience of their customers, who for the most part operate during the peak hours of the day. Hence, a congestion pricing program would not be very effective for deterring a trucker from delivering supplies to an office that closes at 6:00 p.m. every day. However, it does have the potential of swaying local carriers who deliver goods to a 24-hour supermarket to do so during the nighttime or the early morning (before 6:00 a.m.). Further complicating the problem is the fact that there are many different types of trucking companies ranging from independent local owner/operators to large national carriers, to fleets owned and operated by single shippers. Decision-making within these organizations varies widely.

This document reviews other jurisdictions' experiences in utilizing incentives and regulations that aim to shift truck deliveries to off-peak periods including costs, benefits, and lessons learned for New York City. The research also incorporates negative impacts for consideration, such as economic impacts on businesses and trucking companies. The case studies include past experiences from New York's bridges and tunnels, London's Congestion Pricing Program, the 1996 Atlanta Olympic Games, private Port programs, and empirical research from New York City.

2.0 Case Studies

The following case studies cover previous experiences of programs and mandates implemented in the United States and around the world to reduce truck traffic or promote off-peak operations. The last two studies, the PANYNJ's 2001 Value Pricing Initiative in New York City and the Tappan Zee Bridge 1997 Variable Pricing Initiative for Commercial Vehicles, cover previous experiences with truck tolling in or around New York City and can shed light on the impacts that a similar program might have in New York City's central business district.

2.1 ATLANTA – 1996 OLYMPICS GAMES CASE STUDY

The challenge of transporting thousands of visitors while maintaining acceptable air quality led Atlanta city officials to aggressively implement a suite of transportation control measures during the 1996 Olympic Games.

Measures included increases in the quantity and frequency of transit services; outreach efforts to encourage voluntary shifts in normal business hours and increased telecommuting; and closure of the downtown to private automobile travel.[6] In addition, an outreach campaign was conducted to encourage commercial vehicles to voluntarily consolidate their deliveries and, as much as possible, shift them out of peak hours. This required the cooperation of private businesses (groceries, retailers, distribution centers, etc.), which had to adjust their hours of operation to receive off-peak deliveries.[7]

Traffic counts were collected at four locations through the metropolitan area to gauge the impact of the transportation control measures on traffic volumes. Weekday morning peak traffic counts decreased 22.5 percent from normal levels, while 24-hour traffic counts showed little change from pre-Game levels. Much of the reduction in peak-hour traffic can be attributed to heightened transit ridership, which increased 217 percent during the Games.[8]

In addition, surveys of employers in metropolitan Atlanta indicated that there was a widespread effort to adjust schedules around the Games, including

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[6] Cambridge Systematics, 2001. National Cooperative Highway Research Program Report 462: *Quantifying Air Quality and Other Benefits and Costs of Transportation Control Measures*. Transportation Research Board, Washington, D.C.

[7] Atlanta Regional Commission, 2007b. Personal communication, September 2007.

[8] Friedman, M., Powell, K., Hutwagner, L., Graham, L., Teague, G., 2001. *Impact of Changes in Transportation and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma*. Journal of the American Medical Association, 285: 897-905.

shifting of work hours; compression of the work week, and increased vacations.[9] There were no empirical studies of the impact specifically of truck delivery shifts on peak-hour traffic, given that this was just one of many changes in place during the Games.

However, anecdotal evidence from the freight industry indicates that shifts did occur. Most freight stakeholders appreciated having the opportunity to deliver during off-peak hours since it allowed them to improve their bottom line by reducing the costs associated with traveling during congested periods. Outside of the Olympics, they are forced to travel during congested periods to meet the delivery requirements of their customers.[10]

Off-peak deliveries are so attractive to the freight industry that they raised the issue during recent discussions surrounding Atlanta's Freight Mobility Plan, which is currently under development. The delivery industry, particularly Coca-Cola, which is headquartered in Atlanta, suggested that an Olympics-style campaign be conducted to encourage local businesses to accept off-peak deliveries. The possibility of piloting such a campaign in a limited section of the city is under discussion. It has been acknowledged that this type of pilot would require working with the diverse delivery needs of local businesses to make off-peak delivery possible. Some of these needs include just-in-time delivery (manufacturing sector); narrow delivery windows (grocery sector); and quick delivery of hot cement to construction sites within 3 hours of mixing (construction industry). More detailed needs are listed in Atlanta's Freight Mobility Plan Needs Assessment.[11]

2.2 Port of Los Angeles-Long Beach PierPass Off-Peak Program

Background

On July 29, 2005, the PierPass Off-Peak program was initiated. Under this program, all international container terminals in the Ports of Los Angeles and

[9] Cambridge Systematics, 2001. National Cooperative Highway Research Program Report 462: *Quantifying Air Quality and Other Benefits and Costs of Transportation Control Measures*. Transportation Research Board, Washington, D.C.

[10] Friedman, M., Powell, K., Hutwagner, L., Graham, L., Teague, G., 2001. *Impact of Changes in Transportation and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma*. Journal of the American Medical Association, 285: 897-905.

[11] Atlanta Regional Commission, 2007a. *Atlanta Regional Freight Mobility Plan: Draft Needs Assessment Section 7: Freight Operating Systems Profile.* http://www.atlantaregional.com/FreightMobility/files/Operating_Systems_Profile.pdf.

Long Beach established four new evening shifts per week (Monday through Thursday 6:00 p.m. to 3:00 a.m.) and one new weekend shift (Saturday 8:00 a.m. to 6:00 p.m.). As an incentive for trucks to use the new shifts, a traffic mitigation fee is now assessed for loaded containers moving through the terminal gates during the peak daytime shift between 8:00 a.m. and 5:00 p.m. on Mondays through Fridays. The original fee for the program was $40 per 20-foot equivalent unit (TEU), or $80 for the typical 40-foot container, it has been recently raised to $50 and $100. There is no fee for empty containers, chassis (a container trailer with no cargo container attached), or bobtails (a tractor, truck cab, without a trailer attached) moving through the gates at the Port. There is also no fee for containers that utilize the Alameda Corridor (a 20-mile roadway connecting the Ports of LA and LB to downtown Los Angeles) and already pay the Alameda Corridor Transportation Authority (ACTA) fee. The traffic mitigation fee is collected for all containers, and then refunded to those using the off-peak hours. The beneficial cargo owners (shippers, consignees, or their agents) are responsible for payment of the fee. Neither the trucking community nor the water carriers is assessed a fee under this program. The fees collected are used to cover the estimated $160 million annual cost of keeping the terminals open at night. The initial goal of the program was to shift 25 to 30 percent of the daily volume to off-peak periods.

PierPass is a special-purpose entity created by the marine terminal operators in the Ports of Los Angeles and Long Beach. PierPass is a nonprofit organization that will collect the fees and disburse them to the marine terminal operators within the Port. PierPass intends to sunset the fee after 2 or 3 years when 40 percent of the commerce through the Ports is expected to shift to nighttime operations. PierPass will be subject to an external audit, the results of which will be published for the trade community.

PierPass was initiated in large part as a response to proposed state legislation (California General Assembly Bill 2041) that included a "peak-hour surcharge" to cover the costs of extended terminal hours and infrastructure costs on nearby highways. Unlike the PierPass Off-Peak program, the program proposed by this bill would not have been managed by the Port, the terminal operators, or the shipper community.

Change in Port Gate Traffic

The Off-Peak program has been widely adopted by the shipper community. On its first day of operations, more than 1,000 port users registered for the program and over 7,500 containers were shipped during nighttime rather than daytime operations. On a typical day, more than 10,000 trucks use the new Off-Peak shifts. On January 6, 2006, PierPass announced that more than 1 million truck trips had been diverted from peak daytime traffic since the start of the Off-Peak program. And by May 2007, it was announced that the Off-Peak program had diverted more than 5 million truck trips from peak daytime traffic since the program's start in July 2005.[12]

The PierPass Off-Peak program has resulted in a substantial shift in port-related truck traffic. At the Port of Long Beach (according to traffic engineering staff at the Port), the percentage of port traffic that operated during daytime hours (8:00 a.m. to 6:00 p.m.) decreased from 90 percent before the Off-Peak program to 66 percent after the Off-Peak program (Table 2.1). Most of the shift in truck traffic occurred in trucks using nighttime operations rather than shifting to weekend operations. The nighttime weekday percent of truck traffic increased from 2 percent to 24 percent, while the percent of truck traffic on the weekends increased only slightly (7 percent to 10 percent). This shift to nighttime operations at the Port has held fairly constant over the life of the program. During the first week after the program began, daytime traffic dropped to 65 percent of total gate moves and held steady at between 63 percent and 66 percent of total gate moves through the middle of September 2005. As shown in Table 2.1, this percentage has held steady throughout the first 6 months of the program.

Table 2.1 Port of Long Beach Truck Traffic by Time Period

Time Period	Daytime Weekday Truck Traffic	Nighttime Weekday Truck Traffic	Weekend Truck Traffic	Total
1 – January 1, 2005 to July 23, 2005	90%	3%	7%	100%
2 – July 24, 2005 to December 31, 2005	66%	24%	10%	100%

Source: Port of Long Beach Transportation Planning.

Note: Excludes data for Matson/Pier A Port of Long Beach with service to Hawaii.

The Off-Peak program is well ahead of its targets. When launched, PierPass set its goal to shift 15 percent to 20 percent of all cargo movement to Off-Peak shifts by the end of the first full year of operation, and 30 percent to 35 percent by the end of the second year. The Off-Peak program reported it reached its two-year goal in just two months.

Change in I-710 Traffic

Changes in truck traffic at the port gates impact truck activity on the I-710 freeway. Data from a California Department of Transportation (Caltrans) classification count station on I-710 at the Pacific Coast Highway were used to estimate the change in truck activity resulting from the Off-Peak program. Data

[12] PierPass Program Official Web Site. http://www.pierpass.org/press_room/releases/?id=52.

were compared for the first two weeks in May 2005 with the first two full weeks in February 2006. Table 2.2 shows the distribution of truck trips by time period for each of these two months. Most notable in this data summary is the noticeable increase in the amount of truck traffic in the late night period (7:00 p.m. to 6:00 a.m.). In the northbound direction, the percent trucks in nighttime traffic increased from 16.7 percent to 27 percent. In the southbound direction, the percent of trucks in nighttime increased from 17.4 percent to 28 percent. Slight decreases in truck traffic are evident during both the morning commute peak period (6:00 a.m. to 9:00 a.m.) in the southbound direction, and in the evening commute peak period (3:00 p.m. to 7:00 p.m.) in the northbound direction. Midday truck traffic has decreased substantially in both directions.

Table 2.2 I-710 Distribution of Class 9 to 14 Trucks by Time Period

Northbound			Southbound		
Time Period	May 2005	February 2006	Time Period	May 2005	February 2006
6 a.m. – 9 a.m.	15.2%	12.2%	6 a.m. – 9 a.m.	12.2%	12.0%
9 a.m. – 3 p.m.	51.4%	44.8%	9 a.m. – 3 p.m.	52.1%	44.2%
3 p.m. – 7 p.m.	16.7%	16.0%	3 p.m. – 7 p.m.	18.3%	15.8%
7 p.m. – 6 a.m.	16.7%	27.0%	7 p.m. – 6 a.m.	17.4%	28.0%
Total	100.00%	100.00%	Total	100.00%	100.00%
8 a.m. – 6 p.m.	72.9%	63.8%	8 a.m. – 6 p.m.	72.1%	62.0%
6 p.m. – 8 a.m.	27.1%	36.2%	6 p.m. – 8 a.m.	27.9%	38.0%
Total	100.00%	100.00%	Total	100.00%	100.00%

Source: Caltrans.

The data also indicate that there has been a slight increase in the amount of trucks during the weekend time periods. Table 2.3 shows that the number of trucks on Saturday and Sunday increased from 60,744 trucks to 63,142 trucks from May 2005 to February 2006 on I-710. This is a 3.8 percent increase compared to a 1.9 percent increase in the total volume of trucks Class 9 to 14 on the weekdays during the same time period.

Table 2.3 I-710 Weekend Trucks

Month	SB	NB	Total
May 2005	29,579	31,165	60,744
February 2006	32,961	30,181	63,142

Source: Caltrans.

Tables 2.4 and 2.5 show the hourly distribution of trucks within the full daytime period of 6:00 a.m. to 8:00 p.m., along with the change in the percentage of truck traffic by period. The third column in these tables reflects the effective percentage change in truck traffic for that hour, adjusting for overall growth in truck traffic. Both of these tables show fairly significant reductions in hourly truck volumes for the morning commute peak, midday, and the early part of the evening commute peak. However, the tables also show that for some hours of the evening commute peak, particularly in the northbound direction, traffic has actually increased, suggesting a preference by shippers for extending their pickup and deliveries at the Port into the early part of the Off-Peak period. Potentially, appointment systems could be used to smooth this trend and realize even greater congestion reduction benefits from the Off-Peak program. Under this type of program truckers would have to set up a pick-up/drop-off timeslot ahead of time (by Internet or by phone); this would allow the port to cap the number of transactions in a particular hour to avoid peak times in lieu of smoother operations throughout the off-peak hours. However, at this time no such appointment system is contemplated.

Table 2.4 I-710 Hourly Change in Class 9-14 Truck Traffic (Southbound)

Hour	May 2005	February 2006	Change
6 a.m.	3.5%	2.6%	-26.3%
7 a.m.	4.5%	3.5%	-20.6%
8 a.m.	7.2%	6.1%	-15.6%
9 a.m.	10.3%	8.0%	-22.0%
10 a.m.	9.8%	8.1%	-17.2%
11 a.m.	9.7%	8.5%	-12.1%
12 p.m.	7.0%	6.3%	-10.0%
1 p.m.	6.5%	6.4%	-1.3%
2 p.m.	8.0%	7.3%	-7.8%
3 p.m.	6.2%	5.7%	-7.9%
4 p.m.	5.1%	4.6%	-9.9%
5 p.m.	3.1%	2.7%	-13.9%
6 p.m.	2.4%	3.1%	28.1%
7 p.m.	2.1%	4.2%	97.3%
Total	85.4%	77.2%	-8.2%

Source: Caltrans.

Table 2.5 I-710 Hourly Change in Class 9-14 Truck Traffic (Northbound)

Hour	May 2005	February 2006	Change
6 a.m.	3.4%	2.8%	-17.1%
7 a.m.	4.2%	3.8%	-10.8%
8 a.m.	4.6%	5.4%	17.4%
9 a.m.	7.2%	7.2%	0.1%
10 a.m.	9.1%	8.1%	-10.6%
11 a.m.	9.5%	8.0%	-16.2%
12 p.m.	9.4%	7.8%	-16.5%
1 p.m.	8.8%	7.0%	-20.3%
2 p.m.	8.0%	6.0%	-25.0%
3 p.m.	6.6%	4.8%	-27.6%
4 p.m.	5.3%	3.8%	-28.5%
5 p.m.	3.5%	3.8%	8.6%
6 p.m.	2.9%	3.4%	18.6%
7 p.m.	2.4%	3.2%	33.6%
Total	85.0%	75.2%	-9.8%

Source: Caltrans.

Operational Impacts

Information on the operational impacts of the Off-Peak program has come from numerous sources. The Off-Peak program has been credited with more smoothly flowing shipments through the Ports during the peak autumn shipping period. This allowed retailers to keep their shelves well-stocked during the critical holiday shopping season. Prior to the introduction of Off-Peak, a surge of imports created bottlenecks at the port complex just before Christmas in 2004. This led some importers to threaten to bypass the Ports and take their business elsewhere if the situation failed to improve. At the height of the 2005 season for containerized goods arriving from Asia, the Port of Long Beach was not experiencing any significant congestion, according to Don Snyder, Director of Trade and Maritime Services.

Bruce Wargo, General Manager of PierPass, believes that the PierPass program is popular with low-margin exporters such as those that ship wastepaper, and with high-volume importers who own distribution centers that already stay open at night.

In a PierPass survey in September 2005, 73 percent of truck drivers serving importers and exporters said they have experienced an improvement in traffic since the program's launch and 58 percent reported being able to accommodate more cargo trips. However, according to the same survey, many drivers reported that shorter waiting times at the port had not materialized. It is suspected that much of this has to do with staffing issues during the Off-Peak shifts.

The costs of the Off-Peak program are slowly making their way through the cargo supply chain. According to the Fracht web site, a logistics company based in Australia, the extra costs of the PierPass Traffic Mitigation Fee have affected Less-than-Container-Load (LCL) rates from the United States to Australia in the form of a U.S. $3.00 PierPass Fee per shipment. Another company, TNT Freight Management, has set up a line of credit for the Off-Peak program by advancing charges for additional administration, plus the monitoring of clearance. The cost associated with performing these functions is $25.00 per Full Container Load (FCL). These charges are passed on to the account of the paying party.

Community Reactions

Before the beginning of the Off-Peak program, PierPass reached out to community stakeholders to explain the program and its expected changes to traffic patterns and air quality. The outreach team made presentations to Los Angeles and Long Beach City Council members, the I-710 Freeway Oversight Committee, the San Pedro Chamber of Commerce, the Harbor City/Harbor Gateway Chamber of Commerce, the Coolidge Triangle Neighborhood Association, the DeForest Park Neighborhood Association, and many others. Also, because PierPass is a first-of-its-kind program, it was widely advertised both before and during its implementation. Reactions to these presentations and publicity around the region have generally been positive.

One neighborhood group has vocally opposed the shift to nighttime operations. In a letter to the Long Beach (LB) Harbor Commission, PierPass executives and locally elected officials, amplified by a press release and a newly launched web site (www.polb.org, “People of Long Beach”), North Long Beach’s Coolidge Triangle neighborhood insisted that the Ports of Long Beach and Los Angeles stop the PierPass Off-Peak program until an Environmental Impact Report is prepared and circulated to impacted communities and health and noise impacts are mitigated. The neighborhood group noted that while nighttime operations would reduce congestion, the forecasted increase in Port of Long Beach traffic would mean that the number of trucks during the daytime would still increase. Therefore, the residents of the neighborhood would still have to fight truck traffic during the day, and they would be exposed to significantly increased air pollution and noise during nighttime operations.

Another issue, which although not currently being raised by neighborhood groups has been noted in public meetings, is the longer-term potential for nighttime traffic to increase to unacceptable levels as overall port traffic grows. Cambridge Systematics recently completed a study funded by the Ports of Long Beach and Los Angeles to look at various options for truck trip reductions at the ports. One of the investigated strategies involved an extended gate hour program with a shift distribution similar to the current shift distribution under the Off-Peak program.

There also are trucking interests that do not have favorable impressions of the Off-Peak program. The Teamsters are opposed to the fee based on their belief that it will further squeeze revenues available for paying truck drivers, thereby causing their real incomes to fall. They are concerned that the truckers will get even more hours of work and less pay for the extra hours. Another concern is that the truckers will have to be available at the whim of the steamship lines and trucking company dispatchers to work any and all hours of the night or day and weekends. Some in the trucking industry believe that unlike other unionized port workers, truckers (who generally are not unionized at the ports) will not receive shift premiums or overtime pay for extended and off-peak hours of work.

2.3 LONDON CONGESTION PRICING

Background

Since February 17, 2003 motorists driving in central London on weekdays between 7:00 a.m. and 6:30 p.m. were required to pay £5 (approximately U.S. $10); this fee increased to £8 (U.S. $16) in July 2005. This fee is applied equally to passenger vehicles and trucks. There are some exemptions, including motorcycles, licensed taxis, vehicles used by disabled people, some alternative fuel vehicles, buses, and emergency vehicles. Area residents receive a 90 percent discount for their vehicles. The charging area is indicated by roadside signs and symbols painted on the roadway.[13]

Payments can be made at selected retail outlets, payment machines located in the area, by Internet and cellular telephone messaging, any time during that day. Motorists can purchase weekly, monthly, and annual passes with modest (15 percent) discounts. A network of video cameras records the license plate numbers of vehicles and matches it with the paid list. The owners of vehicles that have not paid as required are sent a $160 fine. This fine is reduced to $80 if paid within two weeks, and increases to $240 if not paid after a month – the same policy for parking penalties in the inner London area.[14]

Impact on Traffic

Just over a million people enter central London during a typical weekday morning peak (7:00 – 10:00 a.m.). Over 85 percent of these trips are by public transport. Prior to the congestion pricing program about 12 percent of peak-

[13] Victoria Transport Policy Institute, http://www.vtpi.org/london.pdf.

[14] Ibid.

period trips were by private automobile.[15] During the program's first year traffic entering the charge zone decreased by 14 percent, a reduction of approximately 54,000 vehicles per day (including personal and commercial vehicles).

A large portion of people who changed their travel patterns as a direct result of the new pricing scheme switched to public transportation to enter the City, particularly bus. Others changed their travel time or route in response to the charge, particularly those who drove through the City's streets to get to their destination, while a minority shifted mode to taxis, motorcycles, bicycles, or to walking.[16]

As a result traffic speeds in the charge zone have increased considerably. Average traffic speed during charging days (including time stopped at intersections) increased 37 percent, from 8 miles per hour prior to the charge up to 11 miles per hour after pricing was introduced. Peak period congestion delays declined about 30 percent, and bus congestion delays declined 50 percent. Bus ridership increased 14 percent and subway ridership about 1 percent.[17]

Impact on Truck Traffic

While the primary focus of this program was to reduce passenger vehicle traffic entering and traversing the City's streets, the program has also experienced success in deterring truckers from traveling to and within the charge zone. The impact was felt primarily during the program's first two years (2003 and 2004); however truck traffic started to pick up in the subsequent two years (2005 and 2006) due to natural economic growth. During the first year of operation truck traffic entering the charge zone decreased by 11 percent followed by a 5 percent decrease on the second year, a 4 percent decrease on the third, and an increase of 6 percent from 2005 to 2006. Truck-miles traveled within the charge zone decreased the first two years by 8 percent and 7 percent, however miles increased in 2005 with an 8 percent increase followed by a 2 percent increase the following year. By 2006 the volume of trucks entering the region had decreased by 13 percent (roughly 2,000 trucks annually) since the program's inception, and the number of truck-miles traveled has experienced a net decrease of approximately 7 percent (3,000 truck-miles annually).

The recent increase in truck VMT is likely the result of economic growth, the natural growth in demand for freight goods, and/or an increase in productivity by the freight carriers. As Table 2.6 shows, trucks entering the region decreased by 13 percent while the miles covered by trucks decreased by half that amount,

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[15] Ibid.

[16] Transport for London. Fifth Annual Impacts Monitoring Results. http://www.tfl.gov.uk/assets/downloads/fifth-annual-impacts-monitoring-report-2007-07-07.pdf.

[17] Ibid.

7 percent. This suggests that fewer trucks are on the road and those trucks are making more stops along their routes into the City, indicating that the carriers have found a way to make their truck trips more efficient. In summary, the decrease in truck traffic is apparent at entry points and within the zone.

Table 2.6 Impact of Congestion Pricing Program on Truck Traffic

Concept	2002-2003	2003-2004	2004-2005	2005-2006	2002-2006
Trucks Entering the Charge Zone	-11%	-5%	-4%	6%	-13%
Truck-Miles within the Charge Zone	-7%	-8%	8%	2%	-7%

Source: Transport for London.

This apparent increase in productivity coupled with the natural growth in freight demand (from increases in population and demand for goods purchased over the Internet) could potentially nullify the benefits reaped during the initial years of the project. More time and data is needed to analyze how truckers will adapt in the coming years and fully evaluate the impact of this program on the commercial sector.

2.4 PANYNJ'S 2001 VALUE PRICING INITIATIVE IN NEW YORK CITY[18]

In March 2001 the Port Authority of New York and New Jersey (PANYNJ) introduced a time of day pricing initiative throughout its six facilities which bring traffic into New York City (the George Washington Bridge, Lincoln Tunnel, Holland Tunnel, Bayonne Bridge, Goethals Bridge, and Outerbridge Crossing). These facilities are depicted in Figure 2.1. The program was aimed to help finance the PANYNJ's capital budget and to reduce inbound traffic during the peak hours of the day (6:00 – 9:00 a.m. and 4:00 – 7:00 p.m. on weekdays).

The discounts were made available only to E-ZPass customers traveling during off-peak hours. As shown in Table 2.7, passenger car customers would save $1.00 for shifting to the off-peak hours, while truckers would save $1.00 per axle, and $2.50 if they moved to overnight hours.

[18] Holguín-Veras, J., Q. Wang, N. Xu, K. Ozbay, M. Cetin, J. Polimeni, 2005. *The impacts of time of day pricing on the behavior of freight carriers in a congested urban area: Implications to road pricing.* Transportation Research Part A, 40 (2006), pp. 744-766.

Figure 2.1 PANYNJ Toll Facilities

Source: Holguín-Veras, et al., 2005.

Table 2.7 Toll Rates before and after Value Pricing Initiative

Vehicle Type	Hour	Before	After
Passenger Car	Peak	$3.60	$5.00
Passenger Car	Off-Peak	$3.60	$4.00
Truck	Peak	$3.60 per axle	$6.00 per axle
Truck	Off-Peak	$3.60 per axle	$5.00 per axle
Truck	Overnight	$3.60 per axle	$3.50 per axle

When the program was introduced, toll rates also were increased, which led to some confusion for the public. In fact, only 25 percent of surveyed commercial vehicle drivers understood the time-of-day discounts that were available to them through E-ZPass. The lack of understanding coupled with the small cost savings was not effective for changing users' behaviors. Furthermore, over 60 percent of the carriers said that they did not have the flexibility to change their schedule to the off-peak hours because the customer would not allow it. Fifteen percent mentioned that the cost from the tolls was passed on to the customers.

Approximately 20 percent of respondents indicated that they changed their operations due to the toll increase/congestion pricing. Out of this group, a small portion (14 percent, representing 2.8 percent of the total sample) stopped using the facilities altogether given the increase in toll rates and other costs of doing business in New York City. Some of the specified operational changes included: switching to E-ZPass or increasing its use, increasing shipping charges to customers in order to offset the toll, and adjusting the delivery route. Approximately 6.2 percent of carriers decreased their usage of the facilities, and a very small portion (0.5 percent) switched to the off-peak hours. Finally, as was the case with the London example, a large portion of the users that decreased their use of the PANYNJ facilities reported making productivity adjustments to deal with the new price. These adjustments included longer travel times during a trip, more stops, and increased shipment size.

In summary, most users did not just change one aspect of their operation to deal with pricing, but rather used a combination of modifications including productivity increases, change in facility usage, and cost transfers. It is important to note that none of the carriers that changed behavior did so by simply decreasing usage of the facility or shifting to off-peak hours. Instead this behavior was combined with productivity increases to offset the costs. The research suggests that 42.79 percent of the strategies affected only the carriers, 32.66 percent of the strategies primarily impacted the receivers, while the remaining 24.55 percent of the strategies involved both parties.

2.5 Tappan Zee Bridge 1997 Variable Pricing Initiative for Commercial Vehicles

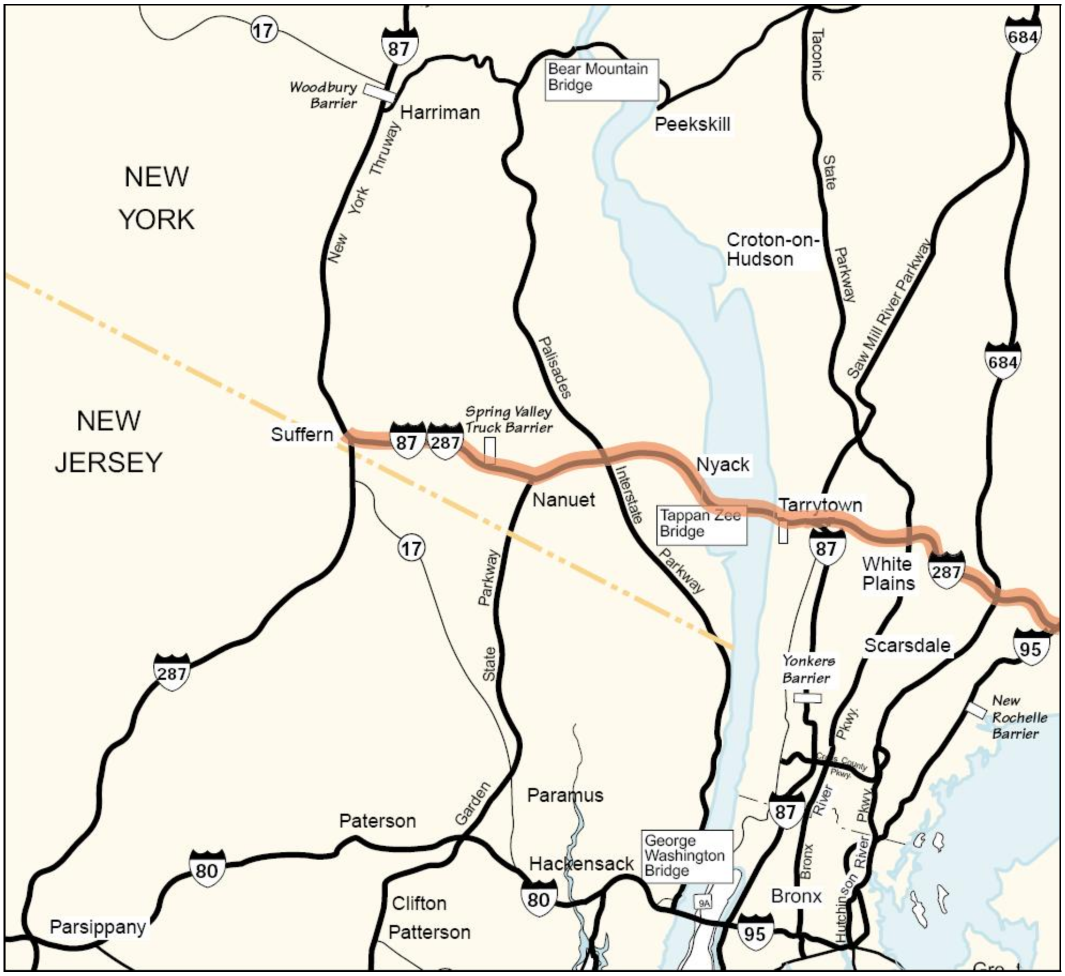
The information for this case study is based on the findings of a financial audit conducted by State of New York's Office of the State Comptroller, Division of Management Audit and State Financial Services. The study aimed to evaluate the economic and operational impact of the 1997 Congestion Relief Initiative. [19]

The Tappan Zee Corridor is the 15-mile section of the New York State Thruway between Suffern in Rockland County and Elmsford in Westchester County which includes the Tappan Zee Bridge (see Figure 2.2). The Corridor is the most heavily traveled section on the Thruway, carrying as many as 125,000 vehicles per day. One-way peak traffic on the Bridge can be more than 7,000 vehicles per hour during workday morning commuting hours. An extension in 1993 of I-287,

[19] New Cork State Thruway Authority's Tappan Zee Corridor Congestion Relief Initiative. Report 98-S-58. http://www.osc.state.ny.us/audits/audits/9899/98s58.pdf.

which now serves as a beltway around New York City for East Coast travelers, led to an increase in traffic – especially commercial traffic – and contributed to the overall traffic congestion in the Corridor. In fact, from 1993 to 1996 total commercial traffic at the Bridge Toll Plaza increased by 70 percent.

Figure 2.2 Map of Tappan Zee Corridor and Tappan Zee Bridge



Source: Governor's I-287 Task Force – Long-Term Needs Assessment and Alternatives Analysis for the I-287 Tappan Zee Bridge Corridor.

The Spring Valley Toll Barrier (Barrier) is located nine miles northwest of the Bridge. Rockland County residents had complained for years about paying Barrier tolls; area residents use the Thruway as a local highway because there are few alternative routes that allow quick access across the county. Prior to July 15, 1997, Barrier tolls (collected from both northbound and southbound travelers) were 40 cents for passenger vehicles, and from 50 cents to $1.50, depending on vehicle class, for commercial vehicles. Residents also complained about increased traffic, which affects quality of life, air pollution, noise, and safety issues in the Corridor. In calendar year 1996, 27 million vehicles, including 24 million passenger vehicles, crossed this facility. To address the congestion and other traffic-related issues, the Authority's Board of Directors approved the Tappan Zee Corridor Congestion Relief Initiative (Initiative), which was implemented on July 15, 1997. The Initiative resulted in closing the Barrier as a toll station for all but northbound commercial traffic, and in raising Bridge and Barrier tolls for certain vehicles and for certain travel times. A major goal of the Initiative was to decrease Corridor congestion, particularly at the Barrier, and thus reduce noise, air pollution, and safety concerns. The Initiative was also intended to discourage commercial traffic on the Bridge, especially during peak periods.

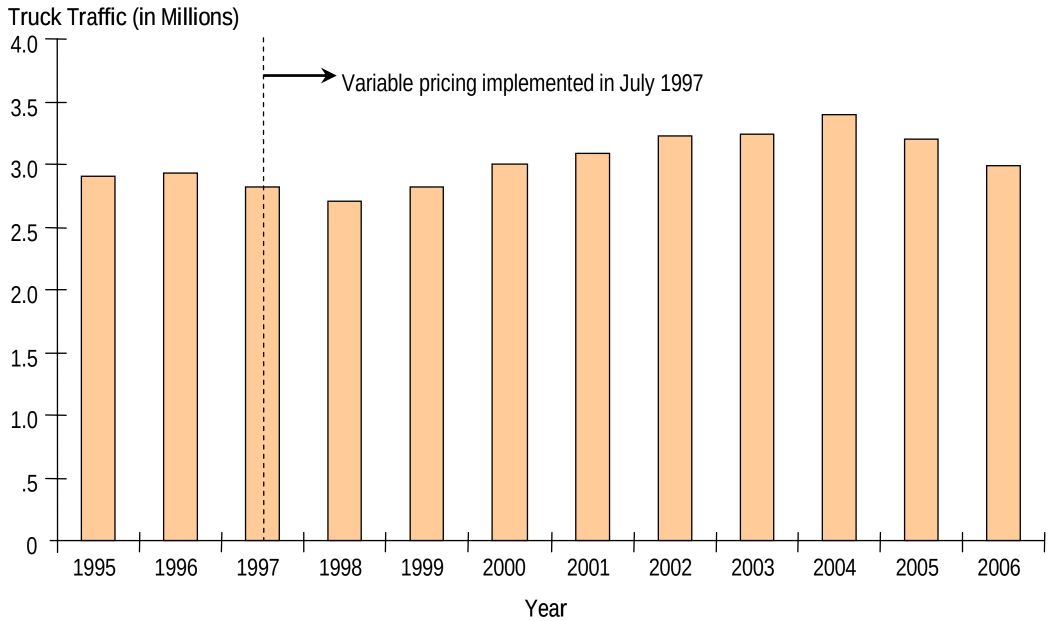
- **Removal of the Southbound Barrier –** All southbound traffic maintains travel at highway speed. Toll charges are eliminated for all passenger and commercial southbound traffic.
- **Conversion of the Northbound Barrier –** Only northbound commercial vehicles are required to stop and pay a toll at the Barrier. Since there is no longer a southbound toll, the northbound toll is doubled so that commercial vehicles pay the equivalent of a round trip toll. Thus, during off-peak hours, E-ZPass customers pay $1.00 to $3.00 (double the prior commercial rate); cash and charge-card customers pay double the E-ZPass rate ($2.00 to $6.00) at all times.
- **Increase of Bridge Tolls –** Tolls continue to be collected from southbound traffic only. As at the Barrier, the prior commercial Bridge toll ($3.75 to $10.00) is now the E-ZPass commercial rate; cash and charge-card commercial customers pay double the E-ZPass rate ($7.50 to $20.00) at all times. The noncommuting passenger vehicle toll increased from $2.50 to $3.00 per trip. The E-ZPass carpool and commuter rates (50 cents and $1.00, respectively) did not change.
- **Congestion/Incentive Pricing for Commercial Vehicles –** During the busiest peak times at the Bridge (between 7:00 a.m. and 9:00 a.m.) and the Barrier (between 4:00 p.m. and 6:00 p.m.), E-ZPass commercial customers pay double the standard E-ZPass rate. The higher rates decrease to standard E-ZPass rates during the hour before and the hour after the busiest peak times.

To summarize, commercial vehicles using cash or charge cards pay twice the E-ZPass rate 24 hours a day, while those using E-ZPass pay higher rates only during rush hours. Congestion/Incentive pricing is intended to encourage truckers to convert to E-ZPass (Authority traffic data shows that E-ZPass traffic lanes move faster), and to discourage them from traveling during peak hours.

As a result of the initiative, commercial traffic on the Bridge during this period decreased by 8.2 percent, dropping from 1.47 million recorded trips in the Pre-Initiative year to 1.35 million recorded trips in the Post-Initiative year (see Figure 2.3; note that these figures represent one-way traffic only since toll is only charge in one direction). These results were significant for the first year; however, as shown in Figure 2.3, traffic volumes quickly rebounded to pre-initiative volumes in 1999, and continued increasing for the next five years.

Furthermore, passenger car volumes increased from the pre to the post initiative period by over 200,000 (compared to the truck decrease of 120,000); whether or not these are related is not known, but the net impact of the initiative was nearly insignificant.

Figure 2.3 Truck Traffic at the Tappan Zee Bridge before and after Variable Pricing Implementation



Source: NYMTC Truck Toll Volume Trends (1999-2006) and the New York State Thruway Authority (1995-1998).

Note: Data for 1995-1998 was provided for one-way traffic only while the remaining data is for two-way traffic. In order to graph these together, the traffic volumes from 1995-1998 were multiplied by two. While this is not 100 percent accurate, the graph still shows the general trend with increasing truck traffic volumes after 1998, and a slight decrease after the implementation of the initiative in 1997.

One of the main goals of the Initiative was to discourage commercial traffic in the Corridor during peak travel periods. However, data maintained by the Thruway Authority reveals that commercial traffic volume at the Bridge during the morning peak period actually increased after the implementation. The results are based on a comparison of a six-month period prior to the Initiative (January 1, 1997 through June 30, 1997) to that of the same period in the subsequent year (January 1, 1998 through June 30, 1998).

It was found that, while overall commercial traffic did decrease, the percentage of commercial vehicles that cross the Bridge during peak hours actually increased slightly. In the period before the Initiative, 18 percent of the 773,000 commercial vehicles that crossed the Bridge did so during the four-hour peak period (6:00 a.m. to 10:00 a.m.); in the period after, 20 percent of 712,000 commercial vehicles crossed the Bridge during the peak hours.

To determine whether this pattern was continuing at the Bridge, the study by the Comptroller's Office also compared peak-hour commercial traffic volume during the first three months of the Initiative (July 1, 1997 through September 30, 1997) to the same three-month period in 1998. It was found that commercial traffic had increased by 1 percent (3,000 trips) overall, but by 8 percent (5,000 vehicles) during the four-hour peak period. These statistics indicate that commercial peak-hour volume is not decreasing.

The study indicated that among the reasons commercial traffic on the Bridge has not declined as expected are that commercial truckers may not have enough incentive, or enough schedule flexibility, to change their travel times to avoid peak hours, or to change their travel patterns to use other routes. In addition, truckers who continue to pay by cash, or who cross the Bridge during peak hours, may not know about congestion pricing. In fact, an Authority survey conducted in November 1997 and another survey done in the summer of 1998 showed that many commercial truckers were still unaware of the congestion pricing policy.

2.6 Lessons Learned from Case Studies

The case studies presented here provide several important lessons for any future off-peak delivery program. In particular, it seems clear that tolls are not likely to have a significant impact on the time of operations for truckers. The reasons for this are that current programs may not provide enough incentive for truckers to shift, truckers do not have enough schedule flexibility to change their travel times to avoid peak hours (receivers tend to control delivery times), and in general truckers do not have the flexibility or incentive to change their travel patterns to use other routes. The following key points can be drawn from these cases:

- Truck tolls of even $20 (Tappan Zee Bridge) or $6 per axle (PANYNJ) do not have a significant impact on truckers' operations in New York. The main reaction from truckers to these initiatives was to switch to or increase the use of E-ZPass at the toll facilities. While the price increase did cause a significant decrease in traffic at the Tappan Zee Bridge in the first year, truck volumes quickly bounced back and continued increasing in the subsequent years. Similar results were experienced with the PANYNJ's Initiative.
- The London Program did manage to reduce tuck traffic entering the region by 13 percent since its inception, however truck miles traveled within the region decreased by only half that amount (7 percent). These numbers agree with the findings from the PANYNJ survey, which indicated that some truckers deal with toll increases by increasing productivity (e.g., increasing payload and the number of stops on their trip).
- Freight carriers seem to be interested in the idea of doing business during the off-peak hours; however they are constrained by the demands of their

customers, the receivers. The receivers, generally, are constrained from doing business during the off-peak because of the cost and inconvenience of having their business open to receive deliveries during that time.

- Programs that provide incentives for carriers and receivers/shippers such as the PierPass Off-Peak program have the potential to achieve greater success than programs targeting just the shippers. This program provided financial incentives to shippers for doing business during the nighttime period ($40 per TEU, $80 for the typical container) as well as the potential for time savings for the truckers (both on the highways and at the port).
- Outreach is very important for these programs to be successful. Even though it is an extraordinary situation, the success in the reduction of peak-hour traffic during Atlanta's Olympic Games is based almost solely on the outreach program conducted prior to the event. On the other hand, a large portion of truckers surveyed after the Tappan Zee and the PANYNJ initiatives were not aware that congestion pricing programs were in place, limiting the possible impacts.

3.0 Application to New York City

The case studies covered in Section 2.0 talk about different situations in which off-peak delivery programs were implemented or researched in public and private environments. This section discusses how the findings from these case studies apply to New York City conditions today. A snapshot of the local trucking environment is provided along with findings from research investigating alternative nighttime delivery policies and incentives in New York City. Section 3.2 also covers several implications that need to be considered when discussing off-peak delivery programs for New York City.

3.1 Trucking Environment and Regulations in New York City

New York City regulations define a truck as any vehicle or combination of vehicles designed for the transportation of property, which has either of the following characteristics: two axles with six tires, or three or more axles. The City has numerous regulations that restrict local and through trucks to designated truck routes, and limit the sections where they may enter, stop, stand, or park.

Through trucks are limited to a handful of roadways, and may not use some of the main arteries such as 34th Street between the Queens Midtown Tunnel and Dyer Avenue during times of the day with heavy traffic (11:00 a.m. and 6:00 p.m.). Local truckers must always carry a bill of lading, or similar document, showing the points of origin and destination of the trip and are required to stay within the designated truck routes. For deliveries outside the truck routes, operators must leave a designated truck route at the intersection that is nearest to his or her destination, proceed by the most direct route, and then return to the nearest designated truck route using the most direct route.

Several zones within Manhattan have stricter restrictions on truck traffic. Chelsea, Chinatown, Greenwich Village, Little Italy, Lower East Village, and the Garment District have special considerations limiting the access of trucks with the purpose of making deliveries or pick-ups in those zones, and limits them to designated roads. The Financial District and the Midtown Core (from 7th Avenue and 42nd Street to 3rd Avenue and 59th Street) prohibit trucks longer than 33 feet. See Figure 3.1 below for the designated truck routes (in blue) and the limited truck zones.

These regulations, coupled with the volume of traffic in Manhattan and many of the narrow streets in the central business district, limit the truck traffic in that region to primarily medium to small delivery trucks.

Figure 3.1 Designated Truck Routes in Manhattan

Source: New York City Department of Transportation.

3.2 Night-time Deliveries Implications for New York City

Several implications need to be considered when discussing programs for off-peak deliveries in New York City. While such a program might be successful at shifting truck traffic to the off-peak, it could in turn generate negative impacts that might negate the benefits. These may include night-time traffic and noise, increase in goods prices in the City, and increased congestion during the beginning of the off-peak hours. This section briefly discusses these issues and how they might affect Manhattan.

- **Do we really want deliveries during the night-time?**

  The noise and truck traffic associated with night-time deliveries would likely be unwelcomed by Manhattan residents. Consider the case of perishables (such as fruits and vegetables) being transported from the Hunts Point Food Distribution Center in the Bronx to different sectors throughout Manhattan. Deliveries usually originate during the early morning (6 AM) and recur several times throughout the day. A complete shift to the off-peak would likely imply truck deliveries as early as 2 AM to supermarkets and other grocery retailers in Manhattan. Deliveries at this time would be required in order for trucks to make 5-6 stops and be out of Manhattan before the start of the peak hour (6 AM). The first delivery would take place at around 2 AM and the last somewhere around 5-6 in the morning.

  An environmental study would need to be conducted to get a clear idea of the noise levels that such traffic would generate, but given the volume of business being conducted out of this location (the Bronx Terminal Market generates over $1.5 billion in revenue annually, more than any other terminal market in the world)[20] it would stand to reason that it would be very significant. This is just one example of how such a policy/program would impact deliveries into Manhattan.

- **If total buy-in to an off-peak program is not achieved, the result might be more truck traffic than before.**

  One key factor that needs to be considered is the level of buy-in from receivers for an off-peak delivery program. Consider for example the case of a truck delivering goods to five restaurants in Manhattan. Assume that given a number of financial incentives, three of these restaurants opt to start accepting deliveries during the night-time, but the other two decide against it. As a result that truck will likely go into Manhattan during the day-time to make two deliveries, and then come back at night to make the remaining

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[20] New York City Terminal Produce Co-Operative Market. http://www.terminalmarkets.com/huntspoint.htm

three, in the end creating more traffic and congestion than with no program at all. In the long-run the market may reorganize itself so that individual truckers only do deliveries during the daytime or night-time but there is no guarantee of this, and in the meantime the results might be the opposite of the program's goal.

- **Economic impact would reverberate throughout the City.**

  If a policy is implemented in Manhattan that would force carriers to make deliveries during the off-peak hours (6PM – 6AM), the Borough's residents might stand to lose more with rising costs at their local store than they gain through decreased congestion. The cost of doing business during the night-time would likely be felt be the city's residents when they go to the corner store, the supermarket, the pharmacy and other local stores throughout their neighborhood.

  Consider that a trucker doing business during the off-peak hours might charge extra higher rate per hour than during the daytime. This cost is likely to be passed on to the receiver(s), who likely will pass it on to the consumers. The extent of the increase is hard to measure, but the cost of living in Manhattan would increase at some level as a direct impact of this policy.

- **Trucks might line up outside of the City's borders to wait for 6PM.**

  An overnight delivery program (especially a ban on peak hour deliveries) has the potential to create a chokepoint at the toll booths during the change from peak to off-peak hours. Truckers waiting to make deliveries right after 6PM are likely to wait in an area close to the toll booths. Rest areas and truck stops are already over capacity and no designated waiting areas are available. This lack of space might translate into truckers waiting alongside the highway, exacerbating congestion problems at that time. This also would pose a serious safety issue.

  A similar situation takes place at the ports in New Jersey, on the New York harbor. Overnight trucks traveling to the ports have to wait until the gates open. Given the lack of rest area parking, the trucks tend to wait in roadways around the region. There are studies underway to address this issue by three metropolitan planning organizations (MPOs) in the region: the New York Metropolitan Transportation Council (NYMTC), the North Jersey Transportation Planning Authority (NJTPA), and the South Western Regional Planning Agency (SWRPA).

- **A program could be conceived to ban only the larger trucks from entering Manhattan during the daytime.**

  Banning only large trucks during the daytime would likely mean that several carriers would shift to smaller trucks and still deliver during the day (given the receivers' demands). This would result in increased congestion given the added number of vehicles, especially at the toll booths where more transactions would need to be processed.

These issues need to be taken into account when considering an off-peak delivery program for Manhattan. They highlight the complexity of truck delivery patterns and their supply chain. These factors are not included here to advocate against any such program, but rather as key information that should be used to elaborate any successful program or policy of this type. The following sub-sections discuss the findings of the case studies and how their lessons can apply to New York City conditions today.

3.3 Atlanta – 1996 Olympics Games Case Study

This is an extraordinary case in which stakeholders were expecting the City to be suddenly and temporarily flooded with traffic from people attending the Olympic Games in addition to the freight traffic associated with running this event. As a result it is hard to extrapolate the results from a two-week outreach program to a full-time off-peak delivery initiative. Nonetheless, it is very interesting to note that carriers were very interested in the idea of doing business either in the early morning or in the evening, as avoiding traffic would allow them to be more productive and operate more efficiently.

Off-peak deliveries are so attractive to the freight industry in the region that that the issue was raised during recent discussions surrounding Atlanta's Freight Mobility Plan, which is currently under development. The City of Atlanta is considering the possibility of piloting such a campaign in a limited section of their jurisdiction. However, not enough information is available to understand how receivers and shippers feel about this type of program. This information would be key in assessing the feasibility and potential effectiveness of such a project.

The principal lesson learned from this program is that outreach to stakeholders is very important to the success of this type of program. Receivers and carriers must be educated to ensure they understand how the program works, the overall benefits associated with doing business in the off-peak hours, and find ways to translate these benefits into monetary savings for both sides (such as lower shipping costs due to the reduction in travel time traversing the City's bridges and tunnels).

Clearly, it remains to be seen whether a measure implemented for a short period of time to respond to a high-profile event can be mainstreamed into normal operations.

3.4 Port of Los Angeles-Long Beach PierPass Off-Peak Program

The results from this successful program reinforce that there is interest from the freight industry in doing business during the off-peak hours. The benefits stem primarily from the amount of traffic that truckers face during the day to travel to/from the Ports of Los Angeles and Long Beach. In this case in particular, the program has been successful due to the fact that truckers at either port would probably save a significant amount of time in going through security and picking-up or dropping off their container. As a result, not only would shippers be saving $40 for the typical 40-foot container, but also truckers would save time at the gates and on the highways, and hence boost their productivity.

However, it should be noted that a significant portion of truck traffic at the port is likely long-haul traffic as opposed to local deliveries, giving it greater flexibility in terms of schedule. This would not be the case in New York City, as truckers go in to deliver

Nonetheless, the program demonstrates that efforts to target both receivers and carriers through financial incentives (money and time) can be very successful in achieving shifts to the off-peak period. The program would likely not have been as successful if the fees were assessed to the truckers (as opposed to the shippers), or if the nighttime operations provided no additional benefit in terms of time savings for the truckers at the port and on the highways.

3.5 London Congestion Pricing

As a result of the pricing initiative the volume of truck traffic entering the charge region decreased by 13 percent, however during the same period truck-miles traveled within the zone decreased by only 7 percent. These findings support those from the PANYNJ's Value Pricing Initiative survey, where truckers address increases in tolls by a combination of a small decrease in facility usage combined with a small boost in productivity through higher payloads and more stops.

While the large decrease in the number of trucks would result in lower congestion at the entry roads for the region, (in New York City this might be the bridges coming from New Jersey and Queens/Brooklyn), the increase in stops and miles covered per truck might negate some of the results inside the charging zone. Furthermore, truck regulations in Manhattan would only allow truckers to increase productivity (in terms of carrying more cargo per trip) to a certain degree. After this point is reached by most carriers, the volume of trucks entering the region will continue to increase. This is especially true in New York City were there is a very competitive market for trucking services, and the profit margins are very thin, meaning that truckers are likely already operating at or close to their maximum level of productivity.

More time is needed to fully comprehend the effect of the toll on commercial traffic in Central London. The results from this project should be followed as more data becomes available, as it could provide insight to the reaction that a similar program would have in New York City in the long run.

3.6 PANYNJ's Value Pricing Initiative

The impacts of the 2001 value pricing initiative are hard to quantify for several reasons. Firstly, the tragic events of September 11, 2001 occurred six months after the program went into effect, and completely changed traffic in and around New York City for a significant period of time. In fact, it took over three years for truck volumes at the PANYNJ facilities to bounce back to 2001 levels (about 16.5 million trucks per year) and they have yet to reach 2000 volumes (over 17 million). Secondly, toll rates were increased for both the peak and off-peak hours at the same time that the pricing program was introduced. Lastly, a significant number of truckers in the region did not know about the program.

The survey of truckers using the facilities revealed that 20 percent of truckers changed their operation as a result of the program and the toll increase. The majority of these did so by switching to E-ZPass or increasing its use, increasing shipping charges to customers in order to offset the toll, and adjusting the delivery route. Approximately 6.2 percent of carriers decreased their usage of the facilities, 2.8 percent stopped using them altogether, and a very small portion (0.5 percent) switched to the off-peak hours.

The results reveal that truckers were not very responsive to the variable pricing initiative. This is due to the fact that:

- They would only be saving $1 per axle for driving during the off-peak period and $2.50 per axle for driving during the overnight hours (which would apply mainly to through traffic).
- Only 25 percent of carriers surveyed indicated that they knew about and understood the congestion pricing initiative.
- Nearly three quarters of the respondents indicated that they have to deliver during normal business hours or whenever the customer dictates (i.e., schedule is out of their control). The study showed that the average carrier has to be at the customer location within 45 minutes (before or after) of the time stated by the receiver.

3.7 Tappan Zee Bridge Variable Pricing Initiative

This program, as opposed to the London and the PANYNJ's initiative, was targeted specifically at commercial vehicle traffic in traversing the Tappan Zee Corridor. The results show that even with significant differentials in tolls between the peak and the off-peak period ($3.75 to $10.00 during off-peak versus $7.50 to $20.00 in the peak depending on truck configuration) trucks are not likely to shift their schedule to off-peak hours. While truck traffic decreased by 8 percent in the year after implementation, it quickly bounced back in the following year and continued increasing for the next five years at a high pace.

Furthermore, the results showed that even when the total truck volume decreased, the number of trucks traveling during the peak hours remained essentially the same (meaning that the decrease was mainly from trucks traveling during the off-peak).

Finally, an important lesson from this program is that the reduction in truck traffic might lead to an increase in passenger car traffic given the added capacity available (which would result in better travel times). While truck traffic decreased by 120,000 trucks in the year after implementation, passenger car traffic increased by 200,000 vehicles. No data is available to tie these two together; nonetheless it shows that the potential exists for such a problem. To avoid this type of situation, parallel programs that target both commercial and passenger traffic must be implemented together.

3.8 NEW YORK CITY NIGHTTIME DELIVERY POLICY INCENTIVES RESEARCH[21] [22]

Recent work was completed by Dr. Holguín-Veras and colleagues from the Rensselaer Polytechnic Institute that attempts to measure the impact congestion pricing would have on trucks in the New York City region. This work focuses on understanding the nature of the relationship between carriers and receivers and testing a variety of scenarios combining tolls, tax breaks, and lower shipping costs that would encourage truckers and receivers to shift their hours of operation to off-peak times. The research included the abovementioned analysis of the 2001 Value Pricing Initiative performed under contract to the PANYNJ, and subsequent studies using data from that project and other survey instruments.

Joint Receiver-Carrier Policies

Stated-preference surveys were conducted to better understand the necessary conditions for carriers to shift their operations to the off-peak. The surveys did not target any particular group of crossings.

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[21] Holguín-Veras, J., M. Silas, J. Polimeni, and B. Cruz, 2007. *An Investigation on the Effectiveness of Joint Receiver-Carrier Policies to Increase Truck Traffic in the Off-peak Hours.* Springer Science + Business Media, LLC 2007.

[22] Holguín-Veras, J., 2007. *Necessary Conditions for Off-Hour Deliveries and the Effectiveness of Urban Freight Road Pricing and Alternative Financial Policies in Competitive Markets.* World Conference of Transport Research, Berkeley, California, 2007.

The research produced three main findings:

1. Different industry segments exhibit different degrees of sensitivity to the various types of policies considered in the study (tax breaks, shipping charges, tolls);
2. Receivers' willingness to accept off-peak deliveries is crucial to the success of any such initiative; and
3. The willingness of receivers to accept off-peak deliveries depends to a great extent on the marginal costs of accepting off-peak deliveries vis-à-vis the financial incentive provided by the program.

Tables 3.1 and 3.2 highlight the second and third findings. They show the percent of carriers that hypothetically would be willing to partake in off-peak deliveries given a level of toll-savings (ranging from $0 to $7) for the carriers, and either tax deductions for receivers (Table 3.1), or reductions in shipping costs for receivers (Table 3.2). Looking only at the first column of either table shows that currently 11.71 percent of carriers participate in off-peak deliveries (with $0 toll savings and no incentive for carriers). Increasing toll rates in the peak hour by $7 per axle (i.e., $21 for small three-axle trucks or $28 for larger four-axle trucks) would result in only a 3 percentage point shift to the off-peak hours. Among the reasons for this is the fact that shipping costs are much higher than this amount, hence adding $21 to $28 is not a big burden for truckers. Furthermore, carriers are generally able to distribute the cost to all of their receivers along their route (for example, a three-axle truck delivering to five customers could add a relatively insignificant surcharge of $4 to each receiver to offset the toll). Finally, receivers have a significant say in the time of delivery, and will not shift to off-peak hours unless they receive savings that are higher than the cost of operating during that time. These costs can include one or two employees, in addition to security, electricity, and any other resources needed during that time.

Table 3.1 Expected Carriers' Off-Peak Delivery Market Share as a Function of Toll Savings to Carriers and Tax Deductions to Receivers

Toll Savings (Dollars per Axle) to Carriers	Tax Deduction to Receivers					
	–	$2,000	$4,000	$6,000	$8,000	$10,000
–	11.71%	13.25%	14.52%	15.92%	17.19%	18.11%
$2.00	12.76%	14.40%	15.74%	17.21%	18.56%	19.52%
$3.00	13.23%	14.90%	16.28%	17.77%	19.15%	20.12%
$5.00	14.07%	15.82%	17.25%	18.80%	20.19%	21.19%
$7.00	14.83%	16.65%	18.14%	19.74%	21.12%	22.14%

Source: Holguín-Veras, et al.[23]

Table 3.2 Expected Carriers' Off-Peak Delivery Market Share as a Function of Toll Savings to Carriers and Shipping Cost Discounts to Receivers

Toll Savings (Dollars per Axle) to Carriers	Shipping Costs Differential Given to Receivers (Percent)					
	0 %	20 %	40 %	60 %	80 %	100 %
–	11.71%	14.27%	17.19%	19.51%	20.84%	21.69%
$2.00	12.76%	15.48%	18.54%	20.98%	22.36%	23.23%
$3.00	13.23%	16.01%	19.14%	21.53%	23.01%	23.89%
$5.00	14.07%	16.98%	20.21%	22.69%	24.17%	25.06%
$7.00	14.83%	17.86%	21.20%	23.75%	25.20%	26.11%

Source: Holguín-Veras, et al.[23]

Receivers' reactions were modeled to demonstrate the impacts of two policy incentives: tax savings for businesses accepting deliveries during off-peak periods and shipping costs discounts. The first row of Table 3.1 shows the impact of just the tax deduction on off-peak delivery market share. A $2,000 annual deduction would increase market share by approximately 1.5 percentage points while a $4,000 deduction would essentially yield the same results as a $7 per axle toll. A $10,000 deduction would increase the number of carriers delivering during the off-peak to 18 percent. The full range of the table goes from the current 11.71 percent of truckers conducting off-peak deliveries to a potential 22.14 percent if a $7 per axle toll was put in place in combination with a $10,000 tax deduction for receivers. The findings show that significant incentives for receivers can go much further to achieve the goal of off-peak deliveries than solely toll increases. A combination of both policies would yield maximum results.

Table 3.2 presents shipping cost savings to receivers in percentages. As illustrated, a 20 percent reduction in shipping costs would have almost the same impact as the $7 per axle toll increase during the off-peak hours. This theoretical exercise also examines the possibility of eliminating shipping costs altogether for receivers, and projects that as a result over 21 percent of the carriers would shift their hours of operation to the off-peak. Finally, a combination of $7 per axle toll with no shipping costs for receivers would result in over one quarter of carriers (26.11 percent) shifting to the off-peak.

While 100 percent shipping costs reductions and $10,000 tax breaks might seem absurd, the exercise shows the power receivers have in deciding the delivery times, and that even with these incentives (without considering toll savings) only 6.4 percent to 9.98 percent of carriers would find it feasible to shift to the off-peak. These findings underscore how important it is for receivers to operate in their current timeslot (mainly while they are open) and to avoid the inconvenience and costs associated with off-peak deliveries.

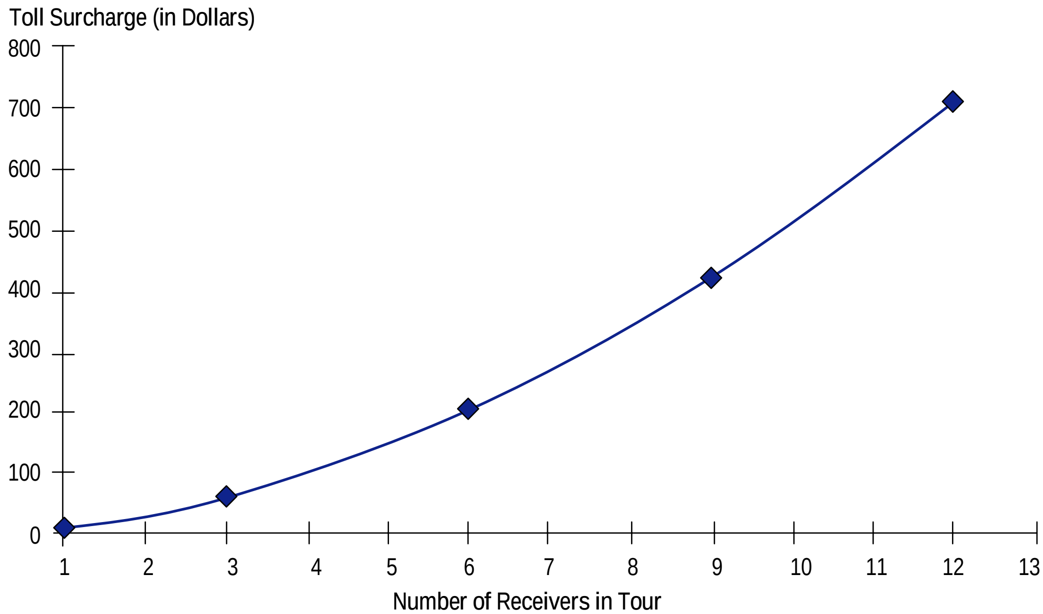
The study also investigated the feasibility of a truck making six stops in the City being able to shift operations entirely to the off-peak hours. If a truck starts a trip to the City at the start of the off-peak hour, takes 10 minutes traveling between customers, 15 minutes unloading, and 30 minutes to get to the first customer, then the last customer would have to operate nearly 3 hours during the off-peak period (see Table 3.3). This timing would present significant costs for receivers along the tail-end of the trip. For example, an office building that closes at 6:00 p.m. and is the last in one of these trips would have to remain open until 10:00 p.m. (assuming off-peak period starts at 7:00 p.m.).

Table 3.3 Delivery and Departure Time for Truckers in a Six-Stop Tour during the Off-Peak (Minutes after the Off-Peak Hour Starts)

Customer	Arrival	Departure
1	30	45
2	55	70
3	80	95
4	105	120
5	130	145
6	155	170

These findings indicate that truckers with more stops along their routes would be less sensitive to tolls than would those with just one or two stops (given that even a $50 toll would not be sufficient for the 4th, 5th, or 6th receiver to remain open for more than two hours). Figure 3.2 shows the minimum toll surcharge that would be required for a truck to shift the entire trip to the off-peak (assuming it passes on some of the savings to the receivers to remain open for business). As illustrated, while shifting a three-stop trip to the off-peak would require a $60 toll, shifting a trip of six stops would require a toll exceeding $200. These findings added to those stated previously suggest that incentives other than solely tolls would be required in order to achieve a meaningful shift in hours of operation.

Figure 3.2 Minimum Toll Surcharge to Switch an Entire Tour to the Off-Peak Hours



Source: Holguín-Veras et al. [24]

Based on findings from the stated-preference surveys, the industry segments most likely to respond favorably to off-peak delivery policies are the group of businesses consuming and transporting wood/lumber, food and metal. These receivers were found to be particularly sensitive to tax deductions. The carriers are particularly sensitive to the receivers' request for off-peak deliveries. This combination of circumstances increases the probability of implementing off-peak deliveries.

The food establishments industry is discussed in more detail in the following subsection. Receivers of and carriers of wood/lumber and metal products are potential targets for off-peak deliveries, however, in the case of New York City the number of receivers and, consequently, the number of truck trips involved for these industry are likely not as high as those involved in the food establishment case. This suggests a smaller payoff in terms of truck trips switched to the off-peak hours. Nonetheless, these are industries that could be targeted in outreach programs. Shipments of these commodities may include wood and lumber to be used for construction or the manufacturing of furniture, metal products can also be used for manufacturing or construction work (this could include metal sheets, bars, rods, wires, and molten form to make castings and other basic metal products).

Restaurant Industry Study[23]

A survey was conducted to analyze the potential for members of the food retailing business in the City (i.e., the restaurant and drinking places sector) to shift deliveries, pick-ups, and service calls to off-peak hours. This industry was targeted because these establishments are usually open during the nighttime, and previous research suggested that both carriers and receivers of these goods would be interested in off-peak deliveries. Furthermore, it is estimated that the current restaurants and drinking places in Manhattan (over 6,500) receive somewhere between 36,000 and 42,000 deliveries per day, resulting in 18,000 to 21,000 daily truck trips. This implies that even small changes in the delivery patterns for these establishments could yield significant improvements to the City's congested roads. As a point of reference, New York City's 22 toll river crossings facilities administered by the various transportation agencies handled over 43 million trucks in 2006. Assuming that these are distributed over a six-day week (excluding Sundays), this would equate to nearly 138,000 daily trucks, meaning that the restaurant and drinking places sector represents approximately 13 percent to 15 percent of total truck traffic in Manhattan.

The survey asked receivers whether they'd be willing to accept off-peak deliveries provided that they were rewarded financially through four different incentive programs: tax deductions for one worker, unspecified government subsidies, unspecified tax cuts, and a 20 percent surcharge in shipping costs during the peak hour. The results from these questions are shown in Table 3.4. As shown, more than half of the establishments surveyed stated that they would be willing to accept off-peak deliveries under the first two programs, nearly half (46 percent) said they would do so if tax cuts were provided, and one-third said that they would do so for a 20 percent reduction in shipping charges.

[23] Holguín-Veras, J., N. Perez, B. Cruz, and J. Polimeni, 2006. *Effectiveness of Financial Incentives for Off-Peak Deliveries to Restaurants in Manhattan, New York.* Transportation Research Record: Journal of the Transportation Research Board, No. 1966, Transportation Research Board of the National Academies, Washington, D.C., 2006, pp. 51–59.

Table 3.4 Receivers' Willingness to Accept Off-Peak Deliveries by Incentive

Incentive	Accept Off-Peak Deliveries?	
	Yes	No
1. Tax Deduction Equal to Salary of One Worker Doing Off-Peak Deliveries	55.40%	44.60%
2. Government Subsidy to Restaurants Receiving Off-Peak Deliveries (Amount Not Specified)	57.80%	42.20%
3. Tax Cut for Companies Receiving Off-Peak Deliveries (Amount Not Specified)	46.30%	53.70%
4. 20% Reduction in Shipping Charges during Off-Peak Hours	33.33%	66.67%

These numbers suggest that the restaurant and drinking place sector has a strong potential to respond to this type of policy given the right amount of incentive. The logistics might not necessarily be as simple though, given that carriers do not always deliver exclusively to restaurants, but may also include bodegas and delis along their trips which are usually open during business hours and not during the evening. Nonetheless, establishments in this sector should be targeted in any outreach program promoting off-peak deliveries in Manhattan.

3.9 Estimated Impact on VMT in the New York City CBD

Over 1.5 million vehicle trips end in the area south of 86th Street in Manhattan every day. These vehicles travel over 4.7 million vehicle miles per day. Trucks and commercial vehicles account for 13% of the vehicle trips that end in the area and 7.4% of the miles traveled in the area.[24] Traffic data reveals that peak period VMT (vehicle-miles traveled) in this zone represents nearly 79% of the total daily VMT[25]. Truck and commercial traffic in turn accounts for 8% of peak period VMT. This section presents a brief summary of the impact that the initiatives presented in Section 3.8 would have in the mix of traffic in this section of Manhattan during the peak and off-peak periods of the day.

Given time and resource limitations several assumptions had to be made in order to complete this exercise. These are as follows:

[24] New York City Department of Transportation.

[25] Peak period is defined as 6AM to 8PM.

1. It was assumed that total truck VMT would remain the same within the district. The Receiver Incentives option would only shift traffic from the peak to the off-peak period; it would not reduce or generate traffic. As a result, the current overall VMT in the zone of 4.75 million would remain the same after implementing any of the initiatives. This is reflected in the last column of Table 3.5 which shows a 0% change in daily overall VMT.
2. The analysis also assumes that passenger vehicle VMT will remain constant. In reality, passenger vehicle VMT is likely to increase with fewer trucks given the improvement in travel times.
3. The percentage change in market share covered in Tables 3.1 and 3.2 were used to estimate the additional truck VMT during the off-peak. Although the number of trips varies by receiver, the total number of receivers in the zone is proportional to the total number of trips ending in the zone. In keeping with the same ratio of receivers to trips, it is assumed that a 1% receiver participation level would therefore translate to a 1% shift in trucks and commercial vehicles to the off-peak period. Likewise, it is assumed that the ratio of trips to VMT would remain the same. Therefore a 1% shift in the total number of truck and commercial vehicle trips ending in the zone would translate to a 1% shift of total truck and commercial vehicle VMT in the zone.
4. Some of the scenarios described are theoretical exercises that would not be feasible in reality, such as 100% shipping costs reduction for receivers, or $10,000 tax deductions. These are presented here merely for reference purposes and to provide the reader with a better understanding of the impact of the variables involved.

Table 3.5 contains the impacts that the different scenarios would have on peak period truck and commercial vehicle traffic and also compares it against the total peak period traffic (including all non-commercial traffic). The scenarios include tolls (from $2 to $7 per axle), tax deductions ($2,000 to $10,000 per receiver), reductions in shipping costs (10% to 100%), and a complete ban of truck and commercial vehicle traffic during the peak period. The results of the initiatives range from a 1.42% to 100.00% reduction of peak period truck and commercial vehicle traffic translating to an overall reduction of 0.11% to 8.05% in peak period VMT. These numbers highlight the significant volume of passenger car traffic in relation to trucks and other commercial vehicles.

Three scenarios will be analyzed in more detail: The $7/axle toll, the $2,000 tax deduction combined with the $7/axle toll, and the complete ban on truck and commercial vehicle traffic during the peak period. These examples are the more realistic options in terms of ease of implementation, and were chosen to help illustrate the impact of the various types of alternatives.

$7 Toll per Axle for Trucks and Commercial Vehicles

As indicated, a $7/axle surcharge (this would be $21 for a typical 3-axle truck) during the peak period (6:00 AM to 8:00 PM using VMT from the NYMTC BPM model) would result in a decrease of 12,789 daily truck and commercial vehicle miles traveled during the peak period, representing a 4.21% decrease in truck and commercial vehicle VMT, and a 0.34% decrease in overall peak period VMT. While a 4-5% reduction in truck and commercial vehicle VMT might seem significant, the numbers show that in the general picture this initiative would have an insignificant impact on peak period VMT (which would decrease only from 3.78 to 3.76 million miles traveled per day).

$7 Toll per Axle and $2,000 Tax Deduction

Combining the previously discussed scenario, which affects carriers directly, with a $2,000 incentive for receivers would result in a 6.66% shift of truck and commercial vehicle VMT to the off-peak, equivalent to 20,249 VMT per day. This in turn would translate to 0.54% overall reduction in overall peak period VMT, which is still relatively insignificant, and would likely go unnoticed by most peak-hour drivers.

Truck Ban During Peak Period

Approximately 196,000 truck and commercial vehicle trips end in Manhattan south of 86th street on a daily basis. With an average truck and commercial vehicle trip length of 1.53 miles, this translates to roughly 300,000 daily VMT. A complete ban of truck traffic during the peak period would mean that all trucks would have to enter and do business in this section of Manhattan between the hours of 8PM and 6AM. If all of these trips are transferred to the off-peak it translates to an 8.05% shift in VMT from the peak to the off-peak period. However as mentioned earlier in this chapter, such a program would likely have significant economic and environmental impacts for Manhattan residents (in terms of higher product costs, increased noise, and more traffic congestion at night).

The following figures show the composition of traffic in Manhattan's Central Business District. Figure 3.3 shows the current situation, while the following three show the truck shift to the off-peak for each for the three scenarios discussed above. As shown the impact for the first two cases are negligible (less than 1%), while the ban on peak hour truck traffic results in a 6 percentage point shift to the off–peak.

Table 3.5 Shift in Peak Period VMT by Scenario

Scenario	6 a.m.-8 p.m. Peak Period Truck and Commercial VMT	6 a.m.-8 p.m. Peak Period Overall VMT	6 a.m.-8 p.m. Peak Period Truck and Commercial VMT Difference	6 a.m.-8 p.m. Peak Period Truck and Commercial VMT Difference (%)	6 a.m.-8 p.m. Peak Period Overall VMT Difference (%)	24-Hour Overall VMT Difference (%)
Baseline	304,000	3,775,000	–	–	–	–
$2 Toll/Axle	299,696	3,770,696	(4,304)	-1.42%	-0.11%	0%
$3 Toll/Axle	297,769	3,769,769	(6,231)	-2.05%	-0.17%	0%
$5 Toll/Axle	294,326	3,765,326	(9,674)	-3.18%	-0.26%	0%
$7 Toll/Axle	291,211	3,762,211	(12,789)	-4.21%	-0.34%	0%
$2,000 Tax Deduction	297,687	3,768,687	(6,313)	-2.08%	-0.17%	0%
$4,000 Tax Deduction	292,482	3,763,482	(11,518)	-3.79%	-0.31%	0%
$6,000 Tax Deduction	286,743	3,757,743	(17,257)	-5.68%	-0.46%	0%
$8,000 Tax Deduction	281,537	3,752,537	(22,463)	-7.39%	-0.60%	0%
$10,000 Tax Deduction	277,766	3,748,766	(26,234)	-8.63%	-0.69%	0%
$2,000 Tax Deduction and $7/Axle Toll	283,751	3,754,751	(20,249)	-6.66%	-0.54%	0%
$4,000 Tax Deduction and $7/Axle Toll	277,643	3,748,643	(26,357)	-8.67%	-0.70%	0%
$6,000 Tax Deduction and $7/Axle Toll	271,085	3,742,085	(32,915)	-10.83%	-0.87%	0%
$8,000 Tax Deduction and $7/Axle Toll	265,428	3,736,428	(38,572)	-12.69%	-1.02%	0%
$10,000 Tax Deduction and $7/Axle Toll	261,247	3,732,247	(42,753)	-14.06%	-1.13%	0%
20% Shipping Cost Reduction	293,506	3,764,506	(10,494)	-3.45%	-0.28%	0%
40% Shipping Cost Reduction	281,537	3,752,537	(22,463)	-7.39%	-0.60%	0%
60% Shipping Cost Reduction	272,027	3,743,027	(31,973)	-10.52%	-0.85%	0%
80% Shipping Cost Reduction	266,576	3,737,576	(37,424)	-12.31%	-0.99%	0%
100% Shipping Cost Reduction	263,091	3,734,091	(40,909)	-13.46%	-1.08%	0%
20% Shipping Cost Reduction and $7/Axle Toll	278,791	3,749,791	(25,209)	-8.29%	-0.67%	0%
40% Shipping Cost Reduction and $7/Axle Toll	265,100	3,736,100	(38,900)	-12.80%	-1.03%	0%
60% Shipping Cost Reduction and $7/Axle Toll	254,647	3,725,647	(49,353)	-16.23%	-1.31%	0%
80% Shipping Cost Reduction and $7/Axle Toll	248,704	3,719,704	(55,296)	-18.19%	-1.46%	0%
100% Shipping Cost Reduction and $7/Axle Toll	244,974	3,715,974	(59,026)	-19.42%	-1.56%	0%
Truck ban during peak hours	–	3,471,000	(304,000)	-100.00%	-8.05%	0%

Figure 3.3 Baseline VMT

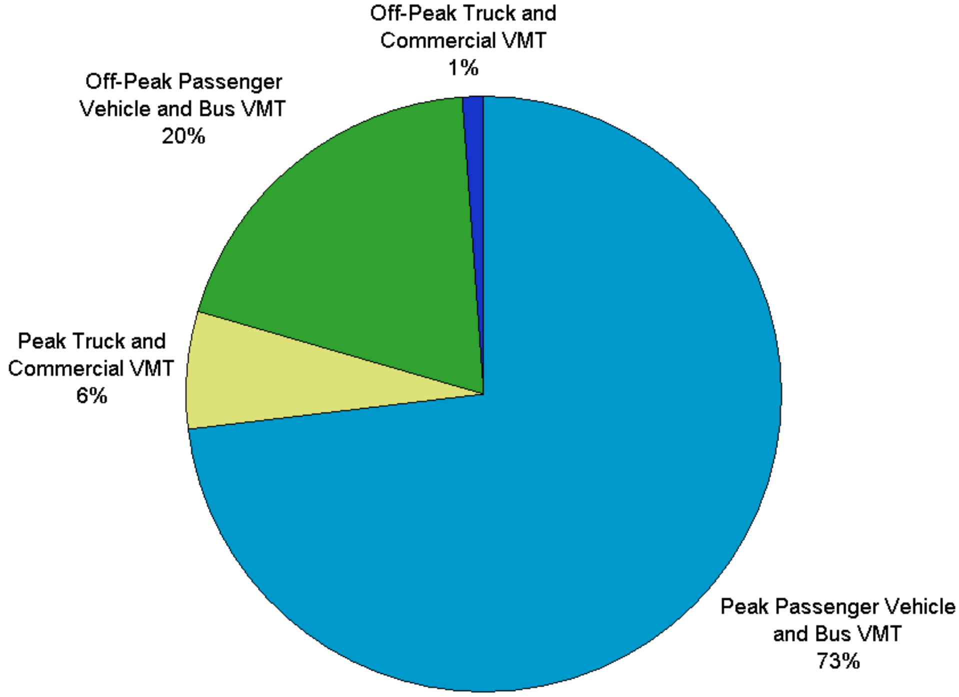


Figure 3.4 $7/Axle Toll Scenario

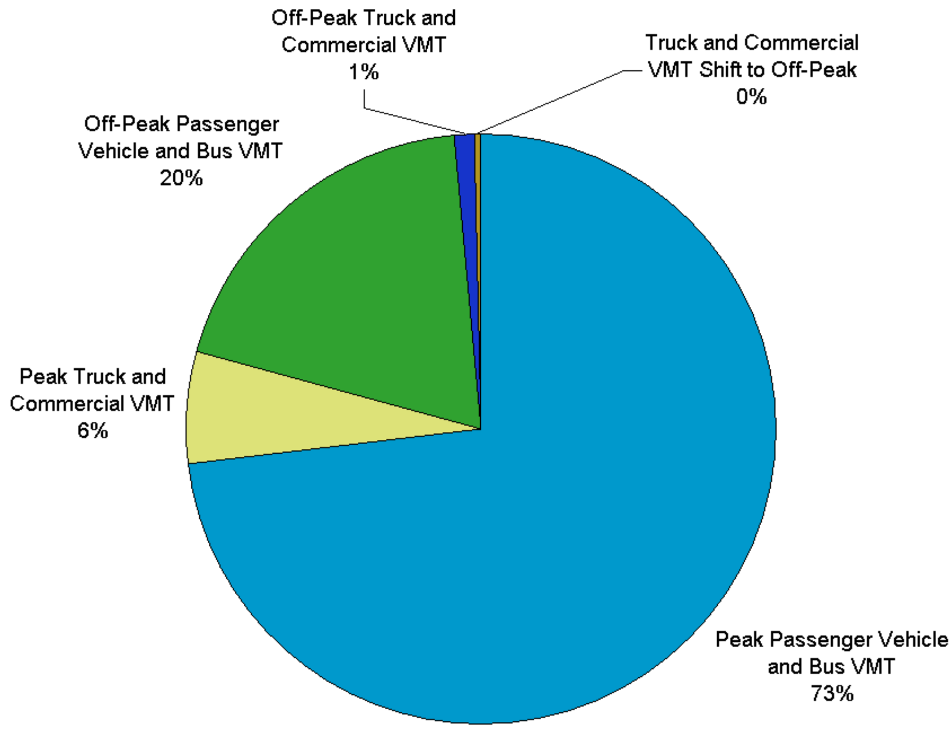


Figure 3.5 $7/Axle Toll and $2,000 Incentive Scenario

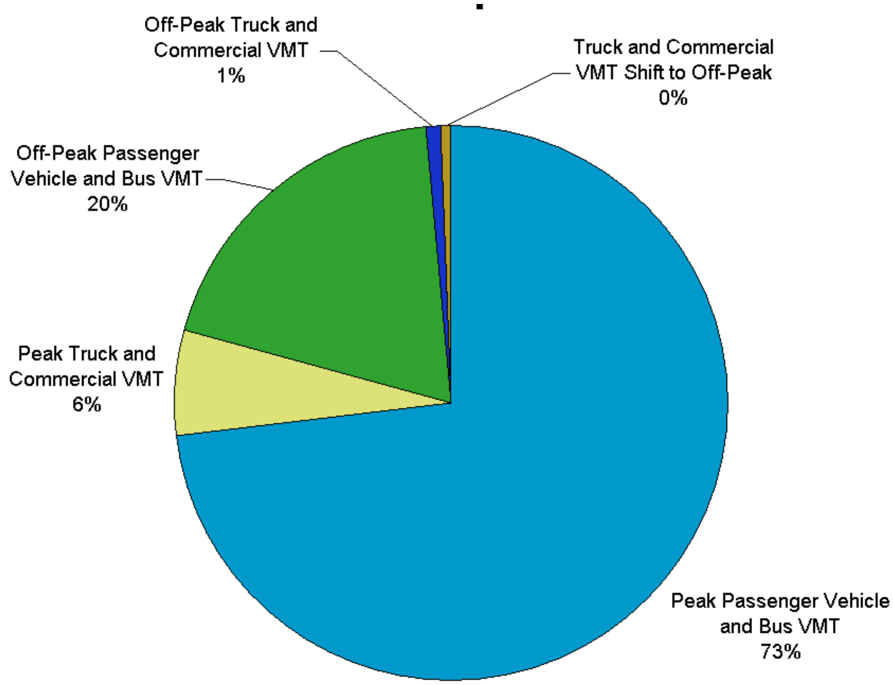
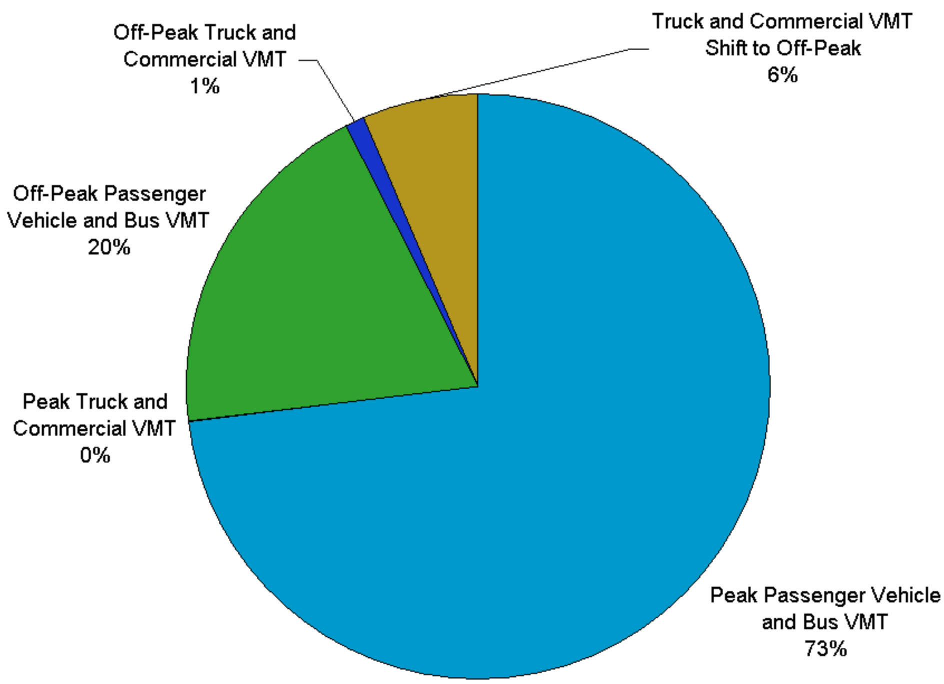


Figure 3.6 Truck Ban Scenario



4.0 Key Findings and Conclusions

This section highlights the key findings from the case studies and the research projects described in this document.

- The case studies summarized in this report reveal that freight carriers have interest in the idea of doing business during the off-peak hours; however they are constrained by the demands of their customers, the receivers. The receivers, generally, are constrained from doing business during the off-peak because of the cost and inconvenience of having their business open during that time.
- As illustrated in the Tappan Zee Variable Pricing Initiative, toll structure alone will not have a significant impact, even at $20 per truck. In fact $20 might be an insignificant figure for most carriers given that they'd be able to pass along the cost of the tolls to the several receivers they may visit along their routes. If a truck makes 4 stops in the city, it would only need to add a relatively insignificant fee of $5 to each receiver in order to offset the toll.
- Receivers are only likely to shift operations to the off-peak hours if enough savings are provided to offset the cost and inconvenience of being open during that time. Research shows that for a truck making 6 stops along a route to the City to shift their entire operations to the off-peak, it would require the last three customers in the trip to be open for two to three hours after off-peak hours begin. As a result it would take tolls in the range of $150 to $200 for carriers alone to switch (assuming that they'd pass along a portion of the tolls to the receivers).
- Increases in truck toll alone in the range of $7 per axle ($28 for a large 4-axle truck) might provide benefits of approximately 3 to 7 percentage points in terms of the number of trucks entering the region. However a portion of these are likely to be offset by increases in productivity, such as trucks making more stops inside the charge zone, which will keep truck traffic inside the region at similar levels.
- Research shows that incentives for receivers such as tax breaks, government subsidies, and reduction in shipping costs can be more effective tools to engage carriers in off-peak deliveries than solely tolls. A combination of both approaches (incentives and tolls) is likely to yield the most success. Accepting off-peak deliveries can be very costly for receivers in Manhattan, hence a potential program that would force truckers to deliver during the nighttime is likely to have significant economic impacts in the region.
- The restaurant and drinking establishment sector is a significant generator of freight traffic in New York, generating approximately 18,000 to 21,000 truck trips every day. A recent survey suggests that a significant portion of these establishments in Manhattan would consider taking deliveries during the off-

peak, which could have major impact in daily truck traffic. Part of the attraction is the fact that they are already open during that time of the day. However, not all establishments have the capabilities of accepting off-peak deliveries; many for example do not have a back cargo door.

- Another potential industry sector is the daily morning deliveries in Manhattan to the food and perishable retail establishments such as bodegas and delis. Unlike restaurants, these establishments generally operate more along the hours of 6 a.m. – 6 p.m. These trips would not only be affected by time of delivery but at the beginning of the trip as well. Most of the perishables come from one of the produce markets, fish markets or meat markets within the five Boroughs or from Long Island, Connecticut, or New Jersey. These trips usually start before the peak hour and arrive in the Manhattan at the start of the peak when the establishments open. The potential exists to entice these establishments to accept deliveries at a slightly earlier time.
- It is important to note that in order for a trucker making 6 stops for deliveries in Manhattan to switch the entire route to the off-peak (after 7:00 p.m.), the last three receivers would need to be open past 9:00 p.m., which might prove to be too costly for them. Assuming conservative times for unloading and travel between stops, the last shipment would be unloaded at approximately 10:00 p.m. For early morning deliveries, this would translate into truckers entering the charge zone in the off-peak but doing most of the travel inside the zone during the peak hour, negating the desired results.
- Outreach would be an important aspect of any type of program developed. Carriers, receivers, and the community need to understand the benefits associated with such a program, including congestion relief, reduction in pollution, and the generation of revenues to improve and maintain the City's transportation systems. In fact, follow-up surveys for the Tappan Zee and the PANYNJ's variable pricing initiative revealed that a significant portion of truckers were unaware that such a program was in place, limiting the potential impact that the program can have.
- Complementary programs must be put in place to discourage automobile traffic from filling the void left by the lack of trucks during peak hours. Otherwise, the congestion and air pollution could be exacerbated, not decreased.
- Even if New York City develops a program to entice carriers and receivers to shift to the off-peak, in time the natural growth in demand for freight goods dictates that congestion will still occur in the peak and off-peak hours. This is mainly because trucks are the primary (if not the only) mode used for transporting goods to and from Manhattan. As a result, alternatives that promote the use of other modes should be studied in conjunction with any program.

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Congestion Mitigation Commission Technical Analysis

Congestion Reduction Policies Involving Taxis

technical

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New York City Economic Development Corporation
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Table of Contents

List of Tables

List of Acronyms

CBD – Central Business District (in this case, the area of Manhattan south of 60^{th} Street)

CPZ – Congestion Pricing Zone (the area of Manhattan south of 86^{th} Street)

GPS – Global Positioning System

LBS – Location Based Services

NYCDOT – New York City Department of Transportation

TLC – New York Taxi and Limousine Commission

VMT – Vehicle Miles Traveled

NYPST – New York Passenger Ship Terminal

PABT – Port Authority Bus Terminal

Executive Summary

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems. Congestion pricing has been proposed to address these issues.

The New York City Department of Transportation estimates that taxis account for 31% of total daily Vehicle Miles Traveled (VMT) in the area south of 86th Street in Manhattan. This document examines potential measures to reduce VMT by targeting taxis and for-hire vehicles (car services, black cars and limousines). Two potential measures include: 1) the increased regulation of taxi cab operations within the borough, and 2) placing a congestion surcharge on taxi and for-hire fares during the peak periods.

Operations management regulations could include the establishment of a much greater number of curbside taxi stands throughout the area of Manhattan south of 86th Street that will effectively eliminate the practice of hailing taxis in that area. Theoretically, the use of taxi stands would limit the amount of "cruising" taxi drivers do in search of passengers and therefore contribute to reducing VMT. Such a policy could also limit congestion and safety hazards caused by taxis stopping in active lanes to pick-up or discharge passengers.

Two fare surcharge scenarios were analyzed: one in which taxi and for-hire drivers would pay an $8 daily fee to enter or travel within the area of Manhattan south of 86th Street, and one in which a $1 or $2 surcharge would be added to taxi and for-hire trips made within or through the area of Manhattan south of 86th Street between the hours of 6:00 AM to 6:00 PM on weekdays.

Current Taxi Operations and Management Practices

Currently there are more than 13,000 medallion (yellow) taxi cabs operating in New York City. Additionally, 20,000 to 25,000 car service vehicles, 10,000 black cars and 5,000 luxury limousines – which together are regulated as "for-hire vehicles" – serve the travel needs of many residents and visitors to New York City. While for-hire vehicles are typically reserved in advance via telephone, passengers can hire a medallion cab on-the-spot by hailing one on the street or by visiting a taxi stand. An unofficial inventory of taxi stands in New York City reports that there are 83 taxi stands and taxi relief areas in the area of Manhattan south of 96th Street.

Taxi stands in New York City are located in areas where there is concentrated demand for taxis. These areas include transit hubs, entertainment venues, and hotels. Busy stands are often staffed with a dispatcher to ensure the stand operates in an efficient and orderly manner.

Case Studies

There are few, if any, cities that are directly comparable to New York with respect to taxicab operations and utilization. Most larger U.S. cities (e.g., San Francisco[1], Chicago[2]) do not expressly prohibit taxicab cruising, but do require that all licensed taxicabs be equipped with a two-way radio and belong to a company or association with a centralized dispatching facility. Washington, DC,[3] taxicab regulations explicitly permit cruising, and do not require taxicabs to be equipped with a two-way radio or belong to a radio dispatching service.

Application to New York City

Two types of management policies are considered as alternatives that could be applied in New York City. The first policy would include the establishment of "No Hailing Zones" wherein taxi customers would be prohibited from hailing taxis and directed to taxi stands to procure service. Because it is difficult to estimate the effect of a No Hailing Zone policy on taxi VMT, a pilot program that would affect a smaller area of Manhattan could be a desirable alternative. The pilot program would allow City officials, the public, and the taxi industry to observe how the No Hailing Zone operates with respect to passenger and driver compliance, changes to taxi VMT and passenger waiting time. If the data shows that the pilot program is meeting the City's goals, No Hailing Zones could be expanded or introduced elsewhere in Manhattan.

Taxi fare policies are the second set of alternatives considered in this analysis. The first scenario proposes that taxi and for-hire drivers would be responsible for paying a daily $8 fee to enter or travel within the area of Manhattan south of 86th Street, with pass through to the fare. Based on an average of 30 trips completed per shift, each fare would have a $0.27 surcharge added. The second scenario proposes a $1 or $2 surcharge added to every trip that has an end point or travels

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[1] "Taxicab/Rampted Taxi Rules and Regulations," San Francisco Taxicab Commission, available from http://www.sfgov.org/site/taxicommission_index.asp?id=37437 (accessed November 9, 2007).

[2] "Rules and Regulations for Taxicab Medallion License Holders, City of Chicago, Department of Consumer Services, available from http://egov.cityofchicago.org/webportal/COCWebPortal/COC_ATTACH/TaxicabMedallionLicenseHolder.4.14.06_2final[1].pdf (accessed November 9, 2007).

[3] D.C. Municipal Regulations – Title 31, District of Columbia Taxicab Commission, available from http://dctaxi.dc.gov/dctaxi/cwp/view,a,1187,q,487959, taxiNav, |30625|.asp (accessed November 9, 2007).

through the area of Manhattan south of 86^{th} Street. These policies could affect taxi demand and hence taxi travel behavior.

Conclusions

While there are lessons to be learned from the case studies, there is a general lack of quantitative data that shows the effects on VMT, congestion, and safety attributable to taxi management policies including No Hail Zones or pricing. The most relevant data points came from within the New York City experience with these industries.

Strategy 1, No Hail Zone and Taxi Stand Network

For the operations management approaches, the implementation of a No Hailing Zone in the busiest districts of Manhattan offers the potential to limit taxi cruising, reduce taxi VMT, and improve congestion and public safety. The measure is unproven, however, as currently empirical evidence to support the claim is absent. The initiation of a pilot program in one small area could provide the City with an opportunity to observe how such a policy would operate in New York City and allow officials to determine whether or not such a policy is desirable for larger areas of Manhattan.

With or without a No Hailing Zone, taxi stands provide an important service in many areas of the city, assisting passengers in securing a taxi ride, where hailing a cab could be unsafe or difficult due to competition. Taxi stands in the City should be developed in such a manner that they are easy to identify, provide amenities that heighten passengers' sense of comfort and safety, and, where possible, offer the services of an on-site dispatcher to ensure that the taxi stand operates in an efficient and orderly manner. Key findings include:

- **There is no evidence that eliminating taxi hailing would reduce VMT.** The degree to which VMT is reduced would depend upon how far taxis would travel back to a taxi stand after discharging a passenger. While the proposed scenario includes taxi stands that are located no more than a few blocks away from any given point within the specified area of Manhattan, a driver may have to travel past several taxi stands to find an available space in a stand queue. Furthermore, taxi drivers may opt to drive a longer distance to one of the more heavily utilized stands, or to stands that typically house customers traveling longer distances (resulting in higher fares).
- **Taxi stand implementation would be challenging with respect to traffic operations.** Taxi stands operate most effectively when they have highly visible signage and other identifiers, have adequate space for queuing vehicles and waiting customers, offer passengers assurance that vehicles will be present and ready to receive passengers, are located in a safe and well-lit area with shelter from the elements, and have an attendant available to insure that the stand operates in an efficient and orderly manner. Securing adequate curb and sidewalk space for taxi and customer queues may reduce

curbside parking capacity and require the relocation of bus stops. Working around infrastructure such as fire hydrants also poses a challenge. At particularly busy locations, taxi queuing space would have to be long enough so that taxis waiting in queue would not block lanes, intersections or interfere with bus operations.

- **Taxi stand implementation would be challenging with respect to enforcement.** Hailing taxis is a part of the longstanding culture in New York City. A significant outreach effort would be required to teach the drivers and the traveling public to change their behavior. Other costs such as stand attendants and police enforcement activities must be considered as well.

Strategy 2, Fare Surcharge

Another possible way to reduce taxi VMT is to increase the fares that passengers pay during peak travel periods. Two fare surcharge scenarios are presented. The first scenario proposes a scheme in which taxi and for-hire vehicle drivers would be responsible for paying the proposed $8 fee to enter the area of Manhattan south of 86th Street, with the fee being passed along to taxi customers in the form of a nominally higher fare. The second scenario proposes a $1 or $2 surcharge added to taxi and for-hire trips made within or through the area of Manhattan south of 86th Street between the hours of 6:00 AM to 6:00 PM on weekdays. Using reasonable fare elasticities, the effect of the proposed fare increases on taxi and for-hire ridership, and hence, VMT, is discussed.

An increase in taxi fares is likely to reduce customer demand for cab service, but is unlikely to reduce taxi VMT since the number of cabs is fixed by law. A reduction in taxi trips would increase the availability of cabs, however, and likely lead to some customers who currently take car services or black cars taking medallion cabs instead. Based on an analysis of historical trends, total VMT in the charging zone is expected to be reduced as follows by each fare surcharge option:

- Reduction in total VMT of up to 0.1 percent from the application of the $8 daily fee to all taxis and for-hire vehicles.
- Reduction in total VMT of 0.3 percent from the application of a $1 per trip surcharge to taxi and for-hire vehicle trips in the charging zone.
- Reduction in total VMT of 0.6 percent from the application of a $2 per trip surcharge to taxi and for-hire vehicle trips in the charging zone.

1.0 Introduction

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

According to Texas Transportation Institute's Urban Mobility Report, New York City ranks second in the nation in terms of annual delay. The majority of the delay is spent during the peak hour, with travelers experiencing 46 hours of annual delay (per traveler) in 2005, up from 34 hours in 2000, a 35 percent increase. This congestion costs the City and its residents over $7 billion in 2005, costing each peak traveler approximately $888.

By 2030, nearly a million more residents, 750,000 more jobs, and millions more visitors are expected to further strain the City's transportation system. The current system cannot handle the anticipated increase in traffic and meaningful infrastructure-based solutions are challenging, costly, and lengthy to implement. A comprehensive and innovative set of strategies must be implemented to make a profound change in travel behavior.

The New York City Department of Transportation estimates that taxis account for 31% of total daily Vehicle Miles Traveled (VMT) in the area south of 86th Street in Manhattan. This document examines potential measures to reduce VMT by targeting taxis. Two potential measures include: 1) the increased regulation of taxi cab operations within the borough, and 2) placing a congestion surcharge on taxi fares during the peak periods.

This document examines the implementation considerations and potential impacts of these two strategies. The analysis is organized into the following six sections:

- **Section 1.0** presents a definition of the problem at hand;
- **Section 2.0** examines the existing taxi and for-hire services available in Manhattan and their operating characteristics;
- **Section 3.0** examines how New York differs from other American cities in regard to taxi management,;
- **Section 4.0** discusses potential taxi management strategies that could be implemented in New York City.
- **Section 5.0** summarizes key findings from this study; and
- **Section 6.0** lists works cited in this study and identifies sources of additional relevant information.

2.0 Current Status of Taxi and Car Services in New York City

Taxis and for-hire vehicles play an important role in the daily lives of residents, commuters, and visitors to New York City. There are four basic types of vehicles that are licensed by the New York City Taxi and Limousine Commission (TLC): medallion taxicabs, car services, black cars, and luxury limousines. These are described below. The operational characteristics of each vehicle type are described in this section and followed by a discussion of practices that are currently in place to manage taxi and car service licensing and operations.

2.1 TAXI AND CAR SERVICE VEHICLE AND SERVICE TYPES

Medallion Taxicabs

One of the signature sights in New York City is the "yellow cab" also known as medallion taxicabs. There are just over 13,000 yellow medallion cabs circulating the streets of New York City – with trips concentrated within Manhattan below 86th Street. (Outside of Manhattan, LaGuardia and JFK Airports – and to a lesser extent Downtown Brooklyn – are the only other major areas in New York City where yellow medallion taxis provide intensive service. Over 80 percent of taxi trip origins occur in Manhattan below 86th Street. Yellow cabs are the only form of taxi in NYC permitted to cruise for or be hailed by potential customers. According to a 2005 estimate, medallion taxis carry about 25% of all paying passengers traveling by taxi, for-hire vehicles, bus, and subway

A woman observed hailing a taxi on 6th Avenue in Midtown.

within Manhattan.[4] It should be noted that the average taxi fare is low in comparison to the average transit fare, based on historical data.

For-Hire Vehicles

In addition to the familiar yellow cabs, New York City is home to other for-hire vehicle services, also licensed by the TLC. These include the following:

- **Car services**– There are an estimated 20,000 – 25,000 licensed car service vehicles operating from one of several hundred car services in New York City.[5] Most of these operate outside Manhattan or above 86th Street. Nearly all car service car passengers call in to the car service and are picked up at their origin by a vehicle that has been assigned to that person via radio contact from the home base. (Passengers can also be picked up at a particular car service's base of operations, which is a rare occurrence except for those services whose bases are located near transit hubs.) These car service vehicles are prohibited from cruising for and picking up hailing passengers, though a substantial amount of this activity does occur, especially in busy areas outside of the Manhattan core (e.g., Downtown Flushing, Central Harlem, etc.)
- **Black cars** – These **v**ehicles serve a significant number of passengers who have an origin or destination within Manhattan below 86th Street. There are an estimated 10,000 black cars (operated by around 70 different services) and another 5,000 luxury limousines. Black car services began in the 1980s, when the TLC prohibited medallion taxicabs from conducting radio pick-up

The Lincoln Town Car is the standard model used by "black car" limousine services. Photograph source: http://www.hyslivery.com

service. Their numbers grew rapidly over that decade, but have remained relatively steady in the 10,000 – 11,000 vehicle range since the year 2000.

- **Luxury limousines** – Luxury limousine services grew rapidly in the 1990s, experiencing slower but significant growth since the year 2000.) These cars are dispatched and the customer must call in advance to utilize these services. Many businesses in Manhattan contract with black car services to

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[4]Schaller Consulting, *New York City Taxicab Fact Book*, 2006; Samara Epstein, Director of Constituent Affairs, New York City Taxi and Limousine Commission. Interview by authors. Personal interview via telephone. New York, NY. 2 November 2007. .

[5] Samara Epstein.

transport employees and clients/customers. These vehicles are prohibited from cruising and picking up hailing passengers, but anecdotal evidence indicates that street hails occur in Manhattan below 86th Street, especially at times and locations when medallion taxis are hard to find.[6]

2.2 TAXI STANDS AND OTHER WAITING AREAS IN NEW YORK CITY

In addition to cruising and hailing, yellow cabs can pick up fares at one of many designated taxi stands existing in New York City. There is no official estimate of the number of existing taxi stands in New York, though TLC is currently conducting an inventory. One unofficial count[7] indicates that there are 83 taxi stands and taxi relief areas located in Manhattan below 96th Street.

Customers wait in queue at the taxi stand on 7th Avenue outside Pennsylvania Station.

There are two types of stands, as defined by the New York City Department of Transportation (NYCDOT), which manages curb frontage in the city:

- A taxi stand is a pickup point for passengers. Taxi drivers are required to remain with their vehicles and be available to pick up fares.
- Taxi relief stands provide designated curb space for yellow taxicab drivers to park their vehicles for up to one hour. Despite uncertainty over the precise number of stands in existence today or in the past, it is believed that the number of taxi relief stands in Manhattan has been reduced significantly in recent years.[8]

A few taxi stands are operated by a dispatcher (sometimes provided by one of the city's Business Improvement Districts), and can be found at major transportation hubs such as Penn Station, Grand Central Terminal, and hotels.

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[6] Samara Epstein.

[7] "NYC Taxi World," available from http://www.phunreport.com/taxi/stands.htm (accessed November 9, 2007).

[8] Nancy Wright, Coordinator of the Taxi Stand Reporting Program, New York City Department of Transportation, Interview by authors. Personal interview via telephone. New York, NY. 2 November 2007

Most, however, are unstaffed and are located at major office buildings, hotels, and hospitals. According to the unofficial website list identified above, more than half of Manhattan's taxi stands are located between 34th and 59th Streets. The following paragraphs outline some examples where taxi stands are being used in Manhattan and provide insight into some of issues surrounding these taxi stands and waiting areas for other for-hire vehicles.

Assessment of Taxi Stands

The following are some observations about taxis stands in Manhattan.[9]

- The most heavily utilized taxi stands are adjacent to major trip generators: transportation terminals, hotels, and on a more limited time of day basis, near major entertainment sites, such as theaters.
- The presence of a dispatcher, especially a dispatcher who vigorously defends the curb space for taxis and maintains the integrity of the passenger waiting line, contributes to the efficient operation of a taxi stand.
- Taxi stands are easy to find and use when they are well signed and have a noticeable dispatch stand (often provided and staffed by a Business Improvement District).
- Even staffed taxi stands face enforcement problems, particularly when there is significant competition for use of the curb space (by delivery vehicles and even police vehicles).
- Many non-staffed taxi stands are underutilized for a variety of reasons: little or no enforcement of curb space, poor signage, and absence of significant traffic generators.

Times Square and the Theater District

In an effort to help reduce congestion and improve safety, the NYC Department of City Planning, in conjunction with NYCDOT and TLC, conducted a study in 2000 – 2001 which assessed the effectiveness of taxi stands in the Times Square and the Theater District area. This study identified 28 taxi stands in the area bounded by 6th and 8th Avenues from West 38th Street to West 53rd Street. The study found that many of these taxi stands were located near office buildings, commercial businesses, hotels, and theaters. The study found that at some of the most active taxi stands, and at certain times of the day, the customers' average waiting time was far shorter than the drivers' average cruising times between fares. However, except for stands nearest hotels and a few others that are busy in the late evening hours, most of the these stands were found to serve fewer than

[9] *Taxi Stands in Times Square and the Theater District.* New York City Department of Planning and New York City Department of Transportation, 2001; Nancy Wright..

20 taxi movements per hour during each of three observed travel periods (morning peak, midday peak, and evening peak).[10]

The study made several recommendations to increase the visibility and utilization of taxi stands in the Times Square and Theater District area. One recommendation, which was implemented, reduced the number of taxi stands from 28 to 23. At some of the remaining stands, new signage and illuminated globes were installed. In addition, the study recommended converting three of the stands from non-staffed stands to staffed stands.

Port Authority Bus Terminal

The same study cited above examined the two dispatcher-staffed taxi stands at the Port Authority Bus Terminal (PABT) along 8th Avenue. One of its key findings applies to most staffed taxi stands in Manhattan. The most important element of their success is the dispatcher, who makes sure that only yellow medallion taxicabs are using the curb space and helps moves taxis through the stands. However, it was noted that there was little coordination between the dispatchers at the two stands, resulting in a periodic mismatch between passengers and vehicles. The study concluded that better communication was needed between the two stands, that adequate sidewalk space be maintained for queuing passengers, and that dispatchers were crucial to the continued success of these taxi stands.

New York Passenger Ship Terminal

In 2004, weekend service taxi stands were established at the New York Passenger Ship Terminal (NYPST). The goal of implementing the weekend service was to reduce the number of vehicles traveling into the terminal. Medallion taxicab drivers were actively encouraged to use these stands to drop off and pick up passengers traveling to and from the NYPST. Attendants were stationed at the stands, assisted by the New York City Police Department, to ensure that only licensed medallion taxicabs used these designated stands. Signs indicating the schedules and the locations of these areas were also installed.

Penn Station

Penn Station has taxi stands on both 7th and 8th Avenues, both of which are staffed with dispatchers for significant times of the day (provided by the 34th Street Business Improvement District). As at the PABT, the dispatchers are crucial to the success of these stands. They aggressively protect the curb space and at times patrol the passenger waiting lines to prevent out-of-turn hailing. At the 8th Avenue stand, maintaining a clear curb space is often difficult, as the lane is often used by non-taxi vehicles, including police vehicles. Another issue with

[10]*Taxi Stands in Times Square and the Theater District.*

both stands is that long passenger waiting lines sometimes induce riders to walk upstream several blocks to hail a taxi that hasn't yet entered the taxi stand line. This reduces the supply of taxis, further exacerbates passenger waiting, and undermines the attractiveness of the stand.

Current Process for Creating New Taxi Stands

Stakeholder requests for new taxi stands are made to NYCDOT. Once a request is made there are numerous criteria and factors NYCDOT reviews, such as: curb utilization, traffic flow, current parking usage (commercial, residential, etc.), and bus lane impacts. Potential actions include installing a new taxi stand, moving the location of an existing stand, or removing the stand all together. The sources of requests include: individuals, block associations, community boards, and Business Improvement Districts.

A sign designating a waiting area for taxis and other for-hire vehicles on East 31st Street.

Black Car Waiting Areas

Black cars add to traffic congestion in Manhattan, while in motion and while waiting for passengers. Designated waiting areas exist, but where these are inadequate to serve demand, black car/limousine drivers often double or triple park as they await their pick up at a hotel or office building, or circle blocks until their scheduled pick-up time.

2.3 RELATION OF TAXI AND TRANSIT FARES

Taxi fares are historically low in relation to transit fares. For example, from 1956 to 1974, the ratio of an average taxi fare to an average transit fare was 6.9. The ratio declined in the 1970s and early 1980s, at the same time that the condition of the transit system deteriorated. In 2006 the ratio was 5.8, based on an average taxi base fare of $9.61 and the six-for-five bonus transit fare of $1.67. To match the previous average 6.9 ratio, taxi fares would have to increase by about $2.

3.0 Case Studies

There are few cities that provide relevant examples of regulations on taxi operations, especially in the U.S. While the practice of hailing a taxi is not as common in other cities as in New York, it is permitted in cities such as Washington, DC; Philadelphia; Miami; Chicago; and San Francisco. Taxi stands at major demand generators and reservations by phone are other popular methods of finding a taxi in those cities.

3.1 Review of Taxi Management Policies in United States Cities

There are few, if any, cities that are directly comparable to New York with respect to taxicab operations and utilization. Most larger U.S. cities (e.g., San Francisco[11], Chicago[12]) do not expressly prohibit taxicab cruising, but do require that all licensed taxicabs be equipped with a two-way radio and belong to a company or association with a centralized dispatching facility. One exception is Washington, DC,[13] whose taxicab regulations explicitly permit cruising, and do not require taxicabs to be equipped with a two-way radio or belong to a radio dispatching service.

New York[14] is unique among larger U.S. cities in having two distinct classes of taxicabs – medallion taxis, whose primary business is via street hail and taxi stands; and car service or for-hire vehicles, who are prohibited from picking up street hail and taxi stand customers, and rely exclusively on telephone call-in and radio dispatch.

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[11] "Taxicab/Rampted Taxi Rules and Regulations," San Francisco Taxicab Commission, available from http://www.sfgov.org/site/taxicommission_index.asp?id=37437 (accessed November 9, 2007).

[12] "Rules and Regulations for Taxicab Medallion License Holders, City of Chicago, Department of Consumer Services, available from http://egov.cityofchicago.org/webportal/COCWebPortal/COC_ATTACH/TaxicabMedallionLicenseHolder.4.14.06_2final[1].pdf (accessed November 9, 2007).

[13] D.C. Municipal Regulations – Title 31, District of Columbia Taxicab Commission, available from http://dctaxi.dc.gov/dctaxi/cwp/view,a,1187,q,487959, taxiNav, |30625|.asp (accessed November 9, 2007).

[14] "TLC Rules and Local Laws," New York City Taxi and Limousine Commission, available from http://www.nyc.gov/html/tlc/html/rules/rules.shtml (accessed November 9, 2007).

4.0 Application to New York City

Strategies to better manage taxi operations within Manhattan south of 86th Street could result in congestion and vehicle miles traveled (VMT) reductions. According to global positioning system (GPS) tracking data retrieved from a sample population of taxis operating within this area of Manhattan, about 30 percent of taxi VMT in Midtown Manhattan in the midday period is accumulated while the vehicle is out of revenue service, e.g., while the driver is cruising in search of passengers to pick up, or making other non-revenue movements such as stopping to eat or return to a fleet garage.

Some strategies that could result in a reduction in taxi VMT include the introduction and widespread use of a greater number of taxi stands in combination with "No Hail Zones" and increasing fares through surcharges. Each strategy offers differing sets of benefits and implementation challenges. These strategies, though presented separately, could be implemented together as a package of regulations.

4.1 Strategy 1, Development of "No Hail Zone" and Taxi Stand Network

One means of managing taxi operation is to restrict the practice of picking up passengers who hail taxis at random streetside locations, and requiring that passengers be picked up at designated taxi stands instead. A network of taxi stands would be installed at frequent intervals to ensure passenger convenience. Such a restriction would be crafted with the aim of limiting the amount of VMT attributable to taxi cruising and improve safety by limiting the number of in-street stops vehicles make to pick up and discharge passengers.

This strategy is presented in two scenarios. The first scenario discusses the establishment of a "No Hail Zone" and supporting taxi stand network throughout the entire area of Manhattan south of 86th Street. The second scenario presents a pilot program concept that would act as the first part of a phase-in of No Hail Zones in Manhattan.

Areawide Taxi Stand Mandate Scenario

This areawide scenario involves the establishment of taxi stands at major trip generators such as transit hubs, large entertainment venues, and hotels at intervals of one for every 500 to 900 feet of street length. The distance of 900 feet is equivalent to one "long block" between avenues on the west side of Manhattan (including the street width of one avenue), while 500 feet is approximately the distance between shorter east-west blocks on the East Side (such as between Fifth

Avenue and Madison Avenue). This distance range is also equivalent to approximately two to four "short blocks" between streets in most of Manhattan. This spacing would result in a network of 1,000 to 1,200 taxi stands throughout the area of Manhattan south of 86th Street.

In this scenario, taxi drivers would be required to make passenger pickups at designated taxi stands while operating in Manhattan south of 86th Street. The practice of hailing a taxi at random streetside locations in this area would be, at least by regulation, prohibited.

The amenities at taxi stands in the area would vary based upon the level of demand at each location. The busiest taxi stands would require visible and recognizable, uniform signage, sufficient street space to accommodate the taxi queue, sidewalk space for the passengers queue, and a stand attendant who will ensure that the stand operates in an efficient and orderly manner. Additional amenities could include variable message signs that could inform passengers of expected wait times for boarding and covered waiting areas to protect waiting passengers from weather elements. Taxi stands in areas where there is less demand would require smaller street and sidewalk queuing spaces, and would not require the services of an attendant. All taxi stands should be in areas that are well-lit so that customers feel safe walking to and waiting at the stand.

The implementation of taxi stands would likely reduce taxicab cruising if customers perceive a benefit to using taxi stands and comply with the regulation. Based on past experience, this is most likely to occur if the taxi stands are near major trip generators, if they are adequately staffed and easily recognizable, and if riders perceive that waiting in line is more beneficial than trying to hail a taxi. The benefits perceived by riders would largely be time savings, but could include such concerns as improved safety, passenger amenities, and a less stressful experience. Innovations that could increase the perception of benefits among riders, and which would likely increase taxi stand usage, might include such actions as:

- Fare or surcharge discounts offered to riders who use taxi stands vs. hailing taxis.
- Information about projected waiting times at taxi stands (e.g., variable message signs that indicate average waiting times).
- Covered waiting areas for riders, offering some protection from the elements.

The degree to which VMT is reduced would depend upon how far taxis would have to travel back to a taxi stand after discharging a passenger. While taxi stands would be located no more than a few blocks away from any given point within the specified area of Manhattan, a driver may have to travel past one, two, or several taxi stands to find an available space in a stand queue, especially during hours when taxi demand is lightest, such as the early morning hours on weekdays. Furthermore, taxi drivers may opt to drive a longer distance to one of the more heavily utilized stands, or to stands that typically house customers traveling longer distances (resulting in higher fares).

In order to ensure widespread compliance with the regulation, significant enforcement protocols would be needed for both the passenger and the driver. As such, significant costs would be borne for enforcement. Passenger behaviors would have to be monitored to ensure that prospective passengers do not hail or attempt to board a taxi that is stopped to discharge passengers. Driver behaviors would have to be monitored to ensure that drivers do not accept passengers who attempt to board at inappropriate locations, and to ensure that any fee or surcharge discount is not offered to customers who are not eligible. While law enforcement officials would take on the responsibility of enforcing taxi regulations, the vigorous enforcement in the immediate vicinity of taxi stands by vigilant stand attendants and dispatchers might be an acceptable choice as well.

There are issues and concerns, in addition to the enforcement issues, that would have to be addressed. Among these are the potential effects the numerous taxi stands would have on traffic operations, parking, transit operations, and air quality. Because taxi stands require dedicated street space for passenger loading and taxi queuing, a portion of a street lane would have to be taken out of service at each taxi stand. The amount of space affected could range from several car-lengths (roughly 50 feet) to several hundred feet at the busiest taxi stand locations. The taxi stand on 8th Avenue at the Port Authority Bus Terminal, for example, requires the dedication of more than 450 feet of curb space for taxi queuing and passenger boarding. In many areas the affected lane currently accommodates on-street truck delivery zones and/or bus stops. Provisions would have to be made to accommodate truck deliveries and bus stops elsewhere if taxi stands remove these amenities. In areas where the affected lane is a live traffic lane, the loss of the lane may adversely affect traffic operations and result in congestion.

Despite the aforementioned concerns, there are potential congestion and safety benefits associated with taxi stands. The establishment of formal taxi stands would limit the practice of stopping in live traffic lanes to pick up passengers who are hailing taxis from the curb. With fewer vehicles stopping in live traffic lanes, roadway throughput is not compromised, and hasty lane-changing by vehicles attempting to pass from behind a stopped taxi would decrease. Stops made in protected taxi stand areas allow passengers to board in areas that are safer than live traffic lanes.

Hopeful taxi passengers discuss their desired trip with a taxi driver before boarding. The taxi is occupying a live traffic lane on Madison Avenue.

Taxi Stand/ "No Hail Zone" Pilot Program Scenario

Because the challenges of implementing an areawide taxi stand requirement is logistically and financially difficult, a more appealing alternative might be to incrementally introduce the program by beginning with a pilot program in a small area of Manhattan. The pilot program would require that taxi pickups made within a specified area occur at taxi stands only. Hailing would be prohibited in this area. The pilot area should be small initially, consisting of only several blocks. The pilot area should be located in an area that experiences particularly heavy taxi demand, such as the area surrounding Penn Station or Grand Central Terminal. For Penn Station, the initial zone could include the area between 6th and 8th Avenues and 30th to 35th Streets. For Grand Central Terminal, the zone could include Madison Avenue to Lexington Avenue between 40th and 45th Streets. The No Hail Zone restriction would be in effect during the midday hours, between 10:00 AM and 4:00 PM. The midday hours, though not the only busy time of day for taxis in Manhattan, is when taxi demand is most concentrated in the core of the Midtown business district. Though evening hours are also a period of high taxi demand, that demand is more scattered geographically among entertainment, dining and nightlife venues, and residential neighborhoods.

The pilot program would allow City officials, the public, and the taxi industry to observe how the No Hail Zone operates with respect to passenger and driver compliance, changes to taxi VMT, and passenger waiting time. Data retrieved from taxi GPS units, and driver and passenger outreach initiatives such as surveys or open house information sessions are potential tools that could be used to determine the degree of acceptability and effectiveness of the No Hail Zone program. If the analysis of the data and additional information is deemed beneficial, the No Hail Zone could be expanded to include larger areas of Manhattan. This incremental process would allow the public and taxi industry an opportunity to become accustomed to the policy, and allow for the costs (i.e., enforcement, developing and operating taxi stands, community outreach programs, etc.) to be distributed over a longer period of time.

Estimated Impact on VMT in the New York City CBD

There is no data to support a quantitative analysis of either scenario under Strategy 1. Qualitatively, the proposed alternatives could be expected to reduce taxi cruising VMT if taxi drivers make a good faith effort to return to a nearby taxi stand after discharging a passenger. If, however, the driver has to make a long trip to reach a taxi stand, or has to pass one, two, or more taxi stands before finding an available space in queue, the VMT reduction could be limited.

4.2 Strategy 2, Fare Surcharges

Another possible way to reduce taxi VMT is to increase the taxi fare that passengers pay during peak travel periods. Two fare surcharge scenarios are presented. The first scenario proposes a scheme in which taxi drivers would be responsible for paying the proposed $8 fee to enter the area of Manhattan south of 86th Street, with the fee being passed along to taxi customers in the form of a nominally higher fare. The second scenario proposes a $1 or $2 surcharge added to every taxi trip made within or through the area of Manhattan south of 86th Street between the hours of 6:00 AM to 6:00 PM on weekdays. Using reasonable fare elasticities, the effect of the proposed fare increases on taxi ridership and the for-hire vehicle sector, and hence, VMT, is discussed.

The analyses of these scenarios require an understanding of taxi elasticity in New York City as it relates to cost. When prices for a commodity like taxi travel rise, the demand will decrease. Typically, with travel demand models, an elasticity of -0.1 to -0.3 is associated with changes in cost for travel. An elasticity in this range represents a hypothesis that a 10 percent increase in travel fare would result in a 1 percent to 3 percent reduction in travel. Studies have found that in New York City, the taxi fare elasticity is -0.22.[15] A 10 percent increase in the taxi fare in New York City is thus expected to reduce taxi trips by about 2.2 percent.

Changes in the demand for taxi service in Manhattan may also affect the black car and car service industry segments. When customers find it marginally more difficult to hail a medallion cab, some may elect to use a black car or livery car

[15] Bruce Schaller, "Elasticities for taxicab fares and service availability," *Transportation*, 26: 283-297, 1999.

service instead. Indeed, the history of these industries is that they arose because of a lack of medallion cab service.

In recent years, the number of car services in particular has fluctuated in response to demand for for-hire services in Manhattan. When customer demand has risen rapidly, as in the mid to late-1990s, the number of medallion cab trips increased as did the number of car service vehicles. Conversely, when customer demand dropped in the early 2000s, the number of livery vehicles declined along with the number of taxi trips. Table 4.1 shows these trends.[16]

Notably, changes in the number of car service vehicles are several times the magnitude of changes in taxi trips. This effect is attributable to the fact that the number of cabs is regulated and has grown only slowly over this time period, while the number of car service cars is unregulated. The car services thus absorbs a disproportionate share of changes in overall customer demand, expanding more rapidly than taxi trips in times of economic expansion and contracting more rapidly in bad economic times.

Table 4.1 Changes in taxi trips and livery car service vehicles in Manhattan

	1992-2000	2000-2002	2002-2004
Change in taxi trips	+21%	-3%	+1%
Change in number of car service vehicles in Manhattan	+85%	-16%	-8%

Scenario A, Implementation of an $8 Daily Entry Fee

The first proposed fare increase scenario calls for the application of a daily $8 entry fee to taxis and for-hire vehicles (inclusive of car services, black cars and limousines) traveling into or within the area of Manhattan south of 86th Street. Drivers would not be charged additional fees for multiple trips into or within the area.

In this scenario, the City would add a surcharge to medallion cab fares to cover the congestion fee. On average, taxi drivers complete 30 fare trips per shift.[17] With the $8 fee divided among the 30 trips, each trip surcharge would increase by 27 cents. When added to the average taxi fare paid in New York City

[16] The decline in the number of livery car services from 2002 to 2004 was attributed to increased vehicle liability insurance costs rather than changes in customer demand.

[17] Schaller Consulting, *New York City Taxicab Fact Book*, 2006.

($9.94)[18], the surcharge would represent a 2.7 percent increase in total fare paid by each passenger. Applying an elasticity of -0.22, it can be expected that the total number of daily taxi trips served would initially decline by 1,100 daily trips in response to the surcharge. This represents a 0.2 percent decline in daily taxi trips.

A reduction in taxi trips would increase the availability of cabs and likely lead to some customers who currently take car services or black cars taking medallion cabs instead. Based on an analysis of trends shown in Table 4.1, it can be estimated that one-third of the reduction in taxi demand would be offset by customers switching from for-hires to taxis. Based on an average taxi trip length of about 2.5 miles in the charging area and car services having about 40 percent of their total mileage being paid miles (with passengers), the projected VMT reduction in the charging zone would be 2,300 miles per day.

For-hire vehicle fares are unregulated and each operator would decide how to adjust its fares to cover the congestion fee. Based on a straight pass-through of the fee and estimated fare elasticities for each type of for-hire vehicle,[19] the $8 fee would translate into a VMT reduction in the charging zone for for-hire vehicles of 3,900 miles per day. Combined with the 2,300 mile reduction in VMT from reduced taxi demand, application of the $8 fee to taxis and for-hire vehicles yields a 0.1 percent reduction in total VMT in the area below 86th Street.

It is important to consider that the $8 fee will be paid only if it is not offset by bridge or tunnel tolls. A substantial proportion of taxis and for-hire vehicles pay $8 or more in tolls on any given day. If adjustments to the fare change were made to account for this, the effect on taxi trip volumes would be reduced commensurately.

Scenario B, Implementation of a $1 or $2 Surcharge for All Trips Made in Manhattan South of 86th Street

The second proposed scenario calls for the application of a $1 or $2 surcharge to taxi, black car, car service and limousine trips in the area of Manhattan south of 86th Street. As with the $8 daily fee, a surcharge would be passed on to taxi riders through the regulated fare. For-hire operators could pass along the cost to their riders as well.

It is anticipated that the surcharge would be applied based on GPS readings in the cabs for alls trips that begin, end or travel within the charging area. The

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[18] Schaller Consulting, *New York City Taxicab Fact Book*, 2006.

[19] The elasticity for car services is assumed to be -0.22, the same as for taxis, and somewhat lower for black cars (-0.10) and limousines (-0.05). These assumptions produce a conservative result for total VMT reductions; if the elasticities were higher, VMT reductions would be larger.

revenues could be collected through a flat annual fee for medallion cabs and for for-hire vehicles that are based or do most of their business in the charging area. For-hire vehicles based outside the charging zone could pay a $1 or $2 per trip fee for entering or exiting the charging area if the fee is administered as part of a congestion pricing scheme.

For medallion taxis, the surcharge represents a 10 percent or 20 percent increase in taxi fare above the $9.94 average fare paid in New York City,[20] which includes existing surcharges. Applying a -0.22 elasticity, the number of taxi trips completed in the area can be expected to fall by 4,300 to 8,500 trips. This decrease represents a 0.9 to 1.8 percent decline in taxi trips served in the study area. Assuming that some for-hire customers switch to medallion cabs, the projected VMT reduction in the charging zone would be 8,800 miles for a $1 surcharge and 17,600 miles for a $2 surcharge

Assuming that for-hire operators pass through the surcharge to customers, a $1 per trip surcharge would result in a VMT reduction among for-hire vehicles in the charging zone of 5,000 miles per day; for a $2 surcharge the VMT reduction would be 10,100 miles daily. Combining the direct effect of the surcharge on for-hire fares with the indirect impact of the taxi surcharge, a $1 fee is projected to reduce total VMT in the area below 86th Street by 0.3 percent while a $2 fee would reduce VMT by 0.6 percent.

Estimated Impact on VMT

Table 4.2 shows a comparison of the fare increase scenarios. A pass-through of an $8 per day congestion fee would, at most, reduce VMT by 0.1%. A $1 or $2 surcharge on trips within the charging zone would reduce total VMT by 0.3 percent and 0.6 percent respectively.

Table 4.2 Estimated Impact on VMT in the New York City charging zone (below 86th Street)

	Scenario A ($8 daily fee)	Scenario B ($1 surcharge)	Scenario B ($2 surcharge)
Base daily taxi trips in the zone, 6 am-6 pm[a]	192,700	192,700	192,700
Base daily for-hire vehicle[b] trips	83,000	83,000	83,000
Change in for-hire VMT due to:			
Change in customer demand for taxi trips	2,300	8,800	17,600
Change in customer demand for for-hire trips	3,900	5,000	10,100
Total	6,200	13,800	27,700
Pct. change in total VMT	0.1%	0.3%	0.6%

[20] Schaller Consulting, *New York City Taxicab Fact Book*, 2006.

[a] *Based on taxi GPS data.*

[b] *Includes black car, car service and limousines*

5.0 Key Findings and Conclusions

The most significant consideration in regulating taxi and for-hire vehicles is the management of the relationship between daily operations and the changes in demand, which are affected by fares as well as regional economic and population growth.

Key conclusions are presented below.

- **A reduction in taxi trips is likely to reduce VMT by shifting some demand between the taxi and for-hire vehicle markets.** A reduction in taxi trips would increase the availability of cabs and likely lead to some customers who currently take car services or black cars taking medallion cabs instead.
- **There is no evidence that eliminating taxi hailing would reduce VMT.** The degree to which VMT is reduced would depend upon how far taxis would travel back to a taxi stand after discharging a passenger. While the proposed scenario includes taxi stands that are located no more than a few blocks away from any given point within the specified area of Manhattan, a driver may have to travel past several taxi stands to find an available space in a stand queue. Furthermore, taxi drivers may opt to drive a longer distance to one of the more heavily utilized stands, or to stands that typically house customers traveling longer distances (resulting in higher fares).
- **Taxi stand implementation would be challenging with respect to traffic operations.** Taxi stands operate most effectively when they have highly visible signage and other identifiers, have adequate space for queuing vehicles and waiting customers, offer passengers assurance that vehicles will be present and ready to receive passengers, are located in a safe and well-lit area with shelter from the elements, and have an attendant available to insure that the stand operates in an efficient and orderly manner. Securing adequate curb and sidewalk space for taxi and customer queues may reduce curbside parking capacity and require the relocation of bus stops. Working around infrastructure such as fire hydrants also poses a challenge. At particularly busy locations, taxi queuing space would have to be long enough so that taxis waiting in queue would not block lanes, intersections or interfere with bus operations.
- **Taxi stand implementation would be challenging with respect to enforcement.** Hailing taxis is a part of the longstanding culture in New York City. A significant outreach effort would be required to teach the drivers and the traveling public to change their behavior. Other costs such as stand attendants and police enforcement activities must be considered as well.

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Wright, Nancy

CAMBRIDGE SYSTEMATICS

Congestion Mitigation Commission Technical Analysis

Increase Cost of Parking in the Manhattan Central Business District (CBD)

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Table of Contents

List of Tables

List of Figures

Executive Summary

During a typical weekday in 2005, about 800,000 autos, taxis, trucks, and vans were estimated to have driven into Manhattan below 59th Street,[1] the area typically regarded as New York's Central Business District (CBD). Census data from 2000, the most recent year available, indicates that more than 270,000 people drive to work in New York's CBD on a typical weekday that year.[2] These drivers and their passengers make up about 16 percent of all commuters to the CBD, the lowest share of any U.S. city, but like drivers everywhere, they can choose to drive because they have access to parking at or near their places of work.

A 2007 survey found that in the New York CBD, where the median, non-discounted price of an off-street, unreserved parking space is $42 per day in Midtown and $34 per day in Downtown,[3] 53 percent of motorists reported that they do not pay for their parking space. The 53 percent includes those who receive subsidized or free parking from their employers, those who are reimbursed for their parking fees by their employer or someone else, and those who park in unmetered spaces on residential streets in the CBD.[4]

Of the remaining 47 percent, five percent of motorists reported parking on the street in a metered space. The remaining 42 percent reported parking off-street in a private or municipal garage or lot and presumably paid market rates for parking (not to mention the time they spent in congestion when entering and leaving the CBD, the wear and tear on their vehicles, and perhaps even the tolls they paid in each direction).

Commuters are not the only category of motorists who drive into New York's CBD. Whether these vehicles are traveling to the CBD on business (for example,

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[1] New York Metropolitan Transportation Council (2007).

[2] As cited by Schaller (2006a), page 45. At an average vehicle occupancy of 1.4 persons per vehicle, this translates to 194,000 vehicles.

[3] Colliers International's 2007 Parking Survey. The median monthly parking rate was found to be $630 in Midtown and $500 Downtown. In surveys, the median daily price paid has been found to be as low as $24.42 because motorists take advantage of early-bird specials and weekly and monthly contracts where possible.

[4] Schaller (2007), page 1. A 1995 study of three areas of the CBD found that 45 percent of drivers were partly or fully reimbursed for the cost of parking (Falcocchio, 1995). A 2004 telephone survey of Trans-Hudson drivers by found that 40 percent of New Jersey drivers paid for parking themselves, while employers paid parking costs for 15 percent of drivers, others paid the costs for 5 percent, and 33 percent of drivers reported that their parking was "free" (University Transportation Research Center, 2005).

to deliver or pick up goods from a CBD location), to shop, visit a tourist attraction, visit a friend or relative, conduct personal business, or return to their home in Manhattan, they need a place to park. All of these vehicles contribute to congestion in and around the CBD.

This report provides an overview of various categories of motorists who park in the CBD, introduces a range of parking-related measures that New York City might implement to make the option of driving into the CBD less attractive, estimates the potential impact of several of these measures on congestion in the CBD, and discusses other potential impacts of each measure on various stakeholder groups such as CBD residents.

Some of these strategies may be effective in diverting some auto trips to other modes. However, due to the extremely high demand for travel to and through the CBD, it is possible that the congestion reduction benefits of a particular parking strategy could be partially or completely offset by latent demand for through trips and other types of trips that use CBD streets (and the roadways leading to the CBD) but do not park. Estimates of VMT reduction cited in this report account for parking-related VMT only and do not consider latent demand.

Among the key findings of the study are the following:

- In terms of reduction in vehicle-miles-traveled (VMT), increasing rates for on-street metered parking could be among the most effective parking-related strategies analyzed in this paper. "Increasing rates" implies a rate structure that would encourage regular turnover of spaces such that at any given time, about 15 percent of spaces are free (approximately 3 spaces per crosstown block if all spaces on the block are metered, or fewer if there is a mix of metered and unmetered spaces). The vacancy rate cuts down on traffic circling the block in search of parking and encourages turnover of parking spaces so that they can be used by short-term visitors rather than all-day workers. Because it reduces parking search as well as overall trips into the CBD, this strategy has the double benefit of reducing VMT and traffic congestion. To be most effective, it could be implemented in conjunction with a residential parking permit system to prevent spillover from metered to unmetered streets.
- Accounting for reduction in traffic circling the block and a reduction in trips entering and leaving the CBD, implementation of increased on-street parking rates could reduce VMT by about 14,000 miles per day, about one half percent reduction from current levels.
- Other strategies to increase the price of parking in the CBD would have only a modest impact, and some may even increase VMT. Eliminating the discount for Manhattan residents on the off-street parking tax may reduce VMT; however, if parking garage operators simply absorb the tax increase and keep garage prices constant, there would be no effect on drivers and no change in VMT. The elimination of the parking tax discount may be the easiest strategy to implement, given that the infrastructure and regulatory

framework for a parking tax is already in place, but there is a possibility that the tax increase could simply reduce operator revenues with no reduction in VMT.

- An estimated 42 percent of motorists who park in the CBD pay the full cost of off-street parking out of their own pocket. Some of these motorists can deduct the cost of parking as a business expense, but still pay a substantial share of the cost out of pocket even when the tax break is considered. The elimination of the parking tax discount might not be equitable because Manhattan motorists who currently pay for parking would be forced to pay more (unless parking lot operators simply absorb the tax), while the "free" parkers would continue to be subsidized. An elimination of the parking tax discount may even persuade some drivers to joint the ranks of "free" parkers, increasing VMT as they cruise in search of an open unmetered space where they can park for the day.

- An alternative may be to devise a method of influencing employers who provide free parking rather than taxing the individual consumers, but it is not clear if the VMT implications would be any different. About 34 percent of motorists receive free off-street parking from their employer, are reimbursed for the cost of parking by their employer or others, or have one of 20 categories of government-issued placards or permits that enables them to park for free in designated off-street spaces throughout the CBD. Motorists who have a guaranteed, reserved parking space at no cost are the most difficult to dissuade from driving into the CBD. New York City could attempt to implement a variety of measures to accomplish this goal, including taxing company-owned parking spaces directly, taxing parking benefits as income (which would have little or no impact on VMT or mode choice), encouraging or requiring employers to give their employees the cash equivalent for their parking benefit (which would produce a VMT reduction of approximately 1,020 miles per day), or restricting distribution and use of off-street parking placards.

- Initiatives that discourage parking in New York's CBD would impact vehicle trips ending in the CBD. Through traffic would be unaffected, however. It is even possible that some of the excess capacity freed up by trips that formerly were destined for the CBD could be absorbed by new through traffic. Given that through auto traffic as a percentage of total auto traffic at Hudson River Tunnels and East River Crossings ranges from 30 to 60 percent,[5] the City may wish to study potential impacts on through traffic before parking policies are implemented in New York.

- Options for further restricting already scarce and expensive parking in Central London were considered insufficient to reduce congestion to targeted

[5] Schaller (2006a), pages 36 and 37.

levels given that through traffic was approximately 30 to 40 percent of all traffic in Central London before congestion pricing was implemented there.[6]

[6] Booz, Allen and Hamilton (2006), page 23.

1.0 Introduction

On any given workday, the Manhattan Central Business District (CBD) hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

According to Texas Transportation Institute's Urban Mobility Report, the New York region ranks second in the nation in terms of annual delay. The majority of the delay is spent during the peak hour, with travelers experiencing 46 hours of annual delay (per traveler) in 2005, up from 34 hours in 2000, a 35 percent increase. This congestion costs the region and its residents over $7 billion in 2005, costing each peak traveler approximately $888.

By 2030, nearly a million more residents, 750,000 more jobs, and millions more visitors are expected to further strain the City's transportation system. The current system cannot handle the anticipated increase in traffic and meaningful infrastructure-based solutions are challenging, costly, and lengthy to implement. During a typical weekday in 2005, about 800,000 autos, taxis, trucks, and vans were estimated to have driven into Manhattan below 59th Street,[7] the area typically regarded as New York's CBD. Census data from 2000, the most recent year available, indicate that more than 274,000 people chose to drive to work in New York's CBD on a typical weekday that year.[8] These drivers make up about 16 percent of all commuters to the CBD, the lowest share of any U.S. city, but like drivers everywhere, they can choose to drive because they have access to parking at or near their places of work. In many cases parking is provided at no cost to these commuters, or is subsidized by their employers or U.S. taxpayers. Research into the effect of parking availability on mode choice has made clear the connection between the cost of parking and the choice of auto for a commute.[9]

A 2007 survey[10] found that in New York's CBD, where the median price of an off-street, unreserved parking space is $42 per day in Midtown and $34 per day

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[7] New York Metropolitan Transportation Council (2007).

[8] As cited by Schaller (2006a), page 45.

[9] See, for example, Hensher (1999), Hess (2001), and Jansson (2002).

[10] Schaller (2007), page 9.

in Downtown,[11] 53 percent of motorists do not pay for their parking space, for the following reasons:

- Their employers provide a space in an off-street garage or lot as a benefit, or they work on-site at a construction site with available parking (10 percent). About 26 percent of motorists who park off-street for free (or 2.6 percent of all motorists surveyed) reported having parking provided by a government agency;
- They are reimbursed for the cost of parking by their employer or others (24 percent); or
- They park for free at an unmetered space on a Manhattan street (19 percent). Six percent of motorists who parked on-street in unmetered spaces (or just over one percent of all motorists surveyed) reported using a government-issued placard. However, due to the locations where surveys were conducted, the number and share of placards may have been underestimated.

Five percent of motorists reported parking on the street in a metered space. Over the average duration of their stays, they paid about 14 times less than the fees paid by off-street parkers. It is assumed that most motorists who choose to park in a metered space do so for a limited amount of time and are not commuting to work in the CBD.

The remaining 42 percent of motorists reported paying for their own off-street parking in a garage or lot and presumably paid market rates for parking. Included in this amount are motorists who are self-employed and can deduct business-related expenses, such as the cost of parking, on their income tax forms, thus reducing their net income and their associated tax burden. Self-employed motorists have partially subsidized parking costs, but the amount of the tax break is insignificant with respect to its impact on their mode choice decisions, as described later in this report.

Commuters are not the only category of motorists who drive into New York's CBD. Whether these vehicles are traveling to the CBD on business (for example, to deliver or pick up goods from a CBD location), or to shop, visit a tourist attraction, visit a friend or relative, conduct personal business, or return to their home in Manhattan, they need a place to park. All of these vehicles contribute to congestion in and around the CBD.

Whether motorists pay for parking directly, indirectly, or not at all, the City has many parking-related policy options for discouraging them from driving into the

[11] Colliers International's 2007 Parking Survey. The median monthly parking rate was found to be $630 in Midtown and $500 Downtown. In surveys, the median daily price paid has been found to be as low as $24.42 because motorists take advantage of early-bird specials and weekly and monthly contracts where possible.

CBD. A combination of strategies may be most effective at diverting a large percentage of auto trips to other modes.

This report provides an overview of various categories of motorists who park in the CBD, introduces a range of parking-related measures that New York City might implement to make the option of driving into the CBD less attractive, estimates the potential impact of each of these measures on congestion in the CBD, and discusses other potential impacts of each measure on various stakeholder groups such as CBD residents. The remainder of the report is organized into the following sections:

- **Section 2.0, Analytical Framework,** answers the question "Who Parks in the CBD, and Why?" The section summarizes the various categories of CBD-bound motorists in terms of their parking options and describes the existing regulatory and economic framework (city parking regulations, average parking fees in the CBD, access to placards, availability of free on-street parking, etc.) in which motorists make their parking and mode choice decisions;
- **Section 3.0, Case Studies,** lays out the menu of parking-related measures available to New York City, based on the city's own past experiences and the experiences of other cities around the world;
- **Section 4.0, Applications to New York City,** explores the degree to which each of these measures could reduce congestion in and around the CBD and lays out issues that need to be addressed when implementing any or all of the proposed parking-reduction measures;
- **Section 5.0, Key Findings and Conclusions,** summarizes key findings; and
- **Section 6.0, References and Sources of Additional Information,** contains additional information and sources that may be useful for more detailed consideration of any of the recommendations or findings of this report.

2.0 Analytical Framework

2.1 Who Parks in the CBD, and Why?

This section will explore each of these categories of motorists outlined in the introduction in more detail. Table 2.1 contains a summary of the categories and establishes a nomenclature that will be used throughout the remainder of this report.

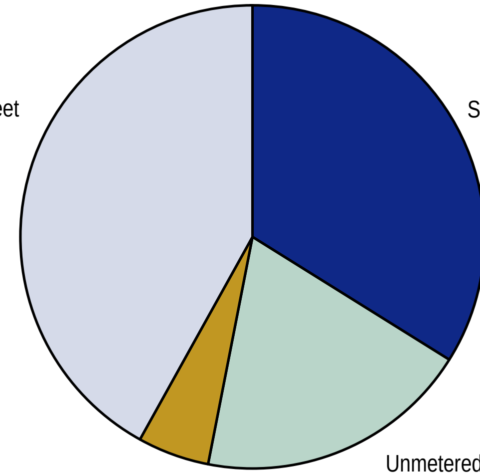
Table 2.1 Categories of Motorists Who Park in the CBD

Category	Includes motorists who:
Subsidized off-street	Are provided parking for free or at a significantly reduced cost by their employers, or are self-employed, and thus are able to partially deduct the cost of parking from their income taxes as a business expense
Unmetered on-street	Search for and find parking at an unmetered space on a street in the CBD
Metered on-street	Search for and find parking at a metered space on a street in the CBD
Paid off-street	Park off-street in a lot or garage and pay market rates
Placard (on-street or off-street)	Have been issued one of 20 categories of parking permits or placards by a Federal, state, or local government agency, and park either off-street or in unmetered on-street spaces. Placard parkers are a subset of the "Subsidized off-street" and "Unmetered on-street" categories.

Figure 2.1 shows the distribution of motorists who park in the CBD, according to a 2007 survey.[12]

[12]Schaller (2007).

Figure 2.1 Categories of Motorists Who Park in the CBD



*Note: Placard parkers are a subset of both the "Subsidized off-street" and "Unmetered on-street" groups.

Trucks and commercial vehicles, taxis, and livery vehicles are not included in Table 2.1, nor are they included in the data in Figure 2.1. Commercial vehicles also generate a demand for on-street and off-street parking in the CBD. While on the clock, workers park commercial vehicles in the CBD to make deliveries or conduct business (and are reimbursed for the cost of parking by their employer). Thus, they will exhibit characteristics similar to the "subsidized off-street" group. The demand for parking generated by commercial vehicles should not be ignored, and the impacts of policy changes on these groups must be taken into consideration. The city has already studied and taken measures to address the need for commercial vehicle parking. These measures will be discussed throughout this report.

Each of the categories of parkers in Table 2.1 is explored in more detail below.

2.2 Subsidized Off-Street Parking

Some Manhattan businesses reimburse their employees for all or a substantial part of their daily parking expenses, whether they are commuting to their office or traveling for business. The parking reimbursement may be negotiated into an employee's contract or may be provided as a fringe benefit as a matter of company policy. It is common practice for firms doing business in the city on a contractual basis to negotiate reimbursements for parking expenses and other business-related expenses into their contracts with their clients. Approximately 24 percent of motorists driving into the CBD to park are reimbursed by their employers for the expense.

Some businesses own parking spaces in or near their buildings and reserve these spaces for their employees' use. The spaces may be incorporated into the firm's lease, in which case it is difficult to determine the true cost of the space. Large construction sites in the CBD have off-street parking spaces reserved for some or all construction workers' private vehicles, in addition to spaces reserved for construction vehicles and equipment. Approximately 10 percent of motorists park in these reserved spaces.

As will be discussed below, some motorists driving vehicles with government-issued placards are permitted to park off-street in reserved spaces. It is estimated that one-quarter or more of motorists that park off-street in the CBD for free, or six percent or more of all motorists, have a placard or permit. These motorists will exhibit characteristics similar to other subsidized off-street parkers.

In any of these cases, the person doing the parking does not ultimately pay for all or some part of the parking. The subsidy artificially reduces the cost of parking, in some cases to zero, which makes the demand for parking among this group very inelastic. Virtually no city policy involving parking price increase will have an effect on this group's decision to drive into the CBD. Therefore for parkers in this group, solutions involving other types of financial incentives (excluding price increases) will be explored in Sections 3 and 4.

2.3 On-Street Parking

Nearly one in five motorists entering Manhattan's CBD reported parking in one of 22,100 unmetered spaces on the street, meaning they paid nothing for parking. Unmetered spaces are used by all types of vehicles throughout the day and night, but many are occupied during business hours by commuters who:

1. Drive into the city in the morning peak, thus contributing to congestion on routes used to access the CBD;
2. Circle the blocks of unmetered residential streets in the CBD in search of an available space, thus contributing to congestion within the CBD; and
3. Successfully find an available unmetered space.

Parking spaces on residential streets are often occupied by vehicles belonging to CBD residents. A number of these residents commute to jobs outside the CBD and vacate their spaces during the day, opening them up for CBD-bound commuters.

The five percent of motorists who do pay for on-street parking in one of 6,900 metered spaces in the CBD pay an average of $1.73 for the duration of their stay, about one-fourteenth what off-street parkers pay in the CBD.[13] Motorists who use metered space are much less likely to be commuters (since parking for eight hours is difficult if not impossible at most meters) and much more likely to be shopping, on personal business, or on other short trips.

In his book *The High Cost of Free Parking*, Donald Shoup discusses the implications of underpricing on-street parking. In Shoup's opinion:

> "Underpricing curb parking is no fairer than giving discounts on other public services merely on the basis of chance. Everyone would be outraged, for example, if cities allocated public housing on a first-come, first-served basis to anyone who wanted it, even to a rich miser. Allocating curb parking by cruising (circling the block searching for a free space) is not only unfair (in the sense that it randomly rewards a few lucky drivers), but it also wastes drivers' time and increases traffic congestion. Curb parking is a valuable public asset, and underpricing it is fiscally, socially, and environmentally irresponsible."[14]

Shoup argues that curb parking is not a public good, contrary to popular opinion, and advocates for cities to charge high enough prices for on-street parking that approximately one space in seven or eight remains vacant at all times (a vacancy rate of about 15 percent). He contends that "the cushion of vacant spaces eliminates the need to cruise," or circle the block searching for a free space. Cruising for parking is a significant source of traffic in congested areas. In a 2006 survey of drivers on Prince Street in SoHo, 28 percent of drivers said they were searching for parking.[15] Another study completed in 2007 found that 45 percent of drivers on Seventh Avenue in Park Slope, Brooklyn, were searching for a parking space.[16]

Section 3 will present case studies of other cities around the world that have increased on-street parking rates and experimented with variable time-of-day pricing for on-street parking. Section 4 will discuss the potential impacts of these measures on parking and traffic congestion in New York City.

2.4 PAID OFF-STREET PARKING

According to a recent study, 38 percent of CBD parkers personally paid their parking fees at off-street garages and lots. An additional four percent of motorists parking in the CBD report that they can deduct the cost of parking as a

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[13] Ibid.

[14] Shoup (2005), Page 313.

[15] Schaller (2006b).

[16] Transportation Alternatives (2007).

business expense, but, as will be explained below, the cost savings realized through this deduction are probably not significant enough to alter mode choice decisions.[17] The motorists who were surveyed reported that they paid an average of $24.42 per day to park in the CBD.[18]

More than four out of five motorists parking in a garage in the CBD claimed to have paid the daily rate, as opposed to a weekly or monthly fee that would offer a discount, suggesting that they do not drive into the CBD every day.[19] There are many potential reasons for this behavior, including:

- Telecommuting;
- Splitting time between a suburban office and a CBD office;
- Frequent business travel that requires days out of the office; or
- Perhaps the most common reason, a business-related trip (such as a meeting away from the office) or a personal trip (such as a doctor's appointment) that is chained with the commute trip at the beginning, middle, or end of the work day and therefore increases the attractiveness of driving over other modes on that particular day.

Motorists who pay for their own parking may benefit from Federal tax breaks for commuter-related parking expenses. Under Section 132(f) of the Federal tax code, employees may elect to withhold up to $215 per month from their gross (pretax) salary to pay for commute-related parking expenses. Businesses benefit from the FICA-related[20] savings associated with their employees' pre-tax withholdings. The benefits of this program are somewhat modest, however, when one considers that even at the highest Federal tax bracket of 35 percent, this would result in savings of just over $900 per year in Federal taxes, in addition to smaller state and city tax savings, depending on place of residency. Assuming a monthly parking fee of $537 (the daily rate of $24.42 multiplied by 22 business days per month), the annual tax savings would amount to about $645 per year for a person with a moderate income, a little more than one month of free parking or 10 percent of the total annual parking costs of $6,447. Table 2.2

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[17] Schaller (2007).

[18] Ibid.

[19] Ibid. The 82 percent of motorists who paid the daily rate as opposed to a discounted monthly or weekly rate includes those in the "market-rate off-street parking" group and those in the "subsidized off-street parking" group.

[20] Federal Insurance Contributions Act, which governs Social Security and Medicare payroll taxes. Section 132(f) withholdings reduce an employee's gross salary for purposes of calculating FICA-related taxes, which are then split evenly between employers and their employees. Thus, employers can realize modest financial benefits by encouraging their employees to use Section 132(f) withholdings.

contains examples of calculations for a lower-tax-bracket commuter (Person A) and a higher-tax bracket commuter (Person B).

Table 2.2 Potential Tax Savings with Pre-Tax Withholding for Two Income Levels and Two Parking Locations

	Person A	Person B
Without Paycheck Withholding		
Annual salary	$60,000	$240,000
Monthly gross income	$5,000	$20,000
Federal income tax rate	25%	35%
Monthly Federal income tax	$1,250	$7,000
Annual Federal income tax	$15,000	$84,000
With Paycheck Withholding:		
Annual salary	$60,000	$240,000
Monthly gross income	$5,000	$20,000
Monthly pre-tax paycheck withholding for parking	$215	$215
Adjusted gross income	$4,785	$19,785
Federal income tax rate	25%	35%
Monthly Federal income tax	$1,196.25	$6,924.75
Annual Federal income tax	$14,355	$83,097
Annual Federal income tax savings	$645	$903
Monthly parking fee	$537	$537
Annual parking fee	$6,447	$6,447
Tax savings as percentage of parking cost	10%	14%

Those who are self-employed may be eligible to deduct 100 percent of the cost of parking as a business expense when calculating their net income for income tax purposes but, similar to the calculation above, the actual savings as a percentage of total parking costs are, at most, equal to a person's marginal income tax rate. Therefore, although their costs may vary slightly, for purposes of this discussion, self-employed parkers are treated like others who pay the full cost of off-street parking.

Regardless of their reason for driving into the CBD, of all the categories of parkers analyzed in this report, those who pay out-of-pocket for off-street spaces are among the most susceptible to price increases (Motorists who park in metered and unmetered on-street spaces are also price-sensitive and will be discussed separately below). Various increases in the cost of parking may cause some share of this group to shift from auto commuting to another mode.

Section 3 discusses methods other cities have used to increase the price of off-street parking, and Section 4 contains a discussion of the price elasticity of demand for parking in New York's CBD and potential ways for the city to take advantage of pricing strategies that discourage parking.

2.5 Placard Parking

New York City government agencies, the State of New York, and the Federal government all issue parking permits to certain employees that enable them to park their personal vehicles for free in designated areas. Additionally, many agencies own their own vehicles for official use that are driven in and around the CBD during peak periods. In all, there are more than 20 categories of legal placards and permits, plus a variety of unofficial and illegal placards, such as those issued by unions. The categories of legal placards are summarized below:

- Clergy;
- Corrections-Union;
- Court Officer;
- Court Clerk;
- Disability (SPI);
- DoE Teacher's Permit;
- DOT Agency Business Parking Permit (three-hour limit);
- FDNY (not UFA permits);
- FDNY Union – UFA;
- NYPD – Unrestricted;
- NYPD – Restricted;
- Official Business – City of New York;
- Official Business – State of New York;
- Police – Department Investigation;
- Police – District Attorney;
- Police – Federal Law Enforcement;
- Police – State of New York (NYSPD);
- Press;
- USPS; and
- Other.

Figure 2.2 shows an example of a New York Press license plate and a sign designating one side of a street for vehicles with placards.

Figure 2.2 New York Press License Plate and Related Regulatory Signage

According to 2000 Census Journey to Work data, 33 percent of government workers in Manhattan's CBD drive to work. Government workers are more than twice as likely to drive to work in the CBD as private sector finance, real estate, and professional service workers, a group whose median income is several times higher. The vehicles they drive may be official government vehicles or their personal vehicles. Some employees need their vehicles throughout the day to attend meetings or conduct field visits, explaining their need for a parking permit. Others with placards include members of the clergy who may need to visit a hospital; ambulances; court officers; and teachers who need a parking space near their school.

There are no reliable data available on the number of government placards issued and to whom they were issued. Each government agency is responsible for setting its own criteria for issuing placards and tracking their distribution and use. Section 3 discusses an approach used by the Federal government to reduce demand for government worker parking in Washington, D.C.

3.0 Case Studies

Section 2 laid out the types of motorists who park in New York City's CBD and suggested reasons why each of these groups chooses to drive into the CBD to park instead of using other modes. This section introduces several examples of potential strategies that discourage parking in the CBD. The strategies are presented as a series of case studies from several cities around the globe that have addressed the problem and may provide lessons for New York City. Table 3.1 summarizes the case studies presented in this section.

Table 3.1 Case Studies of Strategies to Discourage Parking in CBDs

Area	Strategy
Boston, Massachusetts, USA	Parking Freeze in downtown Boston and two other neighborhoods limits growth in supply of off-street parking. Resident Permit Parking Program restricts unmetered on-street parking to CBD residents.
San Francisco, California, USA	Imposed 25% ad valorem tax on all commercial, off-street, non-residential parking transactions.
Redwood City, California, USA	Meter prices increased to market rates to encourage turnover of spaces, increase space vacancy rate, and reduce demand for cruising for parking.
Canada, Sweden and Australia (all cities nationwide)	Employer-provided parking treated as a taxable fringe benefit.
California cities in air quality non-attainment areas	Parking "cash out" program provides employees the option of receiving either a free parking space or a cash payment equal to the value of that space.
Washington, D.C., USA	Government employees required to pay for parking that formerly was free.

3.1 Boston Parking Freeze

In 1976, the Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency (EPA) agreed on a new set of rules to limit the availability of commercial parking spaces in downtown Boston "to discourage automobile use in downtown Boston, to reduce vehicle miles traveled in the region, and to encourage and develop greater use of public transit."[21] The downtown "parking freeze" capped at 35,556 the number of public parking

[21] City of Boston Air Pollution Control Commission (1978), page 13.

spaces in commercial off-street facilities in Boston's CBD (see Figure 3.1). In order for new commercial parking to be built, spaces must be eliminated elsewhere in an amount equal to the number of new spaces being created. The freeze only applies to commercial off-street parking that charges a fee to the general public. Residential parking spaces are exempt, as are spaces reserved for the use of a building's employees, customers, and guests. This remains the longest-lasting parking freeze ever implemented by the U.S. EPA.[22]

Each year, the Boston Air Pollution Control Commission (APCC) inventories parking spaces in the zone covered by the freeze. If the current number of spaces does not exceed the capped number of spaces allowed in Boston's CBD, the excess spaces are added to a "parking freeze bank." Property developers must apply to the APCC for a permit to add new parking spaces in the freeze zone. The permit will only be granted if spaces are available in the bank, unless the parking spaces qualify for an exemption as described above.

Between 1977 and 1997, the total number of parking spaces in the freeze area increased by nine percent (primarily due to qualifying exemptions), while the number of employees downtown increased by 15 percent. After adjusting for inflation, long-term (daily) parking fees nearly doubled over this same period, as can be expected when demand exceeds supply.[23] Between 1970 and 1990, the percentage of commuters entering Boston's CBD by non-auto modes increased from approximately 47 percent to 54 percent. Transit mode share increased from approximately 32 percent to 39 percent. These increases can be explained in part by the parking freeze, and also by the fact that Boston saw significant transit upgrades and extensions of existing lines with virtually no highway improvements. In more recent years, disruptions caused by the Central Artery/Tunnel project (the "Big Dig") may have been responsible for continued maintenance of transit mode share in the region.

To discourage auto commuters from attempting to find free parking on streets in residential areas near the CBD, the City of Boston instituted a residential parking permit (RPP) program in addition to the parking freeze. The RPP program originally was implemented in areas near the CBD facing high competition between residents and commuters for parking, a problem that predated the freeze. As the freeze accelerated the expansion of commuter demand for parking to neighborhoods outside the CBD, the RPP program was expanded to cover 16

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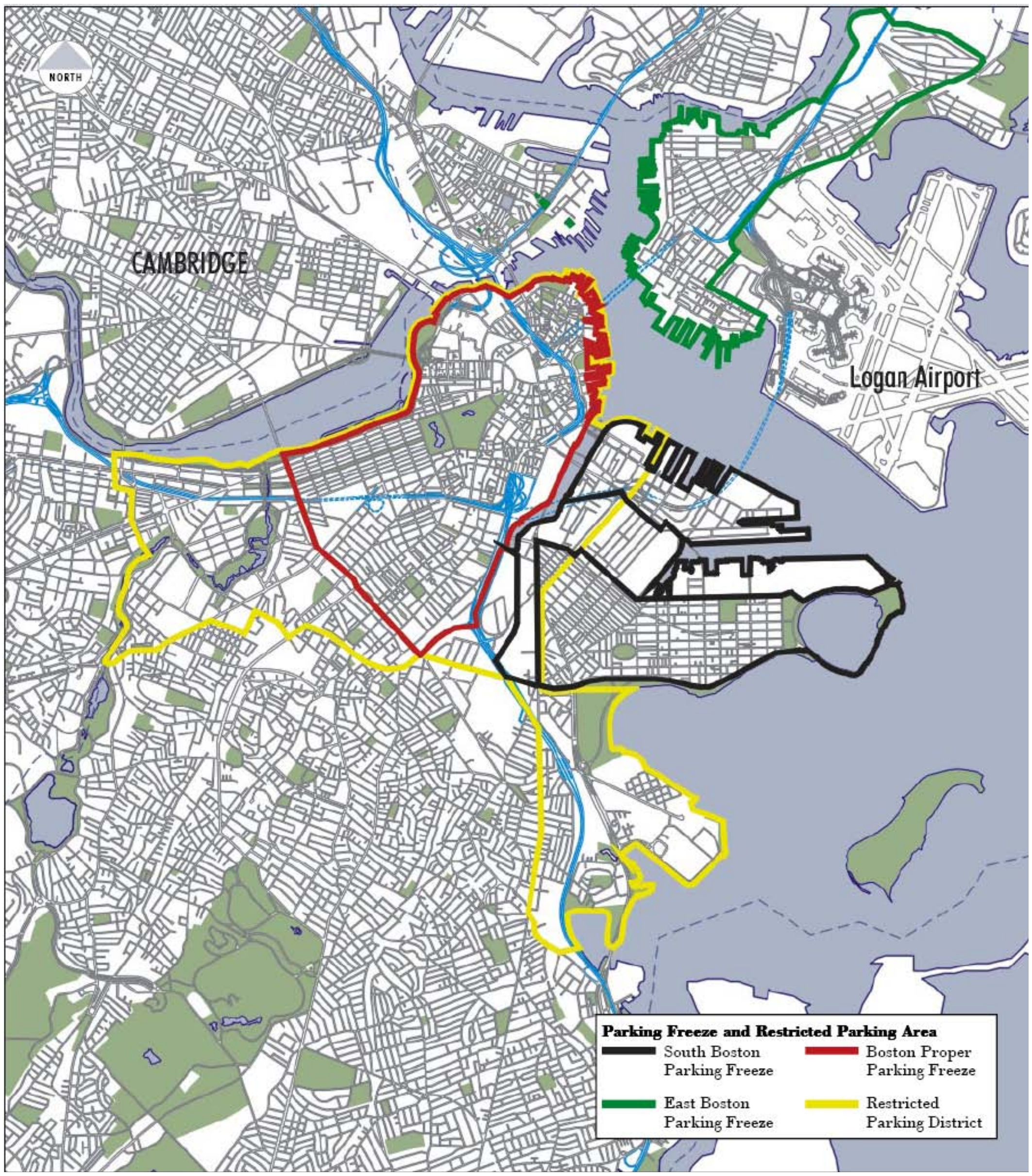
[22] New York City implemented a parking moratorium from 1973 to 1981 in response to a similar EPA mandate that the city improve its air quality to comply with the Clean Air Act. The parking moratorium lasted until 1981, when a new set of rules reducing the number of accessory parking spaces allowed in new buildings and conversions and restricting the size and location of freestanding parking structures and lots went into effect for Midtown and Downtown. Most new parking in Manhattan today requires approval of the City Planning Commission.

[23] City of Boston (2001).

neighborhoods inside and outside the CBD, including transit station areas (where commuters began to park and take a short ride to the CBD) and the area surrounding Fenway Park. The RPP program is now viewed as an essential component of Boston's overall parking supply management program.

Figure 3.1 Map of Limits of Boston Parking Freeze



Source: Access Boston 2000-2010, Boston's Citywide Transportation Plan (2001). "Parking in Boston," page 18.

A South Boston Waterfront parking freeze, covering parking lots within walking distance of the CBD in an area with a rapidly developing commercial office market, went into effect in 2004. A freeze in East Boston, covering commercial and employee parking at Logan Airport, as well as park-and-fly parking spaces and rental motor vehicle parking spaces at nearby businesses serving Logan Airport, was instituted in 1989. These zones are covered by regulations similar to those in the CBD zone, but are administered separately. The South Boston parking freeze covers all types of spaces, not just commercial public spaces as in the downtown. It is too early to tell the impact that this freeze will have on this rapidly evolving area.

One negative impact of the Boston CBD parking freeze has been the limited availability of short-term parking for CBD visitors on non-commute trips, such as retail, recreation, and entertainment trips. Available spaces tend to be marketed primarily to longer-term commuter parkers due to the financial benefits of having a consistent and dependable stream of revenue via monthly parking contracts. Short-term parking rates, as a result, tend to be extremely expensive (well over $20 for one to two hours of parking). The Boston Convention and Visitor's Bureau, which owns a large underground parking garage under Boston Common, recently has proposed increasing the size of the garage, and thus the number of spaces controlled by the parking freeze, to better accommodate visitors to the CBD.

3.2 San Francisco Parking Tax

In October 1970, San Francisco instituted a 25 percent tax on all public and private off-street parking in the city. Residential spaces were exempt, and rates were unchanged for metered spaces. The tax forced the largest citywide rate increase in San Francisco's history and had a dramatic and measurable effect on travel patterns in the city. Two years later, in response to public outcry, the rate was reduced from 25 percent to 10 percent. In the meantime, the rate changes provided an ideal test bed for the effects of parking price increases.

A 1974 study[24] estimated elasticities of demand for parking with respect to price[25] at 13 municipal garages and 10 surface lots in San Francisco, using data from before and after the 25 percent parking price increase at all publicly-available parking in the city. Across all types of travelers, an average price elasticity of -0.3 was observed, indicating a 0.3 percent reduction in demand for parking for every 1 percent increase in parking price. CBD travel was estimated to drop by 2 percent, but the study author was not able to make a clear connection between the parking tax increase and a reported decrease in the growth of traffic crossing the Golden Gate Bridge.

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[24] Kulash, D. (1974), as summarized in Vaca et. al (2005).

[25] The elasticity of demand with respect to price describes the sensitivity of motorists to increases in the price of parking. For example, an elasticity of -1.0 indicates that a one percent increase in the price of parking causes a one percent reduction in the demand for parking.

At the peak of the parking tax, when the rate was set at 25 percent, the parking operators' net revenues were estimated to have fallen 36 percent, compared to their projected revenues had the tax not been imposed. The estimated losses incurred by operators exceeded the revenue generated from the tax by San Francisco government, raising questions about the economic efficiency of the tax.

3.3 Canadian, Swedish, and Australian Taxes on Parking Benefits

Section 2 described the many New York City CBD parkers who receive a free parking space as a fringe benefit from their employers. In Canada, Sweden, and Australia, these benefits would be taxed as income. In practice, the tax has proven difficult to enforce. Revenue Canada (the Canadian counterpart to the IRS) provides many exemptions that render the parking benefit tax moot, and Sweden and Australia find compliance rates are low and enforcement too expensive to be worthwhile. In fact, in Sweden, public opinion surveys found that one of the key objections to the congestion pricing program in Stockholm was a prediction that those with company cars would not have to pay the congestion fee, based on a history of lax enforcement of the parking levy.[26]

In Canada, the value of parking benefits is assessed at the fair market value of parking in the area surrounding the employee's parking space. Employees that require the use of their vehicle for daily job functions are not required to pay the tax. Exemptions also are granted in the case when employers find it difficult to determine the fair market value of the space (in which case the value is assumed to be zero), or when the space is in an open lot shared by multiple employees (as is the case with most parking lots), as opposed to being specifically assigned to the employee.

In Sweden, any benefits in kind, including use of an employer-provided car, fuel used for that car, and any travel to and from work meetings that are reimbursed by an employer, including parking, must be reported as taxable income. Employers are required to provide the registration number of the employer-provided car for verification by the Swedish Tax Agency. The agency reports that compliance rates are low.

The Australian Taxation Office requires assessment of a tax on car parking fringe benefits only when there is a parking lot within one mile of the employee lot that charges a rate above a monetary threshold that increases annually. If there is no pay parking lot within one kilometer, the space is assumed to have zero market value and no tax is assessed. The tax is assessed on the employer on a daily basis, prorated for the number of days the space is used each year. The car must be parked for more than four hours between 7 a.m. and 7 p.m., it must be under

[26]Swedish National Road Administration (2003).

the control of or leased to the employee, it must be parked at the employee's primary place of employment, and it must be used for at least one trip to or from the employee's home that day.

Studies published by the Swedish cities of Göteborg and Stockholm predicted that strictly enforcing the country's existing parking benefits tax law could reduce car traffic by between five and 10 percent in Göteborg and 13 and 17 percent in Stockholm. In the City of Stockholm, the potential for increased tax revenue is estimated at 60 million Swedish Kronor (approximately U.S. $9 million) per year. Nationwide, potential revenues were estimated at 150 million Kronor (U.S. $23 million) annually.[27]

3.4 California Parking "Cash-Out"

In 1992, after Congress passed the 1990 Clean Air Act Amendments, California enacted legislation requiring many companies in air quality non-attainment areas to offer their employees a cash allowance in lieu of a subsidized parking space. The reasoning behind the law was that if offered cash, employees might consider other alternatives, such as biking, using transit, or carpooling, rather than driving alone to work. Firms whose parking was unbundled from their building lease found the initiative appealing because it allowed them to release unused spaces back to their landlord, saving money. Firms who owned their own parking in areas where parking supply was limited could generate revenue by leasing unused spaces to other firms or to the public.

Parking cash-out does not increase the cost of parking. Instead, it increases the benefit of *not* parking. There are tax implications for both employers and their employees, however. Employees who choose to receive a parking cash-out payment in lieu of a parking space see an increase in their gross pay, which affects Social Security[28] and Medicare taxes (which are split between the employee and the firm) as well as income taxes (which are paid by the employee). As an alternative, employees may continue to receive the free parking space with no change in their compensation, and no consequences to the firm or any other employees.[29]

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[27] Office of Urban Transportation, City of Göteborg (2005), and Office of Regional Planning and Urban Transportation, Stockholm County Council (2003).

[28] Workers pay Social Security taxes only on the first $90,000 in income. An employee with a salary over $90,000 would not see any increase in Social Security taxes as a result of taking a parking cash-out payment, but would see an increase in Medicare taxes.

[29] Prior to 1998, the Internal Revenue Service ruled that if an employer offered parking cash-out to any employee, all parking benefits to all employees would be taxable. An act of Congress overturned that ruling, and since 1998 parking cash-out has had no tax consequences for employees who do not elect to receive the benefits.

Today, parking cash-out is considered a success at those firms that implemented the initiative, but implementation has not been as widespread as some had initially hoped. A study of eight employers who implemented parking cash-out after 1992 found that the share of commuters driving alone to work fell from 76 percent to 63 percent across all firms. One firm in Downtown Los Angeles with relatively high parking costs saw the share of solo drivers plunge from 75 percent to 53 percent with parking cash-out, while firms in Santa Monica and West Hollywood, where parking was cheaper and thus the cash-out less attractive, saw more modest decreases in solo driving (from 72 percent to 70 percent in the least favorable case). The share of commuters carpooling increased from 14 percent of all commuters to 22 percent across all firms. Transit use among employees of these firms increased from six to nine percent, while walking and biking shares increased about one percentage point and one tenth of a percentage point, respectively. Total vehicle miles traveled fell by five to 24 percent for the eight firms studied, with the largest decreases in Downtown Los Angeles. It is estimated that parking cash-out resulted in a savings of 1.1 million vehicle miles traveled.[30]

3.5 Market Rate Parking Meters in Redwood City and San Francisco, California

Redwood City, California, a suburb of San Francisco, has become a national example of best practices in parking management. San Francisco has conducted a pilot project involving market-rate meters in downtown.

As part of a downtown revitalization strategy, Redwood City set its parking meters to charge rates that would ensure a 15 percent vacancy rate, or about one available space out of every eight. The city also dedicated parking meter revenue to pay for improvements on each block where meters are installed.

Redwood City works with businesses and new developers to ensure that existing parking is used to the maximum extent possible and to limit the need for new parking. The City manages on-street and off-street parking to ensure sufficient availability at all hours of the day. The City has been successful at managing demand during regular business hours on weekdays and also on weeknights and weekends when visitors come to the downtown to attend shows and go shopping.

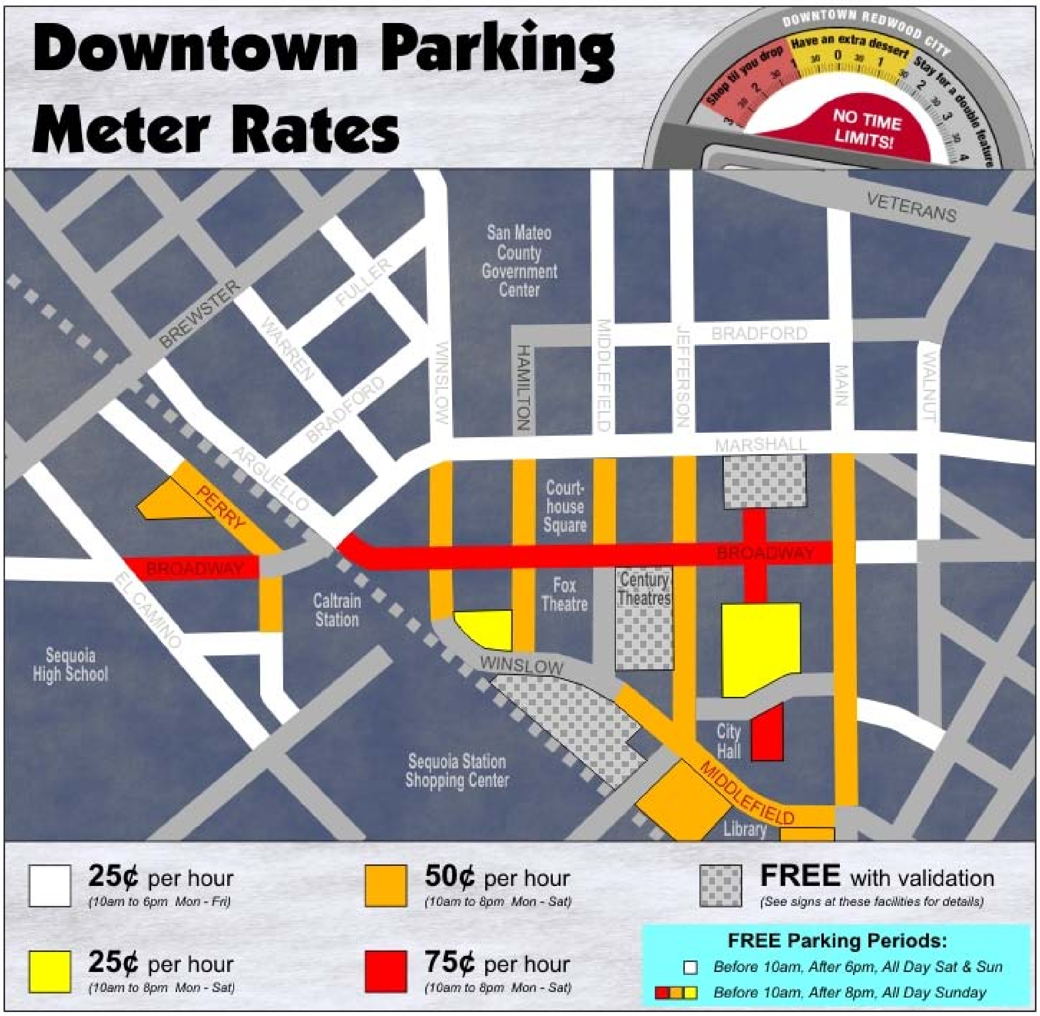
Before the current plan was implemented, Broadway, a main thoroughfare in downtown, had free parking, leading to congestion and competition for space, while nearby metered spaces (which also were a longer walk from businesses located on Broadway) sat empty. After implementing the highest parking meter rates (75 cents per hour) on Broadway, demand for parking was redistributed

[30] Shoup (1997).

throughout the downtown to side streets, surface lots, and nearby parking structures.

Redwood City has set rates for on-street parking at 25, 50, or 75 cents per hour, depending on demand on each street and each block (see Figure 3.2). Payment is made at pay and display meters, similar to New York City's Muni-Meters. Commuters can purchase monthly permits for garages in the area. The simplicity of the rate structure and payment aids enforcement and compliance with parking regulations.

Figure 3.2 On-Street Parking Meter Rates and Off-Street Rates in Redwood City, California



Source: City of Redwood, California.

Revenue from the meters is returned to a redevelopment district surrounding the city center. Parking meter revenues funds sidewalk improvements, street cleaning, and police patrols. Redwood City took lessons learned in other communities to heart and avoided directing revenues to its general fund.

Instead, it built a relationship with the business community in the downtown redevelopment area and is working with them to ensure parking management is successful for the city's residents, visitors, and businesses.

In light of Redwood City's experience, San Francisco County Transportation Authority and the Port of San Francisco are studying the effects of raising on-street parking meter rates in downtown San Francisco. The Port recently conducted a pilot study involving 200 spaces that the agency controls in downtown San Francisco. The Port found through revealed-preference analysis that commuters were willing to pay up to $5 more per hour for on-street parking than current rates. The Port also estimated that demand, particularly in peak hours, is very inelastic: a 50 percent increase in rates yielded a 5 percent decrease in peak period occupancy, an elasticity of -0.1.[31]

3.6 Charging for and Prioritizing Use of Government Employee Parking in Washington, D.C.

In 1979, the Federal government required Federal employees in Washington, D.C. to begin paying one-half of the prevailing rates at local garages in downtown Washington, D.C. Previously, employees were able to park for free in government-contracted lots and garages that were run by private entities. A study that compared drive-alone mode shares at government facilities to a sample of non-government control facilities found a one to 10 percent drop in auto commuting in central city areas and a two to four percent drop in outlying areas.[32]

The new pay-to-park requirement was accompanied by a Federal commitment to fund the Washington Metro, a new regional rail system. Since 1979, the various government agencies located in downtown Washington have limited the addition of new parking, and instead have promoted transit use among their employees as government has grown in size. In the closing weeks of his term in office, President Jimmy Carter issued Executive Order 12191, the Federal Facility Ridesharing Program, which required executive agencies to "actively promote the use of ridesharing (carpools, vanpools, privately leased buses, public transportation, and other multi-occupancy modes of travel) by personnel working at Federal facilities to conserve energy, reduce congestion, improve air quality, and provide an economical way for Federal employees to commute to work."

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[31] San Francisco County Transportation Authority (2007), p 21.

[32] Miller and Everett (1982).

The order also led to the establishment of guidelines for each Federal agency to assign priority to parking spaces in Washington and around the country. The Code of Federal Regulations contains the following guidance regarding the priority for reserved employee parking:

> "Federal agencies must assign available parking spaces to their employees using the following order of priority:
>
> a. Severely disabled employees (see definition in §102–71.20 of this chapter);
>
> b. Executive personnel and persons who work unusual hours;
>
> c. Vanpool/carpool vehicles;
>
> d. Privately owned vehicles of occupant agency employees that are regularly used for Government business at least 12 days per month and that qualify for reimbursement of mileage and travel expenses under Government travel regulations; and
>
> e. Other privately owned vehicles of employees, on a space-available basis."

This is only one example of guidelines that have been established for government employee parking around the country. Outside Washington, D.C., the Federal government has attempted to locate offices in areas with good transit accessibility, limit availability of parking, and encourage ridesharing. These policies, along with the strict limitations on parking in downtown Washington, D.C., a high-quality service on the Washington Metro, high levels of traffic congestion in the Washington metropolitan region, and poor highway accessibility to Washington's core, have shifted a large number of Federal government employee commute trips from auto to transit. An estimated 42 percent of rush hour commuters on Metro are Federal employees, who make up less than 14 percent of the region's workforce.[33]

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[33] National Capital Planning Commission (2004).

4.0 Applications to New York City

The case studies in Section 3 have identified several potential parking policies that New York City could implement in order to discourage travel by auto to the CBD. This section will discuss possible applications of each strategy within New York City's unique regulatory and economic framework.

Some examples of measures that public agencies have taken to influence mode choice through parking policies may be applicable to New York. Options to be addressed in this section include:

- Freezing the number of parking spaces in various categories in the CBD at a set level and denying future applications for new parking unless other parking spaces are eliminated;
- Eliminating Manhattan residents' parking taxes discount for off-street parking;
- Taxing off-street, subsidized parking benefits as income;
- Conducting outreach and incentive programs to encourage property owners and businesses to charge for parking, or to implement "cash-out" programs that offer the employee either a free or subsidized parking space or its equivalent cash value as a benefit;
- Raising the price of on-street metered parking and installing meters on streets in the CBD that currently have unmetered parking; and
- Reducing the number of government-issued placards.

Table 4.1 provides an overview of how each type of policy could impact each of the categories of motorists described in Section 2. A more detailed discussion follows.

Table 4.1 Impacts of Potential Parking Initiatives on CBD Motorist Categories

	Impacts on CBD Motorist Categories				
Strategy	Market-Rate, Off-Street	Subsidized Off-Street	Metered On-Street	Unmetered On-Street	Placard (On-Street or Off-Street)
Parking freeze	Total number of motorists remains constant, but auto market share declines in long-term				
Eliminating Manhattan residents' parking tax discount on off-street parking	High	Low-Medium	Low	Low	Low
Taxing off-street subsidized parking as income	Low	Medium	Low	Low	Low
Parking cash-out	Low	Medium-High	Low	Low	Low
Increasing rates at on-street parking meters	Medium – potential for increased competition from metered parkers	Low	High	High	Low
Reducing placard parking	Low	Low	Low	Low	High

VMT impacts are estimated for each of these options, except for the change in taxes on off-street parking and reduction of placard parking. VMT impacts for these two alternatives will be estimated separately using the Best Practice Model (BPM).

4.1 Parking Freeze

New York City has had strict regulations on the provision of parking spaces in new developments in the CBD since the end of the parking moratorium in 1982. Most new developments and redevelopment projects in Manhattan south of 96th Street already require special approval of the Planning Commission to add new parking spaces, and most new spaces are added for resident "accessory" parking, as opposed to parking accessible to commuters.

Instituting a parking freeze, as has been done in Boston, could be a viable long-term approach to managing parking demand in New York City's CBD. (There is some evidence, however, that the redevelopment of surface lots in the CBD to higher economic uses has resulted in a decline in parking spaces in recent years.) With a parking cap, it would be relatively easy to predict future demand for auto trips ending in the CBD, since the supply of parking spaces ostensibly would not change. As the number of jobs in the CBD increases, demand for parking would increase, and prices would rise commensurate with demand.

The largest impact would be expected for the market rate off-street parking group, but effects would not be felt until (and unless) demand for parking grows substantially in the future, and even then only the additional trips would be impacted. Unless the parking cap is instituted as a parking reduction measure in the early phases, a parking freeze will have no short-term effect on demand for trips to the CBD, and it would have no short or long-term effects on through trips or trips by vehicles dropping off people in the CBD. In fact, one consequence of a parking freeze could be an increase in VMT if vehicles are forced to drive around the CBD in search of a free on- or off-street parking space.

A parking freeze would require a thorough initial inventory of all on- and off-street parking spaces in the CBD. Boston recently has needed to clarify its methodology for conducting the parking inventory, especially with respect to parking lots that lack marked spaces. New York City would need to have a thorough quality assurance/quality control process to ensure that all spaces and lots are counted accurately. After completing the initial inventory, the City would then need to assume the responsibility of tracking parking space deletions and reviewing applications for additional spaces when excess spaces become available. The City would need to track changes in ownership as well and determine how these changes would affect the parking space permits. Decisions would have to be made regarding the categories of spaces included in a freeze such as all, all commercial, commercial open to the public, residential, etc.

4.2 Increasing Taxes on Off-Street Parking

Increasing taxes on off-street parking would primarily affect those drivers who currently pay for their own market-rate off-street parking. These drivers are not limited to commuters: visitors and those conducting business in the city may be affected as well. To the extent that the tax increase is high enough to be felt by companies that own parking spaces and provide them to their employees, there could be some impact on parkers in the subsidized off-street group, but for purposes of this discussion they are assumed to be immune to the tax increase.

An option that could be considered to increase taxes on off-street parking includes:

- Eliminate the discount for Manhattan residents. New York City currently has a two-tiered sales tax on parking. Manhattan residents who park their cars long-term and do not use the vehicle for business purposes pay

10.375 percent, while others pay 18.375 percent on the value of the parking fee.[34]

Elimination of the parking tax discount for Manhattan residents would reduce the number of drivers using off-street parking spaces. Assuming that these drivers chose to travel in the CBD by transit, increasing the tax would reduce VMT in the CBD. Any vehicle miles traveled reduction would be in the market rate, off-street category, since increasing the parking costs would have very little effect on the other categories of parkers. VMT impacts will be estimated separately for this alternative using the BPM.

It is also possible that the elimination of the discount would not reduce VMT. Parking operators in New York also might simply choose to absorb the cost of the tax, rather than pass it on to their customers, since the lowest-cost operating strategy appears to be to fill their lots as early in the day as possible with all-day parkers. The result of the elimination of the off-street parking tax increase could therefore be to reduce parking operators' profits, with no reduction in travel demand or VMT.

4.3 Taxing Off-Street, Subsidized Parking as Income

For a variety of reasons, a tax on the value of off-street, subsidized parking would have a very small effect on people who get free parking from their employer. Only New York City residents pay city income taxes, and since the tax ranges from only 2.907 percent to 3.648 percent of income, the effect of the new parking benefit tax would be much smaller than a direct tax or fee increase that would raise the cost of parking.[35]

Using the same assumptions as in the previous example, if a worker's parking costs increase by 3.648 percent per year, the daily VMT in the CBD could be reduced by an estimated 450 miles. The VMT reduction is calculated only for the portion of the trips inside the CBD. VMT for the remainder of these trips outside the CBD also would be reduced.

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[34] To qualify for the resident tax rate, Manhattan residents must submit an application to the New York City Department of Finance. Residents must park their cars for one month or longer, have the vehicle registered to a Manhattan address, and use the car exclusively for personal use.

[35] To have a much greater effect on VMT, as has been the case in Sweden, Canada, and Australia, the State and Federal tax codes would have to be altered to treat parking benefits as taxable income, which in turn would increase total taxes significantly on those drivers who currently have an employer-provided parking space in the CBD. For purposes of this discussion, it is assumed that the tax change would be made by New York City only, and would affect New York City residents only.

The calculation, shown in Table 4.2, assumes the following:

- An estimated 194,000 personal vehicles park in the CBD as part of a daily commute each day.[36] Only these commuter trips are assumed to be affected by the subsidized parking tax.
- A 2007 survey found that 24 percent of motorists parking in the CBD were reimbursed for the expense by their employers.[37] The same survey found that approximately 50 percent of the motorists who park in the CBD live in New York City (and therefore pay New York City income tax).
- The elasticity of demand for parking with respect to price is assumed to be -0.3, based on the experience of San Francisco.[38]
- Of those motorists who are discouraged from parking in an off-street space by the tax increase, about one in five would continue to drive into the CBD, but would find another place to park (for example, in an on-street space).

The city will have to address several issues if this initiative is implemented. First, it will be difficult to put a dollar value on the benefit provided by a free parking space. The average price of parking in the CBD, or in a subsection of the CBD, or in the particular garage where the space is located, would have to be assumed, and the city would need to have some enforcement mechanism in place to ensure the parker or the parker's employer withholds the city income tax from the employee's salary, or reports the benefit as income on the employee's income tax return. Costs associated with this tax would be distributed among the agencies and personnel that are already responsible for collecting, assessing, and enforcing income tax in New York City and New York State government.

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[36] Schaller (2006a), page 45, cites Census Journey to Work data that indicate 270,000 people drive to work in the CBD each day. At an average vehicle occupancy of 1.4, this translates to 194,000 vehicle trips ending the CBD each day for commute purposes.

[37] Schaller (2007), page 9. The actual percentage of motorists affected by the tax could be considerably less because motorists in this category include both regular commuters who are provided a parking space by their employer (and would be affected by the tax) and motorists on infrequent business-related trip who are eligible to be reimbursed for their parking fees (and would not be affected by the tax).

[38] The elasticity may be less than the -0.3. If drivers are not given price signals each time they park, but instead are presented with a relatively insignificant increase in their gross pay, viewed on their regular paycheck stub or on their income tax form once per year, they are not as likely to be affected by the increase.

Table 4.2 Estimated Effect of Taxation of Parking Benefits on Daily Vehicle Miles Traveled in the CBD

Number of vehicles that park each day in Manhattan CBD (commute trips only)	194,000
Percentage who park off-street in employer-provided parking	24%
Number who park off-street in employer-provided parking	46,500
Number who park off-street in employer-provided parking, and pay city income tax (50%)	23,300
Percentage increase in monthly parking cost	3.648%
Elasticity of demand for parking with respect to price	-0.3
Percentage decrease in parking ([EXP(elasticity * ln[percentage increase in cost])]-1)	-1.1%
Motorists who no longer park off-street	250
Motorists who continue to drive into the CBD but park elsewhere (20%)	50
Motorists who no longer drive into the CBD (80%)	200
Average daily VMT per trip for trips ending in CBD (portion of trip in CBD only)	2.19
Estimated daily VMT reduction due to taxation of parking benefits	450
Percentage reduction in daily VMT	0.016%

Note: These calculations assume only commuters would be affected by taxation of parking benefits. Therefore, a baseline of 194,000 commuter vehicles is used rather than the 274,000 total passenger vehicles entering the CBD on a typical day.

4.4 Parking Cash-Out

Parking cash-out has been popular with businesses and employees in the limited number of cases where it has been implemented, but especially in New York City's CBD, each business must do a careful analysis of whether cash-out is a wise financial decision. Businesses must weigh the capital savings on parking (based on the cost of a parking space and the expected reduction in demand for parking) against the annual cost per square foot for the cash-out payments (including any additional tax liability they would incur due to an increase in their employees' gross incomes), and then compare annual cost for the cash-out payments as a percentage of capital savings against the cost of capital.

Assuming parking demand exceeds supply at the current price point in the CBD, parking cash-out can be an even more effective strategy for reducing demand for parking in the CBD if it is accompanied by a reduction in available parking spaces, such as a shift in allocation from solo drivers to carpools.

Various states and municipalities have taken different approaches to implementing parking cash-out. In California, a state law was passed that requires companies to offer parking cash out. Other states and cities have asked businesses to implement parking cash-out voluntarily. Most of the state's costs have been associated with producing and disseminating educational materials about parking cash-out, since the concept is not widely understood.

To estimate the potential VMT reduction that could be realized by encouraging additional employers to offer parking cash-out voluntarily (for example, by offering tax incentives to offset the additional Federal tax liability they would incur due to an increase in their employees' gross incomes), the following could be assumed:

- An estimated 194,000 personal vehicles park in the CBD as part of a daily commute each day.[39]
- Taking into account employers who already offer parking cash-out, employers representing an additional 10 percent of CBD employers would voluntarily offer parking cash-out;
- 10 percent of employees would accept a parking cash-out offer.[40] Some types of workers, such as construction workers who have free on-site parking, would be unlikely to participate.

Table 4.3 shows the calculation of VMT reduction that could be achieved by instituting voluntary parking cash-out.

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[39] Schaller (2006a), page 45, cites Census Journey to Work data that indicate 270,000 people drive to work in the CBD each day. At an average vehicle occupancy of 1.4, this translates to 194,000 vehicle trips ending the CBD each day for commute purposes.

[40] Shoup (1997) found that in California, parking cash-out offers reduced vehicle trips by 11 percent on average, and Schaller (2006a) found that 90 percent of auto commuters to New York's CBD have a transit option for their commute trip.

Table 4.3 Estimated Effect of Voluntary Parking Cash-Out on Daily Vehicle Miles Traveled in the CBD

Number of vehicles that park each day in Manhattan CBD (commute trips only)	194,000
Percentage who park off-street in employer-provided parking	24%
Number who park off-street in employer-provided parking	46,560
Number working at a firm that begins to offer parking cash-out for the first time (10%)	4,660
Number of drivers accepting parking cash-out offer (10%)	465
Average daily VMT per trip for trips ending in CBD (portion of trip in CBD only)	2.19
Estimated daily VMT reduction due to taxation of parking benefits	1,020
Percentage reduction in daily VMT	~0.02%

Note: These calculations assume only commuters would be eligible for parking cash-out. Therefore, a baseline of 194,000 commuter vehicles is used rather than the 274,000 total passenger vehicles entering the CBD on a typical day.

According to these calculations and assumptions, parking cash-out could reduce VMT by 1,020 miles per day, a 0.02 percent reduction. The VMT reduction is calculated only for the portion of the trips inside the CBD. VMT for the remainder of these trips outside the CBD also would be reduced. In a voluntary program, if tax incentives are offered by the city, the City's share of the cost of the tax incentives and any employer education programs would need to be taken into account.

Subsidized, off-street parkers, who make up less than a third of all parkers in the CBD, would be the biggest beneficiaries of a parking cash-out program. It is difficult to estimate what percentage of businesses would offer parking cash out (especially if the program is voluntary) and what percentage of employees would take the offer. Some types of workers, such as construction workers who have free on-site parking, would be unlikely to participate. All things considered, parking cash out is unlikely to have a significant effect on VMT in the CBD by itself.

4.5 Increase Rates for On-Street Metered Parking

Donald Shoup, in his book *The High Cost of Free Parking*, advocates for increasing the price of all on-street parking to market rates, including parking that is currently unmetered and parking that is metered. He defines market rates as the price that will result in a 15 percent vacancy rate, or approximately two to three spaces per crosstown block (long blocks on numbered Streets between Avenues, where most unmetered parking is found) in New York City's CBD.[41]

In order to achieve these vacancy rates, the city would have to experiment with prices to determine the right price on each block or in each neighborhood, as both San Francisco and Redwood City have done. Fortunately, Muni-Meters could facilitate the experiment, enabling variable pricing by time of day, by location, and by type of vehicle (as is already done in the Theater District and on some Midtown streets and a portion of Canal Street for commercial vehicles).

New York City already has experimented with market-rate pricing using Muni-Meters. On east and westbound streets from 23rd Street to 59th Streets from Second to Ninth Avenues, and on Canal Street between Bowery and West Broadway, free loading zones were eliminated as part of the city's Commercial Parking/Congestion Pricing Program. Commercial vehicles must now pay $2 for one hour, $5 for two hours, and $9 for three hours of parking for loading and unloading in these areas. At most of the spaces the rates are in effect from 7 a.m. to 6 p.m. Monday through Friday.

The Commercial Parking/Congestion Pricing program has provided the city with real-world experience in setting prices for parking to encourage turnover and make efficient use of curb space. Figure 4.1 shows an example of signage and a Muni-Meter display on a block where commercial vehicle pricing has been implemented.

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[41] Shoup claims that "Traffic engineers usually recommend that at least one in seven curb spaces—one space in every seven--should remain vacant at all times to ensure easy parking access and egress," and cites three traffic engineering books and studies on the impacts that cars searching for parking have on traffic flow and time spent searching for parking. [Shoup (2005) page 297.]

Figure 4.1 Example of Commercial Parking/Congestion Pricing Program Signage and Muni-Meter Charges

If discouraging retail customers is a concern with raising meter rates, the City could implement graduated rates, similar to those used in the existing Commercial Parking/Congestion Pricing Program for commercial vehicles. Lower rates for the first hour or two, following by steeply increasing rates for subsequent hours, could allow people to pay reasonable prices for short-term parking while encouraging turnover of spaces.

It is likely that increasing the metered rates in the CBD will push more parkers to unmetered blocks, which are primarily on residential streets. This could be prevented through a new system of residential parking permits,[42] which would limit alternate side spaces to neighborhood residents.

The imposition of higher rates for on-street parking in the CBD would affect VMT in two ways:

- First, VMT would be reduced among those drivers who are no longer circling the block in the CBD in search of parking. One of the key benefits of metered parking is the potential to reduce cruising for parking in the CBD. As mentioned previously, studies have found that a significant share of traffic on

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[42] The permits themselves could be priced at market rates to ensure supply meets demand. In several cities, permits are issued at zero or minimal cost to all who are eligible. Other cities, such as Toronto, have experimented with relatively high residential parking permit fees and/or have limited the number of permits to the number of available spaces.

CBD streets at various times of day is made up of motorists looking for a free parking space.

- Second, VMT would be reduced among motorists who are discouraged from driving to the CBD.

In a 2006 survey of drivers on Prince Street in SoHo, 28 percent of drivers said they were searching for parking.[43] Another study completed in 2007 found that 45 percent of drivers on Seventh Avenue in Park Slope, Brooklyn, were searching for a parking space.[44] Studies elsewhere around the world found that between 8 and 74 percent of the traffic was due to cruising for parking.[45]

To calculate the potential VMT reduction due to reduction in cruising, the following assumptions could be made:

- During a typical weekday in 2005, nearly 800,000 autos, taxis, trucks, and vans were estimated to have driven into Manhattan below 59th Street.[46] Personal vehicles made up 67 percent of this number, which is equal to 536,000 auto trips into the CBD. Pass-through trips made up 35 percent of this total, and four percent of vehicles entering the CBD made one or more stops but did not park, leaving 61 percent, or an estimated 330,000 vehicle trips ending in the CBD.[47,48]
- Of these 330,000 personal vehicles, approximately 16,500 (or 5 percent) park at a meter on the street.[49] Vehicles parking at metered spaces include some with placards. The exact proportion is not known, but for purposes of this estimate, it is assumed that 17 percent of vehicles parking at on-street meters, or 2,800, have placards, leaving about 13,700 vehicles parking at meters without placards.
- If it is assumed that each vehicle without a placard spends about 9 minutes[50] searching for on-street parking in the CBD, at an average speed of 6.5 miles

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[43] Schaller (2006b).

[44] Transportation Alternatives (2007).

[45] Shoup (2006), page 1.

[46] New York Metropolitan Transportation Council (2007).

[47] Schaller (2007), page 14.

[48] Schaller (2006a), page 2.

[49] Schaller (2007), page 9.

[50] Shoup (2005), page 290. Three 1993 studies of cruising for parking in New York were cited by Shoup, along with various other examples from around the world. The midpoint of the search times for the New York studies was about 9 minutes.

per hour,[51] each vehicle generates 0.975 VMT per trip searching for parking. A vehicle may make more than one trip and search for parking more than once per day in the CBD, but for purposes of this calculation, each vehicle entering the CBD is assumed to search for parking on the street only once per day.

- Placard vehicles have to search for parking, but their search time is assumed to be 6 minutes today, rather than 9 minutes, because they are able to park in metered spaces at no cost as well as certain spaces signed "No Parking" for general motorists. With an average speed of 6.5 miles per hour, each placard vehicle generates about 0.65 VMT per trip. Assuming the on-street meters would be priced high enough to guarantee a 15 percent occupancy rate, both placard parkers and other on-street parkers would benefit from the reduced search time. (The implications of on-street parking availability on placard parkers' decisions to drive into the CBD are discussed below.)

Table 4.4 shows the calculation of reduction in VMT due to reduced cruising for parking. VMT among placard parkers could be reduced by 300 miles per day, while all other parkers would reduce VMT by about 7,400 miles per day, for a total VMT reduction of 7,700 miles per day just due to a reduction in cruising (an overall reduction of 0.27 percent).

[51]This assumption is based on average travel speeds in Manhattan and considering that while searching for parking, motorists often travel at much slower speeds than overall traffic.

Table 4.4 Estimated Effect of Increasing On-Street Meter Rates on Daily Vehicle Miles Traveled in the CBD

		Placard	No Placard	Total
A	Number of commuters who park in metered spaces on the street each day in the CBD before price increase (trips)	2,800	13,700	16,500
B	Search time for on-street space before price increase (minutes)	6	9	
C	Average speed while searching for space (MPH)	6.5	6.5	
D	VMT generated by cruising, per vehicle ([B/60] * C)	0.650	0.975	
E	VMT generated by cruising before price increase (A*D)	1,800	13,400	15,200
F	Average daily VMT per trip for trips ending in CBD (portion of trip in CBD only)	2.19	2.19	
G	VMT generated by trips ending in the CBD before price increase (A*F)	6,100	30,000	36,100
H	Total VMT attributable to trips entering the CBD to park on-street before price increase (E+G)	8,000	43,300	51,300
J	Percentage increase in parking cost	0	167%	
K	Elasticity of demand for parking with respect to price	0.0	-0.3	
L	Percentage decrease in parking (EXP[K*ln(J+1)])-1)	0%	-25.5%	
M	Motorists who no longer park at a meter (A*L)	0	3,500	3,500
N	Motorists who continue to drive into the CBD but park elsewhere (20%)	0	700	700
P	Motorists who no longer drive into the CBD (80%)	0	2,800	2,800
Q	Number of commuters who park on the street each day in the CBD after price increase (A-P)	2,800	10,900	13,700
R	Search time after implementation of higher-rate on-street parking (minutes)	5	5	
S	Average speed while searching for space (MPH)	6.5	6.5	
T	VMT generated by cruising, per vehicle ([R/60]*S)	0.54	0.54	
U	VMT generated by cruising after price increase (Q*T)	1,500	5,900	7,400
V	Reduction in VMT due to reduction in cruising (E-U)	300	7,400	7,700
W	Percent change in VMT due to reduction in cruising	0.01%	0.26%	0.27%
X	Average daily VMT per trip for trips ending in CBD (portion of trip in CBD only)	2.19	2.19	
Y	VMT generated by trips ending in the CBD after price increase (Q*X)	6,100	23,900	30,000
Z	Reduction in VMT due to reduction in vehicle trips to the CBD (G-Y)	0	6,100	6,100
AA	Percent change in VMT due to reduction in vehicle trips to the CBD	0.0%	0.21%	0.21%
BB	Total VMT attributable to on-street parking after price increase (U+Y)	7,700	29,800	37,400
CC	Total reduction in VMT due to implementation of higher-rate on-street parking (V+Z)	300	13,500	13,900
DD	Percent change in VMT	0.01%	0.47%	0.48%

Note: Due to rounding, some figures may not total correctly.

To estimate the reduction in VMT due to drivers who are discouraged from driving into the CBD, the following could be assumed:

- As stated above, approximately 2,800 vehicles with placards park at meters and about 13,700 vehicles park at meters without placards.

- There are 29,000 curb spaces in the CBD, of which 6,900 have meters.[52] As the average motorist parks on-street for 3.6 hours,[53] it is clear that a typical metered space turns over multiple times throughout the day, accounting for the discrepancy between the number of meters and the number of vehicles parked at all meters in a given day.
- If, for purposes of this example, the hourly rate at an on-street meter were to be increased 167 percent, from $1.50 per hour to $4 per hour, rates would be closer to the average hourly rate paid by motorists who park in an off-street garage for the average occupancy of 6 hours per day. [54]
- Using the results from the San Francisco study, the elasticity of demand for parking at a metered space with respect to price is assumed to be -0.3, implying a 0.3 percent decrease in parking demand for each 1 percent increase in price.
- Motorists would have the alternative of parking in an unmetered space, but it is assumed that if an unmetered space were available in the neighborhood where the motorist was parking, the motorist would choose to park for free. As was assumed in the example above with an increase in the price of off-street parking, perhaps 20 percent of motorists priced out of metered spaces would switch to an unmetered space further from their destination or to a garage (which would be a comparable value after the meter rate increase, considering security, climate control, and other benefits of off-street parking), rather than switch to other modes or cancel their trips.

Table 4.4 shows the calculation of VMT reduction for vehicles entering the CBD, if the price of on-street parking meters in the CBD were to be increased to higher rates. The total VMT reduction could be 6,100, a 0.21 percent decrease. Vehicles with placards would not be affected, because they do not pay for on-street parking. The VMT reduction is calculated only for the portion of the trips inside the CBD. VMT for the remainder of the trips outside the CBD also would be reduced.

Accounting for trips within the CBD associated with cruising for parking plus trips to the CBD, increasing the price of all on-street parking in the CBD to higher rates could decrease VMT by a nearly 14,000 miles, about one half percent. The excess capacity could be absorbed by through traffic or delivery vehicles within the CBD, so these estimates may be high. The impacts would vary by neighborhood, since motorists with placards compete for metered spaces with non-placard parkers, commercial vehicles, and others to a different degree in, say, SoHo, than in the area around City Hall and other government offices.

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[52] Schaller (2007), page 6.

[53] Ibid, page 11.

[54] Ibid, page 11.

The costs of installing and maintaining new meters (which could be Muni-Meters) and new signage.

4.6 Reducing Placard Parking

According to a 2005 study, two out of the top 10 Census tracts in Manhattan where people drive to work surround the government offices and courts in Lower Manhattan. As mentioned in Section 2, 33 percent of government workers in Manhattan's CBD drive to work, and they are more than twice as likely to drive than private sector finance, real estate, and professional service workers. Reducing the rate of driving among government workers could be based on prioritization of placard issuance, similar in concept if not in details to the strategy employed by the Federal government in Washington, D.C.

VMT impacts will be estimated separately for this alternative using the BPM.

Monitoring and enforcing the use and misuse of placards could be an effective way to reduce trips by drivers with placards, but the city would bear the costs of tracking the placards and increased enforcement of their proper use.

4.7 Estimated Impact on VMT in the New York City CBD

In terms of reduction in vehicle-miles-traveled (VMT), strategies to increase the price of parking in the CBD would have a range of impacts, and some may even increase VMT. Initiatives that discourage parking in New York's CBD would impact vehicle trips ending in the CBD, but VMT associated with through traffic would be unaffected. It is even possible that some of the excess capacity freed up by trips that formerly were destined for the CBD could be absorbed by new through traffic.

Table 4.5 summarizes the potential VMT impacts of each strategy discussed in this section.

Charging higher rates for parking at on-street meters would be among the most successful parking-related policies in terms of VMT reduction. Increased on-street parking rates could reduce VMT associated with cruising for parking spaces, and it also would reduce the supply of long-term parking on streets in the CBD, thus reducing the VMT among commuters and other all-day parkers. This policy has the potential to reduce VMT by about 14,000 miles per day, about one half percent less than current levels.

Table 4.5 Impacts of Potential Parking Initiatives on VMT in the CBD

Strategy	Reduction in daily VMT in the CBD	Percent reduction in total VMT in the CBD
Parking freeze	No reduction in current VMT; potential reduction in future VMT growth	0%
Elimination of Manhattan resident parking tax discount	To be estimated using Best Practice Model	
Taxing off-street subsidized parking as income	450 VMT	0.016%
Parking cash-out	1,020 VMT	~0.02%
Increasing rates at on-street parking meters	14,000 VMT	0.5%
Reducing placarded parking	To be estimated using Best Practice Model	

Note: Does not include VMT reduction outside the CBD, and does not account for latent demand for driving in the CBD (e.g., by delivery vehicles and through traffic) that could offset the VMT reductions.

A parking cash-out program is unlikely to have a significant effect on VMT in the CBD on its own (approximately 1,020 VMT per day), but, assuming there is a shortage of parking in the CBD, parking cash-out can be a more effective strategy for reducing demand for parking in the CBD if it is accompanied by a reduction in available parking spaces, such as a shift in allocation from solo drivers to carpools. If there is no shortage, and parking can be priced to match demand, there is no need to eliminate capacity.

Taxing off-street subsidized parking as income would have little or no impact on commuter mode choice due to the very small percentage increase and real increase in the cost of commuting. The reduction may be fewer than 500 VMT per day.

A parking freeze would have no impact on current VMT, but it could help to reduce future growth in VMT. New York City's already-stringent regulations governing accessory parking in new developments, coupled with the high cost of land, may already be reducing the number of off-street parking spaces in the CBD.

5.0 Key Findings and Conclusions

There is no one solution to the problem of congestion in and around in New York City's CBD. The demand for parking is divided among several types of motorists, each of which has different characteristics and will have different reactions to potential policy changes. A combination of measures would achieve the greatest impacts. However, due to the extremely high demand for travel to and through the CBD, it is possible that the congestion reduction benefits of a particular parking strategy could be partially or completely offset by latent demand for through trips and other types of trips that use CBD streets (and the roadways leading to the CBD) but do not park. Estimates of VMT reduction cited in this report account for parking-related VMT only and do not consider latent demand.

The following are the major conclusions of this analysis:

- In terms of reduction in vehicle-miles-traveled (VMT), charging higher rates for metered parking could be among the most effective parking-related strategies analyzed in this paper. "Higher rates" implies a rate structure that would encourage regular turnover of spaces such that at any given time, about 15 percent of spaces are free (approximately 3 spaces per crosstown block if all spaces on the block are metered, or fewer if there is a mix of metered and unmetered spaces). The vacancy rate cuts down on traffic circling the block in search of parking and encourages turnover of parking spaces so that they can be used by short-term visitors rather than all-day workers. Because it reduces parking search as well as overall trips into the CBD, this strategy has the double benefit of reducing VMT and traffic congestion. To be most effective, it could be implemented in conjunction with a residential parking permit system to prevent spillover from metered to unmetered streets.
- Accounting for reduction in traffic circling the block and a reduction in trips entering and leaving the CBD, implementation of increased on-street parking rates could reduce VMT by about 14,000 miles per day, about one half percent reduction from current levels.
- Other strategies to increase the price of parking in the CBD would have only a modest impact, and some may even increase VMT. An elimination of the Manhattan resident parking tax discount may reduce VMT; however, if parking garage operators simply absorb the added cost to drivers and keep garage prices constant, there would be no effect on drivers and no change in VMT. An elimination of the parking tax discount may be the easiest strategy to implement, given that the infrastructure and regulatory framework for a parking tax is already in place, but there is a possibility that the change in tax policy could simply reduce operator revenues with no reduction in VMT.

- An estimated 42 percent of motorists who park in the CBD pay the full cost of off-street parking out of their own pocket. Some of these motorists can deduct the cost of parking as a business expense, but still pay a substantial share of the cost out of pocket even when the tax break is considered. However, an increase in the parking tax might also be the least equitable solution because motorists who currently are paying for parking would be forced to pay more (unless parking lot operators simply absorb the tax), while the "free" parkers would continue to be subsidized. An increased parking tax may even persuade some drivers to joint the ranks of "free" parkers, increasing VMT as they cruise in search of an open unmetered space where they can park for the day.
- An alternative may be to devise a method of influencing employers who provide free parking rather than taxing the individual consumers, but it is not clear if the VMT implications would be any different. About 34 percent of motorists receive free off-street parking from their employer, are reimbursed for the cost of parking by their employer or others, or have one of 20 categories of government-issued placards or permits that enables them to park for free in designated off-street spaces throughout the CBD. Motorists who have a guaranteed, reserved parking space at no cost are the most difficult to dissuade from driving into the CBD. New York City could attempt to implement a variety of measures to accomplish this goal, including taxing company-owned parking spaces directly, taxing parking benefits as income (which would have little or no impact on VMT or mode choice), encouraging or requiring employers to give their employees the cash equivalent for their parking benefit (which would produce a VMT reduction of approximately 1,020 miles per day), or restricting distribution and use of off-street parking placards.
- Initiatives that discourage parking in New York's CBD would impact vehicle trips ending in the CBD. Through traffic would be unaffected, however. It is even possible that some of the excess capacity freed up by trips that formerly were destined for the CBD could be absorbed by new through traffic. Given that through auto traffic as a percentage of total auto traffic at Hudson River Tunnels and East River Crossings ranges from 30 to 60 percent,[55] the City may wish to study potential impacts on through traffic before parking policies are implemented in New York.
- Options for further restricting already scarce and expensive parking in Central London were considered insufficient to reduce congestion to targeted levels given that through traffic was approximately 30 to 40 percent of all traffic in Central London before congestion pricing was implemented there.[56]

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[55] Schaller (2006a), pages 36 and 37.

[56] Booz, Allen and Hamilton (2006), page 23.

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Congestion Mitigation Commission Technical Analysis

License Plate Rationing Evaluation

technical

memorandum

prepared for

New York City Economic Development Corporation
New York City Department of Transportation

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date

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Table of Contents

List of Tables

List of Figures

List of Acronyms

BRT – Bus Rapid Transit

CQL – Congestion Queue Length

GDP – Gross Domestic Product

HNC – *Hoy no Circula*

ITS – Intelligent Transportation System

NYMTC – New York Metropolitan Transportation Council

OD – Origin Destination

VMT – Vehicle Miles Traveled

Executive Summary

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

License Plate Rationing is a possible approach to reduce congestion in New York to restrict some vehicular traffic from entering the Manhattan Central Business District City on particular days. Typically a License Plate Rationing program restricts a set of vehicles from entering a specified area on certain days based on the last digit of the vehicle's license plate.

License Plate Rationing has not been implemented in cities generally considered to be international peers of New York City, such as western European capitals, or Asian cities such as Tokyo or Singapore. For the most part, it has been implemented in Latin American cities with severe air quality problems and very different demographics than New York. This memorandum focuses on the three most enduring and well documented implementations in the Latin American cities of Mexico City, Mexico; Bogotá, Colombia; and São Paulo, Brazil. While there are lessons to be learned from the experiences, the documentation is not as thorough, impartial, or clear cut as might be the case were similar policies to be tried in the United States.

Mexico City started the *Hoy no Circula* scheme (No Circulating Day) in 1989. *Hoy no Circula* restricts access by cars with two particular license plate digits every weekday (e.g., license plates ending in the numbers "5" or "6" could not enter the city on Mondays). **Bogotá** implemented the *Pico y Placa* (Peak and License Plate) program in 2000. This program also restricts access to the city based on the last digit of a vehicle's license plate. It differs from Mexico City in that access is restricted during the peak period only, not a full day. Bogotá adds another layer of complexity by changing the numbering scheme every year, making it more difficult for households to maintain the right set of license plates to enable access each day of the week. *Pico y Placa* was implemented along with a Bus Rapid Transit (BRT) system and 180 miles of new bicycle paths to promote use of modes other than the personal vehicle. **São Paulo** implemented a License Plate Rationing scheme called *Rodizio,* restricting two numbers each day of the week since 1997.

The major findings of the studies of these implementations are as follows:

Short-Term Benefits – In both Mexico City and São Paulo, short-term benefits in the first year of implementation were well documented. In Mexico City, the trial implementation during the winter months of 1989 resulted in a 20 percent reduction in daily vehicles in circulation within the urban cordon area, increases in vehicle speed, decreases in fuel consumption, and a 6.6 percent increase in subway ridership. A six-month experimental trial in São Paulo resulted in a two to five percent reduction in peak-period vehicular volumes, an 18 to 23 percent improvement in average speed on two major avenues which were tested, and a reduction of 26 percent (p.m. peak) and 37 percent (a.m. peak) in average congested queue length on the avenues. No mode shift was reported; rather drivers appeared to time shift out of the impacted peak periods. No specific short-term impacts were documented in Bogotá.

Long-Term Benefits Unclear – The most extensive and objective documentation of the long-term impacts of License Plate Rationing was found for the Mexico City implementation. These studies found that there was no sustained improvement in air quality, no increase in subway ridership, and worsening air quality on weekends and other times outside of the License Plate Rationing scheme. Mode shift was primarily to taxis and small buses rather than to subways, which counterbalanced any improvements likely to be achieved by reductions in auto travel. Demand for gasoline went up after two months of implementation, and Mexico City became a net importer rather than net exporter of used vehicles from the rest of the country, meaning that residents sought to evade the restrictions by becoming multi-vehicle households (with variably coded license plates) and began to acquire older (and less fuel efficient and more polluting vehicles) from the countryside. Whereas in theory the system should have restricted 20 percent of vehicles from the road on any given day, many vehicles are exempt from the restriction if they meet certain emission standards. In the end, current regulations restrict only about 7.6 percent of vehicles on any given day. The 7.6% is forecast to decline to 2.9 percent by 2010 as newer less polluting vehicles come on-line and are exempted from the restrictions. The policy indicates that the primary motivation for Mexico City's implementation in the long term is air quality improvement, not congestion reduction. Assessing the air quality impacts in Mexico City is further complicated by the phasing out of leaded gasoline and adoption of U.S. vehicle emissions standards during the same period.

In Bogotá, the long-term impacts are affected by the companion implementation of a major BRT system and an extensive network of bicycle paths. Government-commissioned studies found a nine percent mode shift from private auto to BRT. BRT ridership has grown dramatically since its implementation, but there also has been a large corresponding drop in traditional bus ridership. Given the available documentation, it is not possible to isolate the relative impacts of the various strategies being employed during this period. However, Bogotá does demonstrate the importance of combining License Plate Rationing or other vehicular limitation strategies with major improvements in alternative modes of travel.

Enforcement – All three cities impose hefty fines for violations: $200 in Mexico City on per capita Gross Domestic Product (GDP) of $10,700; $107 in Bogotá on per capita GDP of $6,300; and $100 in São Paulo on per capital GDP of $4,500. Given a per capita GDP of $46,617 in New York State in 2006, this level of penalty would translate into fines close to $900, far in excess of most comparable penalties currently in effect for non-criminal motor vehicle violations in the United States. In addition, Mexico City devotes a large police presence to the enforcement of *Hoy no Circula* (in the absence of high-technology solutions) and impounds violating vehicles for 48 hours.

Socioeconomic Bias – Since households with more than one vehicle are better positioned to avoid the ban, License Plate Rationing is more favorable to households with multiple vehicle ownership, which is highly correlated with income. Thus, the theory that License Plate Rationing reflects a more equitable response to congestion than schemes involving direct pricing strategies is not correct as more affluent households are better able to adopt strategies to circumvent the intent of the policy. This was most clearly apparent in Mexico City.

Application to New York City Metropolitan Area – Given the greater wealth of the region relative to the Latin American cities studied, and higher auto ownership rates, it is likely that many area residents would emulate the adaptation strategy of Mexico City residents by acquiring additional vehicles with a different license plates such that they would be able to drive at least one of their vehicles across the cordon on any given day. Combating such strategies (by standardizing license plates across multi-vehicle households) would require a major change in how vehicle registrations are handled in the United States (from an individual vehicle to household vehicle basis), and it would have to be done across multiple state jurisdictions (at a minimum, New York, New Jersey and Connecticut). Even then, one could imagine further adaptation strategies such as neighboring households swapping vehicles on different days of the week if the government rotated the license plate numbering scheme on an annual basis as in Bogotá.

Besides new vehicle acquisitions, other strategies which people might employ that would further reduce the effectiveness of rationing might include increased use of taxis and shifting trips to days that the vehicle is not restricted. Finally, the elimination of trips barred by rationing could induce additional demand – new trips could take advantage of less congested roadways.

In conclusion, in combination with good transit, rationing has had an impact in Bogota. Lessons from the Latin American examples show that travelers find ways to evade the ban, often by acquiring an additional vehicle. New York area demographics imply that many of the single vehicle households have the financial means to purchase an additional car.

1.0 Introduction

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

According to Texas Transportation Institute's Urban Mobility Report, New York City ranks second in the nation in terms of annual hours of delay. The majority of the delay is spent during the peak hour, with travelers experiencing 46 hours of annual delay (per traveler) in 2005, up from 34 hours in 2000, a 35 percent increase. This congestion costs the City and its residents over $7 billion in 2005, costing each peak traveler approximately $888.

By 2030, nearly a million more residents, 750,000 more jobs, and millions more visitors are expected to further strain the City's transportation system. The current system cannot handle the anticipated increase in traffic and meaningful infrastructure-based solutions are challenging, costly, and lengthy to implement.

Rising levels of pollution and congestion have led some cities around the world to implement vehicle restrictions that control the entry of vehicles into congested areas. Vehicle restrictions include regulatory strategies that prohibit automobile travel according to time and/or space such as:

- Prohibiting automobiles from parts of a city or corridor to make improvements for pedestrians, bicyclists, or public transit;[1]
- Restricting access to specific vehicles with permits based on residential restrictions, commercial restrictions, restriction by type of vehicle, etc.;[2,3] and
- Restricting access based on vehicle license plate numbers.

One approach to reducing congestion in New York City through vehicle restrictions is License Plate Rationing. Typically a License Plate Rationing program restricts a set of vehicles from entering a specified area on certain days based on the last digit of the vehicle's license plate. Such measures have not

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1 Leo Lemmers (1995), *How Amsterdam Plans to Reduce Car Traffic*, World Transport Policy and Practice, Volume 1, No. 1, pages 25-28.

2 Auckland Road Pricing Evaluation Study, 2005 (http://www.transport.govt.nz/arpes-index/).

3 Victoria Transport Policy Institute, TDM Encyclopedia (http://www.vtpi.org/tdm/tdm33.htm).

been implemented in any city in the United States. The most widely known example of License Plate Rationing in the United States was the fuel purchase program during the gas crises of the 1970s, when vehicles with license plates having an odd number as the last digit were only allowed to purchase gasoline on odd-numbered days of the month, while vehicles with even-numbered license plates were only allowed to purchase fuel on even-numbered dates.

For the most part, License Plate Rationing has not been implemented in cities generally considered to be international peers of New York City, such as western European capitals, or Asian cities such as Tokyo or Singapore. For the most part, it has been implemented in Latin American cities with severe air quality problems and very different demographics than New York. This memorandum focuses on the three most enduring and well documented implementations in the Latin American cities of Mexico City, Mexico; Bogotá, Colombia; and São Paulo, Brazil. While there are lessons to be learned from these experiences, the documentation is not as thorough, impartial, or clear cut as might be the case were similar policies to be tried in the United States. This document is organized into the following five sections:

- **Section 1.0** presents a definition of the problem at hand;
- **Section 2.0** provides an overview of case studies in select cities from around the world;
- **Section 3.0** discusses how lessons from these case studies might apply in the New York City environment;
- **Section 4.0** presents a summary of the key findings; and
- **Section 5.0** presents references and sources of additional information.

2.0 Case Studies

The License Plate Rationing examples described in this memorandum restrict a category of vehicles from entering or being driven in certain areas of large cities during specified time periods. The primary goal of these policies is to improve air quality. To achieve this goal, the policies are designed to induce motorists to make changes in their travel patterns by not driving in defined areas at certain times of the day; shifting trips to other modes such as transit, ridesharing, bicycling or walking; shifting the time of day of travel; or not making the trip at all. The policy is based on the theory that fewer vehicles on the road would translate into increased vehicle speeds, reduced congestion levels, decreased fuel consumption, and lower levels of pollutants.

There are several important considerations in evaluating the general effects of License Plate Rationing:

- First, public transit (particularly fixed or dedicated guideway systems like subways and bus rapid transit (BRT)) and non-motorized travel are the most desirable alternatives in terms of fighting pollution and congestion. Transit and bicycle paths must have available capacity and must be attractive enough to discourage shifting to modes which are less likely to reduce pollution levels such as taxis and traditional diesel buses running on public streets.
- Second, short-term benefits need to be made sustainable in the long run to address the various ways in which travelers try to circumvent the driving restrictions.
- Third, a robust enforcement system is needed and should include meaningful fines for violators.
- Fourth, License Plate Rationing might lead to an inequity across socioeconomic strata as households owning multiple vehicles, or having the financial capability to acquire multiple vehicles, are better positioned to circumvent the prohibitions.

The three most enduring and well documented implementations of License Plate Rationing are Mexico City, Mexico; Bogotá, Colombia; and São Paulo, Brazil. In all cases, License Plate Rationing was implemented in combination with other air quality improvement strategies. In Mexico City, License Plate Rationing was part of a larger air quality initiative which involved an emissions control program requiring that vehicles have their emissions checked and certified at regular intervals, phasing out of leaded gasoline, and adoption of U.S. vehicle emissions control standards. The License Plate Rationing program in Bogotá was implemented alongside a new BRT system and 180 miles of new bicycle paths to promote the use of modes other than the personal automobile. São Paulo introduced stricter emissions control at the same time as License Plate Rationing.

All three implementations were first introduced on a trial basis. The short-term benefits had the desired effect of reducing motor vehicle travel, and therefore, the trial programs were made permanent. However, the long-term impacts in Mexico City and Sao Paulo have not proven nearly as effective. During the trial implementations motorists complied with the policies or faced significant fines. Once the policies were made permanent, motorists were willing to invest in solutions to get around the restrictions (such as taking taxis or acquiring additional vehicles).

2.1 Mexico City, Mexico Case Study

The Mexico City Metropolitan Zone (*Zona Metropolitana de la Ciudad de México*) is the largest and densest metropolitan area in the country of Mexico. In 2005, the Zone had a population of 19.23 million. Figure 2.1 shows greater Mexico City. The shaded area represents the most densely populated part of the Zone.

Transportation System

Transportation in Mexico City is managed by the government of the Mexican Federal District through several public companies that administer the different modes of transportation.

Mexico City is served by the *Sistema de Transporte Colectivo Metro*, the largest subway system in Latin America. The system is 129 miles (207 km) in length, has 11 lines, and 175 stations. A twelfth line is planned to be constructed in the year 2008 and a suburban rail system currently is under construction. The Metro carries approximately four million people every day, surpassed only by the subway systems in Moscow (7.5 million), Tokyo (5.9 million), and New York City (4.9 million).[4] According to the information available through the Metropolitan Transit Authority (MTA) of New York, Mexico City's subway has only 129 miles (207 km) of tracks as compared to 660 miles (1,063 km) in New York City.[5]

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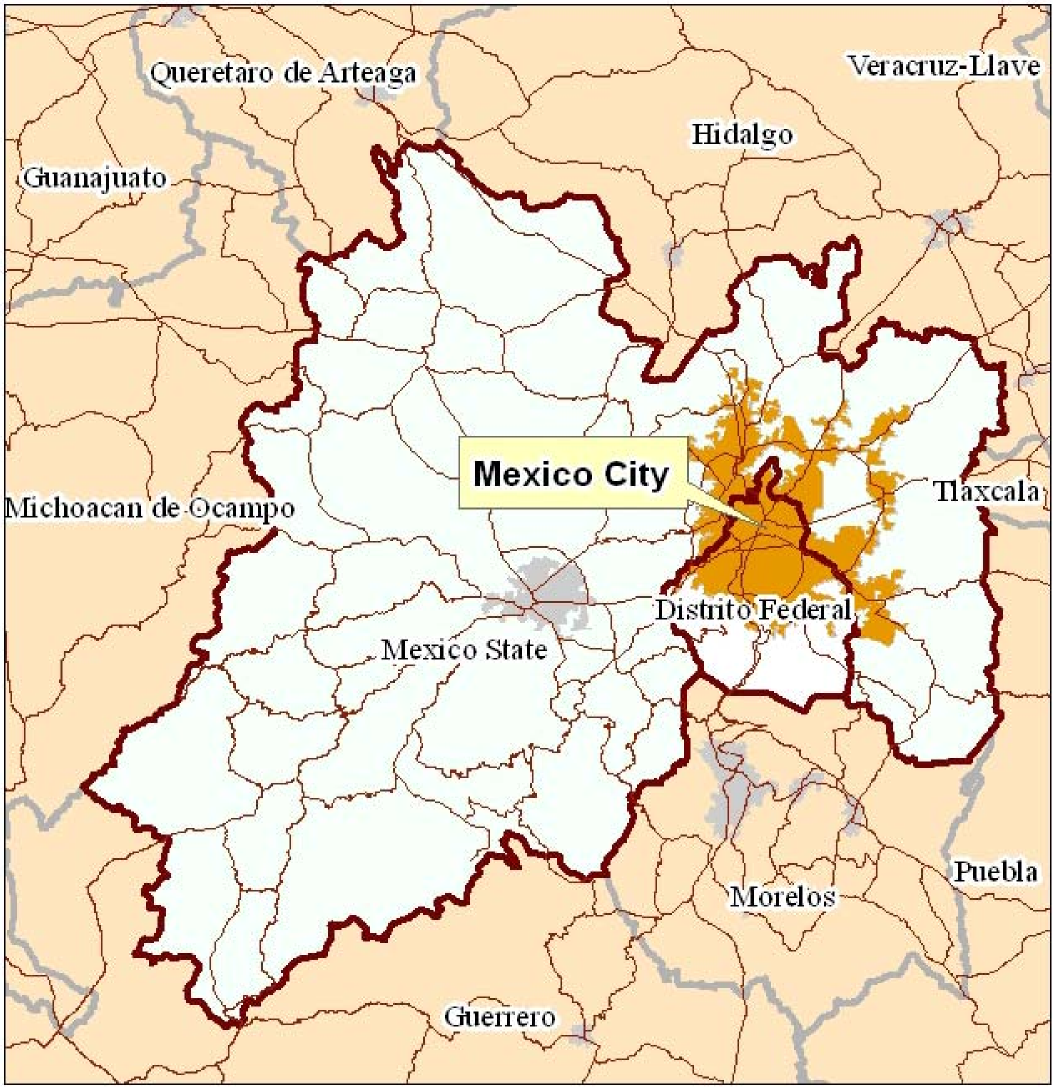
[4] Mexico City Transit Authority (http://www.ste.df.gob.mx/index.html) and http://www.ntdprogram.gov/ntdprogram/pubs/top_profiles/2005/agency_profiles/2008.pdf.

[5] MTA (http://www.mta.info/nyct/facts/ffsubway.htm) & Mexico City Transit Authority (http://www.metro.df.gob.mx/operacion/cifrasoperacion06.html).

Figure 2.1 Greater Mexico City Map

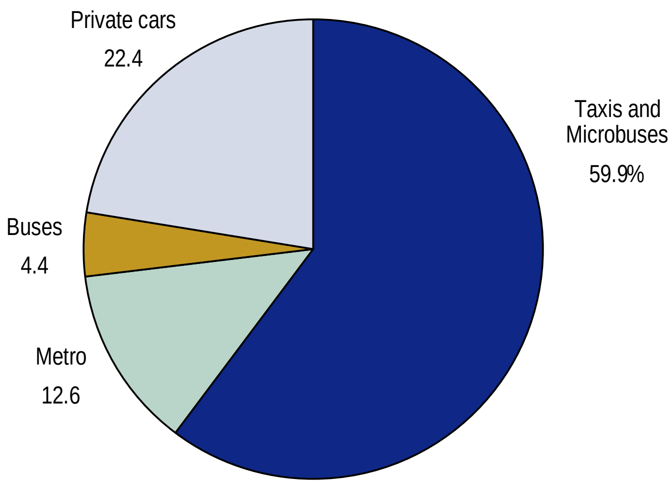


There are approximately 2.5 million registered vehicles in the Mexico City Metropolitan Zone,[6] a total which grows by approximately 160,000 vehicles every year. Severe environmental problems in the area can be partially attributed to this volume together with the age of the vehicles (32 percent of vehicles were made before 1980), the inadequate maintenance, the long distances they travel daily, the insufficient combustion due to altitude, the types of gas

[6] *Metropolitan Mexico City: Transportation Policies and Economic Development* (2001), Alejandro Villegas López.

they use, and the high levels of traffic congestion.[7] As shown in Figure 2.2, private cars are the second most used mode of transport after Taxis and Microbuses (Microbuses are privately operated large vans or small buses).

Figure 2.2 Mode Share of Trips per Person per Day in Mexico City



The city does not have an expressway network that connects points within the city; all cross-city trips must be made on arterial roads. In the late 1970s, many arterial roads were redesigned as *ejes viales* (high-volume one-way roads) that cross Mexico City proper. Two freeway ring-roads serve to connect points within the city with the larger metropolitan area. *Circuito Interior* is the inner ring and *Periférico* is the outer, or main ring. Due to the high density of traffic on the main ring, an elevated highway that runs atop and parallel to a portion of the road was constructed and opened in 2007. This elevated highway is colloquially called *segundo piso*, the second level of the *Periférico*.

License Plate Rationing Program – *Hoy No Circula* (HNC)

On November 20, 1989 Mexico City introduced a program that banned all vehicles from driving one day per week based on the last digit of the vehicle's license plate. The program, called *Hoy No Circula* (No Circulating Day), was introduced primarily to control air pollution in Mexico City.[8]

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[7] *Towards an Air Quality program for the decade 2000-2010 for the Metropolitan Zone of the Mexico Valley*, Clean Air Initiative.

[8] Lucas Davis (2006), *The Effect of Driving Restrictions on Air Quality in Mexico City*, University of Michigan; Eskeland and Feyzioglu (1997), *Rationing Can Backfire: The Day without a Car in Mexico City*, The World Bank Economic Review; Luisa Molina and Mario Molina (2002), *Air Quality in Mexico Megacity: An Integrated Assessment*, Kluwer Academic Publishers, Massachusetts.

The HNC was initially implemented for the Federal District (Mexico City proper) but now covers surrounding regions in the State of Mexico as well. The policy currently is operational under the rules listed in Table 2.1.

Table 2.1 Restriction by Day of Week in *Hoy No Circula*

Weekday	Plate's Last Digit
Monday	5 or 6
Tuesday	7 or 8
Wednesday	3 or 4
Thursday	1 or 2
Friday	9 or 0

The original implementation of the plan was proposed for one winter season only. The winter season was targeted because thermal inversion increases the adverse effect of pollution. Due to the program's success in its initial stages, the City decided to implement it year round in 1990. As the program progressed, exemptions were provided to low-emission vehicles. For example, in 1997 cars with catalytic converters were exempted from the ban. This exemption was the beginning of a pattern of exemptions for less polluting vehicles, which demonstrates that the primary purpose of the program is air quality improvement, not congestion reduction per se. There is no readily available data on the percent of vehicles exempted.

The HNC implementation was part of the *Proaire* initiative which included a set of measures to counter air pollution. Some other measures in *Proaire* were vehicle emission certifications, development of high-capacity transit, and development of bike paths and pedestrian facilities.

Enforcement

The License Plate Rationing program in Mexico City experienced high levels of compliance.[9] Substantial fines coupled with a large police presence in the City helped discourage violations. The violation fines are equivalent to around $200 at 2006 prices, quite high considering that per capita GDP in Mexico in 2006 was $10,700. The penalty also includes impounding the violating vehicles for a period of 48 hours. In addition, the license plate registration system in Mexico is well regulated in that it would be difficult for people to cheat the system by using fake license plates. In general, the available information points to an effective enforcement of the system, albeit without the use of technically

[9] Lucas Davis (2006), *The Effect of Driving Restrictions on Air Quality in Mexico City*, University of Michigan.

advanced equipment. Recently there have been reports of corruption and bribery in the system for illegally classifying low-emission vehicles which are exempt from the ban, however.[10]

Impacts

During the trial implementation stage in 1989, Mexico City estimated a 20 percent reduction of the vehicles in circulation based on 100% compliance, an increase in mean speeds, decrease in gasoline consumption and an increase of 6.6 percent in subway ridership. As a result the authorities decided to make the program permanent.[11,12]

However, once the program was made permanent, it led to substantially different driver behavior. Travelers found the public transportation system an undesirable long-term substitute for driving. To evade the rationing restrictions, residents of Mexico City purchased more vehicles, in order to have at least one vehicle available for use on any given day.

Studies were conducted to evaluate the impact of this program. Davis[13] studied the effect of driving restrictions on air quality in Mexico City using measures of air quality from monitoring stations. This study found no evidence of long-term improvements in air quality due to License Plate Rationing alone. Some of the key findings of the study were as follows:

- No statistical evidence of improvement in air quality during any hour of the day or day of the week;
- No evidence of sustained increase in ridership on public transit; and
- A relative increase in air pollution during weekends and hours of the day when restrictions did not apply.

The study controlled for various factors influencing air quality in Mexico City and looked at different reasons why the License Plate Rationing policy did not have the desired effect. An important finding was the increase in taxi utilization during restriction periods compared to the degree of mode shifting to public transit. These results imply that mode shift has been primarily toward taxis and

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[10] Joseph Sussman (2006), *Mexico City: Transportation and the Environment.* Lecture at Massachusetts Institute of Technology.

[11] Ramiro Tovar Landa (2001), *Mobile Source Pollution in Mexico City and Market-Based Alternatives,* The Cato Review of Business & Government, Cato Institute.

[12] The 20% statistic refers to theoretical reductions as the Mexico City report assumed 100% compliance in the short-term trial of HNC.

[13] Lucas Davis (2006), *The Effect of Driving Restrictions on Air Quality in Mexico City*, University of Michigan.

microbuses instead of public transit (buses and subways). Davis[14] suggests that the inability to use private automobiles to access transit stops may be the reason for the preference for taxis over mass transit. Also, the study states that cars are owned by wealthier households that prefer taxis over the cheaper, crowded, and potentially unsafe metro system.

Another study[15] analyzed gasoline consumption for the period of 1984 to 1992 by modeling demand for gasoline before and after the regulation came into effect. The study showed that demand for gasoline went up six months after the rationing implementation. This study, as well as Davis' report,[16] identifies household vehicle ownership as the factor behind observed trends in pollution and gasoline consumption. The increase in household vehicle ownership was estimated by tracking the sale of used vehicles. The findings showed that Mexico City was traditionally a net exporter of used cars to the rest of the country; however, it became a net importer after the HNC implementation in 1989. Hence, households increased their vehicle ownership rates by acquiring used vehicles presumably to avoid the ban. The used vehicles are generally less energy efficient and have higher emissions. This further contributes to increased gasoline consumption and adverse environmental impacts.

Statistics from the Office of Environmental Management (*Dirección General de Gestión Ambiental del Aire*)[17] projects further growth in vehicular ownership. The statistics show that the number of active circulating vehicles is projected to increase from 2.78 million in 2003 to 4.31 million in 2010 as shown in Figure 2.3. (The term *circulating vehicles* is used in order to account for the significant number of vehicles registered outside of Mexico City but that are still active within Mexico City on a given day.)

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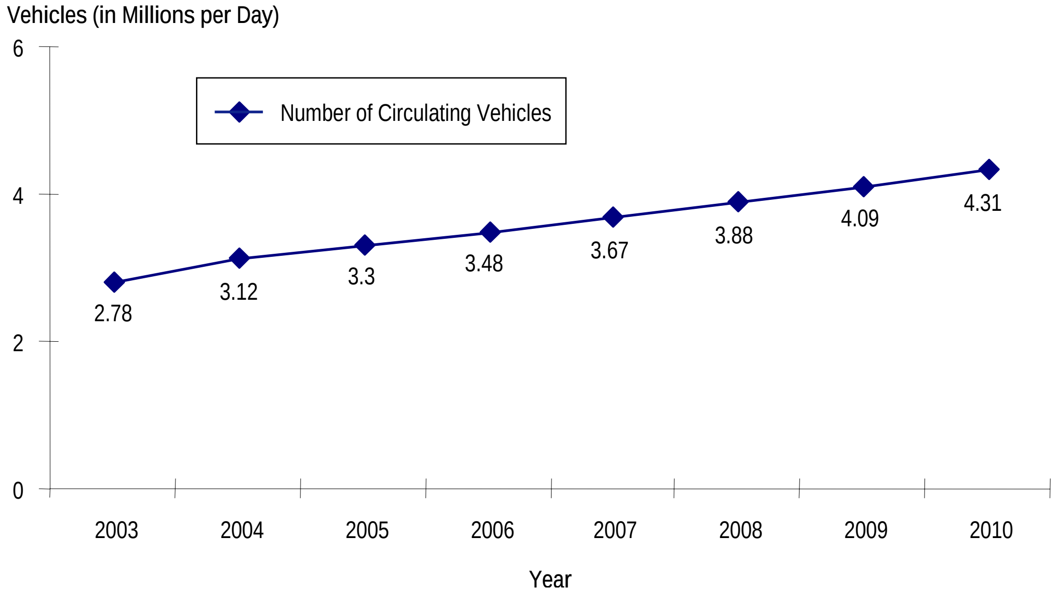
[14] Lucas Davis (2006), *The Effect of Driving Restrictions on Air Quality in Mexico City*, University of Michigan.

[15] Eskeland and Feyzioglu (1997), Rationing Can Backfire: The Day without a Car in Mexico City, The World Bank Economic Review.

[16] Ibid.

[17] DIRECCIÓN GENERAL DE GESTIÓN AMBIENTAL DEL AIRE (2004), *Elementos para la Propuesta de Actualización del Programa "Hoy No Circula" de la Zona Metropolitana del Valle de México.*

Figure 2.3 Projected Number of Circulating Vehicles from 2003 to 2010



Source: Gobierno del Distrito Federal, Secretaria del Medio Ambiente, Dirección de Instrumentación de Políticas, 2003.

The same study also shows that the average distance traveled by vehicles has been increasing consistently over three decades (Figure 2.4), a trend that continued despite the HNC program. This trend points toward an inability or unwillingness of drivers to change modes of travel, and perhaps an ongoing trend toward development around the edges of city leading to longer average commutes.

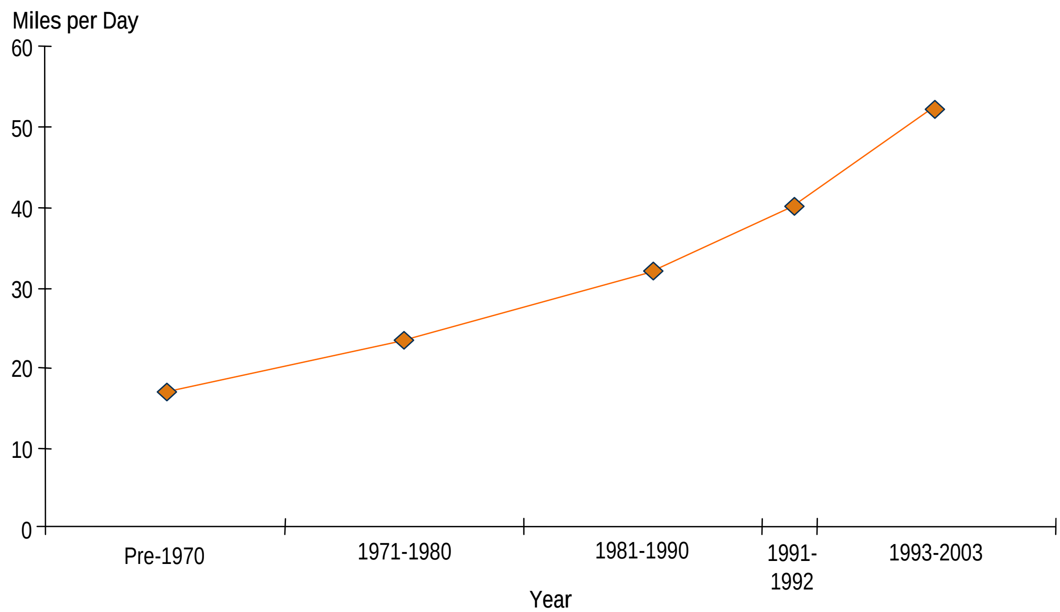
A License Plate Rationing strategy that bans a particular vehicle once every five days could potentially reduce vehicle-miles traveled (VMT) by 20 percent. Many vehicles are exempt from the restriction if they meet certain emission standards, however. The official estimates in 2003 showed that the regulation only restricted around 240,000 vehicles on a given day, accounting for 7.6 percent of the total estimated number of vehicles in the region.[18] The reduction level is forecast to decline to 2.9 percent by 2010 as newer less polluting vehicles come on-line and are exempted from the restrictions. These percentages refer to the number of vehicles affected by the policy, not on traffic.

To enforce the low-emissions exemption, vehicles in the city are required to be tested for emissions regularly. They are categorized according to their emission levels, with those in the "low emissions" category being exempted from HNC. The exemption program was implemented to encourage motorists to shift to newer, cleaner vehicles. Estimates by the Office of Environmental Management (*Dirección General de Gestión Ambiental del Aire*) indicate that the restriction levels

[18] Ibid.

would only apply to 2.9 percent of the circulating vehicles by 2010 as the older, restricted high emission vehicles are replaced by newer low-emission vehicles which are exempt from HNC.

Figure 2.4 Average Distance Traveled by a Vehicle per Day in Mexico City



Source: Gobierno del Distrito Federal, Secretaria del Medio Ambiente, Dirección de Instrumentación de Políticas, 2003.

Future of the Program

Mexico City still faces stiff environmental challenges. The government of Mexico City has proposed various measures aimed at reducing vehicles and emissions on the streets.[19] The proposed measures include expanding the weekday License Plate Rationing restrictions to Saturday, imposing stricter emission standards, and requiring mandatory busing for school trips. In addition, 8,000 new cameras and 100 radar installations are being proposed to monitor traffic infractions.

2.2 Bogotá, Colombia Case Study

As the capital city of Colombia, Bogotá is the largest and most populous city in the country with 6.8 million inhabitants.[20] Approximately 20 percent of the population depends upon automobiles as their primary mode of transport.[21]

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[19] http://ipsnews.net/news.asp?idnews=39090.

[20] Government of Bogotá (http://www.bogota.gov.co/portel/libreria/php/decide.php?patron=01.0101).

Bogotá (Figure 2.5) is also the capital of Cundinamarca State. However, the city itself is a separate state, referred to Bogotá D.C. (*Distrito Capital*). Figure 2.5 shows the Cundinamarca State and the highlights the Bogotá D.C. area.

Figure 2.5 Bogotá Metropolitan in Cundinamarca State

Transportation System

Buses are the primary mode of public transportation in Bogotá. Before 2001, the city was served mainly by privately operated buses, *busetas* (medium-sized buses), and *colectivos* (vans, minivans, or microbuses). Bogotá also has a large fleet of taxis that serve the capital district and surrounding areas.

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[21] Department of Statistics, Government of Colombia (http://www.dane.gov.co/files/censo2005/resultados_am_municipios.pdf).

An extensive BRT system called *Transmilenio* (see Figure 2.6) has been implemented since 2000. This system is being expanded and is planned to serve the entire metropolitan area by 2030. Bogotá also has an extensive system of bicycle paths totaling close to 180 miles (300 km) in length – the largest of any metropolitan area in South America (see Figure 2.7).

Figure 2.6 Bogotá Bus Rapid Transit (*Transmilenio*) Station

Some of the salient features of the transportation system in Bogotá prior to the 2000 referendum for License Plate Rationing are presented below.[22]

- Approximately 140 cars per 1,000 habitants, notably lower than European and North American cities which average more than three times this number;
- Annual addition of approximately 70,000 new cars to an estimated 832,000 existing vehicles;
- Average vehicle speed of 12 miles per hour (19 kilometers per hour);
- Average bus speed during peak hours of seven miles per hour (10 kilometers per hour); and

[22] http://ecoplan.org/votebogota2000.

- The average duration of daily trips in public transportation was two hours and 20 minutes.

Figure 2.7 Bicycle Paths in Bogotá

License Plate Rationing Program – *Pico y Placa*

The City of Bogotá is located at a height of 8,661 feet (2,640 meters) above sea level and, therefore, has a rarified supply of oxygen. Pollution levels in the city are among the highest in South America and vehicular emissions form almost 60 percent of the contaminants in the air. The City of Bogotá has implemented a number of traffic control measures over the years to combat pollution and improve traffic circulation especially in the downtown area, including reversible and counterflow lanes on key arterial routes.

A referendum was held in 2000 and the License Plate Rationing scheme (*Pico y Placa*) was approved by the voters, 51 percent to 34 percent. The *Pico y Placa* (Peak and License Plate) program was instituted and a commitment was made to follow-up this implementation with an intense development of the mass transit system, specifically the *Transmilenio* BRT service. As part of the same referendum, the city implemented a day without cars on the streets, called *El Día* *sin Carro* (No Car Day). It takes place on the first Thursday in the month of February each year. Voters approved this measure 63 percent to 26 percent.[23]

The *Pico y Placa* program restricts peak-hour vehicle entry into the city based on the last digit of the license plates. Restriction hours were instituted from Monday through Friday, 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m. The restriction applies to all vehicle movement within the whole city and is not limited to crossing a cordon. Bogotá adds another layer of complexity by changing the numbering scheme every year, making it more difficult for households to maintain the right set of license plates to enable access each day of the week. For instance, starting July 1, 2005 vehicles were restricted entry into the city according to the scheme in Table 2.2. Comparatively, starting July 1, 2007 the vehicle restrictions follow the scheme shown in Table 2.3.

Table 2.2 Pico y Placa Restrictions, July 2005 to June 2006

Weekday	Plate's Last Digit
Monday	9, 0, 1, 2
Tuesday	3, 4, 5, 6
Wednesday	7, 8, 9, 0
Thursday	1, 2, 3, 4
Friday	5, 6, 7, 8

Table 2.3 Pico y Placa Restrictions, July 2007 to June 2008

Weekday	Plate's Last Digit
Monday	1, 2, 3, 4
Tuesday	5, 6, 7, 8
Wednesday	9, 0, 1, 2
Thursday	3, 4, 5, 6
Friday	7, 8, 9, 0

Vehicles with license plates from Bogotá and Cundinamarca State are subject to the *Pico y Placa* restrictions between 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m. while vehicles from outside these jurisdictions are restricted from 5:30 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m. This is done to discourage people in outer states from starting their travel early to avoid the restrictions.

[23] http://ecoplan.org/votebogota2000.

The restriction excludes the following vehicles:

- Emergency vehicles (such as ambulances, fire trucks, police cars, etc.);
- Diplomatic vehicles, due to their special jurisdiction;
- Presidential caravan;
- Operative vehicles of public utility companies; and
- School and company buses carrying more than 10 passengers.

This means that around 99.9 percent of private and official vehicles and 90 percent of the vehicles registered in the region must adhere to the restriction.[24]

Enforcement

One of the unique characteristics of the *Pico y Placa* system is that it does not restrict vehicles for the whole day but rather only during the peak periods. As such, its implementation and compliance standards are different from Mexico City.

Since the rotating numbers can cause some confusion to commuters, there is a grace period for drivers every time a new rotation comes into effect, during which only warning tickets are issued. These fines are steep considering that the 2001 per capita GDP in 2001 was $6,300.[25]

The City of Bogotá data showed that only three percent of traffic summonses in 2005 corresponded to *Pico y Placa*.[26] Also, during the 2005 "No Car Day," only 43 vehicles were issued tickets for violating *Pico y Placa* traffic restrictions.[27]

Impacts

The long-term impacts of *Pico y Placa* are affected by the companion implementation of the BRT system and extensive network of bicycle paths. Given the available documentation, it is not possible to isolate the relative impacts of the various strategies being employed during this period. However, the Bogotá experience does demonstrate the importance of combining License Plate Rationing or other vehicular limitation strategies with major improvements in alternative modes of travel.

Transportation in Bogotá has experienced major changes during the last decade. The introduction of the *Transmilenio* BRT system induced a mode shift from earlier modes of transport such as buses and microbuses to the BRT system.

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[24] http://ecoplan.org/votebogota2000.

[25] https://www.cia.gov/library/publications/the-world-factbook/geos/co.html.

[26] http://www.bogota.gov.co/portel/libreria/php/decide.php?patron=01.0101.

[27] http://ecoplan.org/votebogota2000.

Table 2.4 shows the split in daily ridership between the different modes of Transit from 1980 till 2004. The four years following the introduction of *Transmilenio* experienced a significant increase in BRT ridership and a corresponding reduction in bus usage, with *Transmilenio* ridership doubling to 1.2 million by 2006.[28]

The decision to restrict four digits per day implies a theoretical daily vehicular reduction of 40 percent. Rotating the numbers for each day means there would be fewer ways to avoid the restrictions.

Table 2.4 Pattern of Bus Ridership
1980 to 2004

	Year							
Vehicle Type	1980	1991	1995	1999	2001	2002	2003	2004
Buses	3,863,298	3,379,419	3,264,645	2,520,871	1,934,318	1,837,675	1,848,456	1,625,133
Busetas	1,274,500	2,289,581	1,810,935	1,988,129	1,825,812	1,808,389	1,740,511	1,597,789
Microbuses		253,581	534,419	248,226	679,513	670,622	643,422	780,744
Transmilenio					466,267	642,777	617,522	690,411

Source: Study of urban public transport conditions in Bogotá, 2005.

Consecutive governments, starting with ex-Mayor Antanas Mockus and continuing with the former administration under Mayor Enrique Peñalosa, focused on reducing vehicular traffic within the city by making alternative modes available and more accessible. Extensive programs were created for developing bicycle paths and pedestrian-friendly facilities. Bogotá now has almost 180 miles (300 km) of bicycle paths in the city.

Although the impacts cannot be quantified for each isolated measure, the package of measures has produced benefits in terms of mode shift to transit and bicycle, reduced travel times, and improved average roadway speeds. The availability of energy efficient, faster, and higher capacity *Transmilenio* buses has reduced the demand for privately owned buses. BRT operations offer a 32 percent[29] improvement in travel time for users over other available modes of transit. There have been claims of a mode shift of 9 percent from private vehicles to BRT.

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[28] Baltes, M.R., Barrios, J.C., (2006) *Applicability of Bogota's TransMilenio BRT (Bus Rapid Transit) System to the United States*. Arturo Ardila, (2005), *Study of Urban Public Transport Conditions in BOGOTÁ.*

[29] Government of Bogotá (http://www.bogota.gov.co/portel/libreria/php/decide.php?patron=01.0101).

Although the impacts discussed above are attributable to the package of measures, there are two notable findings that are specific to the implementation of the *Pico y Placa* program. The first is that the annual rotation of restricted numbers and the corresponding days helped discourage commuters from beating the system. At the onset of the program, the demand for license plates ending in 1, 2, 3, 4, 5, or 6 was high as these vehicles could move around in the city on Fridays. The annual rotation addressed this bias as those vehicles ending in 7, 8, 9, and 0 were permitted on Fridays the following year.

The second lesson learned involves the restriction hours. *Pico y Placa* was implemented for peak hours only due to the presumption that restricting for a complete day would increase a commuter's incentive to purchase an additional vehicle that could be used to access the city on other days of the week. Initially, the plan was implemented from 7:00 a.m. to 9:00 a.m. and 5:00 p.m. to 7:00 p.m., but had to be extended to 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m. due to peak spreading. This raised some questions regarding effectiveness of peak-hour implementation as critics of the program argued that increasing restrictions to earlier hours increased congestion in the middle part of the day.[30]

In summary, studies show that the success of *Pico y Placa* in Bogotá is not a singular event.[31] It was implemented as part of a larger effort to simultaneously improve air quality and provide alternatives to the private auto. Perhaps the most significant long-term impact is the positive change in the public's perception of public transit and bicycle use.

Future of the Program

The Bogotá government continues to pursue the goal of reducing the role of the private automobile in the transportation system. The measures proposed for transportation and traffic improvements include the following:

- Expansion of *Transmilenio* service;
- Integrating private bus operators into the *Transmilenio* framework;
- More car-free days (*Un Día sin Carro*);
- Possibly restricting all private autos during weekday peak hours starting in 2015;[32]
- Renewal of public vehicles, buses, and taxis; and
- Promoting bicycle usage along with clustered land use development in future.

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[30] http://list.jca.apc.org/public/sustran-discuss/2005-November/004139.html.

[31] http://www.globalurban.org/Issue1PIMag05/Montezuma%20article.htm.

[32] World Bank Council for Sustainable Development, *Mobility 2001: World Mobility at the End of Twentieth Century and its Sustainability.*

2.3 SÃO PAULO, BRAZIL CASE STUDY

São Paulo is the capital city of the State of São Paulo in southeast Brazil, as shown in Figure 2.8. The city has an area of 588 square miles (1,523 square kilometers) and a population of 11 million[33] making it the most populous in the southern hemisphere.

Greater São Paulo (*Grande São Paulo*) is the metropolitan area around the city and consists of 39 municipalities with a total population of 19.8 million.

Insufficient infrastructure, large population, low gasoline prices, high number of transit and personal vehicles, and a large number of factories in the city have contributed to making São Paulo one of the most polluted cities in the southern hemisphere.

[33] http://www.ibge.gov.br/home/estatistica/populacao/estimativa2006/POP_2006_DOU.pdf – *Instituto Brasileiro de Geografia e Estatística.*

Figure 2.8 São Paulo in São Paulo State

Transportation System

São Paulo has three main modes of mass transit – São Paulo Metro, a suburban rail network serving the metropolitan area, and a bus system.

The Metro currently operates three lines serving 44 stations in the city. The total length of the network is 37 miles (61 km) and two new lines are under construction. The metro has a daily ridership of around 2.4 million.[34]

The suburban rail system, *Companhia Paulista de Trens Metropolitanos* (CPTM), has six lines that serve the metropolitan region. The CPTM network has average daily ridership of around 1 million.[35]

[34] http://www.metro.sp.gov.br/empresa/relatorio/2005/RAmetro2005.pdf.

The BRT system, called *Passa Rápido,* and regular buses operate on 394 lines in the metropolitan region with an average daily ridership of around 1.5 million.[36]

São Paulo has a number of expressways that connect to the suburban areas and other large cities. Private vehicles still remain the largest mode of travel. Figure 2.9 shows the usage of different modes of travel between 1967 and 1997. As shown, in 1997 (the most recent data available associated with the implementation of the rationing program) motorized travel accounted for more than 20 million daily trips as compared to 8 million for bus (public road) and around 2 million trips for public rail (metro). (The "Public Rail" category includes the metro and excludes the suburban rail system, and "Public Road" includes all public transport by road, such as buses). The "Motorized Travels" line depicts the sum of trips made by Public Road, Car and Taxi, 2 Wheelers and Other (small motorized vehicles).

The number of personal vehicles in the São Paulo metropolitan area was estimated to be more than 4.5 million in 1997, and there were 12,000 buses circulating within São Paulo. At this time traffic congestion was considered a serious problem: average speed for personal vehicles was around 14 miles per hour (20 kilometers per hour) and an average of 3.2 million personal vehicles circulated every day.[37]

License Plate Rationing Program – *Rodizio*

A License Plate Rationing scheme known as *Rodizio* was initially implemented as an emergency measure to control pollution levels in the City of São Paulo in 1995 by São Paulo State's environmental agency, *Companhia de Saneamento Basico do Estado de São Paulo* (CETESB). The implementation proved successful in reducing the level of pollutants, especially Carbon Monoxide, in the air.

In 1996, the State's environmental agency sought to reestablish the program in 10 municipalities but was only allowed to implement it on an experimental basis for the month of August for the peak hour of 7:00 a.m. to 8:00 a.m. The fine for violating the restriction during this time was equivalent to $200 at 1996 exchange rates.[38] In 1997, the program was extended to include the entire central area of São Paulo throughout the year. This License Plate Rationing program continued in 1998 and followed the scheme shown in Table 2.5.

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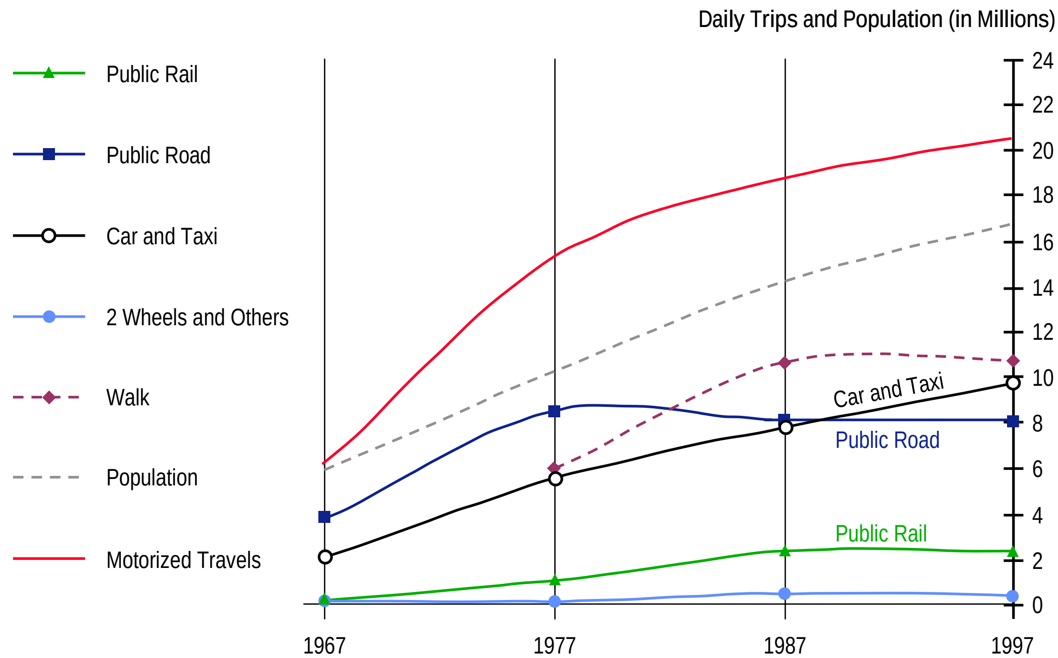
[35] http://www.stm.sp.gov.br/ingesp/english.html.

[36] http://www.stm.sp.gov.br/ingesp/english.html.

[37] Pedro Jacobi, Denise Baena Segura and Marianne Kjellén (1997), *Governmental responses to air pollution: summary of a study of the implementation of Rodízio in São Paulo.*

[38] Pedro Jacobi, Denise Baena Segura and Marianne Kjellén (1997), *Governmental responses to air pollution: summary of a study of the implementation of Rodízio in São Paulo.*

Figure 2.9 Daily Trips by Mode in the São Paulo Metropolitan Region
1967 to 1997



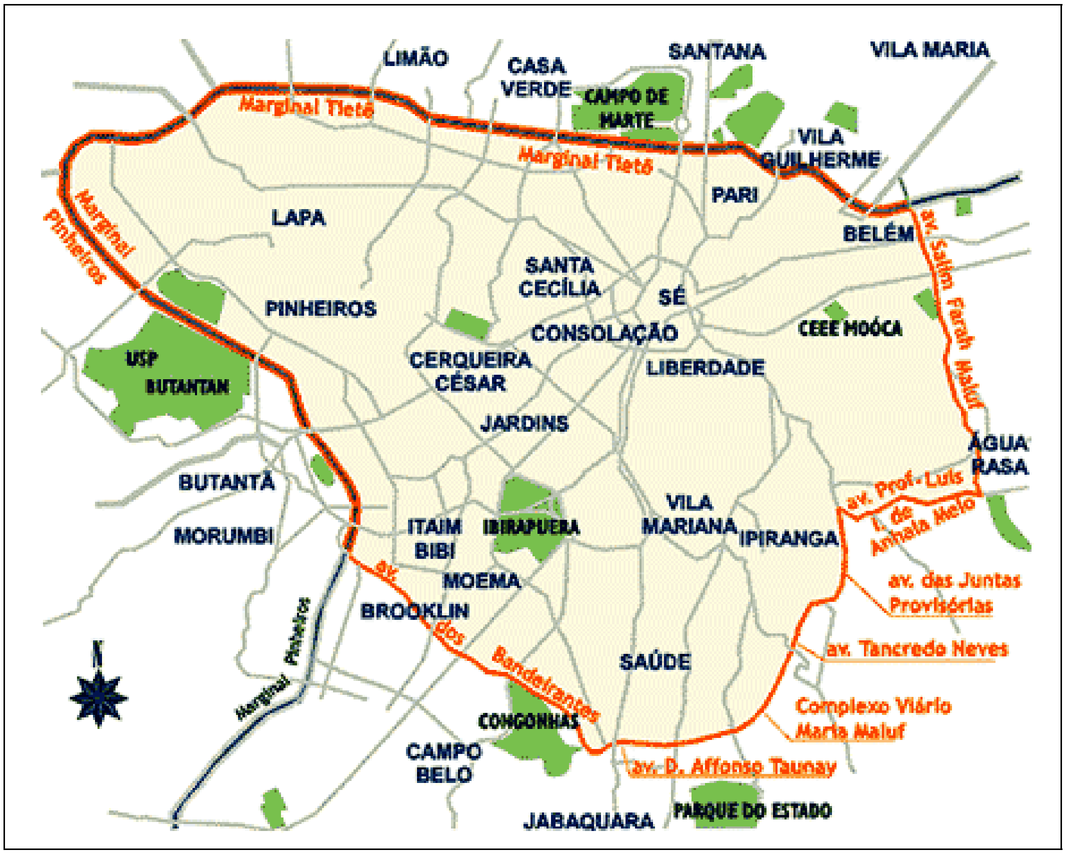
Source: Motorization and Mobility Contrasts in Mega-Cities, World Bank Transport Forum 2000, Washington, D.C. (EH, CMSP, IBGE, and OnibuLis surveys data).

Table 2.5 *Rodizio* Restrictions by Day of Week

Weekday	Plate's Last Digit
Monday	1 or 2
Tuesday	3 or 4
Wednesday	5 or 6
Thursday	7 or 8
Friday	9 or 0

The restrictions were implemented every workday, 7:00 a.m. to 10:00 a.m., and 5:00 p.m. to 8:00 p.m. The implementation limits of *Rodizio* in São Paulo were defined by the ring road that circles the city as shown by the orange line in Figure 2.10.

Figure 2.10 Implementation Boundary of *Rodizio* (Not to Scale)



Enforcement

Once *Rodizio* was introduced as a permanent measure in 1997, the fines were reduced to amounts equivalent to approximately $100. The fines were still quite significant considering that per capita GDP at that time was around $4,500. The compliance levels in the experimental period were reported to be around 95 percent.[39] Reliable data was not readily available on compliance for the period after the *Rodizio* was made permanent.

Impacts

Most of the data related to impacts of License Plate Rationing in São Paulo were obtained from the municipality. Independent data sources were not found.

The City of São Paulo's traffic management agency conducted surveys of traffic volume during the peak periods at seven important avenues of the city between October 1997 and March 1998. Compared to volumes before implementation of

[39] Ibid.

Rodizio, the results showed a two percent reduction in hourly volumes during the a.m. peak and five percent reduction during the p.m. peak. The City of São Paulo also conducted a field survey to monitor traffic performance on two major city avenues during the same period. Table 2.6 indicates the improvement in both travel time and average speed[40] as concluded by the study.

Table 2.6 Before and After Comparison of Traffic Measures

		Before the *Rodizio*	During the *Rodizio*	Change
Travel Time	Morning	21 minutes 27 seconds	17 minutes 37 seconds	-18%
	Afternoon	22 minutes 46 seconds	18 minutes 42 seconds	-18%
Average Speed	Morning	11.6 mph (18.6 kmph)	14.25 kmph (22.8 kmph)	23%
	Afternoon	11 mph (17.5 kmph)	13.5 kmph (21.6 kmph)	24%

The City's traffic management agency developed the concept of CQL (Congestion Queue Length) in 1991 to quantify traffic congestion. The measure was based on the empirical distinction between traffic categories by classifying them as free-moving, slow, stop-and-go, or standing. The CQL can be defined as the sum of the queue lengths of the latter three categories.

Average CQL was reduced by 37 percent in the a.m. peak and by 26 percent in p.m. peak after implementation of *Rodizio*. The reduction in CQL during the a.m. peak hour only implementation (7:00 a.m. to 8:00 a.m.) was 17.7 percent.

However, the total number of vehicles on city streets is currently estimated at more than six million, up from 4.5 million in 1997. This large increase of 33 percent indicates that License Plate Rationing has not discouraged vehicle ownership rates.

The impacts of the *Rodizio* after the initial experimental phase are difficult to determine due to a lack of independent studies. The 33 percent increase in the total number of vehicles on city streets by from 1997 to 2007 indicates a lack of effectiveness in reducing traffic. However, a lifting of the *Rodizio* restrictions during the school holidays in July 2007 resulted in record levels of congestion, leading to its immediate reinstatement. In place for a decade, *Rodizio* has become ingrained in São Paulo residents' way of life.

Future of the Program

The implementation of the *Rodizio* scheme in São Paulo is part of a larger overall initiative to improve the air quality in the city. This initiative, known as *Proconve*, began in 1986. The *Proconve* program is being expanded and will continue to focus on enforcing lower vehicle emissions standards on car manufacturers in Brazil and reducing dependence on gasoline-based vehicles by

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[40] L Biezus and A.J. Rocha (1999), *Does congestion management improve public transit.*

promoting diesel and ethanol powered vehicles. Also, there are a number of projects underway[41] to develop the city's overall transportation infrastructure.

2.4 OTHER IMPLEMENTATIONS

License Plate Rationing has been implemented in other cities in similar fashions to the programs in Mexico City, Bogotá, and São Paulo. Although there is a limited amount of available research regarding the effects of License Plate Rationing on traffic, pollution, and compliance, a brief description of the implementations in Auckland, New Zealand; Athens, Greece; and Santiago, Chile follows.

Auckland, New Zealand

Auckland is the largest metropolitan area in New Zealand with a population of 1.3 million. A color-based scheme of License Plate Rationing was implemented in Auckland whereby license plates were restricted by color coding rather than by numbers. The program was implemented more than 20 years ago and data sources are very limited. No data was readily available on the impacts of this program.

Athens, Greece

Athens is the capital and largest city of Greece with a metropolitan population of around 3.8 million.[42] Since June 1982, private car traffic has been restricted in Central Athens based on a License Plate Rationing scheme. The restricted areas lie inside the city's ring road system. Taxis also were restricted in the first two years of the implementation, but are now allowed. Buses, bicycles, and motorcycles are exempt from the restriction. The license-plate-based traffic restrictions were introduced in Athens to address high pollution levels and to limit access to the vehicles on alternate days based on odd-even license plates. The License Plate Rationing scheme is implemented inside the ring road that goes around the city. A five square-mile (13 square-km) central area is bounded by the inner ring road and the enforcement is mainly through police patrol at the main entrances to the restricted area. The large coverage area and number of entry points into the city make effective patrolling nearly impossible. A steep fine of 100,000 Greek Drachmas (312€ or $440)[43] is charged to violators.

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[41] http://www.stm.sp.gov.br/ingesp/english.html.

[42] http://www.statistics.gr/Main_eng.asp.

[43] http://www.leda.ils.nrw.de/database/measures/meas0205.htm.

The License Plate Rationing measure was implemented in the summer of 1982 and proved to be useful for the initial period of implementation.[44] The scheme is still in place in the central part of the city and recent discussions have emerged about the complete banning of vehicles from certain parts of the city. However, there has not been any comprehensive proof of the long-term benefits of this measure.[45]

It is widely believed that the measure was rendered ineffective as households with financial means purchased second vehicles to avoid the ban. Car ownership per household in Athens has gone up since the measure came into effect.[46] There has been an increase in taxi usage and a shift in traffic flow from the side streets to the ring roads that surround the city. Athens has moved towards road pricing and other traffic management strategies to address their traffic problems.

Santiago, Chile

Santiago is the largest metropolitan area in Chile with a population of about 5.5 million (2005). A number-based scheme of License Plate Rationing is in effect which is dependent on the pollution levels in the city. As such, drivers have to watch for advisories that prohibit them from using their cars on certain days with high pollution levels.

2.5 LESSONS LEARNED FROM CASE STUDIES

License Plate Rationing has been adopted in a number of places as a measure to alleviate pollution and congestion. Some important lessons can be learned from the adoption of the various vehicle restriction schemes provided in the above case studies. It should be noted that the most prominent and sustained implementations have been in Latin American cities such as Mexico City, Bogotá and São Paulo. Other implementations have occurred in cities such as Athens and Auckland which are substantially smaller than New York City. There have been no implementations of License Plate Rationing in cities which are considered New York's international peers such as London, Paris, Berlin, Tokyo, or in any U.S. city.

- License Plate Rationing is tied to an increase in vehicle ownership rates at more than one location as commuters tried to circumvent the ban. Mexico City serves as a prime example of this consequence, with evidence of increasing levels of vehicle ownership also in São Paulo.

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[44] G Argyrakos (1986). *The Influence Of Private Car Restrictions On Commuting The Case Of Athens.* International Conference on Commuting, Rome.

[45] *Sustainable Transport: A Sourcebook for Policy-Makers in Developing Cities.*

[46] Ibid.

- The increase in vehicle ownership per household drove up the demand for preowned vehicles in Mexico City. This affected the average fleet age in Mexico City, and the older vehicles typically have higher gasoline consumption and higher emissions levels.
- Off-peak traffic was found to increase with the implementation of License Plate Rationing confined to peak periods. Bogotá and Mexico City both saw greater congestion levels during off-peak hours and weekends indicating trip deferrals to times when restrictions are not in effect. This counterbalances the objective of License Plate Rationing to eliminate vehicle trips, but could still have some benefit in decreasing congestion and pollution levels during the restricted periods.
- Taxi usage increased. This was another reason why License Plate Rationing did not result in the projected decrease in gasoline consumption in Mexico City. A number of motorists substituted trips from private vehicles to taxis rather than shifting to low-emission and low-energy consumption modes such as public transportation.
- Improvements in air quality were attributed to better emission standards. When License Plate Rationing was implemented alongside stricter emissions controls (São Paulo and Mexico City), the impacts were more effective.
- License Plate Rationing is more effective when paired with improvements to alternate modes of travel. Bogotá experienced positive impacts of the simultaneous implementation of License Plate Rationing, BRT, and bicycle paths. Mexico City did not show an increase in mass transit ridership after implementation of License Plate Rationing.
- A test period for a License Plate Rationing program can be an effective way to refine the various elements of the program to obtain the best results. However, those affected by the program may react differently over the long term, in ways that reduce the program's effectiveness, as evident in Mexico City.

3.0 Application to New York City

New York City is the most populous city in United States with more than 8 million residents. It also is the most densely populated major city in the United States at 26,403 people per square mile (10,194 square km). The island of Manhattan is the business and cultural center of the five boroughs and has a population of around 1.6 million with a population density of 66,940 people per square mile (25,846 square km). New York County (Manhattan) is the densest county in the country.[47]

3.1 Implementation of License Plate Rationing

License Plate Rationing implementation in New York City is presented in this document using two methodologies: the first option would prohibit travel of vehicles into the restricted zone when the last digit of the license plate matches the last digit of the day in the month. The second option would involve color coding the license plates to correspond with a particular weekday on which the vehicle would be prohibited from entering the zone. For the purpose of this analysis, the restricted zone is assumed to be the area south of 86th Street in Manhattan.

Alternative 1, Number-Based License Plate Rationing

In Alternative 1, vehicles would be restricted according to the last number of their license plate and the last number of the numerical date (e.g., a license plate ending in "5" would be restricted on the 5th, 15th, and 25th of each month). This strategy essentially would ban a particular vehicle once every 10 days with a target of reducing weekday traffic by 10 percent.

The number-based rationing is easier to implement since no changes would need to be made to current license plates. This option requires that the implementation policy address issues related to license plates that do not end in numbers and vanity plates. One simple way to address the issue of license plate identifications not ending in numbers would be to base the rationing on a specific digit elsewhere in the license plate identification. For example, if a license plate identification is "123-ABC," the last numerical digit (in this case, 3) could be the basis for the ration.

Alternative 1 also provides the flexibility to change the number of restricted vehicles by changing the number scheme in the future. For example, license

[47] http://www.census.gov.

plate restrictions in Bogotá (see Section 2.2) restrict four numbers each day of the week. The Bogotá concept probably provides the best implementation blueprint for a number-based scheme. Also, the yearly rotation of these numbers makes it more difficult to beat the system over time. However, like all other License Plate Rationing schemes, it would still be easier for households with multiple vehicles to avoid the ban.

Alternative 2, Color-Coded License Plate Rationing

Alternative 2 would restrict a vehicle one day per week based on a color coded license plate. This strategy essentially would ban a particular vehicle once every five days with a potential target of reducing weekday traffic by 20 percent. Color coding avoids some of the implementation issues associated with the letters and numbers under Alternative 1 and would aide in enforcement, making violators more readily identifiable. The color coding also could be used to ensure all vehicles in one household have the same color, avoiding a major issue with number-based rationing.

This alternative, however, presents a major implementation challenge in terms of providing color codes to all registered vehicles in New York and outside states. Providing the necessary access to out-of-state vehicles would introduce a significant level of complexity. Color coding by household would make the implementation even more challenging. Standardizing the colors across multi-vehicle households would require a major change in how vehicle registrations are handled in the United States (from an individual vehicle to household vehicle basis), and it would have to be done across multiple state jurisdictions (at a minimum, New York, New Jersey, and Connecticut). Therefore, Alternative 2 assumes the color coding scheme applies to individual vehicles (rather than across multi-vehicle households).

3.2 IMPACTS

This section presents an analysis of the impacts and issues that may be anticipated from the implementation of Alternatives 1 and 2 in the area of Manhattan south of 86th Street.

Traffic Impacts

A License Plate Rationing program that restricts a vehicle once per week could theoretically affect each vehicle that travels all five days per week. However, the target reduction for weekday traffic may be lower if drivers who currently drive fewer than five days a week have the flexibility to shift their travel to days on which their vehicles are not prevented from entering the CBD. Currently, 32% of drivers using the Battery and Queens-Midtown Tunnels drive less than five times per week and may have the flexibility to shift to days that their vehicles are not restricted from entering the zone.

The potential traffic impact would also be affected by the number of multiple-vehicle households in the region. The 1997/1998 Regional Travel Household Interview Survey[48] (RT-HIS) reports an estimated 45 percent of the households in the New York-New Jersey-Connecticut metropolitan region (excluding Manhattan) have two or more vehicles.[49] These households are better positioned to avoid the ban by using their own alternate vehicle.

Some single-vehicle households might choose to purchase a second car in order to avoid the ban. Given the greater wealth of the region relative to the Latin American cities studied, and higher auto ownership rates, it is likely that many area residents would emulate the adaptation strategy of Mexico City residents by acquiring additional vehicles with a different license plates such that they would be able to drive at least one of their vehicles across the cordon on any given day. As in Mexico City, at least initially many of these additional vehicles might be less expensive, older, less efficient, more polluting vehicles.

Besides new vehicle acquisitions, other strategies which people might employ that would further reduce the effectiveness of rationing might include increased use of taxis and shifting trips to days that the vehicle is not restricted from entering the zone. Finally, the elimination of trips barred by rationing could induce additional demand – new trips could take advantage of less congested roadways.

Considering the above factors, License Plate Rationing impacts on VMT in the New York City CBD will be modeled in a separate analysis using the New York Metropolitan Transportation Council (NYMTC) Best Practices Model, the region's travel demand model.

Transit Impacts

Most of the existing implementations of License Plate Rationing were in cities without a comprehensive public transit system (e.g., Mexico City, Athens) or a system that was introduced or expanded along with the License Plate Rationing implementation (e.g., BRT in Bogotá). New York City has an extensive public transit system in place, but one that is highly congested in certain places during peak periods and may not have the capacity to absorb those restricted from a License Plate Rationing implementation.

The motorists who currently drive into the city already are experiencing delays, in some cases paying tolls, and in some cases high parking costs for access into

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[48] *Regional Travel Household Interview Survey* (2000) New York Metropolitan Transportation Council (NYMTC) and the North Jersey Transportation Planning Authority (NJTPA).

[49] Survey was conducted in the 28 county New York-New Jersey-Connecticut metropolitan area, including 12 counties in New York, 14 counties in New Jersey, and 2 counties in Connecticut.

Manhattan. In facing these disincentives, the mode choice between the existing modes available to these drivers already has been made. As Mexico City's experience shows, a License Plate Rationing scheme that only looks to push drivers to transit without providing new alternatives could make these drivers pursue a variety of strategies other than shifting modes.

Taxi Service Impacts

As mentioned in Section 2.0, the implementation of License Plate Rationing led to increased taxi usage in all of the cases studied. Mexico City experienced an increase in not just the taxi usage but also in microbus usage. New York City, which already has a taxi fleet of 13,000 vehicles, is likely to witness an increase in taxi usage as well.

Commercial Vehicles Impacts

A License Plate Rationing implementation in New York City could include separate regulations for commercial vehicles. License Plate Rationing could have a profound influence on commercial vehicle behavior by pushing more vehicles to off-peak and weekend periods. In the Mexico City case, many commercial vehicles were exempt from the restrictions (based on a separate emissions scale from passenger cars). The issues associated with various strategies for shifting commercial vehicle travel times are described in a separate technical memorandum.

Socioeconomic Impacts

Since households with more than one vehicle are better positioned to avoid the ban, License Plate Rationing is more favorable to households with multiple vehicle ownership, which is highly correlated with income. More affluent households are better able to adopt strategies to circumvent the intent of the policy. This was most clearly apparent in Mexico City.

3.3 ENFORCEMENT

The first step in enforcing a License Plate Rationing program in New York City would be to develop an implementation strategy. The license plate registration process would need to be modified to enable a fair implementation of the program. This would include involvement of different New York State agencies as well as Departments of Motor Vehicles from surrounding states.

For the program to be most effective, a revised registration process would be needed to issue license plates based on household so that all household vehicles are restricted on the same day. Standardizing the restriction (based on colors or numbers) across multi-vehicle households would require a major change in how vehicle registrations are handled in the United States (from an individual vehicle to household vehicle basis), and it would have to be done across multiple state jurisdictions (at a minimum, New York, New Jersey, and Connecticut).

The program also would need to be managed proactively as in Bogotá, by changing the restricted number or color scheme annually, to ensure that long-term adjustments by users are not rendering the system ineffective.

The applications of License Plate Rationing in other places have been accompanied by steep fines: $200 in Mexico City on per capita GDP of $10,700; $107 in Bogotá on per capita GDP of $6,300; and $100 in São Paulo on per capital GDP of $4,500. Given a per capita GDP of $46,617 in New York State in 2006, this level of penalty would translate into fines close to $900, far in excess of most comparable penalties currently in effect for non-criminal motor vehicle violations in the United States. In addition, Mexico City devotes a large police presence to the enforcement of *Hoy no Circula* (in the absence of high-technology solutions) and impounds violating vehicles for 48 hours.

The international applications of License Plate Rationing have not seen a widespread use of any enforcement via intelligent transportation system (ITS) technology. The Latin American implementations were accomplished with large police presences. For the most part, the cost to enforce the program in the Latin American cities is equal to the law enforcement costs of monitoring vehicles, issuing violations, and collecting the fines.

Although the New York City Police Department Highway Patrol has a Traffic Enforcement fleet of approximately 300 personnel, it would be prudent to consider License Plate Recognition technology to aid in enforcement, allowing the Highway Patrol to focus their resources elsewhere. As with the implementation of additional red light enforcement cameras in New York City, using technology for law enforcement purposes requires new state legislation.

License Plate Recognition is an Intelligent Transportation System (ITS) technology that uses digital photography and optical character recognition algorithms to identify vehicles that pass by a particular location. License Plate Recognition has been used successfully in cordon applications (London, England) and in many toll road projects (Highway 407 in Toronto, Ontario; Citylink in Melbourne, Australia; and the Cross-Israel Highway). License Plate Recognition systems require access to vehicle registration databases in order to extract address information for sending citations to violators. For areas such as New York City, where motorists come from numerous states, the technology would need to be set up to read and recognize license plates from multiple states (including all the variations of customized and specialized plates).

A License Plate Rationing scheme for the Manhattan CBD would likely require the use of License Plate Recognition technology at all bridges and tunnels entering the island of Manhattan. In addition, detectors would be needed at strategic locations inside the city to identify trips originating within Manhattan and crossing the northern boundary of the rationing zone. An estimated 20 License Plate Recognition locations at key entry points to the island would be required. Inside the city, detectors could be placed along the highways and avenues at constant intervals. An estimated 115 License Plate Recognition locations would be required to cover just the region south of 86th Street, including the river crossings. Table 3.1 provides rough cost estimates of implementation of rationing at 115 locations in the city.

Table 3.1 Cost Estimate for Implementation of ITS Enforcement

	Readers on Street Grid, East and West Side Highways, and Major Entry Points
Estimated Number of Rationing Stations	115[a]
Estimated Cost per Rationing Installation	$412,000
Estimated Total Field Equipment	$47,380,000
Estimated Central Processing Capital Cost	$100,000,000
Estimated Annual Field Maintenance	$9,476,000
Field Visit to Download Images	$7,774,000
Annual Transaction Cost	$183,070,000
Annual Operating Cost	$200,348,000
Annualized Capital Cost	$17,277,000
Total Capital Cost	$147,000,000
Total Annualized Cost	$200,348,000

[a] The actual number of locations would depend on the License Plate Rationing Scheme.

3.4 Environmental Effects

The environmental effects resulting solely from the License Plate Rationing case studies were unclear. The most extensive and objective documentation of the long-term impacts of License Plate Rationing was found for the Mexico City implementation. These studies found that there was no sustained improvement in air quality at any time of the day, no increase in subway ridership, and worsening air quality on weekends and other times outside of the License Plate Rationing scheme.[50] Mode shift was primarily to taxis and small buses rather than to subways, which counterbalanced any improvements likely to be achieved by reductions in auto travel. Demand for gasoline went up after two months of implementation,[51] and Mexico City became a net importer rather than net

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[50] Lucas Davis (2006), *The Effect of Driving Restrictions on Air Quality in Mexico City*, University of Michigan.

[51] Eskeland and Feyzioglu (1997), *Rationing Can Backfire: The Day without a Car in Mexico City*, The World Bank Economic Review.

exporter of used vehicles from the rest of the country, meaning that residents sought to evade the restrictions by becoming multi-vehicle households (with variably coded license plates) and began to acquire older (and less fuel efficient and more polluting vehicles) from the countryside. Assessing the air quality impacts in Mexico City is further complicated by the phasing out of leaded gasoline and adoption of U.S. vehicle emissions standards during the same period.

The environmental benefits achieved during License Plate Rationing at most locations were likely due to the improved emission standards that were enforced along with License Plate Rationing (*Proaire* in Mexico City, *Proconve* in São Paulo). Similarly, the expected benefits of License Plate Rationing in New York City might not be realized without complementary measures associated with vehicle emissions standards, strategies to address increased taxi usage, evasion via increased vehicle ownership, and improvements to public transportation.

4.0 Key Findings and Conclusions

License Plate Rationing has not been implemented in cities generally considered to be international peers of New York City, such as western European capitals, or Asian cities such as Tokyo or Singapore. For the most part, it has been implemented in Latin American cities with severe air quality problems and very different demographics than New York. This memorandum focuses on the three most enduring and well documented implementations in the Latin American cities of Mexico City, Bogotá, and São Paulo. The experience of these cities offer valuable lessons that shed light on what might be experienced from a License Plate Rationing scheme in New York City. The most relevant conclusions are presented below.

- **Better Chances of Congestion Mitigation when Implemented in Conjunction with Other Strategies –** The Bogotá and Mexico City cases experienced two different effects on transit ridership. The main difference was that in Bogotá drivers were provided with a better public transit system over the existing one, whereas no such measures were taken in Mexico City. It is reasonable to conclude that a driving restriction would not be as effective in influencing commuters to switch modes unless they are provided with transit options that are considerably more attractive than the ones they currently have.
- **Short-Term Benefits May not be Sustainable** – Short-term congestion and air quality benefits may be realized but these may be reduced in the long run as travelers adopt various coping strategies. In each case study, rationing policy was first introduced on a trial basis, then expanded to full-time as the trials seemed to have the desired effects in the short term. Once the policies were made permanent, some motorists were willing to invest in solutions to evade the restrictions (such as taking taxis or acquiring additional vehicles). In addition, some of the mileage reduced from the initial restrictions was offset over the long term by greater off-peak usage, trip deferrals, and induced demand.
- **Socioeconomic Equity –** Since households with more than one vehicle are better positioned to avoid the ban, License Plate Rationing is more favorable to households with multiple vehicle ownership, which is highly correlated with income. More affluent households are better able to adopt strategies to circumvent the intent of the policy. This was most clearly apparent in Mexico City.
- **A robust Enforcement System is Needed –** All three cities impose hefty fines for violations: $200 in Mexico City on per capita GDP of $10,700; $107 in Bogotá on per capita GDP of $6,300; and $100 in São Paulo on per capita GDP of $4,500. Given a per capita GDP of $46,617 in New York State in 2006, this

level of penalty would translate into fines close to $900, far in excess of most comparable penalties currently in effect for non-criminal motor vehicle violations in the United States. Mexico City devotes a large police presence to the enforcement of *Hoy no Circula* (in the absence of high-technology solutions) and impounds violating vehicles for 48 hours. Although not currently used elsewhere, ITS technology is available for enforcement purposes.

- **Implementation is a Complex Undertaking –** A significant effort would be required for effective implementation of a License Plate Rationing program in New York City. Outside states would need to actively be involved in the planning stages. To further complicate matters, high auto ownership in the metropolitan area makes it likely that many area residents would emulate the adaptation strategy of Mexico City residents by acquiring additional vehicles with a different license plate code to avoid the ban. Combating such strategies (by standardizing license plates across multi-vehicle households) would require a major change in how vehicle registrations are handled in the United States (from an individual vehicle to household vehicle basis), and it would have to be done across multiple state jurisdictions (at a minimum, New York, New Jersey and Connecticut). Even then, one could imagine further adaptation strategies such as neighboring households swapping vehicles on different days of the week if the government rotated the license plate numbering scheme on an annual basis as in Bogotá.
- **Better Chances of Air Quality Improvements when Implemented in Conjunction with Other Strategies –** Although most implementations of License Plate Rationing around the world were introduced to address environmental problems, the License Plate Rationing strategies alone have not been able to achieve significant benefits. The implementation of stricter vehicle emissions standards together with License Plate Rationing strengthened the effort to improve air quality. License Plate Rationing itself has not provided long-term environmental benefits.

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Congestion Mitigation Commission Technical Analysis

Exempt Hybrids from the Congestion Charge

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New York City Economic Development Corporation
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Table of Contents

List of Tables

List of Figures

List of Acronyms

AT-PZEV – Advanced Technology Partial Zero Emission Vehicle

CAA – Clean Air Act (1963, 1970, 1990)

CAFÉ – Corporate Average Fuel Economy

CARB – California Air Resources Board

CAV – Clean Air Vehicle (a California state program)

CNG – Compressed Natural Gas (an alternative fuel source)

CPZ – Congestion Pricing Zone

FFV – Flexible Fuel Vehicle

GHG – Greenhouse Gas

GVWR – Gross Vehicle Weight Rating

HEV – Hybrid Electric Vehicle

HOV – High Occupancy Vehicle

ICE – Internal Combustion Engine (for purposes here, a non-hybrid or non-low-emission vehicle)

LEV – Low-Emission Vehicle

LPR – License Plate Readers

PZEV – Partial Zero Emission Vehicle

SOV – Single Occupant Vehicle

SULEV – Super Ultra Low Emission Vehicle

TLEV – Transitional Low Emission Vehicle

ULEV – Ultra Low Emission Vehicle

USEPA – United States Environmental Protection Agency

VMT – Vehicle Miles Traveled

ZEV – Zero Emission Vehicle

Executive Summary

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, trucks, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems. Congestion pricing has been proposed to address these issues.

One incentive that could be considered to help meet the goal of improving air quality is to allow hybrid or other types of low-emissions vehicles to enter the congestion pricing zone without paying a fee. Similar incentives have been adopted in locations throughout the United States and elsewhere. These incentives are credited with spurring growth in alternative fuel vehicle sales in these regions. Is there a possibility, however, that the incentives are working too well? By eliminating driver fees or other restrictions for a set of vehicle types and thereby pushing up demand for those vehicle types, could the congestion-related benefits of traffic control that the restrictions were initiated to achieve be compromised?

Clean Vehicle Market

Vehicles that are fueled by alternative fuel sources or that simply emit low amounts of air pollutants while operating on conventional fuels, collectively referred to as "clean vehicles," are making their presence known in the marketplace. Driven by increasingly stringent government emissions and fuel economy standards, and responding to consumer demands for vehicles that pollute less and require fewer trips to a fueling station, automobile manufacturers have been introducing many new clean vehicle models, particularly hybrid electric vehicle (HEV) models, to the market. Additional incentives such as Federal and state tax rebates also have helped to fuel the HEV market. Nationally, hybrid-electric vehicles represented 0.1 percent of registered vehicles. According to New York State Department of Motor Vehicle data, hybrid-electric vehicles represent 0.2 percent of registered vehicles in the areas of the New York City metropolitan region within New York State (New York City, Nassau, Suffolk, Putnam, Dutchess, Rockland, Orange, and Westchester). Industry experts predict that HEVs will increase their light duty passenger vehicle market presence in coming years, from 1.5 percent of new vehicle sales in 2006 to 4.5 percent or more by 2012.[1]

CASE STUDIES

An additional incentive have been adopted in 10 states, which allows clean vehicle motorists to access High Occupancy Vehicle (HOV) facilities without meeting minimum occupancy requirements. These states have established varying emissions and fuel economy criteria that vehicles must meet to qualify. States such as New York have very stringent qualification criteria, while Virginia allows many more vehicle models to participate in its program. Three state programs have been selected for examination: New York's Clean Pass Program, Virginia's Clean Special Fuels license plate program and California's Clean Air Vehicle program. Additionally, a look at a recent addition to London's congestion pricing scheme, the institution of emissions-related charges, could inform a similar policy scheme in New York City.

New York Clean Pass Program. New York State implemented the Clean Pass Program on the Long Island Expressway in 2006. The program has strict qualification criteria (only three vehicle models presently qualify). Within the first nine months of the program, NYSDMV issued 2,100 Clean Pass decals and clean vehicles accounted for between one and six percent of vehicles traveling in HOV lanes on the Long Island Expressway

Virginia Clean Special Fuels Program. Virginia's program has much less stringent qualification criteria, allowing many HEV models to participate. In the first five years of the program's existence, more than 8,500 vehicles enrolled. Clean Special Fuel Vehicles accounted for 25 percent of HOV utilization on Interstate 95, causing the lanes to operate beyond capacity. Virginia recently restricted clean vehicle use of HOV lanes on Interstates 95 and 395.

California Clean Air Vehicle Program. California's program has perhaps the highest level of participation in the country. More than 85,000 vehicles have Clean Air Vehicle decals and are qualified to travel in HOV lanes without meeting minimum occupancy requirements. Although HOV lane performance in the State has deteriorated in recent years, California officials have blamed population and VMT growth, not HEVs, for the growing lane utilization.

London Emissions-Related Charges. London has implemented emissions-related charges in its congestion charge zone. The emissions-related charges

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[1] 2007 U.S. Hybrid Vehicle Forecast Second Quarter Update, J.D. Power and Associates, August 2007, available from http://www.jdpower.com/corporate/news/releases/pressrelease.aspx?ID=2007127 (accessed September 19, 2007); "Market-Based Approaches to Fuel Economy: Final Modeling Results," Energy and Environmental Analysis, January 2006.

offer a 100 percent discount to the lowest emission vehicles, standard charges for most standard passenger car models, and additional fees for inefficient vehicles. A Transport for London study found that this policy will likely have a minor effect on vehicle fleet composition, traffic congestion, and environmental and air quality.

NEW YORK CITY IMPLEMENTATION SCENARIOS

Three scenarios for potential clean vehicle exemptions in the proposed New York City congestion pricing zone have been developed to determine potential effects on traffic congestion and air quality.

The "*no special provision*" scenario assumes that the congestion pricing scheme will be implemented according to the previous proposal, and that no exemption is offered to clean vehicles. Clean vehicles will grow in number according to market trends, though this will not have an effect on crossings into the Manhattan congestion zone. The number of vehicle trips and anticipated vehicle miles traveled (VMT) will be the same as what is presented in the PlaNYC congestion pricing proposal. With the implementation of congestion pricing, vehicle trips ending in the Congestion Pricing Zone (CPZ) are expected to decrease by 111,000 and VMT is expected to fall by 6.3 percent.

Alternative 1 assumes that the strict standards of the New York Clean Pass program are adopted for a Manhattan clean vehicle exemption, and only select clean vehicle models qualify. This scenario could result in the addition of 1,350 daily vehicle trips that end in the Congestion Pricing Zone (CPZ) above the congestion pricing scenario envisioned in PlaNYC. Vehicle miles traveled (VMT) in the CPZ for passenger vehicles also would increase, by more than 9,000, from 4.03 million in the baseline scenario to 4.04 million VMT daily in the Alternative 1 scenario. This represents a reduction in total VMT (including commercial and transit vehicles) over the precongestion pricing baseline of 6.2 percent. Table 4.1 on page 4.7 provides details on VMT and vehicle trip calculations.

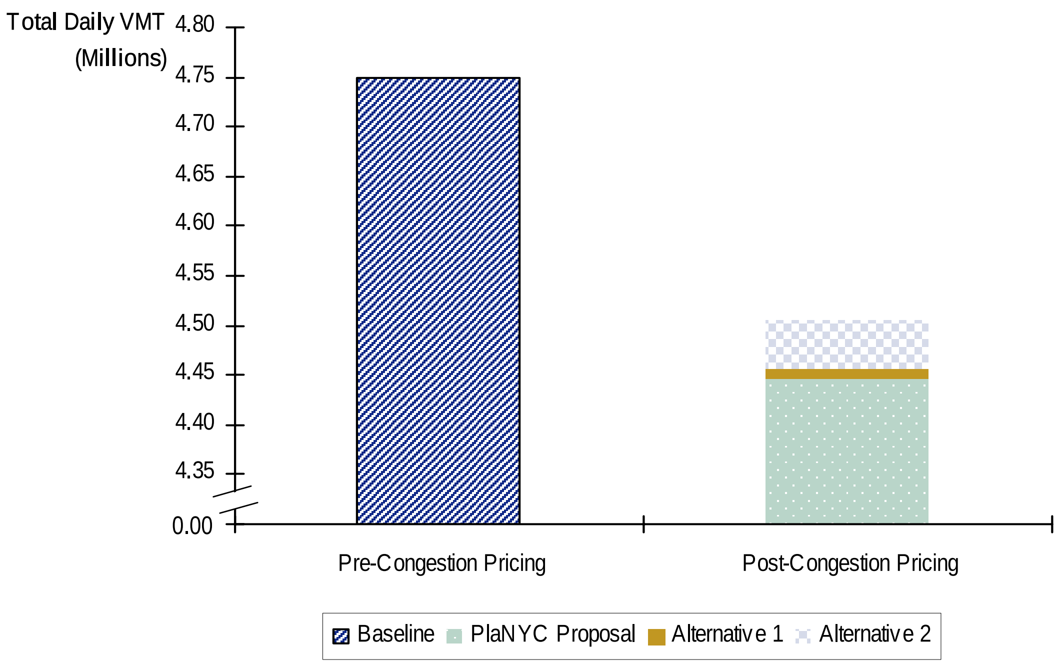
Alternative 2 assumes that the qualification criteria are less stringent, similar to the Virginia Clean Special Fuels program. This scenario could result in the addition of approximately 13,000 daily vehicle trips into the congestion pricing zone above the PlaNYC congestion pricing proposal scenario level. Daily VMT for passenger vehicles would likely increase by 43,000 vehicle-miles relative to the PlaNYC proposal. This represents a reduction in VMT of 5.5 percent over the precongestion pricing baseline.

Figure ES.1 shows the anticipated effect each scenario will have on VMT in the CPZ. Assuming total VMT will drop by 6.3 percent in the first year after congestion pricing is implemented, 4.75 million VMT (precongestion pricing) will be reduced to 4.45 million VMT (postcongestion pricing). The implementation of Alternative 1 would add 9,000 VMT back into the zone, as indicated by the dark blue bar. Alternative 2 would add 43,000 VMT back into the zone, as indicated by the orange bar.

Conclusion

The experiences of other states show that the addition of incentives that save motorists time and money can result in a significant level of program participation. This participation meets the goals of programs geared toward changing vehicle purchasing and travel habits. The evidence does not suggest, however, that such fee and occupancy exemptions contribute to lowering traffic congestion. In fact, the opposite may be true. An incentive program that becomes popular for thousands of drivers may result in a lessening of the congestion reduction benefits of the congestion pricing scheme.

Figure ES.1 Daily Total Vehicle Miles Traveled within the CPZ
Pre- and Post-Implementation Scenarios



1.0 Introduction

On any given workday, the Manhattan Central Business District hosts nearly two million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Streets are congested with cars, buses, taxis, pedestrians, and cyclists. The saturated roadways slow bus service, cause emergency vehicles to lose valuable response time, and contribute to the region's air pollution problems.

According to Texas Transportation Institute's Urban Mobility Report, New York City ranks second in the nation in terms of annual delay. The majority of the delay is spent during the peak hour, with travelers experiencing 46 hours of annual delay (per traveler) in 2005, up from 34 hours in 2000, a 35 percent increase. This congestion costs the City and its residents over $7 billion in 2005, costing each peak traveler approximately $888.

By 2030, nearly a million more residents, 750,000 more jobs, and millions more visitors are expected to further strain the City's transportation system. The current system cannot handle the anticipated increase in traffic and meaningful infrastructure-based solutions are challenging, costly, and lengthy to implement. A comprehensive and innovative set of strategies must be implemented to make a profound change in travel behavior.

One incentive that could be considered to help meet the goal of improving air quality is to allow hybrid or other types of low-emissions vehicles to enter the congestion pricing zone without paying a fee. Similar incentives have been adopted in locations throughout the United States and elsewhere. In Long Island, New York and California, alternative fuel vehicles that meet strict state and Federal emissions and fuel economy restrictions are permitted to travel in High Occupancy Vehicle (HOV) lanes without meeting minimum occupancy requirements. In Virginia those restrictions are less stringent, allowing a wider array of alternative fuel vehicles to access HOV lanes. In the United Kingdom, clean fuel vehicles that meet strict European standards are exempt from paying the congestion fee in Central London. These incentives are credited with spurring growth in alternative fuel vehicle sales in these regions. Is there a possibility, however, that the incentives are working too well? By eliminating driver fees or other restrictions for a set of vehicle types and thereby pushing up demand for those vehicle types, could the congestion-related benefits of traffic control that the restrictions were initiated to achieve be compromised?

This memorandum explores the regulatory environment that has driven and will continue to influence the alternative fuel vehicle market and engages in a discussion of alternative and clean fuel vehicle standards and types in Section 3.0. The section concludes with an examination of existing and forecasted future markets for these vehicles. Section 4.0 introduces four case studies that examine alternative fuel incentives that have been implemented in the United States and the United Kingdom along with the effects on traffic congestion and air quality that have been observed or predicted. Section 5.0 presents three potential scenarios for the implementation of fee exemptions for alternative fuel vehicles in the Manhattan congestion pricing zone. Section 6.0 presents conclusions based upon the discussion of the scenarios.

2.0 Alternative Fuel and Low-Emissions Vehicle Types and Markets

The types of policies that promote the use of alternative fuels, energy efficiency, and reduced emissions can embrace a wide variety of vehicle and engine types. Some policies set eligibility requirements based on the emissions rating of a vehicle model. Other governments have based eligibility requirements on the engine type, regardless of the rated level of emissions or energy efficiency of the vehicle model. Prior to addressing special facilities access incentives throughout the world, it is necessary to understand the various types of low-emissions and alternative fuel vehicles and existing state and Federal emissions policies and standards. This section of the report establishes the context for alternative fuel, clean fuel and low-emissions vehicles, defines vehicle classifications, and provides examples of vehicle models available on the market. This section concludes with a discussion of current and anticipated market penetration of various vehicle types.

2.1 Policy Context: Government Emissions Standards and Ratings Systems

The United States Federal government has been responsible for regulating air quality since 1970. The passage of the Clean Air Act (CAA) and subsequent amendments have established standards for reducing air pollution by regulating mobile and stationary sources of pollutants. The CAA and amendments have led to the establishment of Federal low-emissions vehicle standards and special provisions for stricter standards in the State of California. New York, along with seven other states in the Northeast have adopted aspects of the California standards. Six additional states have or are considering adopting similar measures. The following paragraphs discuss the policy contexts that have resulted in the development of the alternative fuel and low-emissions vehicles that currently are available on the market.

Federal Clean Air Act and Amendments, 1963 to 1990

Federal efforts to reduce air pollution and improve air quality stem from the CAA, originally drafted and passed through Congress in 1963. The CAA initially called for the development of air quality control agencies in each of the states. Federal involvement was limited to addressing pollution issues on the interstate highway system.

In 1970, the CAA was extended and amended to establish a Federal standard and policy for addressing air quality issues. The amendments required the newly established U.S. Environmental Protection Agency (USEPA) to develop and enforce air quality regulations for the sake of protecting human health. Three programs of regulations and standards were developed by the USEPA to address various types of pollutants and sources: 1) the New Source Performance Standards prescribe the level of pollution that a new stationary source may emit; 2) the National Ambient Air Quality Standards (NAAQS) were established to protect human health and the environment from harmful air contaminants and target six air contaminants, including Ozone (O_3), particulate matter (PM), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NO_X), and lead (Pb); and 3) the National Emissions Standards for Hazardous Air Pollutants (NESHAP) were established to achieve the maximum reduction of emissions of pollutants that are not regulated by NAAQS, yet may cause increases in fatalities, or serious or irreversible illness.

The 1970 Amendments called for the enforcement of theses standards by the USEPA in all states except California, which was exempt due to particularly acute air quality problems and that state's efforts in pioneering strict standards of its own. The other 49 states for which USEPA is responsible were given the option to take on the responsibilities of regulation and securing compliance themselves, with funding assistance from the USEPA. States that elect to engage in regulation themselves are required to develop a USEPA-approved State Implementation Plan.

In 1990 the CAA received another set of significant amendments, which are the most recent alterations to the CAA. The 1990 amendments address ozone layer depletion, toxic pollutants, and acid rain. With regard to mobile sources of air pollutants, the 1990 amendments require automobile manufacturers to produce cleaner engines; refiners to produce cleaner, less-evaporative fuels; and non-attainment areas to establish passenger vehicle inspection and maintenance programs that regulate vehicle emissions. The amendments encourage the development of alternative and renewable fuels.[2]

Corporate Average Fuel Economy (CAFÉ) Standards

In response to the oil embargo of 1973-74, Congress passed the Energy Policy Conservation Act in 1975. Title V of the Act, titled "Improving Automotive Efficiency," established a set of fuel economy standards that automobile manufacturers who sell vehicles in the United States would be required to meet. The standards were applicable to passenger car and light truck (under 8,500 lbs GVWR) fleets. The National Highway Traffic Safety Administration (NHTSA) is responsible for establishing, amending, and enforcing CAFÉ standards. The

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[2] "Clean Air Act," U.S. Environmental Protection Agency, May 2, 2007, http://www.epa.gov/air/caa/ (accessed September 20, 2007).

USEPA has the duty of calculating the average fuel economy for each manufacturer's fleet, either by confirming manufacturer fuel economy test data or by testing vehicles at the USEPA's facility in Michigan.

Manufacturers that fail to meet the CAFÉ standards for their fleets are subject to fines of $5.50 for every tenth of a mile per gallon short of their target, multiplied by the number of vehicles produced. In lieu of fines, manufacturers can develop fleets that exceed the CAFÉ standards the following year for which they develop credits to use to "pay off" shortcomings in other years.[3]

Federal Low-Emissions Vehicle Standards

The CAA defined two sets, or tiers, of standards for light-duty vehicles. The standards require that vehicles in each subcategory maintain an acceptable level of emissions for each of the following pollutants: THC, NMHC, CO, NO_X, and PM.

Tier 1 Standards

Tier 1 standards were drafted in 1991 and phased in between 1994 and 1997. The standards applied to all light-duty vehicles under 8,500 pounds Gross Vehicle Weight Rating (GVWR). These light-duty vehicles are separated into three subcategories: passenger cars, light-duty trucks below 6,000 pounds GVWR, and heavy light-duty trucks between 6,000 pounds and 8,500 pounds GVWR. Standards for each vehicle type were developed and then measured using the Federal Test Procedure (FTP_{75}). In 2000, an additional test procedure, the Supplemental Federal Test Procedure (SFTP) was developed to determine emissions levels during more rigorous conditions such as urban driving and driving while a vehicle's air conditioning system is in operation.[4]

Tier 2 Standards

In 1999, a second tier of Federal emissions standards was adopted and began being implemented in 2004. The phasing in of the Tier 2 standards is scheduled to be completed in 2009. Unlike Tier 1, Tier 2 standards include regulations applicable to large passenger vehicles over 8,500 pounds GVWR, up to 10,000 pounds GVWR. Tier 2 evaluates vehicle models' compliance at three stages of a vehicle's life – prior to assembly line production, on the assembly line, and an in-use evaluation to ensure emissions levels are maintained after several years of

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[3] "CAFÉ Overview," National Highway Traffic Safety Administration, available from http://www.nhtsa.dot.gov/cars/rules/cafe/overview.htm (accessed September 18, 2007).

[4] "Emission Standards, United States, Cars and Light Duty Trucks," Dieselnet.com, April 2007, available from http://www.dieselnet.com/standards/us/ld.php (accessed September 15, 2007).

use. Tougher requirements for fuel quality and cleanliness also are part of the Tier 2 standards.

Vehicle manufacturers may certify their vehicle models into one of 11 "certification bins." Each bin corresponds to a level of strictness of the standards, with Bin 1 having the toughest clean fuel requirements and Bin 11 having the most relaxed requirements. Bins 9 through 11 are temporary bins, and will expire after Model Year 2008. In 2009 the entire vehicle fleet sold by each manufacturer must meet an average NO_X emission standard of 0.07 grams per mile.[5]

National Low-Emission Vehicle Standards

During the late 1990s, the transitional period between Tier 1 completion and the phasing-in of Tier 2, the USEPA established a voluntary National Low-Emission Vehicle (NLEV) program, which resulted from an agreement between Northeastern states and auto manufacturers. The program sets forth more stringent standards than the Tier 1 or Tier 2 programs, requiring emissions reductions that are nearly equivalent to the California Low-Emission Vehicle Program. Participating auto manufacturers achieve compliance by adhering to schedules for bringing certain percentages of their vehicle fleets to increasingly cleaner standards. NLEV was implemented in the Northeastern states in 1999 and nationally in 2001. It applies to light-duty vehicles, excluding heavy light-duty vehicles greater than 6,000 pounds GVWR.[6]

California Emissions Standards

The CAA allowed the State of California to establish its own emissions standards due to the severity of air quality challenges in that state, and the efforts the State had made in pioneering restrictive standards to improve air quality. The California Air Resources Board oversees research and establishes the California standards. Historically, California's low-emission vehicle standards have been stricter than USEPA standards. Like the USEPA standards, California's standards have developed under two iterations.

CA LEV-I, or Low-Emission Vehicle (LEV) established standards for vehicles in six different categories, ranked from least to most stringent: CA LEV-I,

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5 "Tier 2 Vehicle and Gasoline Sulfur Program," United States Environmental Protection Agency, available from http://www.epa.gov/otaq/regs/ld-hwy/tier-2/ (accessed September 21, 2007).

6 "National Low Emission Vehicle Program and Ozone Transport Commission (OTC) LEV," United States Environmental Protection Agency, September 2007, available from http://www.epa.gov/otaq/lev-nlev.htm (accessed September 20, 2007); "Cars and Light Duty Trucks-Tier 1," Dieselnet.com, April 2007, available from http://www.dieselnet.com/standards/us/ld.php (accessed September 18, 2007).

Transitional Low-Emission Vehicles (TLEV), Low-Emission Vehicles (LEV), Ultra Low-Emission Vehicles (ULEV), Super Ultra Low-Emission Vehicles (SULEV), and Zero Emission Vehicles (ZEV). CA LEV-I requires that manufacturers produce a certain percentage of vehicles that fit into a certain category, and then progressively develop vehicles in increasingly more stringent categories over time, according to schedules that are built based on the manufacturer's preexisting fleet characteristics. Tier 1 expired in 2003.

CA LEV-II, the second tier of California emission standards, went into effect in 2004 and will be completely phased-in by 2010. CA LEV-II initiated a reclassification (phased in by 2007) of vehicles below 8,500 pounds GVWR in a manner that requires most pick-up trucks and SUVs to meet passenger car emission standards. In addition, the NO_X and PM emission standards were tightened and the TLEV category was eliminated. Vehicles therefore require advanced emission control technologies in order to meet the CA LEV-II emission standards.[7]

New York State Air Quality Standards

New York is one of eight Northeastern states that are members of the Coalition of Northeast Governors (CONEG) and Northeast States for Coordinated Air Use Management (NESCAUM), which defines itself as the CAA of the Northeast States. The participating states have adopted the CA LEV-II standards. New York is also one of many states that have adopted the impending California Greenhouse Gas (GHG) standards. These standards, if upheld in court, will establish limits on the emission of greenhouse gases and other pollutants. They will effect automobile manufacturers in the 2009 model year and require a 30 percent reduction in emissions by 2016. The GHG standards would likely result in the introduction of higher quantities of low-emission vehicles, particularly those that make use of cleaner fuels, into the market in New York State.

2.2 Alternative Fuel, Flexible Fuel and Hybrid Electric Vehicle Types

Alternative fuel vehicles refer to any motor vehicle that uses a fuel source other than conventional gasoline or diesel gasoline. Alternative sources include compressed natural gas (CNG), liquid nitrogen, ethanol, battery electricity, hydrogen fuel cells, and solar power. Vehicle engines that operate on each of

7 "Low Emission Vehicles and Test Procedures," California Air Resources Board, September 2007, available from http://www.arb.ca.gov/msprog/levprog/test_proc.htm (accessed September 19, 2007); "Cars and Light Duty Trucks-California," Dieselnet.com, December 2006, available from http://www.dieselnet.com/standards/us/ld_ca.php#lev (accessed September 18, 2007).

these sources are in various stages of development and availability on the market.

Battery electric and CNG vehicles have been developed and adopted into government vehicle fleets. Governments in some locations have purchased government vehicles, transit buses, and public works vehicles that operate on these fuel sources. Liquid nitrogen, hydrogen, and solar powered vehicles have not yet developed far beyond prototype models. Ethanol has become a popular alternative fuel source in recent years. Most vehicles in the existing consumer fleet are capable of operating well on fuel that includes a 10 percent blend of ethanol. Conventional vehicle engines can be modified to receive fuel blends with higher proportions of ethanol, such as E-85 (85 percent ethanol) fuel. Automobile manufacturers have introduced flexible fuel vehicles onto the market which can operate well on E-85 fuel.[8]

Flexible Fuel Vehicles (FFV)

Many of the popular clean fuel vehicles are flexible fuel vehicles (FFV) which alternate between two fuel sources. FFVs may qualify for several different California emissions rating categories, depending on the technologies used and resulting emissions. Popular examples of an FFV type include models that are capable of receiving E-85 ethanol. Manufacturers such as Daimler Chrysler, Ford/Lincoln, GM, Isuzu, Mazda, Mercedes-Benz, Mercury, and Nissan have produced vehicle models capable of receiving high proportions of ethanol fuel. Combined, these manufacturers have produced a total of 25 ethanol FFV vehicle models available in 2007.[9]

Currently, there are few fueling stations in the United States that offer E-85 fuel. Of the 1,200 stations nationwide approximately 80 percent are located in the Midwest or Northern Plains states.[10] In New York State there are three fueling stations that offer E-85 fuel, while no stations currently offer E-85 ethanol in New Jersey or Connecticut.[11] Due to its scarcity, FFVs operating in the Tri-State region are likely operating on conventional fuel sources at most, if not all, times. FFVs are unlikely candidates for clean fuel or low-emission vehicle incentive benefits because of the fact that these vehicles can, and quite often do, operate on conventional petroleum fuel.

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[8] "Flexible Fuel Vehicles," E85.com, September 2006, available from http://www.e85fuel.com/e85101/FFVlist2007.pdf (accessed September 17, 2007).

[9] "Flexible Fuel Vehicles," E85.com.

[10] Midwest and Northern Plains states include Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, North Dakota, Ohio, South Dakota, and Wisconsin; "E85 Stations," available from http://e85vehicles.com/e85-stations.htm (accessed October 25, 2007).

[11] "E85 Stations."

Hybrid Electric Vehicles (HEV)

Hybrid electric vehicles (HEV) which use a conventional combustion engine and a battery and electric motor, are another example of a popular type of FFV. These vehicles are capable of operating with improved fuel economy and lower emissions, however not all HEVs are developed for those purposes alone, and hence some models do not meet some of the more stringent emission category requirements.[12]

2.3 Low-Emission Vehicle Ratings, Vehicle Types and Examples

Existing consumer market-ready applications of LEVs will be presented according to the emission category established by the California Air Resources Board for which they qualify.

Low-Emission Vehicles

As of 2004, all new cars sold in California, and states that have adopted California Air Resources Board (CARB) standards, including New York, are required to meet LEV II emission ratings. LEV II is the least stringent rating new vehicles are permitted to obtain in California and states that have adopted the California rating system. Most LEV IIs are equipped with conventional internal combustion engine (ICE) technologies. Some hybrid vehicles fit into this category as well, unable to qualify for stricter emission ratings. This is due to the fact that their hybrid technologies are aimed at improving engine performance while maintaining the same fuel economy and emissions rating as standard ICE models. The 2007 models of the GMC Sierra Hybrid and Chevrolet Silverado Hybrid, for example, received the same USEPA fuel economy rating (LEV II) as the standard 2007 GMC Sierra and 2007 Chevrolet Silverado. The hybrid versions of both vehicle models, however, included a 5.8-liter, eight-cylinder engines which offer the consumer better performance than the 4.3-liter, six-cylinder standard models. The hybrid versions of the Sierra and the Silverado offer a slim one to two mile-per-gallon fuel economy savings compared to the standard models.[13] Table 2.1 provides a fuel economy and emissions rating comparison of some LEV-rated vehicle models in the U.S.

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[12] Driveclean CA, available from http://www.driveclean.ca.gov/en/gv/faq/index.asp#2; (accessed September 18, 2007); "Fuel Economy," United States Department of Energy, available from http://www.fueleconomy.gov/ (accessed September 18, 2007).

[13] "Green Vehicle Guide," United States Environmental Protection Agency, September 2007, available from http://www.epa.gov/autoemissions/all-rank-07.htm; (accessed September 21, 2007); "Ratings Highlights," Greencars.org, 2007, available from http://www.greenercars.org/highlights.htm (accessed September 17, 2007).

Table 2.1 Fuel Economy and Emissions Rating Comparison of Select LEV-Rated Vehicle Models

Model (2007)	Engine Specs	Fuel Economy – City	Fuel Economy – Highway	CARB Rating
Chevrolet Silverado C1500	4.3L 6, auto	16 mpg	21 mpg	LEVII
GMC Sierra Classic C1500	4.3L 6, auto	16 mpg	21 mpg	LEVII
Chevrolet Silverado C1500 Hybrid	5.3L 8, auto	18 mpg	21 mpg	LEVII
GMC Sierra Classic C1500 Hybrid	5.3L 8, auto	18 mpg	21 mpg	LEVII

Note: "Ratings Highlights," Greencars.com.

Ultra Low-Emission Vehicles (ULEV)

ULEVs emit 50 percent fewer pollutants than LEVs.[14] A wide variety of conventional gasoline engine cars, SUVs, and pick-ups currently available on the market meet ULEV standards. Popular 2007 sedan models such as the Toyota Corolla and Yaris, Honda Sonata, Mazda MX-5 Miata, BMW X3, and the six-cylinder Nissan Altima qualify for a ULEV rating.[15] Older versions of the Honda Insight, Honda Civic Hybrid, and Toyota Prius met ULEV standards, though most current hybrid vehicle models on the market aim for SULEV, PZEV, and AT-PZEV ratings, which are discussed below.

Super Ultra Low-Emission Vehicles (SULEV)

SULEV is the cleanest emission standard achievable by gasoline-powered vehicles. These vehicles emit between 76 percent and 97 percent fewer pollutants than USEPA Tier 1 requirements, and are 90 percent cleaner than LEVs. SULEV subcategories have been added to the California list of emissions categories. Partial zero emissions vehicles (PZEV) represent vehicles that meet SULEV requirements, have zero evaporative emissions from its fuel system, and have a 15-year, 150,000-mile warranty on its emission control components. PZEVs give automobile manufacturers a partial credit toward meeting ZEV requirements without the need to produce ZEVs. The second new category includes advanced technology partial zero emission vehicles (AT-PZEV). AT-PZEVs use hybrid electric vehicle systems or CNG components to improve fuel efficiency, but otherwise meet PZEV/SULEV emissions requirements.[16]

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[14] Driveclean CA.

[15] "Ratings Highlights," Greencars.com.

[16] "Emissions," Clean Car Campaign, available from http://www.cleancarcampaign.org/emissions.shtml (accessed September 14, 2007).

There currently are dozens of SULEV models available on the market. Auto manufacturers such as Ford, Chevrolet, Honda, Lexus, Mazda, Mercury, Nissan, and Toyota have developed SULEV, PZEV, and AT-PZEV models that are gaining popularity and traction in the marketplace. SULEV vehicle models available in 2007 include the Hyundai Elantra GLS and the BMW 3 Series four-door sedan. The 2007 models of the Volkswagen Jetta, Toyota Camry Sedan, Subaru Forester, Pontiac G5, Ford Fusion, and Nissan Altima qualify as PZEVs. Hybrid vehicles such as the Toyota Prius, Honda Insight, and Honda Civic Hybrid are AT-PZEVs due to the advanced technology used to meet tough emissions standards. It is important to note that due to clean fuel requirements in place in California, New York, and Connecticut, a vehicle that qualifies as PZEV in those states may not burn as clean and therefore qualify as a SULEV elsewhere in the country.

Zero Emission Vehicles

ZEVs have zero tailpipe emissions and are 98 percent cleaner than LEVs. Battery electric vehicles, fuel cell vehicles, hydrogen vehicles, and solar powered vehicles qualify as ZEVs. Currently, there are no ZEV models being mass-produced by the major automobile manufacturers, nor are any models widely available on the market. The CA LEV-II program sets ZEV quotas for automobile manufacturers. Manufacturers unable to produce their quota of ZEVs have the option to produce Advanced Technology Partial Zero Emission Vehicles (AT-PZEV) to receive partial ZEV credits. This arrangement is one of the major motivating factors driving the production of AT-PZEVs and HEVs.

2.4 Alternative Fuel and Lower Emissions Vehicle Market Penetration and Forecasts

Alternative fuel and lower emissions vehicles have been taking on a larger share of the new vehicle market in recent years. In particular, HEVs have been gaining traction in the marketplace. Since Honda introduced the Insight hybrid in 1999 and Toyota's Prius premiered in 2000, consumer demand for hybrids has grown tremendously. These models, and those that have arrived on the market in more recent years, offer consumers physical appearance and performance similar to conventional automobiles.

Despite higher sticker prices than comparable internal combustion engine (ICE) vehicle models, the incentives available to hybrid buyers, including Federal income tax credits and various state and local incentives may reduce to some degree the perceived pricing disparity. The Federal income tax credit, which can be worth up to a few thousand dollars, is available to the original purchasers of hybrid vehicles during the year of purchase. The credits are applicable on a given vehicle model until the manufacturer sells a total of 60,000 units of that vehicle model. Additional incentives available in some states and municipalities include additional tax credits, vehicle emissions inspection waivers, preferred and/or free or discounted parking, and special access to facilities such as HOV lanes without meeting minimum occupancy requirements.

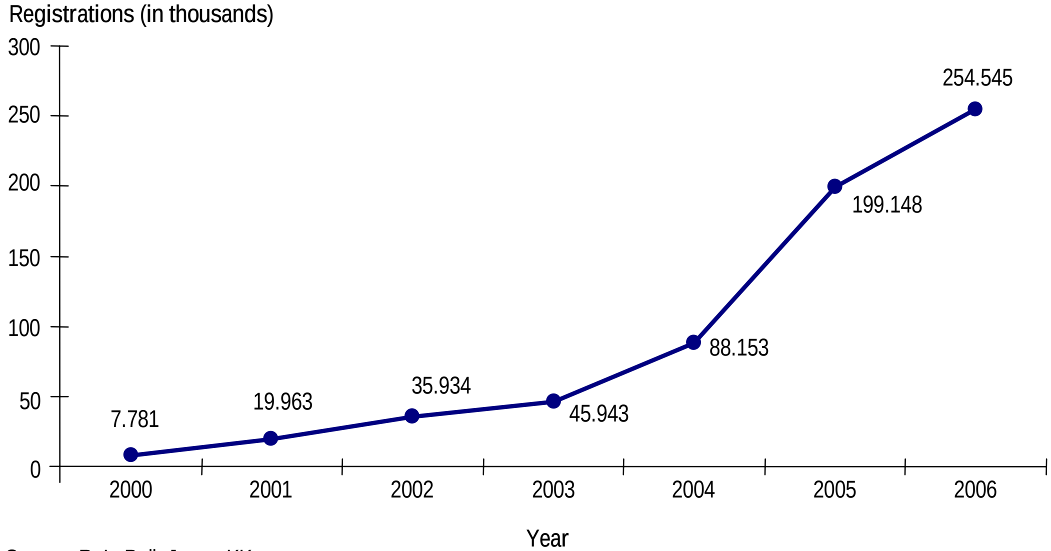
These incentives have contributed to the popularity of HEVs nationwide, but also in specific areas where the incentives are greater. In 2005, over one quarter of all HEV sales in the U.S. occurred in California where strict emissions standards, state tax credits, and HOV lane privileges are present. Virginia, which began offering HOV lane privileges to single-occupant HEVs in its highly congested northern suburbs in the 1990s, was the second largest HEV market in the nation until traditionally larger consumer markets in Florida, Texas, and New York surpassed Virginia's sales in 2005.[17]

Nationwide, HEV sales have increased significantly in each year since 2000. Between 2000 and 2006 new HEV registrations increased by an average of 85 percent annually. Despite a tremendous jump in HEV registrations between 2004 and 2005 (an increase of over 125 percent), 2006 experienced much slower growth. As of 2006, HEVs comprised only 1.5 percent of new light-duty vehicle registrations, but when compared to almost 0.0 percent of new light-duty vehicle registrations in 2000, and 0.5 percent in 2004, significant growth has been achieved. In the first half of 2007, HEVs comprised 2.3 percent of the light duty market.[18] United States HEV registrations between 2000 and 2006 are illustrated in Figure 2.1.

[17] "Hybrid Registrations Increase 81 Percent in 2004," R.L. Polk Japan KK, April 2005, available from http://usa.polk.com/News/LatestNews/news_042505.htm; (accessed September 12, 2007); "Hybrid Vehicle Registrations More than Double in 2005," R.L. Polk Japan KK, May 2006, available from http://usa.polk.com/News/LatestNews/2006_0504_hybrids.htm (accessed September 12, 2007).

[18] JD Power and Associates; R.L. Polk Japan KK; "Motor Vehicle Registrations," European Automobile Industry Report, available fromhttp://www.acea.be/files/VEHICLE%20REGISTRATIONS%202006.pdf, (accessed October 28, 2007).

Figure 2.1 Nationwide HEV Registrations
2000 to 2006



Source: R. L. Polk Japan KK.

HEV Market Forecasts

Since the 1990s all of the major automobile market watchers have been speculating on the potential growth in the HEV and other lower emissions markets. In developing market forecasts, these firms, such as J.D. Power and Associates, ABI Research, and Booz Allen, take dozens of factors into consideration. The following production factors contribute to the development of market and sales forecasts:

- Vehicle rollout schedules, production capacity, technological advancements;
- Regulation factors such as anticipated fuel economy and emissions requirements, the status of government incentives such as tax credits available to consumers who purchase specific models; and
- Consumer factors such as consumer market purchasing power and consumer demands.

There is a lot of speculation and disagreement among forecasters regarding the rate of growth HEVs will experience in the marketplace over the next five to 10 years.[19]

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[19] "Are Fewer People Interested in Hybrids this Year?" Hybridautoinfo.com, available from http://hybridautoinfo.com/news/are-fewer-people-interested-in-hybrids-this-year/ (accessed September 19, 2007); "Popularity of Hybrid Cars Increasing Worldwide,"

Footnote continued

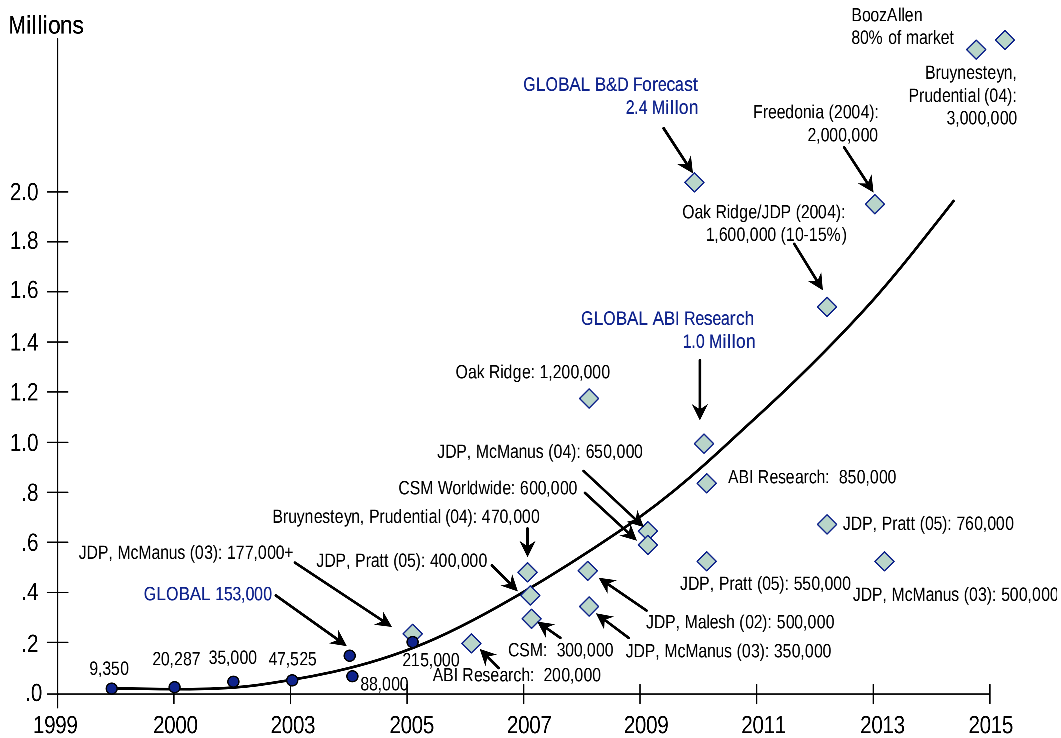
According to some well-respected forecasters such as J.D. Power and Associates (JDP) and Energy and Environmental Analysis (EEA), HEVs will continue to grow in numbers on the market, but their growth, though continuing to be strong, will slow down relative to the rapid growth observed in 2004 and 2005. This anticipated slowing of momentum for HEVs is expected due to public disappointment with the actual fuel economy of HEVs, and predictions that HEV fuel economy will improve only marginally beyond 2012, while the fuel economy of ICEs is expected to improve.

JDP indicates that HEVs will likely achieve a 4.6 percent share of the new vehicle market by 2010, up from 1.5 percent in 2006, and a doubling of the 2.3 percent market share HEVs achieved in the first half of 2007. EEA predicts that HEVs will achieve 4.5 percent of the market by 2012 and as much as 7.5 percent by 2020. The EEA forecasts anticipated higher growth for hybrids if government-sponsored fee-bates for automobile manufacturers are offered as incentives to produce HEVs. Growth could be greater still with technology subsidies to consumers who purchase HEVs. A $5,000 subsidy would result in a market share of over 60 percent, while 30 percent could be achieved with a subsidy of $2,500 by 2025. Though EEA suggests that such subsidies are not sustainable, this scenario indicates that consumers are very responsive to large incentives. Figure 2.2 illustrates HEV market forecasts produced by some of the most reputable firms in the nation.[20]

Hybridautoinfo.com, available from http://hybridautoinfo.com/hybrid-technology/popularity-of-hybrid-cars-increasing-worldwide/ (accessed September 19, 2007).

[20] 2007 U.S. Hybrid Vehicle Forecast Second Quarter Update, J.D. Power and Associates, August 2007, available from http://www.jdpower.com/corporate/news/releases/pressrelease.aspx?ID=2007127 (accessed September 19, 2007); "Market-Based Approaches to Fuel Economy: Final Modeling Results," Energy and Environmental Analysis, January 2006.

Figure 2.2 Forecasts for Growth in the Hybrid Market



Source: HybridCars.com, 2005.

The black curve represents a continuation of the current trend in HEV growth. Many firms have predicted growth at an accelerated rate. JDP, one of the most well-respected forecasting firms in the world, is predicting much slower growth in the HEV market, however. A study conducted by the Institute of Transportation Studies at the University of California-Davis used the trend line in the above figure to find that hybrid vehicles will likely account for 1.2 percent of all light duty vehicle travel in the United States by 2010.[21] Growth could be greater than the national average in states such as New York, where stricter emissions standards are bringing more HEVs to the market.

2.5 Government Incentive Programs

In order to encourage consumers to purchase and drive cleaner vehicles, a Federal tax credit and a number of state and local government incentives have been implemented. The current Federal tax credit, which went into effect

[21] Thomas Turrentine, Ph.D., et al., "Quantifying the benefits of hybrid vehicles," Institute of Transportation Studies, University of California-Davis (2006), pages 9-11.

January 1, 2006, applies to new vehicles purchased and delivered on or after that date. Qualifying vehicles must have been purchased for the purpose of using the vehicles, not reselling them. The credit amount varies from $400 to $3,400 depending upon the fuel economy and emissions rating of each qualifying vehicle model. The full credit value is available until the conclusion of the quarter in which the automaker sells 60,000 units of the vehicle model. Vehicles purchased in the following two quarters will be eligible for 50 percent of the original credit amount. The third and fourth quarter after 60,000 units have been sold, purchasers may receive a credit worth 25 percent of the original credit value, and beyond the fourth quarter, the credit becomes unavailable.

Many state and local governments throughout the country offer additional incentives to encourage consumers to purchase cleaner vehicles. These incentives range from tax credits and rebates to free parking in neighborhood parking lots. A summary of state and local incentives available to private consumers in the New York, New Jersey, and Connecticut Tri-State region is presented in Table 2.2.

Table 2.2 State and Local HEV Incentives Available in the New York Metropolitan Region

Program	State	Program Description	Vehicle Qualifications
State Sales Tax Exemption	Connecticut	The State's six percent sales tax is waived for qualifying vehicles	USEPA fuel economy rating of 40 mpg purchased prior to July 1, 2008
New Haven, Free Parking	Connecticut	Free parking for HEVs at metered parking spots throughout the City of New Haven	HEVs registered in New Haven
Clean Pass	New York	Access to HOV lanes without meeting minimum occupancy requirements	SULEV or pre-2005 ULEV and USEPA fuel economy rating of 45 mpg
Green Pass	New York	10 percent toll discount on New York State Thruway Authority facilities	SULEV or pre-2005 ULEV and USEPA fuel economy rating of 45 mpg
Green Car Tax Incentives	New York	Offers tax credits of up to $3,000 and a tax exemption for purchasing new hybrid electric vehicles (HEVs), alternative fuel vehicles (AFVs), and/or install clean fuel vehicle refueling equipment. The maximum value of the incentive is $5,000 for vehicles weighing less than 14,000 pounds (lbs.) gross vehicle weight rating (GVWR).	SULEV or pre-2005 ULEV and USEPA fuel economy rating of 45 mpg in service before December 31, 2006
Westchester County, Free Commuter Parking	New York	Free parking for HEVs at two commuter parking lots in North White Plains, a savings of $75/month	HEVs

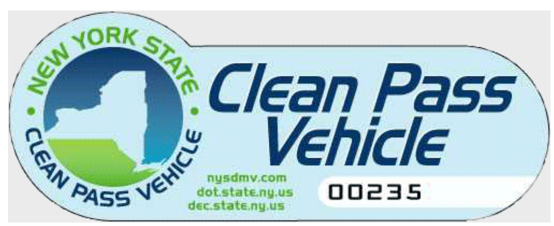
Note: "State Incentives," Whybuyhybrid.com.

3.0 Case Studies

In addition to Federal and state tax rebates, 10 state governments have offered travel incentives to encourage clean vehicle ownership and ease traffic burdens on over utilized general purpose lanes. These states have established varying emissions and fuel economy criteria that vehicles must meet to qualify. States such as New York have very stringent qualification criteria, while Virginia allows many more vehicle models to participate in its program. Three state programs have been selected for examination: New York's Clean Pass Program, Virginia's Clean Special Fuels license plate program and California's Clean Air Vehicle program. Additionally, some lessons can be taken from an overseas example. In London, a city which has implemented congestion pricing, emissions-related charges have been introduced as an incentive for motorists to change their vehicle purchasing habits.

3.1 New York State Programs

New York State Clean Pass Program



Clean Pass is a multiagency pilot program which has partnered the New York State Department of Transportation (NYSDOT), the State Department of Motor Vehicles (DMV), and State Department of Environmental Conservation (DEC). The program was begun in March 2006 as part of Governor Pataki's Strategic Energy Action Plan. The goals of the program are to encourage the use of low-emission, energy efficient vehicles for the sake of improving air quality and the natural environment and reducing dependence on foreign sources of energy.

Vehicle Eligibility

Clean Pass allows motorists whose vehicles meet the California SULEV emissions standards, or ULEV emissions standards for pre-2005 vehicle models, and achieve a USEPA fuel economy rating of 45 miles per gallon to use the HOV lanes on the Long Island Expressway (LIE) without meeting minimum occupancy requirements. Vehicles that meet these standards include clean-burning alternative fuel vehicles and some models of hybrid vehicles. Hybrids that meet the EPA fuel economy standards include the Toyota Prius (model years 2001 to 2007), the Honda Civic Hybrid (model years 2003 to 2007), and the Honda Insight Hybrid (model years 2000 to 2004). Currently, no other hybrid vehicles on the market meet the EPA 45 miles per gallon fuel economy standard.

Motorists who wish to participate in the program submit an application to the DMV. If their vehicles meet the necessary standards, four Clean Pass decals are issued for each vehicle. One decal must be placed on each of the vehicle's four sides (front, rear, driver side, passenger side) to assist law enforcement officials in enforcing HOV restrictions. HOV lanes on the LIE are enforced by Nassau County and Suffolk County police departments.

Current Status of the Clean Pass Program

The Clean Pass pilot program on the LIE was intended to last for one year, during which time the effects of the program on traffic congestion and travel speeds in the HOV lanes were monitored. The program is still in its pilot phase as the partnered state departments await the USEPA's determination on establishing criteria for vehicle eligibility for programs such as Clean Pass. Currently, Clean Pass decals are still being issued to the vehicles initially identified as eligible, although NYSDOT admits that changes in eligibility may result once the EPA makes a determination. By the end of 2006, nine months after the program was begun, more than 2,100 Clean Pass decals had been issued, 68 percent of them to Long Island residents.[22]

With regard to traffic congestion, NYSDOT has stated that although HOV lanes on the LIE were determined to have significant excess capacity prior to the program's initiation, there has been a "degradation" of HOV lane performance since.[23] NYSDOT traffic counts conducted in October 2006, seven months after the program's inception, show that Clean Pass vehicles compose one percent to six percent of vehicles using the HOV lanes on the Long Island Expressway during morning and evening peak-periods.[24] The degree to which HOV lane performance deteriorates will factor into future decisions on whether to continue the Clean Pass program in its current form or introduce stricter vehicle eligibility requirements.

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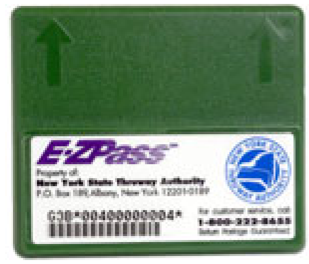
22 "HOV Lanes and Low Emission and Energy Efficient Vehicles," Federal Highway Administration, February 2007, available from, http://hovpfs.ops.fhwa.dot.gov/meetings/uploaded_files/HOV%20Lanes%20and%20Low%20Emission%20and%20Energy%20Efficient%20Vehicles%20Brochure.pdf (accessed September 20, 2007).

23 "New York's Clean Pass Program," New York State Department of Transportation, July 2007, available from https://www.nysdot.gov/portal/page/portal/programs/clean-pass (accessed September 19, 2007).

24 "HOV Lanes," FHWA.

New York State Green Pass Program



Green Pass E-ZPass transponder

The New York State Thruway Authority's Green Pass Program, which went into effect on April 1, 2006, offers a 10 percent toll discount to qualifying automobiles on New York State Thruway Authority facilities. The qualifications for Green Pass program match those of the Clean Pass program. Vehicles must meet California SULEV emissions standards, or ULEV emissions standards for pre-2005 model vehicles, and achieve a USEPA fuel economy rating of 45 miles per gallon. Qualifying vehicle models are currently limited to model year 2000 to 2004 Honda Insight, model year 2001 to 2007 Toyota Prius, and model year 2003 to 2007 Honda Civic Hybrid vehicles. Applicants whose vehicles meet the criteria receive a Green Pass E-ZPass transponder to place within their vehicles.

All E-ZPass transponders are intended for use in the vehicle to which they are issued. Although this policy is not always strictly enforced, this policy is particularly important for transponders that are intended to offer discounts for specific types of vehicles. Transponder colors assist enforcement, with the green color of the Green Pass and blue color of government vehicle E-ZPass transponders, for example, allowing for easy identification of special-use transponders. The ease with which transponders can be moved from one vehicle to another, however, creates a significant enforcement challenge. Active and thorough enforcement of Green Pass and similar special-use transponder programs would require significant enforcement supplements such as police and/or electronic surveillance.

3.2 Virginia Clean Special Fuel HOV Program

Virginia is one of the nine states in the country that allow access to HOV facilities to alternative fuel vehicles without meeting minimum occupancy requirements. Virginia is the only state, however, that extends that privilege to nearly every model of hybrid vehicle. The Commonwealth's Clean Special Fuel program has become tremendously popular, especially since hybrids have acquired traction in the automobile market in recent years. The level of participation in the Virginia program has resulted in HOV lanes operating above capacity in some areas. Virginia transportation officials and lawmakers are seeking solutions that will reduce congestion while preserving the clean special fuel program.[25]

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25 Virginia High-Occupancy Vehicle Enforcement Task Force, *Second Report of the High-Occupancy Vehicle Task Force* (January 4, 2005).

Virginia Clean Special Fuel Program, 1993 to 2000

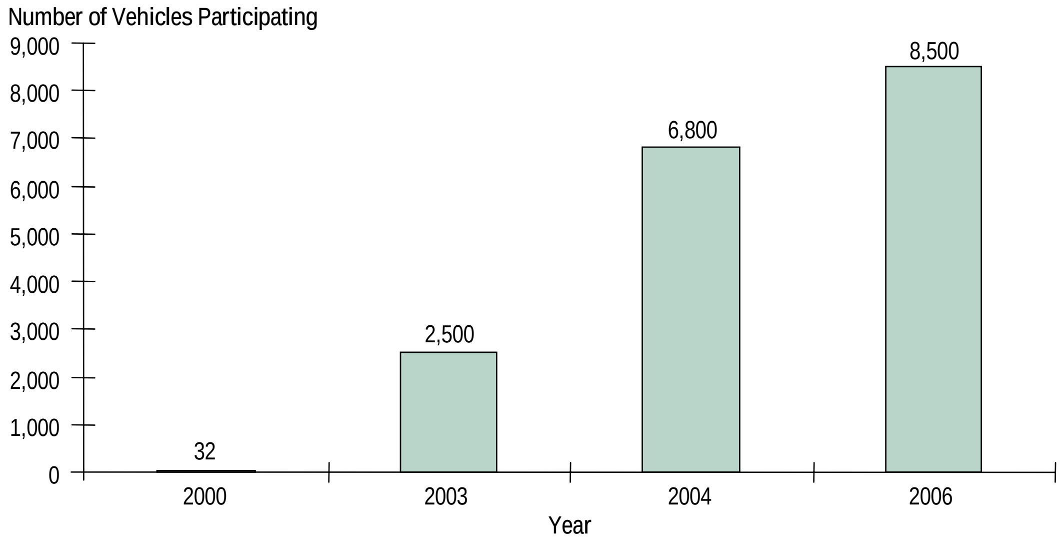
In 1993, the Virginia General Assembly passed legislation that established unique license plates for clean special fuel vehicles. Clean special fuel vehicles were defined as those making use of any product or source of energy which, compared to conventional or reformulated gasoline, result in lower emissions of nitrogen oxides, volatile organic compounds, carbon monoxide or particulates, or any combination thereof. Fuel sources such as compressed or liquefied natural gas, liquefied petroleum gas, hydrogen, hythane, and electricity were included in the clean special fuels definition. Vehicles that met the clean special fuel standards and obtained clean special fuel license plates from the Virginia Department of Motor Vehicles were allowed to use HOV lanes in the Northern Virginia and Hampton Roads regions without meeting minimum passenger occupancy requirements. Between 1994, when the program was implemented, and 2000, only 32 vehicles had obtained clean special fuel license plates.[26]

Legislation Permitting Single-Occupant Hybrids in HOV Lanes, 2000

In 2000 the General Assembly expanded the definition of clean special fuel vehicles to include HEVs and vehicles that operate exclusively on alternative fuels. As evident in Figure 3.1, the expansion of the qualifications for clean special fuel license plates resulted in an almost immediate explosion in participation. By April 2003, 2,500 clean special fuel plates had been issued in Northern Virginia. By the end of 2004, 6,800 hybrid vehicles were registered with the special plates. According to the Virginia Department of Motor Vehicles, 8,500 of Virginia's 11,600 hybrid vehicles were registered in Northern Virginia in 2006.

[26] Virginia High-Occupancy Vehicle Enforcement Task Force, 2005.

Figure 3.1 Clean Special Fuel Program Participation in Northern Virginia
2000 to 2006



Virginia quickly became the second-largest market for hybrid vehicles in the U.S., behind California, until 2005. At this time Florida, Texas, and New York, all traditionally much larger consumer markets than Virginia, registered higher numbers of HEVs. The HOV lane incentives are believed to be one of the primary reasons for the popularity of HEVs in Virginia. According to a Northern Virginia automobile dealer interviewed by the Washington Post, "I'd say 95 percent of the people who buy a Prius say it's to get into the HOV," said Jay Taye, sales manager at Ourisman Fairfax Toyota. "They talk about the tax break and the HOV, and once in a while they say they prefer it for the gas mileage as well."

Indeed the incentive is tremendous, as shown in Table 3.1. Compared to travel time in general lanes, drivers who use HOV lanes in Northern Virginia can reduce their travel time by 55 percent on a trip from Quantico to Washington via Interstates 95 and 395, or by 33 percent on a trip from Manassas to Washington via Interstate 66.

Table 3.1 HOV Time Savings in Northern Virginia
2003

Facility	Start Point	End Point	HOV Travel Time	Non-HOV Travel Time	Percent HOV Time Savings
I-95/395	Quanitco Creek	14th and C Street	29 minutes	64 min	54.7%
I-66	Route 234	23rd and Constitution	63 minutes	94 minutes	33.0%
Dulles Toll Road	Route 28	I-66	12 minutes	13 minutes	7.7%

Note: Virginia High Occupancy Vehicle Enforcement Task Force, 2005.

Effects of Increased Eligibility on HOV Lane Performance

Interstate 395 (Shirley Highway) in Arlington County, Virginia.
Source: FHWA.

Since 2000, the Virginia HOV Task Force has been monitoring HOV lane performance throughout Northern Virginia. In fall 2003, hybrid vehicles accounted for between two and 12 percent of peak-period HOV lane volumes. One year later, hybrids had increased their share of peak-period HOV lane volume to between 11 and 17 percent. By 2005, an estimated 25 percent of the vehicles using HOV lanes in Northern Virginia were hybrid vehicles with special clean fuel license plates. The number of hybrid vehicles using the HOV lanes has exceeded the percentage of so-called "cheaters," drivers who use HOV lanes but do not meet clean special fuel or minimum occupancy requirements, who make up 15 percent of HOV users in Northern Virginia. This growing population of clean special fuel vehicle drivers who use HOV lanes now account for over one percent of all inbound automobile trips from outer portions of Northern Virginia to the region's core areas of Arlington County and the District of Columbia.

The growing share of clean special fuel vehicles has impacted the performance of HOV lanes. According to the 2005 HOV Enforcement Task Force report, the rapid increase in the number of hybrid vehicles has resulted in HOV lanes on Interstate 95 carrying over 1,900 vehicles per hour during peak-periods. This volume is above the recommended capacity of 1,800 vehicles per hour and represents conditions that the Task Force calls "unacceptable levels of service."[27]

In its 2005 report, the HOV Task Force recommended that the General Assembly vote against extending the hybrid exemption privilege beyond its expiration date of July 1, 2006. The task force urged the General Assembly to consider adopting a more exclusive definition of clean special fuel vehicles, which would be limited to SULEVs; increase the registration fee required to procure clean special fuel plates; and increase HOV enforcement to limit the impact of "cheaters."[28]

The General Assembly took action, requiring the Department of Motor Vehicles to issue new clean special fuel license plates. Beyond July 1, 2006, HEVs would still be eligible to receive the new license plates, however vehicles with the new plates would not be permitted to travel in the HOV lanes on Interstates 95 and 395 during HOV-restricted periods without meeting the minimum occupancy requirement. All other HOV facilities in the Northern Virginia and Hampton Roads regions would be open to vehicles with the new clean special fuel plates at all times, without meeting the minimum occupancy requirement. Vehicles with the old clean special fuel plates, even hybrids, are permitted to continue using the HOV lanes on Interstates 95 and 395. The exemption is next due for renewal on July 1, 2008.[29] Virginia's new and old Clean Special Fuel license plates are depicted in Figure 3.2.

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27 Steven Ginsberg, "Hybrid perks may become problems," *The Washington Post*, February 16, 2006, available from http://www.washingtonpost.com/wp-dyn/content/article/2006/02/13/AR2006021301864.html (accessed September 11, 2007); Steven Ginsberg and Carol Morello, "As hybrids multiply, so do carpooling gripes," *The Washington Post*, January 7, 2005, available from http://www.washingtonpost.com/wp-dyn/articles/A54561-2005Jan6.html (accessed September 11, 2007).

28 Virginia High Occupancy Vehicle Enforcement Task Force, 2005.

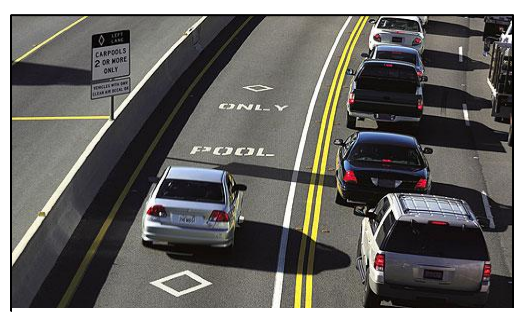
29 "Clean Special Fuel Plates," Virginia DMV, available from http://www.dmv.state.va.us/webdoc/citizen/vehicles/cleanspecialfuel.asp (accessed September 17, 2007).

Figure 3.2 Virginia's Clean Fuel License Plates

Left: New clean special fuel license plates for hybrid and low-emission vehicles registered after July 1, 2006. Vehicles with these plates are not permitted to travel in HOV lanes on Interstates 95 and 395 without meeting minimum occupancy requirements, but are exempt from occupancy requirements in HOV lanes elsewhere in Virginia (Interstates 64, 66, 264, 495, 564, and the Dulles Toll Road). Right: Old clean special fuel license plates for vehicles registered prior to July 1, 2006. Vehicles with these plates are permitted to travel in HOV lanes on Interstates 95 and 395 without meeting minimum occupancy requirements.

3.3 California Clean Air Vehicle Program

State of California legislation approved in 1999 allows SULEVs to use HOV lanes without meeting minimum occupancy requirements. Owners of eligible vehicles apply to the Department of Motor Vehicles, and when approved, receive a Clean Air Vehicle (CAV) decal to display on the vehicle. Between July 2000 and May 2004, approximately 5,400 vehicles registered for the CAV program. The majority of the registered vehicles are located in counties where HOV lanes exist, and over 50 percent are registered in Los Angeles County alone. In September 2004, the State legislature extended the HOV privilege to vehicles that meet AT-PZEV standards and have a 45 miles-per-gallon USEPA fuel economy rating. The addition of the USEPA fuel economy rating requirement is consistent with the New York Clean Pass qualifications. The program is scheduled to expire in January 2011, unless extended by the State legislature.



HOV lane in Orange County, source: http://la.curbed.com.

Vehicles that meet California ULEV and Federal ILEV evaporative standards receive a white CAV decal, while hybrid and alternative fuel vehicles that meet California AT-PZEV and USEPA 45 mpg fuel economy standards receive a yellow CAV decal. Possessors of both decals are exempt from minimum occupancy requirements in California HOV lanes. The California DMV no longer issues white decals except as replacements. The California DMV is permitted to issue a maximum of 85,000 yellow decals. The 85,000th decal was issued in January 2007.[30]

The legislation requires that the California Department of Transportation (Caltrans) assess CAV utilization of HOV lanes throughout the State to determine lane performance and the effects of the clean fuel exemption once 50,000 decals have been issued to hybrid-related vehicles. Key performance indicators to be examined include reduction in level of service, sustained stop-and-go service, slower than average speed than the adjacent mixed flow lanes, and consistent increase in travel time. Caltrans completed a study in June 2007 which found that segments of HOV lanes throughout the State are congested, but did not place blame on HEVs, rather on rising population and vehicle miles traveled.[31]

3.4 London Congestion Charge Zone Emissions-Related Charges[32]

Currently, there is a proposal within the government of London to introduce emissions-related congestion pricing into the existing Congestion Charge zone. While the primary *raison d'être* of the congestion pricing policy in London is to reduce the number of automobiles traveling within Central London, the proposal adds a dimension aimed at accounting for each driver's contribution to carbon emissions and climate change.

Under the proposed emissions-related charging scheme, vehicles would be charged a fee upon entry into the London Congestion Charge zone and different vehicles would be charged a different amount, based upon the vehicle's specific level of carbon emissions. The proposal identifies three tiers of vehicle emissions and corresponding fees.

1. Cars that emit 120g/km CO_2 or less (which is equivalent to cars registered in Vehicle Excise Duty (VED) bands A and b) and that comply with the Euro 4 air quality emissions standard would be eligible for a 100 percent discount (known as the **low-CO_2 discount**). Commercial hybrid vehicles such as the

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[30] "Clean Air Stickers – High-Occupancy Vehicle (HOV) Lane Usage," California DMV, available from http://www.dmv.ca.gov/vr/decal.htm (accessed 17 September 2007).

[31] "HOV Lanes," FHWA; "State will develop plan to reduce carpool lane congestion," Caltrans, June 2007, available from http://www.dot.ca.gov/hq/paffairs/news/pressrel/07pr12.htm (accessed September 21, 2007).

[32] "Combined Impact Assessment of Proposed Emissions Related Congestion Charging," AEA Energy and Environment, August 2007, available from http://www.tfl.gov.uk/assets/downloads/ERCC-impact.pdf (accessed September 6, 2007).

Toyota Prius and Honda Civic Hybrid would barely qualify as band B automobile. Many larger-sized hybrid models would not qualify.[33]

2. Cars in VED bands C-E or in band F that emit between 121g/km CO_2 and 225 g/km CO_2 would be liable for the **standard charge** of £8.00. Additionally, cars in bands A and B that do not meet the Euro 4 emissions standard would be liable for the standard charge. Alternative and flex-fuel vehicle models in this category include the Ford Focus Hybrid, the Volvo S60 and V70 bifuel models, and the Lexus GS, RX, and LS Hybrid models. Standard engine vehicle models such as the Toyota Yaris, the non-hybrid Honda Civic, Ford Focus, Volkswagen Jetta and Golf, Chrysler Sebring, Chrysler PT Cruiser, and Jeep Compass qualify for the standard charge.[34]

3. Cars in VED band G that emit 226 g/km CO_2 and above would be subject to a charge of £25.00 (the **higher charge**). Band F cars with emissions of 226 g/km CO_2 and above, first registered on or after March 1, 2001 but before March 23, 2006 also would be liable for the higher charge. The Toyota Land Cruiser, Honda Accord Tourer, Hummer H3, Volkswagen Passat, Nissan Murano, are categorized as VED band G vehicles.[35]

The proposed emissions-related charges would apply to all passenger vehicles traveling into the London Congestion Charge zone except for-hire services such as taxi cabs, whose emissions will be targeted through other measures, and zone residents who drive cars that qualify for the low-CO_2 discount or the standard charge. Residents who drive vehicles that qualify for the higher charge will be responsible for paying the fee when they re-enter the zone.

In this proposed scheme, vehicles will be tracked using fixed and mobile License Plate Readers (LPRs) at the entry points to the charge zone and elsewhere within the zone. Recorded license plate numbers will be checked against a database of the vehicles' emission categories, as assembled by the Driver and Vehicle Licensing Agency, and vehicle owners will be charged the appropriate fee. Photographs of low-emission vehicles that will not be charged will be deleted immediately.

The proposal underwent a public review phase, which terminated on October 19, 2007. TfL will produce a report to the Mayor and await his decision on whether or not to implement the proposed charges. If the proposal is adopted, TfL states

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[33] VCA Car Fuel Data, available from http://www.vcacarfueldata.org.uk/index.asp (accessed September 19, 2007).

[34] VCA Car Fuel Data.

[35] VCA Car Fuel Data.

that low-emission vehicle exemptions would go into effect on February 4, 2008. The higher charge of £25 would go into effect on October 6, 2008.[36]

Effects on Motor Vehicle Fleet

In 2007 the results of a study commissioned by Transport for London (TfL) were published. The study examined the potential effects of the proposed emissions-related charges on the motor vehicle fleet, the environment, business and the economy, and equalities and human health. The study made use of a model developed by TfL to determine fleet composition of vehicles that access the Congestion Charge zone in two scenarios: without emissions-related charges and with the implementation of emissions-related charges. Baseline conditions were established using data retrieved from the cameras positioned at the access points to the Congestion Charge Zone and a government sponsored behavioral survey to assess vehicle owner behaviors and how government policies such as emissions-related charges may impact them.

The TfL study found that, without implementing emissions-related charges, the proportion of Band A and Band B vehicles which would qualify for the low-CO_2 discount would grow from two percent of the entire fleet to four percent between 2007 and 2009. The model indicates that implementing the emissions-related charges would have a measurable effect on the composition of vehicles entering the Congestion Charge zone. Band A and Band B cars, which would qualify for the low-emissions discount, would increase in their share of the vehicle fleet from three percent to eight percent in 2009 if charges were implemented. It can be expected that Band G cars and pre-2001 vehicles with large engine capacities, which would be subject to the higher charges, would decline from 16 percent in the baseline 2009 scenario to 12 percent of the fleet of vehicles in and around the Congestion Charge zone in the emissions-related charges scenario. These anticipated changes are displayed in Figure 3.3.

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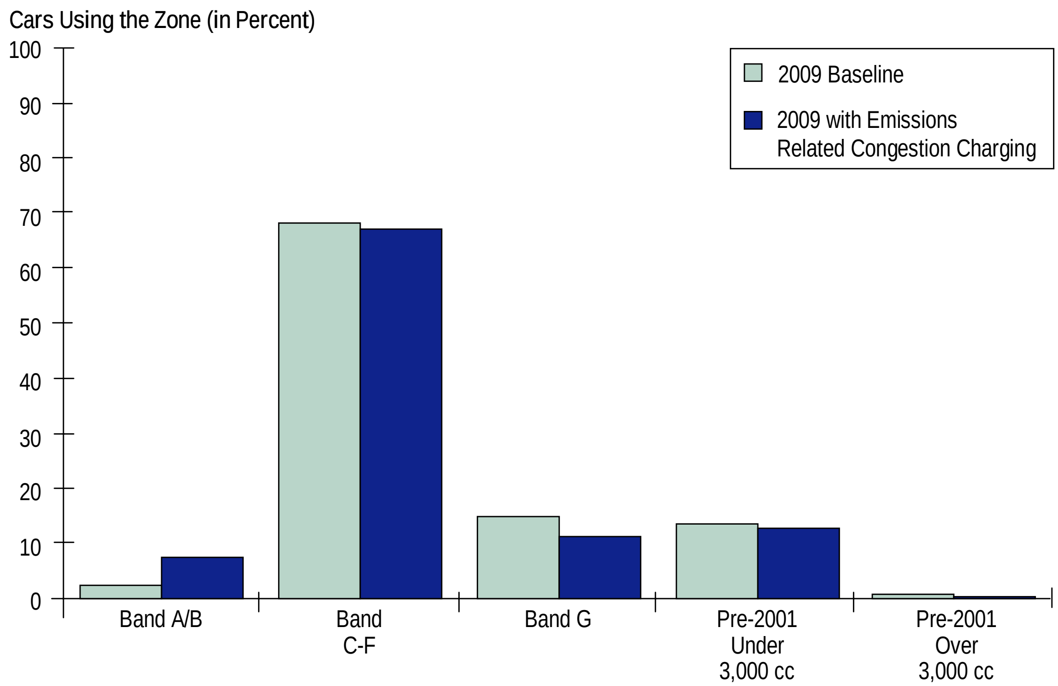
[36] "Proposed Emissions Related Congestion Charging: Public and Stakeholder Consultation: Detailed Scheme Description and Supplementary Information."

Figure 3.3 Anticipated Change in Vehicle Fleet Composition Due to Emissions-Related Charges
2009



Source: TfL Model – Central Scenario.

Traffic and Congestion Impacts

The TfL study shows that, despite instigating a shift in vehicle types within the Congestion Charge zone, the implementation of emissions-related charges would have a negligible effect on the number of vehicles that enter and circulate within the zone. Three scenarios based on driver sensitivities all show minor impacts, with the low-sensitivity scenario resulting in an 0.9 percent *increase* in the total number of vehicles, the high-sensitivity scenario resulting in a 0.5 percent *decrease* in vehicles circulating in the zone, and the middle scenario showing that the implementation of emissions charges would result in a 0.2 percent increase in the number of vehicles circulating in the zone, or approximately 300 vehicles relative to the baseline, no-emission charges scenario. The TfL report stated, however, that the potential for continued growth in Band A and Band B vehicles beyond 2009 could result in a more significant increase in vehicles traveling in the zone.

Environmental and Air Quality Impacts

Due to the anticipated negligible change in the number of vehicles entering and traveling within the Congestion Charge zone and the anticipated growth in the share of Band A and Band B vehicles, TfL is expecting that emissions-related charging will reduce CO_2 emissions in and around the zone by 0.3 percent to 2.0 percent by 2009. Particulate matter (PM_{10}) emissions are expected to have little or no change due to the implementation of emissions-related charges. Nitrous oxide (NO_x) emissions are expected to increase by two tonnes, or 0.01 percent in the middle sensitivity scenario. Additionally, the increasing number of Band A and Band B vehicles is expected to result in slightly lower average vehicle life-cycle emissions and fuel consumption. The report again states that if Band A and Band B automobiles develop a more significant share of the vehicle fleet beyond 2009, resulting congestion could result in more significant environmental impacts.

If implemented, the emissions-related charges in London will likely have a fairly small impact on traffic congestion, environmental air quality, economy, equality, and human health in the first couple of years. TfL will be required to monitor system performance and conduct a study in 2010 to assess the impacts of the charging scheme and recommend any necessary changes that may occur due to the changing vehicle fleet or other important factors.

3.5 Case Study Findings

The case studies show that offering high-value incentives can influence the decisions of the driving public regarding travel behavior and vehicle purchasing. The greater the incentives, whether they be dollar costs or time savings, the greater the public response. Public participation is enhanced when program requirements are easier to meet. For example, Virginia's wide embrace of many vehicle models has resulted in a tremendous level of participation, making the State the second largest HEV market in the United States until 2005. Even with stricter qualification standards, HEV sales in California, New York and London have grown and/or are projected to grow significantly, in part due to occupancy or fee exemptions available to drivers of clean automobiles.

4.0 Application to New York City

The prospect of allowing clean vehicles to enter the New York City congestion fee zone free of charge are considered in three vehicle eligibility scenarios. The first, or baseline scenario, assumes no special provision for clean vehicles is made. The second assumes only SULEVs that meet a USEPA fuel economy rating of 45 miles per gallon, requirements similar to the existing New York Clean Pass program, are allowed to enter the zone free of charge. The third scenario would assume all varieties of alternative fuel technology vehicles, including ULEV and SULEV hybrids, would be granted access to the congestion fee zone free of charge. This third scenario is similar to the Virginia scheme.

Based upon the experiences of initiatives nationwide, market forecasts, and demographic projections, the implications of each policy scenario on the local vehicle fleet composition, traffic congestion, and air quality are theorized. Additional impacts on parking and transit operations also will be discussed. Furthermore, each scenario will present different sets of enforcement challenges that will have to be addressed.

4.1 "No Special Provision" Congestion Pricing Scenario

The "no special provision" scenario assumes that no special provision is granted to alternative fuel, lower-emissions, or other types of special fuel or special propulsion vehicle types. The conditions of this scheme match the City's initial 2007 proposal. According to PlaNYC, the proposed congestion pricing scheme will result in a 7.4 percent reduction of vehicle trips with destinations in the Congestion Pricing Zone (CPZ) (8.7 percent when considering passenger vehicles alone). The revenues collected from the congestion charge will be applied to transit improvements throughout the region that will assist people traveling into Manhattan via alternative modes.

Daily passenger vehicle trips into and within the CPZ are expected to decline by 8.7 percent in the first year after congestion pricing is implemented. As shown in Figure 4.1, the 1.31 million passenger vehicle trips (precongestion pricing) into the core of Manhattan will be reduced to 1.20 million vehicle trips (postcongestion pricing) within one year, a reduction of 114,000 trips a day. The implementation of congestion pricing is expected to reduce passenger Vehicle Miles Traveled (VMT) in the CPZ by more than 300,000 vehicle miles.

Figure 4.1 Anticipated Impacts of No special provision and Alternative Scenarios on Passenger Vehicle Trips with Destinations in the CPZ

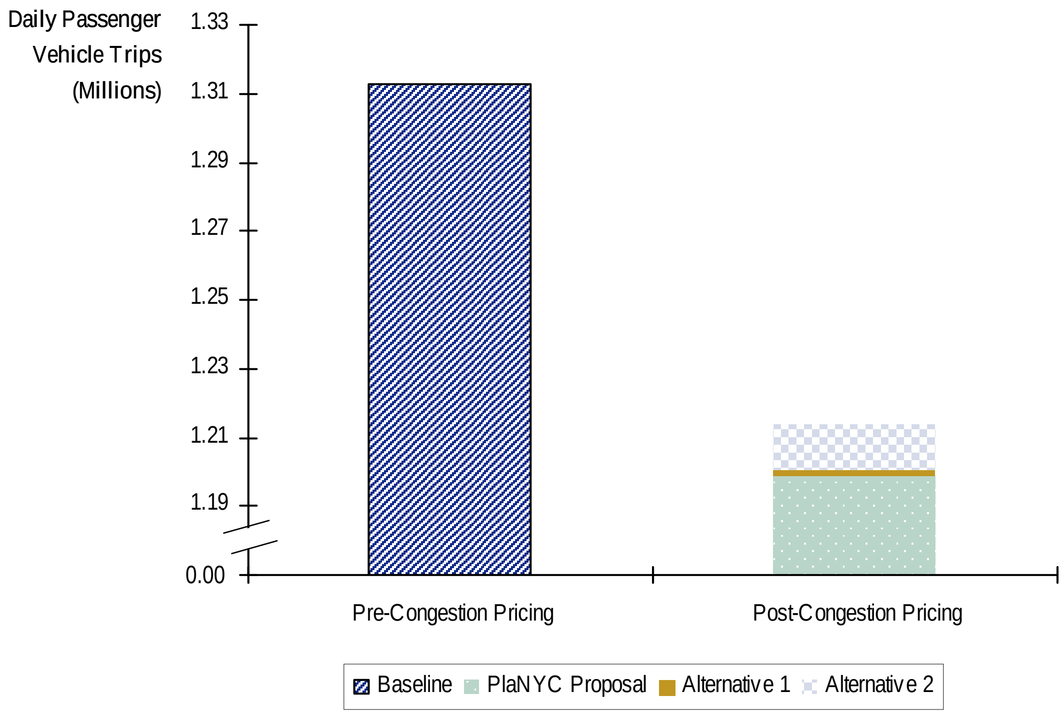
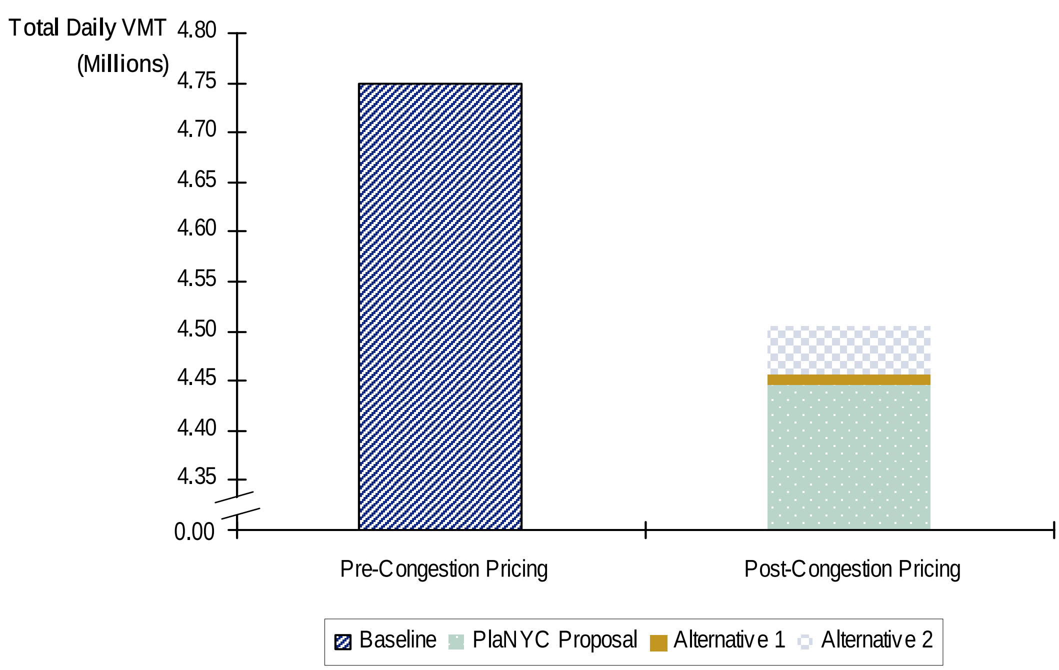


Figure 4.2 Anticipated Impacts of No Special Provision and Alternative Scenarios on Vehicle Miles Traveled in the CPZ



4.2 Alternative 1, SULEV Fee Exemption Scenario

One option for a fee exemption scheme is to adopt the standards of the existing New York Clean Pass program and apply them to the New York City Congestion Pricing Zone. To be registered in Clean Pass, vehicles must qualify for the California Air Resource Board SULEV classification and achieve a USEPA 45-miles-per-gallon fuel economy rating. Currently, only three vehicle models qualify, including the Toyota Prius (model years 2001 to 2007), Honda Insight (model years 2000 to 2004), and the Honda Civic Hybrid (model years 2003 to 2007). The following paragraphs discuss the manner in which such a program would be enacted along with the likely implications.

The program proposed in this scenario could be implemented using the technology and infrastructure planned for in the PlaNYC proposal scenario. Vehicle owners could anticipate making payments automatically using an automatic-debit or prepaid E-ZPass account. E-ZPass transponders issued to qualifying clean vehicle owners would have to include a code that identifies the vehicle as a fee-free light-duty vehicle, similar to the existing Green Pass transponders. The E-ZPass transponders would be intended for use only in qualifying vehicles, and strict enforcement of the special Green Pass transponders would have to be implemented. Camera captures could be used as a supplement to identify fraudulent use of clean vehicle E-ZPass transponders. Vehicle owners who do not enroll with E-ZPass could be issued a decal that would be placed on the vehicle in such a position that it would be captured by the cameras that photograph license plates. LPR technologies are capable of reading additional information such as date-of-issue stickers that are attached to license plates and could possibly be developed to recognize decals placed on license plates, bumpers or elsewhere where they would be visible to the cameras.[37] Discussions with LPR vendors could determine whether or not the Clean Pass decals currently issued by the State for use in HOV lanes on the Long Island Expressway could be used for this purpose. Photographs in which decals are visible and recognized would not result in invoices that request payment of the congestion fee.

Because the conditions and vehicle qualifications of this scenario are similar to the proposed London scheme, forecast models that were developed for London are useful in surmising the potential effects in New York City. The primary difference between the two cities' conditions is the fact that no higher charge for the highest-emission vehicles is proposed in New York. Therefore extreme changes in the highly charged vehicles in London would be modified in a New

[37] "License Plate Recognition – A Tutorial,"available from http://www.licenseplaterecognition.com (accessed 19 October, 2007).

York scenario, more closely resembling the changes in medium-emission vehicles in London. The London model predicted a growth in the local clean vehicle fleet of over 100 percent within the first two years of implementing emissions-related charges, bringing the clean vehicle share of the fleet to between three percent and eight percent of the total fleet. In New York the starting point is at a much smaller share, with HEVs constituting far less than one percent of the total light-duty vehicle fleet. Assuming a rate of growth that incorporates the absence of high-emission charges in New York, the City could develop fleet composition still under, but much closer to one percent over a similar two-year period.

In the middle scenario, the London model predicted that emissions-related charges would result in a 0.2 percent increase in daily vehicle trips into and around the Congestion Charge zone compared to the existing charge policy. A significant portion of the response in London may be attributed not only to the discount for low-emission vehicles but also to the additional charges for high-emission vehicles. Because there is no anticipated higher charge in New York, a growth factor just above 0.1 percent is more likely. This figure represents an assumption that, because New York would not have a heavy vehicle fee, heavy vehicle owners would respond in the same manner as vehicle owners who were affected by London's standard charge for mid-level emission vehicles. This effect resulted in a 0.11 percent increase in low emission vehicle trips.

The PlaNYC congestion pricing proposal anticipates that with congestion pricing there would be 1.20 million passenger trips into and within the Manhattan CPZ. An increase of 0.1 percent above that figure results in an additional 1,350 trips into the Manhattan Congestion zone, as indicated by the thin dark blue bar in Figure 4.1. Thus, most of the reduction in traffic volume projected for the PlaNYC proposal would still be realized. Because SULEVs, PZEVs, and AT-PZEVs emit 90 percent fewer pollutants than LEVs, the air quality impact of these additional vehicles would be equivalent to that of 135 standard LEV trips.

The anticipated rate of reduction in daily vehicle miles traveled (VMT) between the baseline (existing) and the PlaNYC congestion pricing scenario, relative to the anticipated reduction in vehicle trips between the two scenarios produces a ratio that can be used to anticipate VMT in scenarios that result in differing numbers of vehicle trips. When this ratio is applied to Alternative 1, passenger VMT can be expected to top 4.04 million, relative to the anticipated 4.03 million VMT in the no special provision scenario. Total daily VMT, including buses, commercial vehicles and trucks, also would increase by approximately 9,000 vehicle-miles, for a total of approximately 4.46 million VMT.

4.3 Alternative 2, All-HEV Fee Exemption Scenario

A second scenario has been developed to determine the effects of an exemption scheme that embraces a wider variety of HEVs. This scenario closely resembles the Virginia Clean Special Fuels program. In order to be registered in such a clean fuel program, a vehicle would have to make use of hybrid technology or rely exclusively on alternative fuels. There would be no minimum emissions or fuel economy requirements. This scenario allows many more HEV models to qualify for clean fuel designation.

Like the previous scenario, the All-HEV program proposed in this scenario could be implemented using the technology and infrastructures planned for the PlaNYC proposal scenario. The combination of E-ZPass transponder and photographic license plate recording technologies could be utilized. It is unlikely that a special license plate such as those issued by the Virginia DMV could become a basis for identifying clean fuel vehicles in New York City. Because such a large number of vehicles from other states travel into New York, it would be challenging to develop and implement a license plate type that each neighboring state would adopt to their own specifications while remaining easily identifiable to photograph monitors and police.

In the case of Virginia, HEVs using HOV lanes comprised approximately one percent of all light-duty passenger vehicle trips into the metropolitan core from outer suburban areas five years after the program was implemented. Assuming that commuters in New York would reach the same level of participation in two years rather than five is not unreasonable, considering the fact that HEVs have acquired much more traction in the market now, compared to the early years of Virginia's program, and due to the fact that free (or reduced fee if traveling through a tolled river crossing) passage into Manhattan would be a considerable incentive for many Manhattan-bound commuters to participate.

If the postcongestion pricing driving population were to grow by one percent as a result of HEV fee exemption, an additional 13,000 passenger vehicles would be on the road, as indicated by the orange bar in Figure 4.1. Whereas the PlaNYC congestion pricing scenario with no hybrid incentive would reduce passenger vehicle trips by 111,000 compared to precongestion pricing levels, this scenario would reduce vehicle trips by 98,000 in the first two years.

Because emission and fuel economy standards are less strict in this scenario than in the others, and because a larger number of vehicles in this scenario will likely have adverse effects on congestion within and around the zone, it is likely that air quality will suffer beyond the emissions contribution of 13,000 additional hybrid vehicle trips.

Passenger vehicle daily VMT in the CPZ in the Alternative 2 scenario will likely approach 4.08 million. This is approximately 49,000 vehicle-miles more than what is anticipated in the no special provision scenario. When combined with buses, commercial vehicles and trucks, approximately 4.50 million VMT can be expected, which is above the anticipated 4.45 million VMT expected in the PlaNYC congestion pricing proposal.

Table 4.1 Daily Trips Ending in the Congestion Pricing Zone and Daily Vehicle Miles Traveled (VMT) in the Congestion Pricing Zone

	Baseline	PlaNYC (with Congestion Pricing)	Alternative 1[a]	Alternative 2[b]
Passenger Vehicle Trips	1,313,000	1,199,000	1,200,000	1,212,000
Passenger Vehicle VMT	4,338,000	4,034,000	4,044,000	4,084,000
Ratio of Passenger VMT/Passenger Trips	3.30	3.37	3.37	3.37
Total Vehicle Trips	1,509,000	1,398,000	1,399,000	1,411,000
Total VMT	4,748,000	4,447,000	4,456,000	4,496,000

[a] Assumption: London increase in total PV trips =0.1%.

[b] Assumption: Virginia increase in total PV trips =1.0%.

Table 4.2 Reduction of Vehicle Trips and VMT in Each Alternative Scenario, Relative to the Baseline Conditions

	PlaNYC		Alternative 1[a]		Alternative 2[b]	
	Number Change	Percent Change	Number Change	Percent Change	Number Change	Percent Change
Passenger Vehicle Trips	-114,000	-8.7%	-113,000	-8.6%	-101,000	-7.7%
Passenger Vehicle VMT	-304,000	-7.0%	-294,000	-6.8%	-260,000	-6.0%
Total Vehicle Trips	-111,000	-7.4%	-110,000	-7.3%	-98,000	-6.5%
Total VMT	-301,000	-6.3%	-292,000	-6.1%	-252,000	-5.3%

5.0 Key Findings and Conclusions

The offering of incentives to encourage consumers to purchase cleaner automobiles can have a significant impact on purchasing and driving habits. Federal income tax credits and additional state credits available in some states factor into consumers' decision to purchase clean vehicles. The fuel economy that comes with many HEV models adds to the benefits a vehicle owner may enjoy over the course of the vehicle's lifetime. All of these cost incentives are cost savings or reductions that save money for the beneficiary. Even more effective in swaying purchasing decisions are incentives that save drivers something even more valuable – time.

Programs that offer occupancy requirement exemptions in HOV facilities or allow HEV drivers to take advantage of reduced congestion in congestion zones or HOT lanes have a history of enormous popularity in the U.S. These policies are helping to drive an HEV market that already is experiencing boosts due to public awareness of environmental issues, reactions to fossil fuel prices, and a seemingly trendy popularity status in many locations throughout the country. While a shift to cleaner automobiles is a positive change, it can be accompanied by effects such as increased congestion and increased single occupant vehicle trips which can diminish the positive emissions and air quality impacts of alternative fuel vehicles.

In New York, the aim of the congestion pricing scheme is to reduce the number of automobiles on the streets of Manhattan's core districts. That measure alone is forecast to result in fewer single occupant vehicle trips, higher mode share for transit and other alternative modes, and opportunities for better transit, bicycle, and pedestrian systems performance. The addition of free access incentives for clean vehicles has the potential to significantly diminish the anticipated benefits of the congestion pricing scheme, depending on the eligibility criteria used.

The growth in market share that vehicles such as HEVs are experiencing and expected to experience nationwide in the next five to 10 years will result in an increasingly large population of vehicles eligible for the incentive. Furthermore, evidence suggests that the very existence of strict emission standards and incentives that save drivers time and money have induced demand for hybrid vehicles.

Because such an incentive in New York City would allow clean vehicle owners to take advantage of the street space freed up by congestion pricing, without paying any charge, it would likely be tremendously popular. It is likely that clean vehicle sales in the New York region would quickly outpace national averages and the averages of states that have adopted CARB emissions standards, as occurred in Virginia due to the significant time savings achieved in the HOV lanes there. The incentive would have a particularly great effect in areas where motorists would receive the greatest discount. On entrances to the zone that are not currently tolled, drivers would receive a 100 percent discount, while motorists traveling from New Jersey who presently pay $5 tolls to cross the Hudson River would receive a 38 percent discount. This could create levels of program participation that vary based on motorists' geographic proximity to free entrances. A clean vehicle discount would therefore likely pose more of a congestion burden at and near crossings into the zone that do not have pre-existing tolls, unless the City could develop arrangements with area tolling authorities to reduce the toll fee disparity.

The potential exists for qualifying vehicles to make enough trips into and within the congestion zone that roadway performance would deteriorate, lessening the congestion benefits of the pricing scheme. At that time, decisions on whether to discontinue the incentive program, or introduce more stringent qualification criteria would be required.

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Blue Marble Project

Blue Marble Project is a public interest "eco-political" consulting firm founded in 2010 by Alex Matthiessen, an experienced environmental advocate who previously served as CEO and president of Riverkeeper, special assistant to the Undersecretary at the U.S. Department of the Interior, and Rainforest Action Network's grassroots director, among other positions. Blue Marble Project provides advice and services to both for-profit and not-for-profit clients to help them advance a variety of environmental initiatives. Services include environmental regulatory research and analysis, network and coalition building, media relations, (select) fundraising, and design and execution of issue advocacy campaigns.

Komanoff Energy Associates

Charles Komanoff is director of the consulting firm Komanoff Energy Associates, 're-founder' and president emeritus of the renowned advocacy group Transportation Alternatives, a founding trustee of the Tri-State Transportation Campaign, an organizer with the pedestrian-rights organization Right of Way, and director of the Carbon Tax Center. His work includes books (Power Plant Cost Escalation, Killed By Automobile, The Bicycle Blueprint), computer models, scholarly articles, and journalism. Komanoff graduated with honors from Harvard College with a B.A. in Applied Mathematics.

Regional Plan Association

Regional Plan Association (RPA) is America's oldest independent urban research and advocacy organization. RPA works to improve the prosperity, infrastructure, sustainability, and quality of life of the New York-New Jersey-Connecticut metropolitan region. For 90 years, RPA has been an indispensable source of ideas and plans for policy makers and opinion shapers across the region. RPA has pursued these goals by conducting independent research, planning, advocacy, and vigorous public-engagement efforts. A cornerstone of RPA's work is the development of long-range plans and policies to guide the region's growth. Since the 1920s, RPA has produced three landmark plans for the region and is currently working on its fourth plan, which will tackle urgent challenges facing our region.

Robbett Advocacy Media

Robbett Advocacy Media is a communications and advertising firm specializing in public affairs advertising, political campaign media, and organization branding. Founded in 1991, the firm has worked extensively on transportation, environment, education, and healthcare issues. Their work for the Straphangers Campaign, RPA, ESTA, and others has played a role in increased funding for the MTA Capital Program over the past 20 years. The firm has received thirteen Pollie awards for excellence in political and public affairs advertising. Bart Robbett serves as president of the Greater NYC Chapter of the American Association of Political Consultants and adjunct professor at Fordham.

Sam Schwartz Engineering, D.P.C.

After nearly 20 years with the New York City Department of Transportation (NYCDOT) and a successful term as the NYCDOT's Chief Engineer/First Deputy Commissioner, Sam Schwartz started the Sam Schwartz Company in the summer of 1995. The firm has grown from a staff of two to over 100 professional engineers, planners, designers, and pedestrian traffic managers in six offices throughout the country. Today, Sam Schwartz Engineering, D.P.C. (SSE) is an internationally-recognized firm specializing in developing context-sensitive transportation solutions for government, private-sector, not-for-profit, and community clients. Through technical expertise, creative visioning, and consensus-building, SSE strives to balance the needs and improve the quality of life for all users, including drivers, pedestrians, transit riders, and cyclists.

Table of Contents

Executive Summary

It is unquestionable that New York City and its suburbs depend on well-funded and maintained transportation infrastructure. Each day, over 11 million people from around the region rely on our commuter rail lines, subways, buses, taxis, highways, bridges, streets, sidewalks, and bicycle lanes to get to work, shop, go to schools and hospitals, visit parks, museums and shows, and unite with family and friends. Yet our system is at a crossroads, where chronic underfunding and traffic congestion threatens to derail the transportation network.

The Move NY Fair Plan described in this document is the only comprehensive proposal currently being considered that would ensure the regional transportation system's health over the coming decades.

The Move NY Fair Plan is a sustainable solution that will provide toll equity, reduce congestion, boost the regional economy, and raise significant revenues for high-priority road, bridge, and transit projects. When fully bonded, this sum is enough to close the projected funding gap for the MTA's 2015 - 2019 Capital Plan and deliver vital road and bridge improvements the region's drivers and truckers depend on to keep New York moving. Moreover, the Move NY Fair Plan will create more than 30,000 new, local, and recurring jobs in the region. A rational and fair tolling system is inevitable in New York City. **The time has come to make it happen.**

New York's Transportation Crisis

Who We Are

Move NY is a growing and diverse coalition of stakeholders representing many of the region's business associations, trade unions, clergy, civic leaders, transportation and environmental advocates, good-governance organizations, and elected officials. The coalition formed in 2010 in response to the crisis enveloping the City's transportation system, with severe service cuts, escalating fares and tolls, and a dwindling funding base threatening our transit and road network.

Move NY's mission is to build support for a master transportation plan – developed by traffic guru "Gridlock" Sam Schwartz and the Move NY coalition – for the New York City region. As now envisioned, the Move NY Fair Plan will generate the revenues needed to make major investments in maintaining and modernizing New York City's mass transit system and road network, bring toll equity to the region's commuters and businesses, and reduce the grinding traffic congestion that plagues the metropolitan region, its people, and the economy that sustains them.

Sam Schwartz and the Move NY team developed the proposal over several years based on hundreds of conversations with stakeholders around the region, many of whom were prominent in opposing past traffic-pricing proposals. Stakeholder consultations will continue throughout the process of enacting the plan, but this report already represents a comprehensive region-wide dialogue, bringing together Community Boards, neighborhood associations, major labor unions, business groups, and advocates for drivers and the freight industry. While unanimity on any plan isn't possible, we believe we have cultivated as wide-ranging a consensus about our transportation system's needs and the best method of addressing them, as will ever be found in New York.

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It is our hope that, after learning about the Move NY proposal, the region's stakeholders and the public at large will embrace it, or at least its central elements, and join our effort to bring about its implementation.

Our Transportation System is in Crisis

The transportation system that has been a backbone of our region's growth over the last century is in danger of grinding to a halt. The recently announced 2015-2019 MTA Capital Plan is only half-funded. Without a new, sustainable source of transportation revenue, critical projects for our region – not only major expansions, but also the more prosaic yet essential modernization of track, signals, and stations – will be delayed or cancelled altogether.

Meanwhile, severe congestion pollutes the air New Yorkers breathe, increases vehicle collisions, escalates the cost of living, and drains our economy to the tune of $16 billion annually in lost productivity.

Inequities abound. Drivers on outer-borough crossings like the Bronx-Whitestone Bridge pay high tolls while drivers entering the congested Manhattan Central Business District (south of Central Park) via the East River bridges or by crossing 60th Street pay nothing at all.

Underfunded Transportation Infrastructure

New York owes much of its remarkable growth over the last two centuries to bold and innovative investments in its transportation infrastructure. The city has expanded from its confined origins in Lower Manhattan to encompass all five boroughs – thanks in large part to the creation of our far-flung subway and bus system and an elaborate network of highways and bridges.

However, if New York is to continue to grow, and its prosperity is to be shared across the region, it cannot rest on its laurels. The transportation network we built in decades past is aging and insufficient for a regional economy that no longer revolves exclusively around Manhattan. Despite these needs, the resources are simply not there to properly maintain the current system, much less expand it to make it accessible for all of the region's residents.

Chronically underfunded by the State and Federal governments, the MTA has been forced for decades to incur more and more debt to fund its operations and capital budgets. Drivers and transit riders have had to shoulder an increasing share of the burden of paying off and servicing that debt. Tolls and fares have risen four times in the last six years at a rate well beyond general inflation, and they are scheduled to rise again in March 2015. Instead of paying for new transportation options, those fare and toll increases go largely to servicing the mounting debt, which over the last decade has nearly doubled as a percentage of the MTA's operating costs.

The MTA's recently published 2015-2019 Capital Program promises much-needed improvements to the subway and commuter rail lines. However, barely half of the $32 billion needed to pay for those improvements has been identified, leaving a $15 billion gap between what is available and what the system needs. Without new funds, the MTA will be forced to either curtail vital transportation investments, thereby weakening our region's economy and quality of life, or engage in an endless series of debilitating fare and toll hikes. Other than the Move NY coalition, with the plan detailed in this report, no one has identified a viable means of filling the gap.

Chronic, Economy-Sapping Traffic Congestion

Traffic congestion threatens the safety and sanity of pedestrians, cyclists, and drivers alike. It pollutes our air, increases asthma rates, and makes our communities noisier and unpleasant. And it costs our economy dearly – according to a 2014 study conducted by HR&A Associates, roughly $16 billion every year.

The inability to move efficiently and reliably in our city causes headaches for workers trying to get to their jobs and employers who bear the cost to their business from late employees, not to mention missed connections and constant anxiety for people trying to keep appointments. Congestion costs are particularly crippling to businesses that depend on making multiple deliveries and service calls every day. If a plumber or electrician is late because of traffic or time wasted looking for parking, not only does it limit the number of calls he is able to make each day, it makes it harder for him to earn repeat business from equally frustrated clients. These delays result in real costs for New York's businesses. For example, the freight company UPS instructs its drivers to tolerate parking tickets in order to make their drop-offs on time; as a result, the company estimates that it pays up to $12 million in NYC parking tickets every year.

Most New Yorkers are resigned to heavy traffic as a part of living in this great city. But it doesn't have to be this way.

An Unfair and Regressive Tolling System Creates Unsafe Streets

Much of today's congestion is the byproduct of a deeply unfair system of road tolling that undermines both our economic competitiveness and quality of life. Drivers pay heavily to travel across less-congested bridges, with the Verrazano, Throgs Neck, Whitestone, and Triborough/RFK Bridges costing $8.00 cash and $5.54 for E-ZPass users each way (the Verrazano toll is collected in one direction, resulting in a $16.00/$11.08 one-way toll). The Henry Hudson and Rockaway bridges cost somewhat less, at $5.50 cash/$2.54 E-ZPass, and $4.00 cash/$2.08 E-ZPass respectively. Meanwhile, more than a million car and truck trips in either direction are made

Figure 1: Congestion in Manhattan's Chinatown

Source: Move NY

each day for free over the four East River bridges and across 60th Street into and out of the Central Business District (CBD) – the most congested part of the City, which also has the most transit options.

This is unfair in a number of ways. It's unfair that drivers using the City's outer bridges effectively subsidize free trips into the CBD.[1] It's unfair that CBD-bound drivers, many of whom have decent transit alternatives, add to traffic that slows down truckers and van drivers, as well as public bus riders who, on average, are less affluent. In addition, it's unfair that a small proportion – just 17% – of people traveling to the CBD – pay nothing when every other CBD-bound commuter, save bicyclists and pedestrians, must pay a toll or fare to make the same trip.[2] This unfair tolling system creates skewed incentives, resulting in "bridge shopping," in which every day tens of thousands of cars and trucks exit the highways that lead to paid crossings in order to compete on city streets for access to the free bridges. "Bridge shopping" has severe effects on the quality of life in neighborhoods surrounding the East River bridges, such as Williamsburg, Downtown Brooklyn, Chinatown, the Upper and Lower East Sides, Long Island City, and Astoria. Unsurprisingly, asthma and collision rates in those neighborhoods are among the highest in the region. In one egregious example, truckers traveling from Long Island to New Jersey, who should use the most direct route over the Verrazano Bridge and across the Staten Island Expressway (routes designed for heavier vehicles), are incentivized instead to take the antiquated Manhattan Bridge and crowded city streets in Lower Manhattan. Perversely, the larger the truck, the more the driver saves by endangering the lives of pedestrians in some of our densest urban neighborhoods.

Similarly in Western Queens, the free Queensboro Bridge is sandwiched between two paid crossings, causing tens of thousands of drivers to exit highways and jam city streets just to avoid paying a toll.

Unsurprisingly, the site NYC Crashmapper demonstrates, through heat maps marking every vehicle collision (with other vehicles or with pedestrians or cyclists) in New York City between August 2011 and February 2014, that many of the the "hottest", or most dangerous intersections, are precisely those leading to and from the free East River Bridges. Our unbalanced tolling scheme is therefore a principle cause of traffic fatalities and injuries in our city.[3]

1 In other words, those outer tolls wouldn't be so high if they didn't have to make up for revenue not being collected on heavily used City bridges and crossings.

2 In fact, many vehicle and transit commuters in the region also pay for the privilege, in the form of tolls and fares, of using public infrastructure even for non-CBD bound trips (e.g., from Long Island to the Bronx by car or by train).

3 Crashmapper.com

Figure 2: An Unfair Tolling System

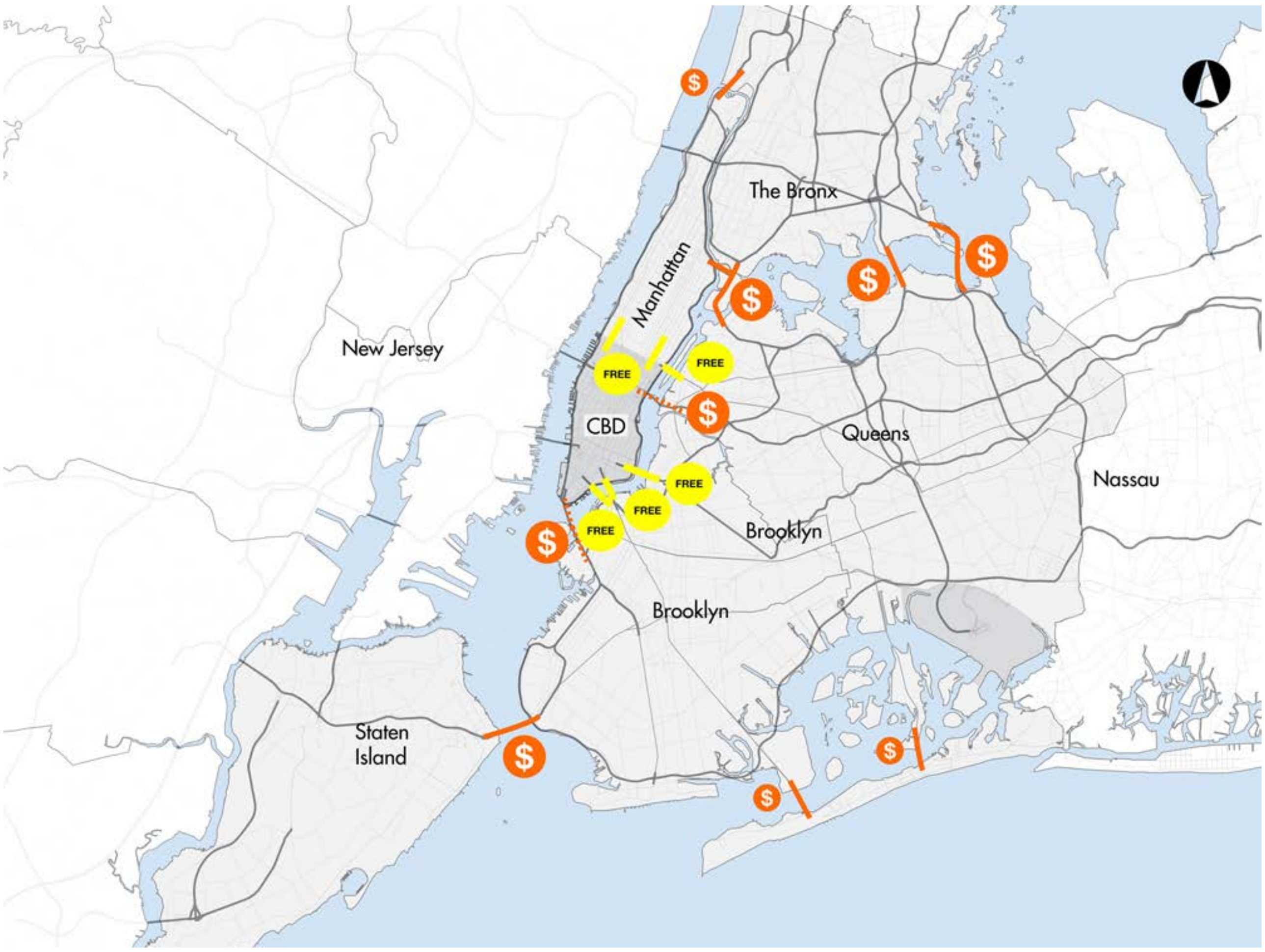
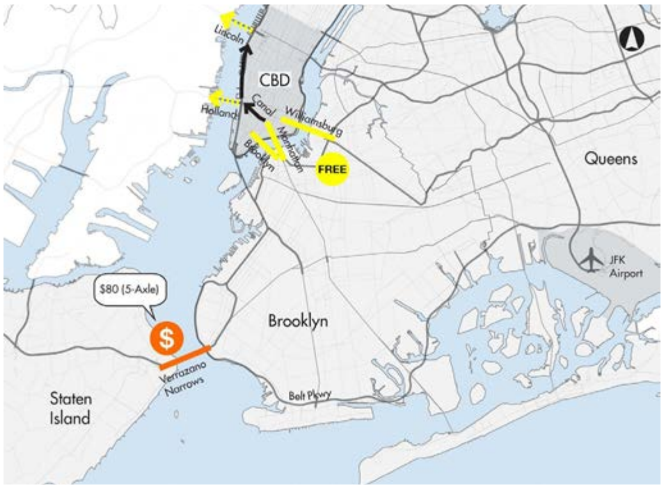
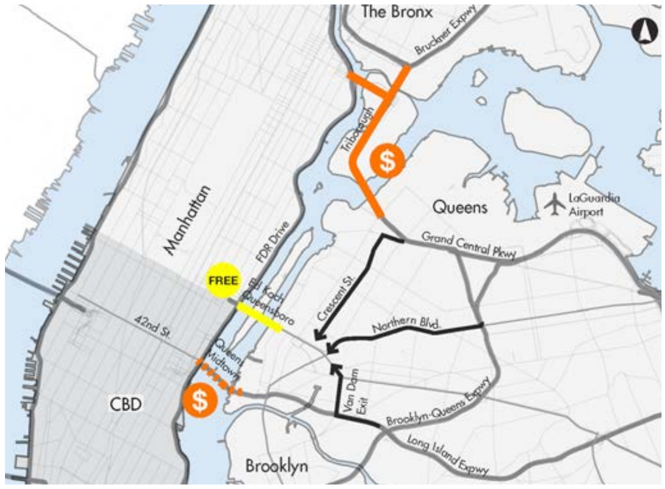


Figure 3: "Bridge Shopping"



Every day, thousands of trucks headed west from Long Island opt for a free trip through city streets in Downtown Brooklyn and Lower Manhattan, rather than paying up to $80 to use the direct route, on infrastructure appropriate for their vehicles, across Staten Island.



The free Queensboro Bridge is sandwiched between two tolled crossings, the Queens-Midtown Tunnel and the Triborough Bridge. As a result, tens of thousands of drivers steer their cars off of highways and jam city streets in Long Island City and Sunnyside.

Importance of a Well-Funded Transportation System

In an ideal world, a solution to New York's funding and congestion woes would involve government action at the federal, state, regional, and municipal levels. Unfortunately, inaction at the federal level has made finding broad-based funding and congestion reduction solutions less likely than ever before, making the need for the Move NY Fair Plan all the more pressing.

The 2012 federal enactment of "Moving Ahead for Progress in the 21st Century" (MAP-21) was originally expected to be a catalyst for performance-driven reforms in the transportation sector, including congestion pricing. However, MAP-21 failed to resolve the crisis of federal transportation funding that faces every state transportation agency in the region.

At the federal level, the vast majority of transportation funding directed to state, regional, and municipal agencies is raised through the federal gas tax and pooled into the National Highway Trust Fund (HTF). About 80% of the funding from HTF is directed to highways, roads, and bridges and administered by the Federal Highway Works Administration (FHWA). The remaining 20% is directed to mass transit and administered through the Federal Transit Administration (FTA). Between 2007 and 2011, New York State received just 15% of its overall surface transportation funding from the HTF (about $1.6 billion in 2014), the lowest federal share of any state.[4]

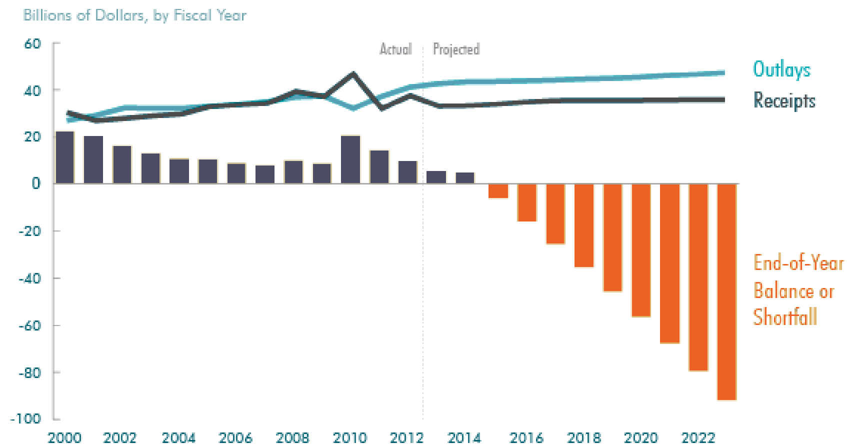
4 Pew Charitable Trust, 2014, p.5

Because of the declining purchasing power of the federal gas tax and improved fuel efficiency of the nation's vehicle fleet, the HTF has been approaching the point of insolvency since 2008.[5] In a last-ditch bailout effort in early August 2014, Congress provided the HTF with an emergency infusion of $10.8 billion to last through May 2015.[6] Unfortunately, much of this funding was sourced from corporate payroll tax diversions that will take years to materialize. Although the federal transportation crisis impacts all U.S. metro areas, New York State Department of Transportation (NYSDOT) and the MTA are expected to be especially hard-hit due to their extensive needs.

NYSDOT also relies on its own Dedicated Highway and Bridge Trust Fund to pay for roads, highways, and bridges. About one-quarter of its funding comes from federal and state sources, with the remainder largely coming from vehicle tolls and state gas taxes. However, like the federal HTF, the State's Dedicated Highway and Bridge Trust Fund faces declining revenues from tolls and gas taxes as overall vehicle miles traveled (VMT) level off and fuel efficiency improves. According to a report from the New York State Comptroller, the State now spends more on debt service (37%) than on much-needed capital projects (25%).[7] For dedicated taxes and tolls, the trend is more severe. In fiscal year 2013-2014, 67% of these revenues were spent on debt service – a figure projected to rise to 76% by 2017-2018.[8] For the State's bridges and tunnels to remain in a State of Good Repair (SGR), it is critical that the State find a more robust long-term solution to its transportation funding crisis.

5 Bipartisan Policy Center, 2012, p.9
6 H.R.5021 - 113th Congress (2013-2014)
7 DiNapoli, 2014, p.8
8 Ibid.

Figure 4: Decline of the National Highway Trust Fund



Source: Congressional Budget Office

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At the municipal level, the New York City Department of Transportation is also projected to face funding volatility in the near future. Although the City's DOT itself does not operate mass transit or most of the major expressways in the City, it is responsible for funding bridges, highways, and street maintenance that is critical to avoid congestion. Of the City's $69 billion annual budget in 2013, just 27% came from state and federal categorical grants, with the remainder generated from sales, real estate, and property taxes.[9] Sales and property tax revenues are functions of the broader health of the City's economy and can fluctuate wildly. The City's $20.8 billion annual Capital Commitment Plan demonstrates the tremendous variability of this funding. During the period 2010-2013, in which the City recovered from one of its worst economic recessions in history, City capital project funding to DOT declined from $1 billion to $661 million.[10] To further illustrate this volatility, future transportation commitments outlined in the City budget are projected to swing from $1.65 billion in City funds in 2014 to just $465 million in 2017.

The Risk to Roads and Bridges

The potential decline in federal funding of NYSDOT bridges is an especially acute concern for the regional economy. NYSDOT currently receives 15% of its funding from the federal government[11]. Of the three agencies responsible for bridges and tunnels in New York City — New York City DOT, NYSDOT, and the MTA — NYSDOT's infrastructure appears to be in the worst overall condition. Based on data submitted to the Federal Highway Administration (FHWA) in April 2013, 12% of the highway bridges in New York State are classified as structurally deficient and 27% are classified as "functionally obsolete."[12] Functional obsolescence indicates that a bridge would need extensive repair or replacement to meet the most current engineering standards but is not yet at risk of structural failure. Likewise, 30% of New York City's roads are in "fair" or "poor" condition, up from 16% in 2000.[13] Of the NYSDOT's highway lanes located in New York City, 51% are in fair or poor condition, up from 38% in 2008.[14]

In the event that Congress is unable to provide a long-term solution for the Highway Trust Fund, the Bipartisan Policy Center speculated that federal highway funding may be cut by up to 35%. Under this scenario, New York State DOT could lose up to $1.8 billion annually.[15]

At the municipal level, the City's bridges appear to be in somewhat better shape. According to the NYC Independent Budget Office, the average condition of 209 NYCDOT-owned bridges sampled in their study improved over the 2000-2012 period, based on the State's numerical rating of bridge conditions. Most of the increase in condition ratings came in the years 2000-2003, when commitments focused on repairing bridges with some of the lowest ratings.

MTA Bridges and Tunnels (B&T) operates seven bridges and two tunnels that form essential links for vehicular highway transportation into the New York City metropolitan area. By traffic volume, it is the largest such authority in the United States, serving more than 800,000 vehicles that carry

9 NYC Independent Budget Office, 2013, p.9
10 City of New York, Office of Management & Budget, 2014, p.8

11 Pew Charitable Trust, 2014
12 New York State Department of Transportation, 2014
13 Center for an Urban Future, 2014
14 Ibid.
15 Bipartisan Policy Center, 2014, p.14

more than a million people daily in the New York Metropolitan area.[16] In 2013, the nine B&T crossings generated $1.64 billion in toll revenue.

However, more than half of B&T's facilities are over 70 years old and need full-scale rehabilitation. Even with regular maintenance, the structures and mechanical components of the bridges and tunnels eventually deteriorate from the combined effects of traffic loads and environmental exposure. By the end of this 20-year planning horizon (in 2034), some facilities will be almost 100 years old, a significant milestone that will require a new level of major investments. As bridge and tunnel components reach the end of their useful lives, they require a higher level of capital investment to keep them structurally sound. Given the MTA's increasing reliance on debt to pay for its capital projects, it is essential that B&T projects are adequately funded to ensure the steady flow of toll revenues they support. The Move NY Fair Plan would provide a stable, long-term revenue stream to capitalize on the progress of NYC DOT in bringing key bridge and highway links into a State of Good Repair.

16 Metropolitan Transportation Authority, 2013

The Risk to Transit

But it is the city's transit system that presents the greatest challenges and needs. The MTA transports the vast majority of people who enter Manhattan's central business district below 60th Street. Of the 3.7 million people traveling to the CBD on a typical weekday more than 80% come by mass transit and fewer than 20% by private auto, taxi, or truck.

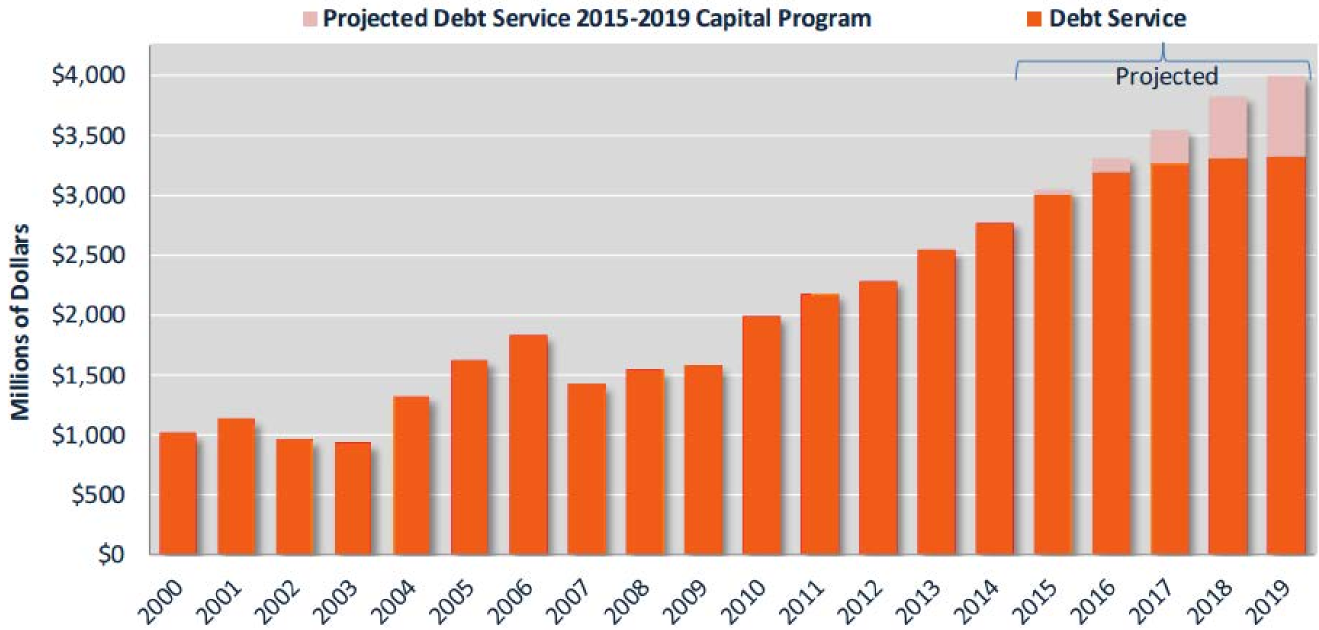
> Of the 3.7 million people traveling to the CBD on a typical weekday, more than 80 percent come by mass transit and fewer than 20 percent come by private auto, taxi, or truck.

Of the nearly 3 million using public transportation, fully 85% or 2.5 million rely on the MTA's commuter rail, subway, or bus services, while the remainder rely primarily on services operated by New Jersey Transit or the Port Authority of New

Figure 5: Traffic entering Manhattan's CBD on the Upper East Side

Source: user ILMRT, Wikimedia Creative Commons

Figure 6: MTA Debt Service Payments, 2000-2019



Source: Citizen's Budget Commission

York and New Jersey.[17] A 2011 report estimated the impact of the MTA's 2010-2014 Capital Program as responsible for 350,000 jobs and $44 billion in economic activity.[18] The MTA's buses, subways, and commuter rail are therefore vital to the healthy functioning of New York's regional economy.

In the coming years the MTA's deficits will be substantial. By 2016 the deficit is projected to be more than $3.6 billion or 18% of operating expenses.[19] The obligation to pay service on this debt has resulted in higher and more frequent fare and toll increases. If the MTA were to borrow the $15 billion needed to completely fund its 2015-2019 Capital Plan, tolls and fares would increase by 15% on top of the biannual 4% increases already scheduled for 2015, 2017, and beyond.[20]

Exacerbating the agency's baseline financial instability are two new risks to existing MTA funding sources:

- The Next Federal Transportation Funding Authorization: This critical piece of legislation was scheduled to expire in 2014 but was recently extended until May 2015. The lack of support for increases in transportation spending threatens to jeopardize the timing and amount of federal funds allocated to the MTA for its 2015-2019 program. Unless a more robust long-term solution to the federal transportation crisis is reached, it is likely that federal funding levels will decline at some point during the MTA's 2015-2019 Capital Program.

- The MTA's Railroad Rehabilitation and Improvement Financing (RRIF) Loan Application: The MTA had anticipated this loan and its more favorable rates and conditions in its funding calculations for East Side Access. If this is not approved, the MTA will be required to issue additional fare-backed debt at a higher interest rate with less favorable repayment terms, which could result in further project delays and the diversion of funds from other critical needs to fund the higher borrowing costs.

17 Komanoff, Balanced Transportation Analyzer, "Travel" tab
18 Metropolitan Transportation Authority, 2011
19 Ibid.
20 Metropolitan Transportation Authority, 2014a

The Need for a New Source of Recurring Revenues

A confluence of factors, among them the long-term instability of both the federal Highway Trust Fund and the NYSDOT Dedicated Bridge and Highway Trust Fund, makes the need for new transportation revenue streams clear. As federal and state commitments to transportation decline, funding gaps in the capital plans for MTA and NYSDOT are becoming increasingly severe.

As noted, the MTA faces a funding gap of $15.2 billion for its proposed 2015-2019 Capital Plan. The Capital Plan calls for just $5.5 billion in funding for network expansion projects such as Phase Two of the Second Avenue Subway – a small fraction of the likely conservative estimate of $14.3 billion needed to complete them.[21] This indicates that even if no network expansion projects were included in the Capital Plan, there would still be a funding gap of $9.7 billion for projects intended to maintain the MTA's facilities in a State of Good Repair. An additional funding source for critical SGR and network expansion projects must be found.

21 Metropolitan Transportation Authority, 2014a

New York State DOT also faces a funding gap in the coming years. Its 2010-2015 Capital Plan outlined a $25.8 billion program that was expected to rely upon the federal HTF for 40% of its funding.[22] For non-MTA transit spending, which covers transit service in suburbs of the New York metro area, the federal share is 80%. Like the federal HTF, the State's Dedicated Highway and Bridge Trust Fund faces declining revenues from tolls and gas taxes as overall Vehicle Miles Travelled (VMT) levels off and fuel efficiency continues to improve. Nearly three-quarters of dedicated NYSDOT toll and gas tax revenues are already being spent on debt service on previous capital projects. The State must locate additional major revenue sources for transportation if it is to complete its upcoming capital projects without incurring further debt.

Table 1: MTA 2015-2019 Capital Program Funding Sources, in millions ($)

Total 2015-2019 Program Costs	**$32,046**
Federal Formula, Flexible, and Misc.	$6,275
MTA Bonds	$3,886
Pay-as-you-go Capital (PAYGO)	$927
Asset Sales/Leases	$600
City of New York Capital Funds	$657
Federal New Starts	$507
Private Developer Funded Improvements	$200
Other MTA Sources	$762
Bridges & Tunnels Bonds and PAYGO	$3,056
Total 2015-2019 Funds Available	**16,870**
Funding Gap	**15,176**

Source: Metropolitan Transportation Authority

MTA's Current Funding Needs

MTA's five-year capital plans have been predominantly funded (57%) by fares, tolls, and dedicated tax and fee revenues that are mostly bonded. An additional 32% of the MTA's capital plans is funded through federal support. State and city support for the MTA has declined dramatically since the 1980s, from 25% in 1982 to about 6% today.[23]

Of the MTA's 20-Year Needs Assessment total – $136 billion sum covering 2015-2034 – only about $16 billion (11%) is allocated for Bridges & Tunnels. MTA Bridges & Tunnels do not require Capital Plan Review Board (CPRB) approval because they are a self-funding entity, which provides $500 million annually in support of MTA's transit operations.

The plan is organized within each agency by asset categories, elements, and project needs codes, including State of Good Repair (SGR), Normal Replacement (NR), System Improvement (SI), and Network Expansion (NE). Network Expansion is a major component of the MTA's Capital Program comprising about 25% of the total in the 2010-2014 period. SGR, NR, and SI represented 23%, 38%, and 11% of the Capital Program, respectively.

The Capital Program's System Improvement component contains some significant endeavors to streamline MTA operations and reduce operating costs. Chief among these is the expansion of Communications Based Train Control (CBTC) to the MTA's most heavily-trafficked subway lines and the implementation of a next-generation fare payment system to replace the MetroCard.

Network Expansion will be a critical prerogative for the agency in the years to come, as the transit network expands to new neighborhoods, to better serve communities that have grown in the decades since the system was first created. The MTA's network expansion (NE) projects currently underway include the Second Avenue Subway, East Side Access, Penn Station Access, the Flushing Line extension, and the

22 New York State DOT, 2009, p. 18

23 Empire State Transportation Alliance, 2014, p.8

Figure 7: Post-Sandy Reconstruction on the MTA's Greenpoint Tubes (G Line)

Source: Metropolitan Transportation Authority

Figure 8: Throgs Neck Bridge

Source: User sfoskett, Flickr Creative Commons

Figure 9: Verrazano Narrows Bridge

Source: User ibagli, Flickr Creative Commons

Select Bus Service/Bus Rapid Transit (SBS/BRT) program. Together, these network expansion projects would cost an estimated $10 billion – an obligation the MTA may have difficulty meeting unless additional sources of revenue are found.

MTA Debt Financing

Like the prior programs, the 2015-2019 Capital Plan is anticipated to be funded through a combination of revenue-backed debt and direct capital support by federal, state, and local partners. However, the current 2010-2014 plan's heavy reliance on debt has placed constraints on the agency's ability to increase borrowing capacity for a new five-year plan. The amount of debt the agency can issue is limited by "what the market can bear" and a state mandated legislative bond cap, currently set at $41.8 billion. Today the MTA carries $33.4 billion in debt. If the State chooses to raise the bond debt ceiling, there is concern that this could cause the MTA's bond rating to be lowered below its current Moody's rating of A2.[24] In addition, the carrying of any additional debt exerts upward pressure on fares and tolls and reduces funding for the general operations budget.

Looking ahead to the 2015-2019 Capital Plan, the primary concern is that the MTA's three secure funding sources – federal, city, and state – combined equate to $16.8 billion, little more than half of the desired $32 billion program.[25] The MTA would be left with a $15.2 billion gap, one that would have to be closed with funds resulting from bond sales or a new revenue source. With $33.4 billion in outstanding debt, the cap must be raised by the state legislature if the MTA wishes to issue any new debt for the 2015-2019 capital program, even if it retires other outstanding bonds.

State Comptroller Thomas DiNapoli has postulated that existing riders and drivers will be burdened with 15 percent fare and toll increases if Albany fails to identify new revenue sources and the MTA is forced to issue more debt in the form of fare-backed bonds. Thus, on top of the 4 percent increases already scheduled in 2015, 2017, and beyond, they will see 15 percent increases in fares and tolls over the course of the MTA five-year capital plan.

Furthermore, the MTA's reliance on such a large amount of debt-based financing will further increase its debt service payments, which are currently projected to account for 17% or $2.3 billion of the MTA's 2014 operating budget. By 2018, annual debt service is projected to reach $2.94 billion, or 18% of the MTA's operating budget.[26] Without further sources of revenue, it is likely the MTA's increasing debt service will negatively impact its ability to complete capital projects on time or on budget. Moreover, since its capital debt is paid out of its operating budget, this means that for every dollar drivers and riders pay in tolls and fares, 17 cents goes to pay off the creditors, as opposed to being invested back into maintaining and improving the region's roads, bridges and transit network.

24 Burton, 2014
25 Metropolitan Transportation Authority, 2014b
26 MTA 2015 Budget

The Move NY Fair Plan

How It Works

The New York metropolitan area relies on a patchwork of state, city, and regional agencies to collect toll revenues on bridge and tunnel crossings leading into and out of the city. The MTA operates seven bridges and two tunnels. NYSDOT operates 605 bridges, and New York City DOT operates 789 bridges throughout the five boroughs, including the East River Bridges — none of which are currently tolled. Poor coordination across these agencies has resulted in toll amounts that vary widely, inconsistent fare payment systems, and significant congestion. Most importantly, the toll levels charged to motorists do not accurately reflect travel demand nor do they appropriately act as a disincentive to drive into the most congested part of the city: Manhattan south of Central Park.

From the perspective of transportation equity, our current tolling system is highly dysfunctional. The highly trafficked East River crossings — the Queensboro Bridge, Williamsburg Bridge, Brooklyn Bridge, and Manhattan Bridge — are not tolled. Meanwhile, less congested crossings, such as the Bronx Whitestone Bridge and the Throgs Neck Bridge, have one-way tolls of $5.54 ($8.00 for cash payments). This is problematic given that most of these areas have poor access to rapid transit compared to Manhattan, where the congested East River bridges are not tolled. This effectively incentivizes drivers to "bridge-shop" in search of a cheaper vehicle trip, intensifying congestion in places like Downtown Brooklyn, East Midtown, and Western Queens leading up to these crossings.

Finally, the existing bridge toll system continues to use an outdated model of tollbooths and cash payments that cause significant "bottleneck" congestion throughout the metropolitan area. Only one of the bridges under the MTA's Bridge and Tunnel Authority, the Henry Hudson Bridge between Manhattan and the Bronx, has been upgraded to cash-less, gate-less tolling.

Toll Swap

The Move NY Fair Plan proposes to set tolls on a logical formula: higher tolls where transit options are most available and lower tolls where transit is either not available or a less viable option. This rationalization of tolls results in pricing all vehicle trips south of 60th Street into or out of the CBD but lowers the price of all trips with non-CBD origins or destinations.

The new toll will be implemented on the four East River bridges as well as on every avenue crossing Manhattan at 60th Street, including the West Side Highway and FDR Drive. The toll charge will match the rate on the MTA's two tunnels (Queens Midtown and Brooklyn Battery) as of March 2015: $5.54 each way with E-ZPass, $8.00 without. Tolls on the MTA's "major" bridges will be reduced by $2.50 each way (45%), so E-ZPass vehicles will pay $3.04 in each direction, while cash payers, whose share of vehicles is just 17% and dwindling, will pay $5.50. Tolls on the three minor bridges will be dropped by $1.00 in each direction.[27]

Electronic and By Mail Tolling

The new tolls will be collected electronically, "at speed" — no slowing down required — as is done increasingly on the NY State Thruway (e.g., at Woodbury in Orange County) and the Henry Hudson Bridge. Vehicles without E-ZPass will be billed via optical license-plate cameras mounted alongside the overhead E-ZPass readers. It may also be feasible to levy the toll via cell-phone apps, which would allow drivers from outside the region an easier way to pay.

No Double Tolling

Drivers entering the CBD who have already paid a toll on the Triborough/RFK Bridge will be charged the difference between the CBD toll and the toll already paid on the Triborough/RFK Bridge, provided that they cross 60th Street within an hour. Therefore, their net cost will be the same ($5.54 E-ZPass in each direction) as for drivers crossing the East River bridges. None of the Harlem River bridges will be tolled; nor does the Move NY Fair Plan address tolls on any of the Port Authority (New Jersey) bridges or tunnels.

Why Make This "Toll Swap"?

First, because our present toll system is unfair and irrational:

- Drivers over bridges like the Manhattan Bridge with four subway lines pay nothing while drivers crossing the Verrazano pay up to $16 round trip with much of the revenue going to pay for transit. In effect, drivers on the existing toll bridges outside the Manhattan CBD are subsidizing the drivers who use the free bridges and roads.

27 Major bridges are the Verrazzano Narrows, Triborough, Whitestone, and Throgs Neck Bridges. Minor bridges are the Henry Hudson, Cross Bay, and Marine Parkway Bridges.

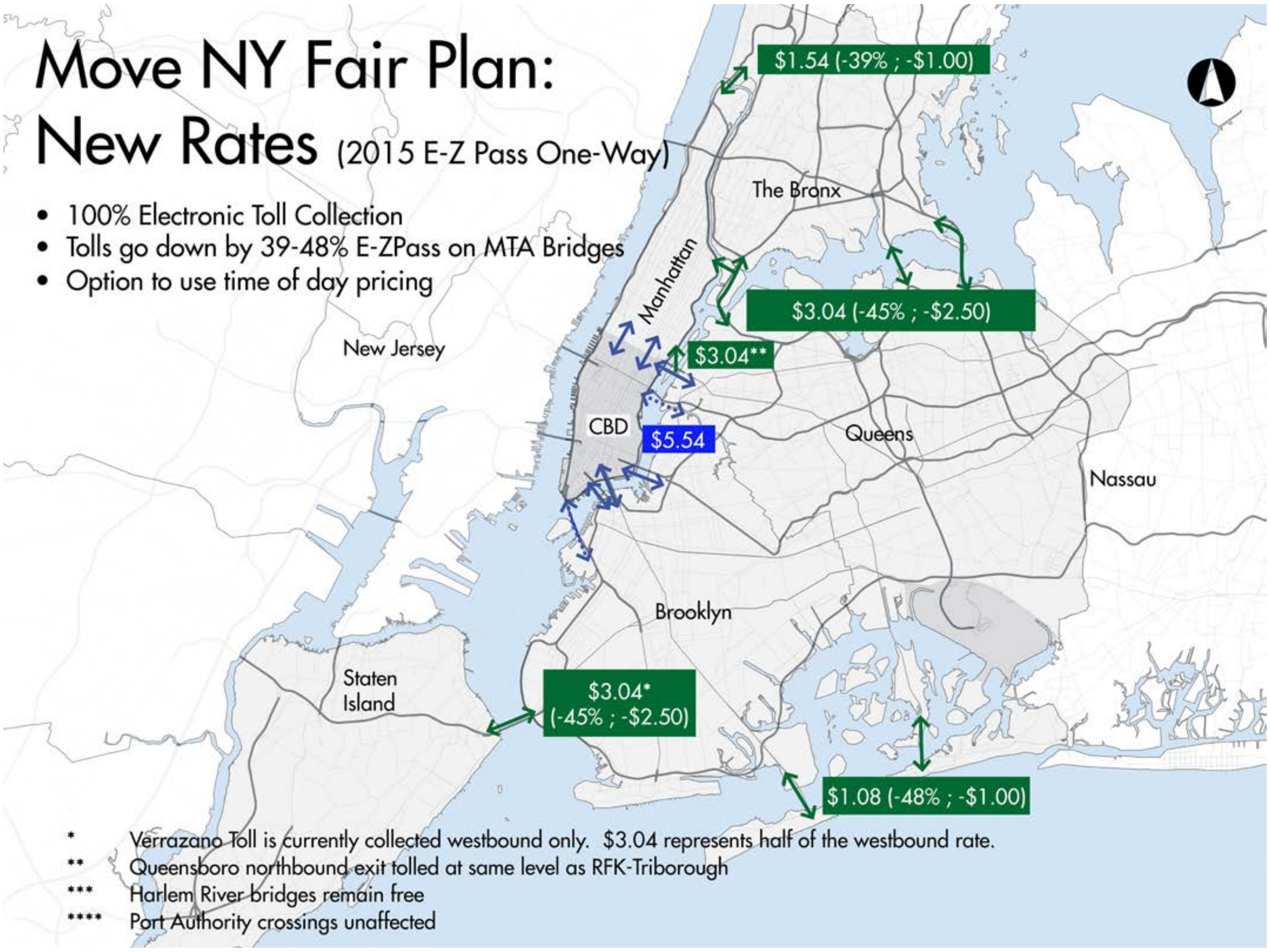
- Tolling the Manhattan crossings makes more sense from a traffic standpoint because each car and truck trip into Manhattan south of 60th Street acts as a much bigger drag on traffic than the average trip on an outer bridge.
- Tolls should be a disincentive to unnecessary trips, but on bridges like the Verrazano and the Throgs Neck transit alternatives are so poor that tolls function more as a penalty.
- The toll disparity between the MTA tunnels and the free East River crossings fosters "toll shopping" that dumps thousands of additional daily trips onto jammed city streets, adding to traffic gridlock in areas least-equipped to handle it.

To ensure that the tolling system remains fair and consistently reflects relative levels of congestion and accessibilty of transit alternatives, it is critical to write into legislation based on this plan a provision that permanently fixes the ratio between the reduced tolls on MTA-owned bridges and the new tolls into and out of the Manhattan Central Business District. For example, in 2015 rates, the E-ZPass toll on the Whitestone Bridge, under our plan, would be 55% of that levied on the East River bridges and at 60th Street; likewise, the E-ZPass tolls on the Henry Hudson and Rockaway bridges would be 28% and 19%, respectively, of the CBD toll. In the event of future toll hikes, those ratios must remain constant.

The second motivation for the Move NY toll swap is that it and allied measures (discussed next) will generate $1.5 billion of recurring net revenues to invest in the city's and region's transportation infrastructure each year. (This figure nets out the revenue given up by lowering the tolls on the seven MTA bridges, as well as the cost to administer toll collection on the East River bridges and at 60th Street.)

These funds will allow City and State agencies to modernize and expand our regional transportation system so that car and truck drivers, straphangers, rail and bus riders, taxi users, and ferry passengers have more dependable, extensive, and safe service. The benefits are detailed further below, including an anticipated 15-20% improvement in travel speeds within the midtown and downtown Manhattan core.

Figure 10: Move NY Fair Plan Proposed Tolls with Changes in Price



Source: Move NY

Figure 11: Taxis in the Manhattan CBD

Source: Mario Roberto Duran-Ortiz, Wikimedia Creative Commons

Commercial and For-Hire Vehicle Contributions

For trucks, Move NY proposes to employ the per-axle toll gradations in effect at the MTA tunnels, but with this exception: tolls for trucks and other commercial vehicles crossing into and out of Manhattan south of 60th Street or on an East River bridge will be capped at one round-trip toll per calendar day, provided the vehicle is equipped with E-ZPass so that the exemption can register. Thus, any E-ZPass-using commercial-registered vehicle will be able to take multiple round-trips into and out of Manhattan south of 60th Street without paying more than one toll each way each day.

> Tolls for trucks and other commercial vehicles crossing into and out of Manhattan south of 60th Street or on an East River bridge will be capped at one round-trip toll per calendar day.

Medallion taxis (yellow cabs) constitute more than 40% of vehicles in motion in Manhattan south of 60th Street, so we propose a different treatment for them, in part because of their status as a middle ground between mass transit and private autos. Moreover, trips crossing 60th Street or using an East River bridge are a minority of taxi trips; hence, applying the $5.54 each-way congestion charge to taxis would incentivize cab drivers to stay below 60th Street at all costs. In other words, a minority of taxi trips would pay a lot while most would pay nothing.

The Move NY solution is to waive the congestion toll for all metered cab trips and instead collect a surcharge pegged to the distance traveled south of 96th Street and the "wait time" component of the taxi fare that is a close proxy for traffic congestion. A combined 15% surcharge on miles traveled, 20% surcharge on the wait-time fare element, and 50 cent surcharge on the "drop" appears to make for a "sweet spot" at which taxi riders pay their fair share while drivers enjoy greater fare turnover since the speed-up in traffic due to the congestion toll attracts enough riders to more than offset any drop-off from the increase in fares.[28]

The plan further proposes treating the new "boro taxis" (green cabs) the same as the yellows, except that their exemption from the toll expires within a set time, perhaps one hour, to ensure that the greens don't stick around in the zone and pick up illegal hails. Green cab fares that never venture south of 96th Street will avoid both the toll and the surcharge, thus keeping those trips affordable without breaking the new social compact by which vehicles pay to drive to and from Manhattan's most congested section.

For app-based services like Uber and Lyft, it may make sense to take advantage of their satellite data network to surcharge for vehicle mileage or even minutes spent within the taxi charging zone. Either metric would closely track the vehicle's addition to Manhattan traffic congestion. Such a

28 These rates would be halved on weekends and holidays, when congestion is less and mass transit is not at full service. Note also that the northern border of the taxi surcharge zone would match the boundary of the district in which only yellows can pick up street hails: 96th Street on the East Side and 110th Street on the West Side.

charge will ensure that these services do not circumvent the new tolls by segmenting their fleets on either side of the charging boundary.

Finally, Move NY proposes that livery cabs, which operate from bases outside the Manhattan business district, as well as radio-dispatched “black cars” that primarily serve corporate clients or make pre-arranged trips, pay the congestion toll in the same manner as private autos. Neither class has GPS-based taxi meters to permit location-based surcharging, and both cross into or out of the charging zone infrequently enough that the new toll should not be unduly burdensome. And yet they’ll benefit from the increased traffic speeds in and around the CBD caused by an overall reduction of vehicles entering the CBD.

“Time of Day” Pricing

As one of the primary purposes of the Move NY Fair Plan is to construct a tolling system that reflects demand (in the form of congestion), it is strongly recommended that as part of the implementation of the Move NY Fair Plan, the MTA be authorized to establish a “time of day” or “peak/off-peak” schedule, with higher rates during weekday rush hour and lower rates during the “shoulder” hours and in the evenings and on the weekends respectively. Those schedules should also apply to the surcharges proposed for taxis and app-based car services.

Regional Toll Equity

An analysis of US Census travel data demonstrates that our plan, for all of the revenues it will generate, will affect only a small number of trips made on a daily basis in the region:

- For the 12 MTA counties together, just 2% of all trips will see a net increase in tolls, while 1% will benefit from a net decrease in tolls at one or more MTA bridges. The remaining 97% of all trips will face no increase in commutation cost (73% are car trips that don’t go to or through the Manhattan core, while 24% are transit trips that face no tolls anyway).That low incidence also holds within the five boroughs, with just 3% of trips facing higher tolls, 1% receiving toll discounts, 52% being car trips with unchanged tolls, and 44% trips via public transit. In other words, 96% of trips in the city will be unaffected either way by the toll swap.
- In the combined 12 counties as well as virtually every subset, households that take auto trips whose tolls will rise have higher average incomes than households using transit: The differential is 22% in New York City, 34% for the four non-Manhattan boroughs, and 29% for the entire region.

Although no one wishes to pay more — and indeed the idea of raising close to $2 billion in new tolls and taxi surcharges warrants a certain humility — the Move NY Fair Plan has been structured to place relatively more of the burden on groups that (i) can more easily afford to bear it by virtue of greater affluence, (ii) will enjoy a larger share of traffic reduction benefits, (iii) are imposing large costs on others by virtue of bringing an automobile onto crowded roads and bridges in hyper-congested districts, and/or (iv) have a relatively rich menu of transit alternatives.

For the 12 MTA counties together, just 2 percent of all trips will see a net increase in tolls, while 1 percent will benefit from a net decrease in tolls at one or more MTA bridges.

The Numbers

The traffic projections cited in this section come from Charles Komanoff’s Balanced Transportation Analyzer (BTA), an extensively researched, multi-layered analysis of nearly every conceivable variable affecting transportation and travel demand in New York City. The infrastructure solutions firm HNTB reviewed the BTA and found it “comprehensive, broad-based, and realistic”. Moreover, the BTA model was vetted by a number of city and state agencies and good-government groups, including NYS Division of Budget, NYCDOT, MTA, Citizens Budget Commission and Regional Plan Association. The BTA is free and available to the public for download at http://www.nnyn.org/kheelplan/BTA_1.1.xls.

Improved Travel and Safer Streets

While the Move NY plan will indeed discourage some private auto traffic into the Manhattan core, it will actually increase mobility for users of every mode of transporation.

First, the new charge into the CBD will result in significantly improved travel speeds within the Manhattan charging area, resulting from (i) the diminution of vehicle trips into the area due to the new toll, (ii) a further diminution as increased investment in transit infrastructure yields improved service that induces car owners to switch some of their trips to transit, and (iii) the elimination of toll shopping, with drivers now taking the most direct path, meaning fewer miles traveled and less traffic. Our modeling projects reductions of 15-20% in average travel durations in Manhattan south of 60th Street, or more than 40 million hours of time savings per year.

Cars on roads and bridges in the areas immediately surrounding the CBD — such as Upper Manhattan, Long Island City, Astoria, or Downtown Brooklyn —will also experience improved travel speeds, with average gains of 6%. While this improvement is less dramatic than that within the CBD, it amounts to greater time savings (more than 50 million hours), on account of the far greater travel volumes on those approach roads.

Consistent with the goals of Vision Zero, city streets will become safer and collisions will decrease due to reduced vehicular traffic and the elimination of toll shopping. The new, balanced toll system will no longer incentivize drivers to compete on city streets for access to the free East River bridges.

Transit users will also experience improved service speeds and dependability, as the new toll revenues help keep subways, buses, and commuter rail in a State of Good Repair while also paying to modernize signals, switches, communications, and rolling stock. We estimate these time savings at nearly million hours per year – more than two-and-a-half minutes for an average subway trip.

The ability to guarantee improved travel speeds within Manhattan is key to being able to surcharge yellow (and green) cab travel within the zone while preserving (and even enhancing) the taxi sector's economic viability. Indeed, our modeling projects that yellow cabs will thrive under the Move NY Fair Plan, with an estimated 15% increase[29] in taxi turnover and more, not fewer, fares per shift, owing to the expectation that the gain in taxi speeds will attract more riders than will be deterred by the higher fare.

Because of better efficiency in the transportation system (less congestion and improved transit service), the Move NY Fair Plan will result in more than 115,000 net additional trips to the Manhattan Core every day, even though there will be 100,000 fewer auto entries. In other words, people will continue coming (even more than they do currently), but a greater proportion of them will do so via transit.

Boosting the Economy and Creating Jobs

Beyond the value of New Yorkers' time itself, the Move NY Fair Plan will substantially benefit the regional economy. Traffic congestion from motor vehicles has wide-ranging negative impacts on our region's safety, public health, and environment.

Annually, drivers will save $2.2 billion in time that would have been spent idling in traffic. Time savings benefit transit riders as well, to the tune of $1.1 billion for subway riders and nearly $100 million per year for bus riders.

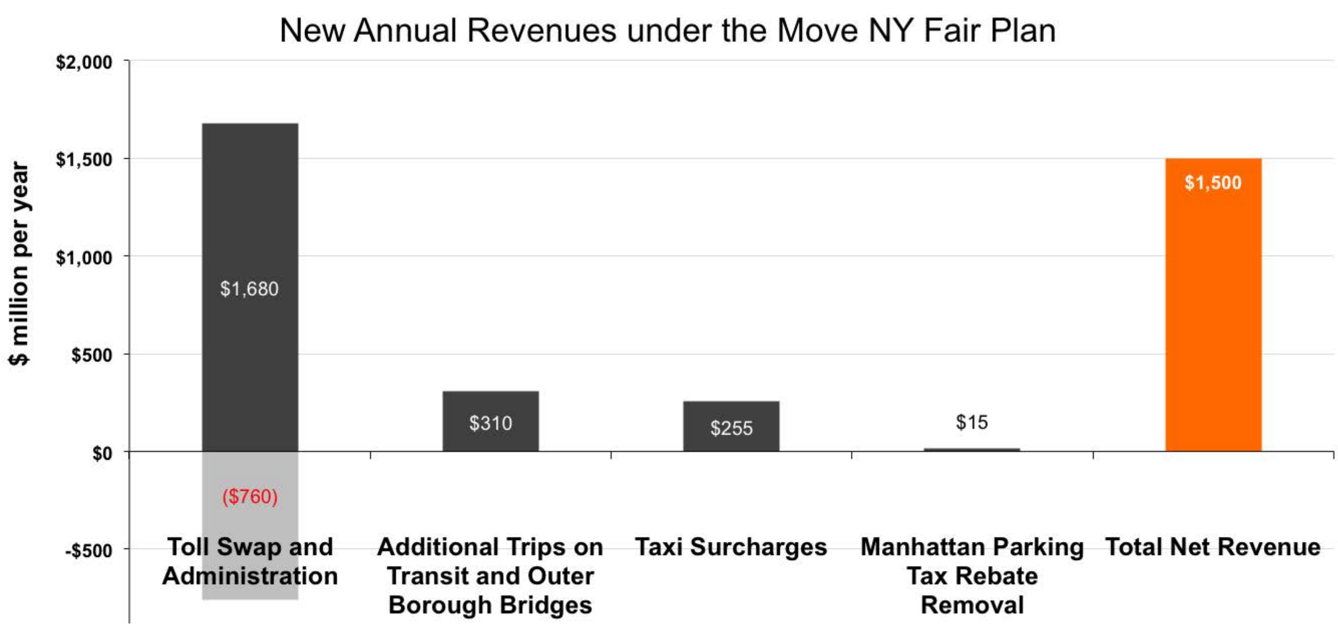
These reductions in travel times have tremendous economic value: $3.60 per work trip.[30] Annually, drivers will save $2.2 billion in time that would have been spent idling in traffic. Time savings benefit transit riders as well, to the tune of $1.1 billion for subway riders and nearly $100 million per year for bus riders. These figures also represent latent job creation and economic productivity that are currently being lost to the impacts of congestion. By reducing congestion and improving travel times, the Move NY Fair Plan will help leverage these savings back into creating stable jobs for the region.

The Move NY Fair Plan will generate long-lasting and significant economic growth for the New York region. According to a forecast by HR&A Advisors, the Move NY

29 This equates to an additional 4-5 fares per shift, from a current average of 29 to nearly 34 daily fares.

30 Based on assumptions on the value of drivers' time including $34 per hour within the CBD and $23 per hour outside.

Figure 12: Revenue Sources



Fair Plan will unlock $2.8 billion in annual economic output and produce 30,000 new local, annually recurring jobs that cannot be outsourced.[31]

These new jobs will be created mostly in the area of construction and maintenance of our transit, road, and bridge infrastructure. In the transit sector, jobs created will include those in car (subway and train) and bus manufacture and maintenance, track reconstruction, signal maintenance, station rehabilitation and upkeep, fare collection equipment repair, bus and subway operation, and station-based customer service enhancement.

By enhancing transit service, easing congestion, and saving New Yorkers' valuable time, Move NY Fair Plan will unlock $2.8 billion in annual economic output.

The private sector will benefit as well, with the culture, retail, and hospitality industries in particular benefitting from the 115,000 estimated additional trips into the Manhattan core each day. Moreover, transit improvements will make more areas of the region attractive for real estate investment and new business, and the logistics industry will enjoy significantly reduced congestion, daily caps on Central Business District tolls, and cheaper travel on major freight arteries.

The Move NY Fair Plan will also generate $168 million in annual sales and income tax revenue, helping to put City and State budgets on more solid fiscal ground.

Revenue Sources

The Move NY Fair Plan will raise $1.5 billion net annually for investment in roads, bridges, and transit. This figure is net of the costs of toll administration and fare reductions for outer-borough bridges.

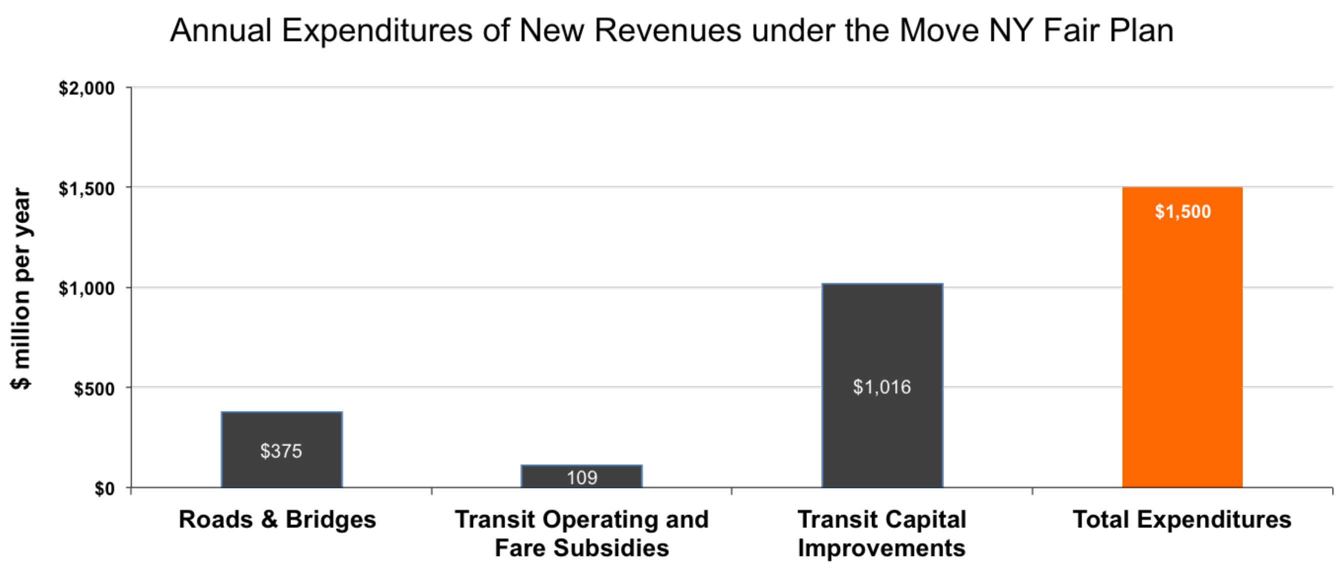
The most significant revenue source is the toll to enter and exit the Manhattan CBD, which will be collected in two ways. First, a cordon toll for drivers entering and exiting Manhattan's CBD at 60th Street will raise 57% of the toll revenue. The second toll, raising the other 43%, will be collected from drivers entering and exiting the Manhattan CBD via the East River bridges. Taxis will be exempted from the cordon toll and will instead contribute through a medallion surcharge, a third revenue source. Further, the MTA is expected to generate substantial additional revenue by two means: first, through higher subway and bus ridership as commuters switch from cars to transit and improvements to transit are made; second, through greater toll revenue from outer-borough bridges as traffic rises in response to reductions in toll fees. Finally, Move NY proposes to eliminate an exemption, enjoyed only by Manhattan residents, from a city excise tax on monthly parking fees.

All can be seen in Figure 12. The revenue items are as follows (all dollar figures are recurring, i.e., per year):

- Toll Swap and Administration: $1,660 million will be collected from the new CBD toll and an additional $20 million from the Queensboro Bridge upper roadway, which will be charged at the newly-reduced toll rate for the Triborough Bridge, i.e., $3.04 with E-ZPass. Reducing tolls on all seven MTA bridges will cost the authority an estimated $600 million a year, and we estimate it will cost $160 million a year to administer the tolling system.
- Additional Trips on Transit and Outer Borough Bridges: We estimate at $230 million the additional revenue arising from the Move NY Fair Plan's investments in improved transit provision, toll-induced switches to transit from auto trips, and increased attractiveness of

31 HR&A Advisors, Inc, 2014.

Figure 13: Expenditures



bus service due to lesser road congestion. Likewise, the demand-based increase in toll revenues from increased use of the seven MTA bridges, arising from the reduced tolls, is $80 million.

- New Taxi Surcharges: $250 million is our estimate of new net toll revenues from yellow and green taxis and app-based car services, while the projected 5% increase in taxi trips will generate another $5 million a year via the "Ravitch" Surcharge enacted in 2009 (note that revenue from app-based services such as Uber and Lyft is not included due to lack of data).
- Manhattan Parking Tax Rebate Removal refers to $15 million that New York City will regain each year by eliminating an exemption granted to Manhattan residents from a city excise tax on monthly parking fees. This item, while relatively small, is an example of our determination to ensure that the responsibility for contributing to our transportation infrastructure is shared by all residents of the region.

The bottom line: gross revenues of $2,260 million a year, less annual negative revenues of $760 million, for a recurring net of $1,500 million per year.

Investments

The Move NY Fair Plan will raise $1.5 billion in net revenue annually, even after covering the costs of reduced toll revenues on existing tolled crossings and managing, enforcing, and maintaining the new tolling system. A quarter of these funds will be used to improve our roads and bridges with the remaining three-quarters dedicated to transit, as shown in Table 2.

Table 2: Assigning Toll Reform Net-Revenues

Program Area	Annual Expenditures (in $ millions)	Share
Roads & Bridges	375	25%
Transit	1,125	75%
Total Expenditures	**1,500**	**100%**

Bonding vs. PAYGO

Since the enactment of the dedicated Payroll Mobility tax in 2009, the MTA devoted a portion of the new revenues for "pay-as-you-go" capital investments (PAYGO) to fund ongoing capital needs. PAYGO funds are typically used for recurring operating expense projects (such as rail replacement), since these projects help repair physical assets that depreciate in value over a relatively short period. By contrast, long-term borrowing or issuing of debt should be used to pay for assets with a long life, such as subway cars (40-year life). The MTA's annual depreciation is about $2.3 billion.[32] PAYGO receipts are "dedicated" in the sense that they are placed in a special account for accounting purposes but are still subject to annual appropriation by the Legislature. Unfortunately, continued borrowing for major capital projects and the recent TWU/LIRR labor contracts have eroded the PAYGO revenue stream. Just $927 million in PAYGO funds is available for the MTA's 2015-2019 Capital Program.[33] PAYGO funds are also vulnerable to future economic shocks, since the funds are mostly derived from payroll receipts.

32 Citizen's Budget Commission, 2012, p. 6.

Roads and Bridges

City and suburban roads and bridges will benefit from an annual infusion of $375 million, which will be used for new projects and to maintain and operate the four currently free East River bridges (ERB): Queensboro, Williamsburg, Manhattan, and Brooklyn Bridges. Table 3 details how these funds might be split between ERB costs and new projects. Approximately, $12 million would be needed to support O&M costs for the ERB's, with the remaining $363 million available for new road and bridge projects.

Table 3: Road and Bridge Funding

Road and Bridge Area	Annual Expenditures (in $ millions)
East River bridges O&M	12
Funds for Capital Improvements	362
Total Expenditures for Roads and Bridges	**375**

Transit

Despite the fact that New York is the most transit-dependent city in the country, too many residents suffer from inadequate access to the transit network. While Queensboro Plaza, the South Bronx, and Downtown Brooklyn might be transit hubs, most other neighborhoods in those boroughs have access to one subway line at most – and sometimes to none at all. Moreover, the subway lines that do exist in those neighborhoods can bring people into Manhattan but are much less useful for traveling between other boroughs. What's more, Staten Island is cut off from the subway system altogether. Instead, many New Yorkers must rely on the local bus network, with its generally slow and limited service, or pay more for Express Buses or commuter rail.

The Move NY Fair Plan proposes to allocate $1.125 billion annually in new, dedicated revenues which could be bonded to generate over $15 billion for transit investments. This funding will allow for critical improvements that will restore our transit system to its rightful place among the world's best.

Move NY will make a priority of filling the City's biggest transit gaps by:

- Restoring more of the bus service that was cut in 2010;
- Adding Express Bus routes and increasing Express Bus service;

33 Metropolitan Transportation Authority, 2014.

- Extending "City Ticket" (weekend discounts for LIRR and MNR travel within city limits) to seven days per week: Metro North and the Long Island Railroad will thus become an affordable express service for riders picking up commuter rail at intra-city stations;
- Further reducing City Ticket fares to $6 peak/$4 off-peak, and Express Buses to $5, to render more affordable these critical means of express transit service from the farther-flung neighborhoods of the city
- Expediting introduction of new Select Bus Service/Bus Rapid Transit routes in all five boroughs;
- Develop a more extensive ferry network through a modest investment of capital and operating outlays that will improve connections for commuters in waterside neighborhoods and bring New Yorkers to emerging destinations across the waterfront.
- Increase suburban transit options by subsidizing county bus systems, thus providing more service, in Nassau, Westchester, Suffolk and Rockland Counties;
- Last Mile Strategies: Making commuter rail more accessible by investing in transit-oriented development and increasing parking capacity at select Metro North and Long Island Rail Road Stations.

In addition to making the transit system more accessible and affordable for all New Yorkers, Move NY wants to make it easier, faster, more reliable, and more comfortable. The Move NY Fair Plan will enable the MTA to accelerate making investments that will greatly improve the straphanger experience, systemwide:

- Communications-based Train Control (CBTC): Currently, the L line is the only subway line that features this technology, which allows trains to be operated at closer distances and thereby increase capacity and decrease wait times and crowding.
- Contact-less open payment system: Similar to London's Oyster Card, this emerging technology will allow riders to wave their fare pass, credit card, or smartphone over a sensor and walk right through. It will also allow for faster and easier transfers between New York City Transit, Metro North, Long Island Railroad, and other transit providers in the region.
- Station rehabilitations: With additional dollars, MTA can accelerate the pace of rehabilitations across the system: e.g., refurbished staircases, greater handicap access, better lighting, easier transfers between lines.
- Countdown clocks: Arrival time information has been a welcome addition to the numbered subway lines. The Move NY Fair Plan will accelerate the implementation of those displays on the lettered lines, too.

Move NY also wants to expand the map of where New Yorkers can go. Our plan invests almost seven billion dollars in major transit capital projects. An example of the kind of

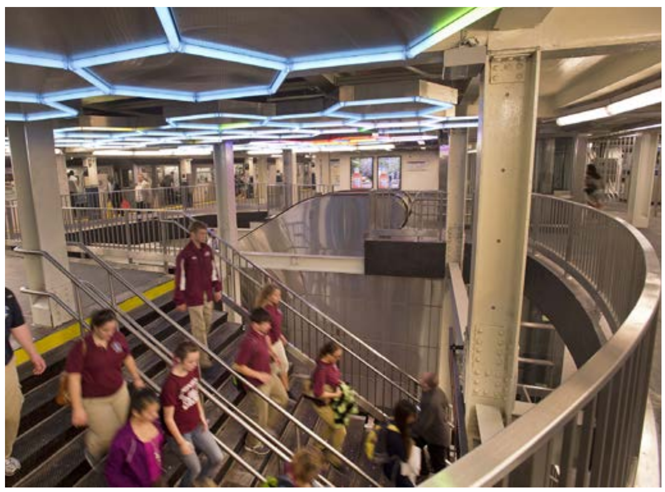
Figure 15: All-electronic tolling on the MTA's Henry Hudson Bridge

Source: Tomas E. Gaston, The New York Post

Figure 16: Contact-less payment system (London Example)

Source: http://www.disabledpersons-railcard.co.uk/

Figure 17: Recent renovations at the Broadway-Lafayette and Bleecker Street subway stations



Source: Flickr user MTAPhotos

project we can fund through this new revenue stream is Metro North's proposed Penn Access project, a project supported by Governor Cuomo which will create a spur on Metro North's New Haven Line and result in the addition of four new stations in the East Bronx, providing new commuter rail access to an otherwise underserved area. While this particular project is simply illustrative of the kinds of projects that are worth exploring, there are many other worthy ideas for new transit projects that will be examined once the Move NY Fair Plan is adopted. We anticipate a process whereby the public, through its elected officials, will have a chance to weigh in with the MTA and NYCDOT to help determine the final list of projects actually funded with Move NY funds.

In recent years, New York City has garnered extensive international acclaim for its efforts to encourage active transportation. The Move NY Fair Plan will allocate capital funds to enhance pedestrian and cycling infrastructure on some of the bridges connecting the various boroughs as well as in other less well served parts of the city.

There are many other worthy ideas for new transit projects, including new subway and Select Bus Service/Bus Rapid Transit routes that we are exploring, and the public listening tour, coupled with input from local elected officials, continues to be the best means of soliciting and synthesizing those ideas.

Table 4: Transit Investments

Transit Investments	Cost (in $ millions)
State of Good Repair/Modernizing the System	**7,500**
Station Rehabilitation and System-wide Arrival Information	3,000
Modernizing Signals: Communications-based Train Control (CBTC)	4,000
Contactless Payment System	500
Targeted Fare Reductions: Express Buses and Intra-City Commuter Rail	**63**
Express and Suburban Bus Service Enhancements	**53**
Regional Transit Capital Expansion: Infrastructure Investments in Subways, Light Rail, Commuter Rail, BRT/SBS, Ferries, Cycling	**6,810**
Total	**15,147**

Note: The total amount includes a 5% buffer to account for contingencies.

Finally, it is important that communities have input into the MTA's process for setting priorities for community-specific transit investments. The Move NY Fair Plan thus proposes that of the $15.2 billion in capital raised by bonding the new annual revenues, the MTA earmark $1.5B of that for community transportation enhancement projects. We further propose that a process be established by the MTA, in consultation with NYCDOT, for mapping out its strategy for improving transit service on a neighborhood by neighborhood basis and giving elected officials an opportunity to represent their constituents in helping the MTA to set local investment priorities.

Source: Flickr User Rabbicrischma

Lockboxing the Revenue

The Importance of Protecting New (and Existing) Revenue

The funding needs of the MTA far exceed currently available resources. The MTA's $32 billion budget for its 2015-19 capital plan is a "scrubbed" number, i.e., the minimum required to meet the demands of the system and the needs of the riders who depend on it. Indeed, Chairman Prendergast has stated that the actual funding need of the MTA for this period, based on proper depreciation accounting, is closer to $40 billion. Likewise, NYSDOT's and NYCDOT's programs for maintaining and improving roads and bridges, are chronically underfunded, and it shows in the city's dilapidated and pothole ridden highways and arterial streets.

New York State has received a one-time revenue windfall of $5.1 billion in bank settlements, and Governor Cuomo has declared his intent to use some of this sum to address the State's infrastructure needs. In his January State of the State speech, the governor designated several projects to receive much of that funding. That list includes: the New Tappan Zee Bridge via a grant to the New York Thruway Authority; a Metro-North spur line and new stations in the Bronx ("Penn Access"); expanded parking capacity at select commuter rail stations; and an Airtrain connecting the Number 7 train and Long Island Railroad to LaGuardia Airport at Willets Point. The Governor also proposes allocating $750 million each toward the MTA's and NYSDOT's five-year capital plans.

There is some overlap between the Governor's priorities and those included in the Move NY Plan. Thus, when budget negotiations begin, it may make sense for the Governor and Legislature to marry the two sources – Move NY (which is derived primarily from user fees paid by NYC metro area residents) and the bank settlement surplus – such that the former could take care of funding the MTA's capital shortfall and New York City's roads and bridges, while the latter could perhaps be leveraged with private capital to support investments in the Governor's above mentioned priorities as well as in other road, bridge, and transit projects around the rest of the state.

In terms of funding the New York City region's mass transit system, the new net revenues generated by the Move NY Fair Plan are required in addition to the MTA's existing sources of "dedicated" funding. These include those derived from various taxes collected by the State on behalf of the MTA, such as surcharges on gas and sales taxes, certain car registration and license fees, and the controversial but crucial Payroll Mobility Tax – a 0.34% (i.e. 34 cents per $100) tax on business payrolls throughout the 12-county MTA region that was enacted in 2009 and presently generates an estimated $1.4 billion per year.

The Move NY Fair Plan can fill the projected $15.2 billion dollar funding gap in the MTA's 2015-2019 Capital Plan as well as support much of the city's road and bridge program, but only if it is combined with existing MTA funding sources such as those listed above, along with available federal funding. That is, all current dedicated MTA taxes must be preserved at current or greater levels as part of the legislation and bonding covenants that would protect new revenue generated by the plan.

That is, all current dedicated MTA taxes must be preserved at current or greater levels as part of the legislation and bonding covenants that would protect new revenue generated by the plan.

Sources of Funding and the Management Thereof

There are essentially five sources of new funding under the Move NY Plan: (i) revenues from collecting tolls on the four East River bridges; (ii) tolls collected at the 60th Street screen line; (iii) surcharges applied to all metered taxis (yellow and green) and on-demand services like Uber, Lyft and others; (iv) additional revenue received by the MTA at its bridges and via the fare box on account of lowered tolls and enhanced service, respectively; and (v) rescission of the parking garage sales tax exemption for Manhattan (only) residents.

There are a number of options for collecting the money from the tolls on the East River bridges and those across 60th Street. Regardless of which agency or authority administers and collects the tolls on these crossings, all of the revenue collected under the Move NY Fair Plan – including the for-hire-vehicle (FHV) surcharges, but excluding additional farebox and non-CBD toll revenue and garage taxes – would go to a new single-purpose financing authority whose sole responsibility would be to redistribute the revenues according to the formula established in the Plan and enabling legislation. (See below for more details.)

While these details will ultimately be worked out by the affected agencies and reflected in the actual legislation, one possible approach for assigning tolling responsibility is as follows:

Tolls on the East River Bridges: The City of New York would transfer jurisdiction of the four East River bridges – Koch (Queensborough), Williamsburg, Manhattan, and Brooklyn Bridges – to the MTAB&T (formerly known as the TBTA) or possibly an MTAB&T subsidiary by means of a long-term lease agreement, as it already does with the entire subway infrastructure. (The assets would continue to be owned by the City.) The MTAB&T or its new subsidiary would take responsibility for operating and maintaining the bridges, thus saving the city (via NYCDOT's budget) millions of dollars annually. These savings would be retained by NYCDOT and could be reinvested in other parts of the city's transportation infrastructure. Because MTAB&T already operates and collects revenue at the MTA's nine tolled facilities, adding four bridges to the agency's portfolio would be straightforward and would be one way to ensure that current and future MTAB&T bondholders are protected. The revenue collected would go to the new financing authority and be distributed to the MTA, MTAB&T and NYCDOT, according to the requirements of the Move NY Fair Plan, which, in turn, would be mandated by legislation.

Tolls across 60th Street: The State would authorize the City of New York (via NYCDOT) to construct, operate, and maintain tolling facilities along 60th Street and to collect the revenues generated by the new tolling system. Tolling along 60th Street would be implemented, as on the East River bridges, via a combination of E-ZPass (~85% penetration) and camera license plate recognition technology (a.k.a. pay by mail), which would take the place of cash, thus obviating the need for any tollbooths or traffic obstruction. Like the East River bridge toll revenue, the revenue collected along 60th Street would go to the new financing authority that would redistribute the revenues to the MTA, MTAB&T, and NYCDOT according to the formula established in the Move NY Plan and enabling legislation.

Of course, the above scenario could be flipped, with NYCDOT collecting tolls on the East River bridges and MTAB&T collecting them along 60th Street, thus preserving NYCDOT's responsibility for maintaining the East River bridges. Again, these decisions will be made by the Legislature together with the public agencies involved.

FHV Surcharges: The Taxi & Limousine Commission (TLC) would regulate the collection of a GPS-based surcharge on for-hire vehicles within the "taxi zone," defined as Manhattan south of 96th Street. The surcharge, assessed on the three elements of the TLC fare structure (drop, miles, wait time) equates to around $1.40 for a typical three-mile trip. Like the new toll revenue, the revenue collected from For-Hire Vehicles would go to the new financing authority that would distribute the revenues to the MTA and NYCDOT according to the formula established in the Move NY Fair Plan and legislation.

The Move NY Highway and Transit Authority

Under the Move NY Fair Plan, the New York State Legislature would create a new authority under the MTAB&T called the "Move NY Highway and Transit Authority." The authority would need to be created as a subsidiary of MTAB&T in order to ensure with a high degree of certainty that TBTA bondholders' interests, which rely on current levels of revenue on the MTA bridges, are protected despite the lowering of tolls on those crossings.

The new authority would not be an operating entity but rather a public benefit corporation authorized by the State to merely collect and disburse the funds generated by the Move NY Fair Plan. As it does now, the Capital Program Review Board would approve, up or down, the MTA's five-year capital plans. For 2015-19 and likely 2020-24, those plans would include the transportation investments laid out in the Move NY Fair Plan.

The total Move NY receipts that flow into the new authority would be divided and allocated to both the MTA and NYCDOT according to a formula established in the legislation and consistent with the Move NY Fair Plan. Because the city's roads and bridges are managed and maintained by both the City and State DOTs, the two agencies presumably would enter into an agreement as to how the (non-MTA) "DOT" share of the revenues would be allocated between them to maintain and improve city roads and bridges.

Considering the public's exasperation with what seem like yearly diversions of "dedicated" tax revenues to other purposes, this financial authority will serve as a vital "lockboxing" mechanism to ensure that drivers' tolls are properly spent on the transportation infrastructure and services they and riders depend on.

Enabling Legislation

The Move NY Fair Plan would be authorized by enabling legislation enacted by the New York State Legislature. The legislation, presumably enacted during the 2015 legislative session, would authorize the MTAB&T and NYCDOT to collect revenues in the form of tolls on the East River bridges and across 60th Street in Manhattan. Note that the legislation would merely authorize the MTAB&T and NYCDOT to impose tolls on these crossings; it would not and should not give the Legislature a hand in setting actual toll amounts. The authority for setting all MTA tolls would remain with the MTAB&T, and State law would require that any NYCDOT imposed tolls on crossings into the CBD match those applied at MTAB&T tolled CBD crossings.

The enabling legislation would require that at such time (presumably 2017 or 2018) as tolls begin to be collected on the currently free East River bridges and at the 60th Street screen line, MTAB&T and NYCDOT also harmonize all the CBD-bound tolls – across the East River and 60th Street – such that the newly established tolls match the then prevailing tolls charged at the two East River tunnels (Queens-Midtown and Brooklyn-Battery).

> The legislation would also establish a permanent ratio between the price of the one-way MTA "outer" bridge tolls and the CBD-bound tolls… thus preserving the lower tolls for the outer bridge crossings called for in the Move NY Fair Plan.

The legislation would also establish a permanent ratio between the price of the one-way MTA "outer" bridge tolls and the CBD-bound tolls, per the Move NY Fair Plan, such that the "outer" bridge tolls would always be lower than the CBD tolls by the same fixed percentage amount. For instance, and assuming March 2015 toll levels for the CBD-bound tolls, under the Move NY Fair Plan one-way tolls on the "outer" MTA crossings would be $3.04 (E-ZPass) while one-way tolls on the East River bridges and across 60th Street would be $5.54 (E-ZPass). Thus, the new ratio of "outer" tolls to CBD tolls under the plan – 0.55 – would be locked in place by law such that whenever the MTA changes the prices of its bridge and tunnel tolls, thus preserving the lower tolls for the outer bridge crossings called for in the Move NY Fair Plan.

How New and Existing Revenue Will be Protected under the Move NY Fair Plan

Outlined below are inherent protections embedded in the plan's design as well as additional mechanisms that, taken together, will ensure that the new revenues are fully protected and the needs of the region's transit, roads, and bridges are met.

First, there is an inherent safeguard against Albany's "raiding" a single dollar of the new revenues generated from the toll swap feature of the Move NY Fair Plan. That is, the estimated $720 million in new toll money collected annually by the MTAB&T at the newly tolled East River bridges goes directly to the MTA and its agencies via the new finance authority. In other words, receiving the revenue generated from the new toll regime under the Move NY Fair Plan will not require the MTA to seek an annual appropriation from the NYS Legislature; indeed, the total net funds generated from the new tolling regime ($1.5 billion per year) never pass through Albany at all.

The second safeguard on the MTA/transit side of the ledger stems from the MTA's obligations to its current bondholders. Insofar as revenue from the presently tolled MTA bridges will decrease under the Move NY Fair Plan, the MTA would, as a practical matter, bond much if not all of the new revenue so as to keep its current bondholders whole. The authorization for such bonding would also be included in the implementing legislation. In addition, the new legislation must stipulate that no new tolls be imposed on currently untolled crossings until and unless the proposed toll reductions are implemented, and vice versa – i.e., the two components of the "swap" must happen simultaneously.

Third, there is "agreement of the state" language that is typically included in legislation authorizing public authorities to issue debt. The section quoted below is taken directly from the TBTA statute. There is equivalent language in most, if not all, public authority statutes that authorize debt, which could be included in the enabling legislation for the Move NY Fair Plan. This so-called Agreement of the State is incorporated in the bond resolution, such that the State cannot take away the powers and funding stream that formed the basis of the financing without the authority involved violating its own covenants and possibly accelerating the debt to which the covenant attaches. One might then ask, "What prevents some future state legislature and governor from violating its own agreement by changing the law and diverting the funds?" The answer is that: 1) they have never done this because of the possibility that bondholders would have a direct claim against the State, and 2) the State understands that its entire system of financing for all public authorities would likely collapse if it violated one of its own agreements.

§ 563. Agreement of the State. 1. The State of New York does pledge to and agree with (a) the holders of the bonds that the State will not limit or alter the rights hereby vested in the authority to maintain, reconstruct and operate the project, to establish and collect such charges and tolls as may be convenient or necessary to produce sufficient revenue to meet the expense of maintenance and operation and to fulfill the terms of any agreements made with the holders of the bonds, or in any way impair the rights and remedies of the bondholders, until the bonds, together with interest thereon, with interest on any unpaid installments of interest, and all costs and expenses in connection with any action or proceedings by or on behalf of the bondholders, are fully met and discharged.

Fourth, in order to avoid a scenario where the New York State Legislature robs Peter to pay Paul (i.e., uses the securing of new MTA revenue to try to divert existing "dedicated" revenue), the legislation and new bond covenants must include a "maintenance of effort" provision, confirming the State's commitment to preserve existing MTA dedicated revenue sources at current (or higher) levels.

Fifth, toll payers should be able to count on their money being reinvested in the roads and bridges on which they rely, as well as in an efficient transit system that helps keep a number of vehicle trips off of city streets and highways. Thus, the enabling legislation will establish spending priorities, which also would be codified in the new finance authority. The following formula is how the Move NY revenue should be allocated, in order of priority:

1. Make up payment to MTAB&T to cover lost revenues from toll reduction on outer bridge crossings, calculated on an annual basis based on the historical percentage share these crossings contribute to all MTAB&T revenues.
2. Cover annual operations and maintenance cost of the East River bridges.
3. Dedicate three-quarters of the remaining new toll revenue (less the amount already paid to MTAB&T as its toll make-up share) to the region's (MTA) transit system via the MTA. Bond all or most of the MTA's share of the annual revenue stream to fund the $15.2 billion gap in the MTA's proposed 2015-19 capital plan, which would be modified to capture key elements of the Move NY Fair Plan. The updated MTA capital plan would thus include:
   a. Enhancing transit to underserved areas using Move NY's four-point strategy – select service restoration of 2010 cuts; added express bus service; new BRT/SBS routes; and City Ticket discounts seven days per week;
   b. Maintaining State of Good Repair; and
   c. Investing in capital projects that provide service expansion.
4. Dedicate the balance of the total available net revenues to city roads and bridges (via NYCDOT and NYSDOT).

All of the aforementioned approaches share a common, critical component: a path for the new revenue that avoids the legislative budgeting process or need for an annual appropriation, thus allowing the MTA and NYCDOT to invest 100% of the revenue generated by the Move NY Fair Plan in improving the city and region's transportation infrastructure.

Conclusion

The Move NY Fair Plan is the only comprehensive proposal that addresses the three interrelated challenges of generating funds for transportation, correcting regressive tolling policies, and reducing traffic congestion. There may be other ways to generate the necessary funds for the transportation network, such as raising the gas or sales taxes, but neither alone could be raised high enough to meet the MTA's (let alone DOT's) funding needs. Moreover, the former wouldn't solve our congestion or toll inequity issues, and the latter would be highly regressive. The Move NY Fair Plan is one that distributes the responsibility for funding the transportation network as fairly as possible among all the network's users, and includes concrete steps to make the transit system more convenient, reliable, and accessible for all the region's residents. The Move NY Fair Plan will boost the regional economy with more than 30,000 annually recurring new jobs by making investments that will dramatically boost the system's efficiency and reduce delays; putting people to work building new lines to underserved areas; and offering pocketbook relief (and thus greater spending power) for drivers and transit users in the city's periphery.

Appendices

Balanced Transportation Analyzer

The Balanced Transportation Analyzer (BTA), developed by Move NY's Charles Komanoff, is an extensively researched, multi-layered analysis of nearly every conceivable variable affecting transportation and travel demand in New York City. Many of the estimates of congestion reduction, travel time savings, and related impacts are based on the inputs of the BTA. The infrastructure solutions firm HNTB reviewed the BTA and found it "comprehensive, broad-based, and realistic." Moreover, the BTA model was vetted by a number of city and state agencies and good-government groups, including NYS Division of Budget, NYCDOT, MTA, Citizens Budget Commission, and Regional Plan Association. The BTA is free and available to the public for download at http://www.nnyn.org/kheelplan/BTA_1.1.xls.

List of Available Reports and Resources

- HR&A Advisors: The Move New York Plan: Economic and Fiscal Impact Analysis
- HNTB: An Assessment of the Balanced Transportation Analyzer's Move NY Revenue Projections
- Citizen's Budget Commission: A Better Way to Pay for the MTA.
- Citizen's Budget Commission: Methods for Protecting New Future MTA Dedicated Revenues from Diversion to Non-Mass Transit Purposes

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2018
Fix NYC Advisory Panel Recommendation

Fix NYC
Advisory Panel Report
January 2018

TRANSMITTAL LETTER

January 19, 2018

As New Yorkers, we face two serious transportation crises on a daily basis – one above ground and one below.

While subway delays have always been part of life in New York City (NYC), the frequency of delays and breakdowns in the subway system — largely caused by overcrowding and deteriorating infrastructure — require the development of a plan for immediate action.

Similarly, traffic congestion in Manhattan has long been a defining feature of our city, but over the past few years, the gridlock caused by congestion has become more impactful on daily life. The periods of time during which the Central Business District (CBD) seems to grind to a halt last longer and occur more frequently throughout the day.

Despite these challenges, population, employment and tourism are all at historic highs and show no signs of slowing. NYC is as vibrant and attractive a place to live, work, and visit as it has ever been.

In October 2017, Governor Andrew M. Cuomo brought together a mix of community representatives, government officials, and business leaders from across the region to serve on the Fix NYC Advisory Panel. The Panel was tasked with developing recommendations to address the severe traffic congestion problems in Manhattan's CBD and identify sources of revenue to fix the ailing subway system.

The Panel met in October, November, and December of last year and January of this year, and was supported by staff from New York State's transportation agencies and HNTB Corporation. We received presentations on previous pricing proposals, international case studies, current data and research conducted by experts, and transportation modeling scenarios. The policy recommendations and options for implementation included in this report are based on our analysis of this information and our joint discussions at the Panel meetings.

The Panel believes the MTA must first invest in public transportation alternatives and make improvements in the subway system before implementing a zone pricing plan to reduce congestion. Before asking commuters to abandon their cars, we must first improve mass transit capacity and reliability.

While some may inaccurately claim our proposals are regressive, the Panel's recommendations attempt to consider to the needs of outer borough commuters and present options for congestion relief to New Yorkers in ways that are both fair and feasible.

We urge the Governor and New York State (NYS) Legislature to consider these strategies for reducing congestion in Manhattan and improving mobility across the region. Fixing NYC is everyone's responsibility.

Mitchell L. Moss
Director, Rudin Center for Transportation, NYU

Sam Schwartz
CEO, Sam Schwartz Engineering

Scott Rechler
Chairman, Regional Plan Association

Kathy Wylde
President and CEO, Partnership for New York

Bill Rudin
Chairman, Real Estate Board of New York

John Samuelsen
International President, Transport Workers Union

Peter Ward
President, New York Hotel Trades Council

Tom Prendergast
Former Chairman and CEO, MTA

Fernando Ferrer
MTA Vice Chairman

Reverend Dr. Floyd Flake
Former U.S. Congressman

Hon. David Paterson
Former Governor, New York State

Darryl Towns
Former Assemblyman, Brooklyn
Former Commissioner, NYSHCR

James Molinaro
Former Borough President, Staten Island

Kevin Law
President & CEO, Long Island Association

Hon. Steve Bellone
Suffolk County Executive

Executive Summary

Traffic Congestion

New York City traffic congestion now ranks second worst among cities in the United States and third worst among cities in the world, and is estimated to cost the New York metro area economy $100 billion over the next five years. Although overall traffic volume into the CBD is decreasing, gridlock and congestion continue to grow. With greater emphasis on livability initiatives, available roadway capacity in the CBD has been reduced because of the installation of pedestrian plazas, bike lanes, and dedicated bus lanes. Truck volumes have also increased with the rise of e-commerce. Tourism continues to flourish, bringing more and more pedestrians, tour buses and intercity coaches. Without adequate enforcement of traffic violations, pedestrians encounter unsafe conditions, bus lanes and intersections are frequently blocked, and double parking is pervasive. Finally, there has been an undeniable increase in application-based for-hire vehicles (app-based FHVs) within the CBD. All of these factors combined have led to an untenable condition of congestion.

Subway Challenges

The subway system has suffered from years of overcrowding and neglected maintenance resulting in chronic breakdowns and delays. In June 2017, Governor Cuomo declared the Metropolitan Transportation Authority (MTA) to be in a state of emergency and directed its leadership to produce a recovery plan for the subway system. Chairman Joseph Lhota submitted his Subway Action Plan (SAP) in July 2017 and asked New York City and New York State to each contribute half of the $836 million needed for Phase One of the program. Even after short-term remedies are implemented, additional funding will be required for the transformative upgrades the system requires.

Proposed Solutions

In an effort to address the needs of our transportation networks above and below ground, Governor Cuomo created the Fix NYC Advisory Panel in October 2017. He directed the Panel to focus on strategies to address the severe traffic congestion problems in Manhattan's CBD and to identify sources of revenue to help fix the ailing subway system.

The Panel has developed the following recommendations:

A Phased Approach is Essential

Phase One initiates investments to improve transit connectivity between the CBD and the outer boroughs and suburbs and calls for immediate stepped up enforcement by NYPD of existing traffic laws. Phase Two calls for a surcharge on taxi and FHV trips in the CBD at the conclusion of a ten month period to allow transportation service companies to install the appropriate GPS technology in all vehicles. Phase Three features the installation of a zone pricing program, first for trucks, and then for all vehicles, entering Manhattan's CBD below 60th Street.

In **Phase One,** the Panel offers six recommendations:

1. **Identify Public Transportation Improvements for the Outer Boroughs and Suburbs**
   The Panel has learned lessons from international examples that strongly support first investing in public transportation alternatives before implementing a zone pricing plan to reduce congestion. These investments, once identified, will enhance the capacity of public transportation alternatives to accommodate those who may choose to leave their vehicles at home upon implementation of a pricing zone and will yield significant private economic benefit to surrounding properties and businesses. The Panel recommends that the Legislature support the Governor's budget proposal to authorize Tax Increment Financing for the MTA. Plus, the Panel strongly endorses the Governor's recommended procurement process modifications.

2. **Improve Enforcement of Traffic Laws within the CBD**
   NYC can have an immediate impact on congestion by adequately enforcing existing laws and regulations such as spillback (blocking the box) and bus lane enforcement.

3. **Overhaul the NYC Placard Program**
   The State of New York should empanel a joint NYS/NYC review board to reevaluate the distribution of all government issued parking placards eligible for use in New York City.

4. **Assess and Address the Impact of Bus Congestion the CBD**
   The NYS Department of Transportation, in consultation with the NYC Department of Transportation and the Port Authority of New York and New Jersey (PANYNJ), should perform a comprehensive review of conditions and regulations related to commuter, intercity, charter and tour buses that have a particularly detrimental impact on congestion on the West Side of Midtown and in lower Manhattan.

5. **Reform Taxi and Limousine Commission (TLC) Regulations**
   The City Council of New York and the TLC should review the existing FHV class categories to ensure they accurately reflect technological advancements with the objective of a consistent policy framework.

6. **Begin Early Work on Zone Pricing Infrastructure Installation**
   The installation of the zone pricing infrastructure will require approximately 24 months for planning, design, and construction, including completion of an Environmental Impact Statement (EIS).

TERMS USED THROUGHOUT THIS DOCUMENT:

Central Business District (CBD) – the commercial and business center of a city. In the context of this report, CBD refers to an area of Manhattan bounded by 60th Street on the north and Battery Park on the south, the Hudson River on the west and the East River on the east.

Dynamic Pricing – A pricing system where rates are continually adjusted according to traffic conditions to maintain a free-flowing level of traffic. Rates are determined in real-time throughout the day.

For Hire Vehicles (FHVs) – There are three classes of FHV service in NYC: Community Cars (Liveries), Black Cars (including application-based transportation services), and Luxury Limousines.

Peak Pricing – A variable pricing system that charges higher rates during times of peak traffic or peak congestion.

Transportation Service Companies – Includes yellow and green taxis, and all classes of For Hire Vehicles.

Variable Pricing – A pricing system that establishes different rates for various times of the day or week that are based on a predetermined set of conditions, such as traffic speed, congestion levels, traffic demand, or other measurable parameters. Variable rates do not change in real-time.

Zone Pricing – An area that is encircled by a boundary or cordon with trips that cross into the area being charged a fee during certain times of the day and/or week. In the context of this report, the term zone represents the area within Manhattan encompassed by the precise boundary line of the Central Business District (CBD).

In **Phase Two,** the Panel recommends implementation of a surcharge policy for taxis and FHVs operating within the CBD with revenues dedicated to the MTA for transit improvements.

7. **Implement a Congestion Surcharge on FHV and Taxi Trips in the CBD**
   Transportation service companies should be afforded a period of ten months to install the equipment necessary to fulfill the requirements of a surcharge policy on trips entering or originating in the CBD. Options for consideration include: the geographical boundaries of the surcharge zone, the amount of the surcharge, and the hours of the day and days of the week the surcharge will be in effect. The panel also urges consideration of a significantly reduced rate for pool trips, as well as methods for reducing the amount of time FHVs spend cruising the CBD without passengers. All revenues from the surcharge should be dedicated to the MTA for the Subway Action Plan and transit improvements identified under Recommendation 1.

In **Phase Three,** the panel recommends implementation of a pricing zone, with the boundary defined as the CBD, to reduce traffic congestion and provide another dedicated stream of revenue to the MTA for system improvements. The Panel suggests that FDR Drive be exempt from the pricing zone from the Brooklyn Bridge to 60th Street. In addition, the Panel recommends that drivers using tolled facilities to enter the pricing zone (the Lincoln, Holland, Hugh L. Carey, and Queens Midtown Tunnels) receive a credit against the zone charge for the amount of the toll already paid.

8. **Implement Zone Pricing for Trucks Entering the CBD**
   Once the infrastructure is in place, the panel recommends initiating the zone charging program inside the CBD with an assessment on trucks that enter the zone during certain peak hours. A brief period of truck-only charging will permit potential operational issues to be identified and corrected.

9. **Implement Zone Pricing for All Vehicles Entering the CBD**
   Once the pricing zone infrastructure is operating properly and smoothly, the Panel recommends implementation of zone pricing for all vehicles. The panel urges consideration of variable and dynamic pricing options in order to maximize congestion reduction.

Performance Measures

Fair and frequent review of the program and opportunities to make modifications when necessary are critical to earning and maintaining public support for the congestion reduction program. The panel recommends evaluation of these metrics twice a year, published in a report available to all, which assesses the efficacy of the surcharge and zone pricing programs.

Conclusion

To remain a world-class city and region, New York must address the increasing congestion on our roadways and bring the subway system back to a reliable state. We encourage leaders at all levels of government to work collaboratively to sustain the region's economic competitiveness, enhance the quality of life for all New Yorkers, and help our city retain its place as the greatest city in the world.

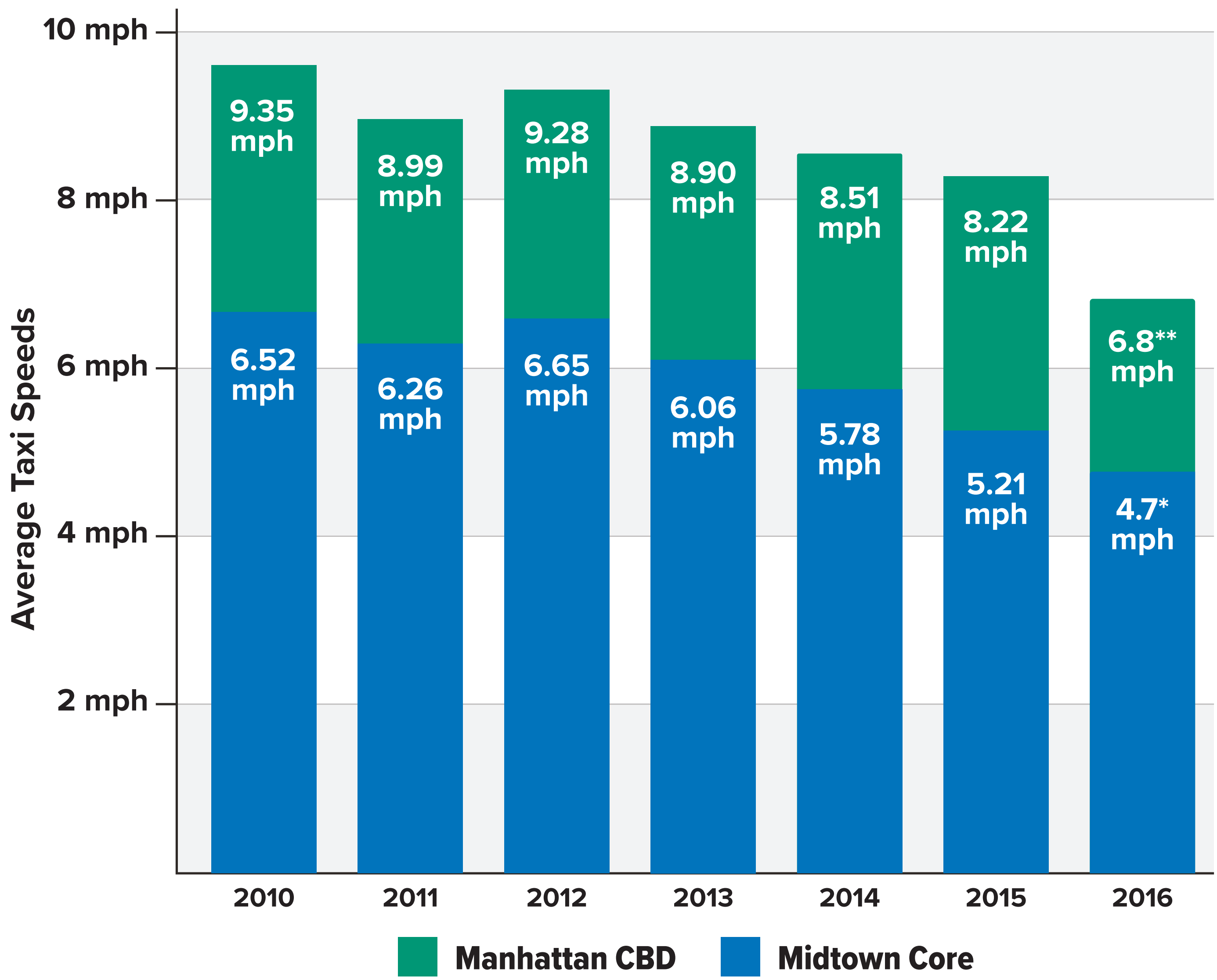
Traffic Congestion

A 2016 study shows NYC's traffic congestion ranks second worst among cities in America and third worst among cities in the world, surpassed only by the congestion levels measured in Los Angeles and Moscow.[1] Our clogged roadway network is crippling our economy. A recent study estimates traffic congestion will cost the New York metro area economy $100 billion over the next five years.[2]

Travel speeds in the CBD dropped more than 17% in 2016 to an average of 6.8 mph.[3] In Midtown, the most congested area of the city, the situation is even worse. Vehicular speeds in the Midtown Core, defined as the area from 59th Street to 35th Street, from Ninth Avenue to the East River, average 4.7 mph[4] – slightly faster than walking speed (see Figure 1).

Over the years, NYC has implemented a series of initiatives aimed at increasing livability by installing dozens of pedestrian plazas, conventional and protected bike lanes, and dedicated bus lanes. In

FIGURE 1. Average Taxi Speeds in Manhattan CBD and the Midtown Core 2010-2016



* "Mayor de Blasio Announces Initiatives to Help Ease Congestion," October 22, 2017. Transcript at http://www1.nyc.gov/office-of-the-mayor/news/681-17/transcript-mayor-de-blasio-initiatives-help-ease-congestion

** Empty Seats, Full Streets, Fixing Manhattan's Traffic Problem," Schaller Consulting, December 2017

Source: NYC Department of Transportation. "New York City Mobility Report," October 2016.

fact, 23 pedestrian plazas,[5] 17 bus lanes,[6] and 109 miles of bike lanes[7] are located within or include portions within the CBD.

Pedestrians, too, are flooding the sidewalks, spilling over into the streets and bike lanes, particularly in Midtown. Between 2009 and 2015, the number of pedestrians increased 18 percent on weekdays and 31 percent on the weekends.[8] This influx of pedestrians into the streets slows traffic, increases congestion, and obstructs vehicles attempting to turn corners at crowded crosswalks. The queuing of vehicles at pedestrian-packed intersections further impedes the flow of traffic and creates serious safety concerns.

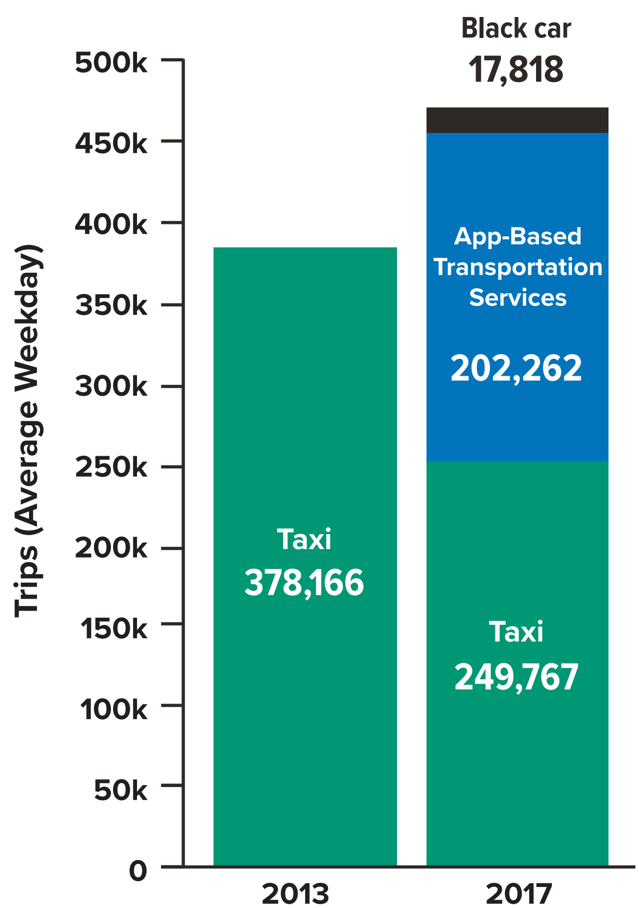
Despite dedicated bus lanes on numerous CBD streets, and upgrades to the bus fleet, bus speeds continue their steady decline. Bus movements are often impacted when unauthorized vehicles enter or park in the bus lanes or when vehicles "block the box" at intersections. The MTA bus system lost 100 million passenger trips over the last eight years, according to an October 2016 report by the Office of the NYC Comptroller.[9] Manhattan has seen the greatest decline in bus ridership, down 16 percent since 2011.[10]

Truck volumes into NYC are increasing, fueled by the rise of e-commerce. The New York Metropolitan Transportation Council (NYMTC) is forecasting a 46 percent rise in freight tonnage through 2040, which will increase congestion in the CBD caused by additional truck deliveries and through trips.[11]

The rapid growth in internet "app" or "on-demand" based transportation services has contributed significantly to recent congestion spikes. NYC TLC data indicates the number of trips and the number of total vehicle hours for app-based FHVs have both dramatically increased since 2013 (see Figure 2), while the number of yellow taxi trips and vehicle hours in the CBD are in steep decline.[12] The impact of app-based FHVs roaming within the CBD is undeniable, according to a report issued in December 2017 by former NYC Department of Transportation Deputy Traffic Commissioner Bruce Schaller:

> *"These large increases in the number of vehicles (both occupied and unoccupied) in the CBD clearly have a very significant impact on CBD traffic flow. The growth in taxi/TNC [FHV] vehicles is even more remarkable given that traffic counts at avenues crossing 60th Street and the East River crossings show steady declines in the number of vehicles entering the CBD. As a result of these two trends — more taxis/TNC [FHV] vehicles but an overall drop in vehicles entering the CBD — taxis/TNC [FHV] vehicles have become a very large part of overall traffic."*[13]

FIGURE 2. Taxi and FHV Service Trips in the Manhattan CBD, 2013-17



Source: Schaller Consulting, "Empty Seats, Full Streets. Fixing Manhattan's Traffic Problem." December 2017

Subway Challenges

> **"The subway system is no doubt in distress and we're here for solutions."**
>
> **– MTA Chairman Joseph Lhota, June 2017**

Not unlike their fellow New Yorkers driving on the surface streets, NYC's straphangers have been coping with breakdowns and delays on a subway system that is finding its way through a prolonged period of distress and disarray.

The legal structure and operating procedures of the MTA and NYCTA are important to understand. While over the decades there have been many different elected officials and appointed executives with varying opinions and strategies, what governs are the legal responsibilities, especially for management, operating and capital costs. In 1953, legislation creating the New York City Transit Authority was enacted for the purpose of transferring operational management of the subways to the new Transit Authority from their owner/operator, the City of New York.[14] The legislation confirmed the City's continuing legal ownership and leased the operation to the NYCTA for management purposes. As owner, NYC retained the obligation to fund all capital projects, as well as other rights. Later that year this enacted law was modified in order to vest with the board of estimate (now the Mayor under current law) approval authority over any capital expenditures made by NYCTA exceeding five million dollars. This $5 million figure had no inflation adjustment and subsequent legislation never changed the figure.[15]

Once the Transit Authority was up and running, the City's leadership shifted its focus to the expansion of highway infrastructure. With little attention over the next two decades, the Transit Authority struggled. Construction and maintenance were deferred, trains broke down and entire lines were shut down. There were additional efforts to establish alternative sources of capital for the subways, such as bonding authority for the Transit Authority and the new Metropolitan Transportation Authority in the

FIGURE 3. Subway Action Plan — Operating and Capital Costs

	2017	2018	2019	2020*
Operating Costs	$100M	$408M	$342M	$301M
Capital Costs	$22M	$306M	$20M	$0
Total	**$122M**	**$714M**	**$362M**	**$301M**

* Recurring operating expenses

Source: MTA

1960s. Nothing modified the City's contractual and statutory obligation to fund capital improvements.

By the late 1970s, the subway system was plagued by crime and graffiti and in a state of total disrepair. In the midst of its own historic economic crisis, the City was unable to meet the many needs and challenges facing the system. The state government stepped up in 1981 with desperately needed financial assistance and institutional reform.[16] These changes included the formation of a Capital Program Review Board (CPRB) to examine and approve five-year plans submitted by the MTA for agencies and facilities. CPRB's members represent the Governor, the Speaker, and the Senate Temporary President. In addition, a representative of the Mayor of New York was appointed to the board but only for review of the Transit Authority's portion of the plan. The Governor's, the Speaker's and the Senate Temporary President's members on the CPRB may veto any MTA plan or any plan of its subsidiary entities. The Mayor's member may only veto or approve the NYCTA plan. The Mayoral appointee's veto power was meant to unify the concept of mayoral approval for capital obligations over $5 million established in the 1950's with the new CPRB structure. The State has no statutory responsibility to fund the capital or operating plans separate from MTA finances.

Throughout the 1980s and into the 1990s the City continued to have financial hardships and interim ad hoc negotiations between the city and the state instituted different financial arrangements with the State providing funding beyond its legal obligation to stabilize the NYCTA operation. Through the administration of Mayor David Dinkins a number of agreements were reached to provide temporary assistance. In 1995, Mayor Giuliani became more assertive of the City's ownership and capital plan veto authority of the NYCTA, as evidenced by him shifting control of policing from the NYCTA Police Department to the New York City Police Department.

During the spring of 2017, New Yorkers suffered through months of seemingly daily failures of the tracks, signals, switches or power systems, including three derailments. In June, Governor Cuomo took the unprecedented yet necessary step of declaring the MTA – specifically the NYCTA – to be in a state of emergency and directed its new leadership to produce a recovery plan within 30 days. Upon his return to the role of Chairman, Joseph Lhota submitted his SAP in July 2017 (see Figure 3), and asked the State and the City of New York to each contribute half of the required funding. While Chairman Lhota's request was not legally justifiable, it reflected the historic response in the 1980s emergency situation in which the state stepped in to provide support. By law, if the NYCTA has an operating deficiency the MTA's recourse is either to reduce operating costs or raise fare revenue. If the NYCTA has a capital needs request, the MTA can submit a capital needs plan to the CPRB, which can approve or disapprove, and the Mayor's member has a unilateral veto/approval. The Mayor's member can negotiate with the MTA to reduce or increase the total amount of the capital plan, or negotiate the projects within the plan.

Chairman Lhota's "emergency" plan had both capital and operating needs and requested a 50/50 State/City split which avoided a fare increase. Governor Cuomo, who had declared the emergency, agreed to fund 50% of the plan (capital and operating) and has provided such funding in his 2019 budget plan. The City has thus far refused to agree to fund its 50%. If the City refuses to fund 50% of the capital and operating cost, Chairman Lhota's legal options are to reduce the scope and cost of improvements, extend the construction timeline to future years, or to increase fares to cover the City's 50% of the operating cost.

MTA Subway Action Plan Status

Phase One of the SAP was devised to stabilize and improve the system by addressing key drivers of 79 percent of the major incidents causing failures and delays (see Figure 4).

Several months in, there are signs the Plan is working. Weekday major incidents are down 21 percent in October 2017 from June 2017 and down 10 percent from October 2016. Weekday major signal incidents decreased 36 percent in October 2017 from June 2017 and 45 percent from October 2016. Using the same comparison periods, weekday major track incidents improved by more than four percent, and weekday major power incidents improved by 50 percent.[17]

FIGURE 4. Primary Causes of Subway Delays

Source: MTA

The repairs included in the SAP will fortify the aging system and bring subway service back to a level of reliability New Yorkers deserve and expect. The Panel is encouraged that the plan is already showing progress, but is concerned about the ongoing debate over its funding.

The region's commuters are tired of uncertainty and delays. We are glad the State has committed to contributing half of the $836 million Plan; we must work together to fund the remainder. Our elected leaders and officials must recognize that we are all in this together, and as such, we are all responsible.

International Experiences

> **"The Stockholm charges went from the most expensive way ever devised to commit political suicide to something that the initially hostile media declared to be a success story."**
>
> **– Jonas Eliasson, Director, Stockholm City Transportation Administration**

While heavy traffic is a sign of a bustling, expanding economy, there is a point at which too much congestion represents a threat to economic growth. The Manhattan CBD is only one example of many such areas around the globe where that threat is now real. While city streets are typically public goods, free for all to use, there is a point at which the next user reduces the utility value for everyone else, a situation often referred to as the "tragedy of the commons." With each additional user, the level of service that the roadway provides becomes further and further eroded, as manifest in increasing levels of congestion, reduced vehicle speeds and increased pollution.

Under conditions of severe congestion, commuting workers bear excess fuel and vehicle operating costs, which in turn increase employer costs by virtue of their having to pay higher wages. Higher delivery costs similarly add to business operating costs. Workers spending more on gasoline and auto maintenance will have less disposable income to spend on other goods and services. Similarly, the added commuting times reduce both time spent working and time spent engaging in leisure activities, resulting in a reduction in productivity and reduced sales for businesses in the leisure and hospitality sector.

The precipitous decline in vehicle speeds within the Manhattan CBD to near walking speed is a signal that those who choose to drive into the most congested part of the City are not bearing the full cost of that choice. In the economics literature, this situation represents a classic case of a negative externality and indicates the presence of a severe market failure. A fee set at the appropriate level addresses that failure by compelling drivers to internalize the full social cost of their travel choices, which is why several international cities have opted for zone pricing.

As the examples below demonstrate, zone pricing improves the flow of traffic by imposing a charge on drivers that can vary with the level of congestion or time of day. Drivers pay a higher price to drive into the zone when traffic is heavy and a lower price when traffic is light. Drivers can choose to avoid the charge entirely by choosing to share rides, use mass transit, travel at off-peak times, or travel on alternative, less congested routes. Although zone pricing has yet to be employed in the U.S. as an approach to reducing excessive traffic congestion, it has been successfully implemented in several large international cities.

Singapore

Singapore first implemented a congestion pricing plan, known as the Area Licensing System, in 1975; the system was redesigned in 1998 and renamed the Electronic Roadway Pricing (ERP) system.[18] The ERP system operates from 7am to 7pm and charges vehicles $2 per crossing. Upon implementation of the ERP system, Singapore saw a 24 percent reduction in weekday traffic entering the Central Business Zone and increases in average travel speeds. In 2020, Singapore will move to a satellite based system for congestion charging.

London

London implemented their congestion charging system in 2003 after first studying the problem as far back as 1964.[19] Starting with a cordon that covered an eight-square-mile portion of their heavily congested CBD, London started charging drivers £5 ($7.50) per day for entering the charging zone area between 7am and 6pm (the fee has since increased to $15). The cordon area was expanded by another eight square miles in 2005. London uses a camera-based collection system for recording vehicle license plates, which has proven more expensive to operate and maintain than a transponder-based system. The initial cost of setting up the system was $260 million in 2003.

To prepare for the introduction of the congestion charge and ensure its success, London made significant transit investments upfront, by adding new bus routes to their network prior to implementation. More than five hundred extra buses were put in service during peak hours to receive passengers choosing mass transit over cars, thus relieving capacity pressures that would have been absorbed by the London Underground.

Once zone charging went live, London saw an immediate congestion reduction of 25 percent with average speeds increasing by 30 percent. Carbon dioxide emissions dropped by 20 percent. Implementation was so successful that the system fell far short of its initial revenue target of $195 million due to the reduction in the number of autos entering the zone;[20] first year collections totaled only $98 million. Taxis and FHVs are exempt from London's congestion fee. Nevertheless, the London strategy succeeded in making the city more "multimodal" by encouraging and expanding the supply of bus service and allowing car lanes to be converted to bus and bike lanes without increasing traffic congestion, implying environmental as well as purely economic benefits.[21]

Stockholm

After careful study of the approach taken in London, Stockholm implemented Sweden's first congestion charging system for its CBD, an area accessible only by a series of bridges.

In the face of strong initial public opposition to the program, the City opted to implement its system as a seven-month pilot program in 2006. They invested $136 million in new bus purchases, and introduced new bus routes running parallel to their most crowded subway lines. The charges ranged from $1.33, $2.00, and $2.67 for vehicles entering the CBD from 6:30am to 6:30pm with a maximum of three charges per day. Taxis were exempt from the congestion charge. The system of overhead gantries and transponders required a capital investment of $410 million with annual operating costs of approximately $30 million.[22]

Stockholm's zone pricing program proved successful from day one. Congestion dropped by 25 percent and average speeds rose 25 percent. Use of public transportation increased between six and nine percent. Carbon dioxide emissions dropped by 10 percent to 14 percent in the inner city.[23]

In late 2007, a public referendum easily passed making the program permanent. Program revenues presently total approximately $100 million on an annual basis.

Unlike the London system, Stockholm implemented time-varying prices, which along with the city's smaller size has been cited as allowing Stockholm to sharply cut congestion while charging much less than London.[24]

Milan

A zone pricing system was implemented in Milan with a focus on both reducing congestion and vehicle emissions. In 2008, Milan launched a trial system called "Ecopass," which charged vehicles based on emissions class and banned the worst polluting vehicles. Like Stockholm and sister city Gothenburg, the charge zone is surrounded by 43 gantries supporting cameras, but like London, the charge does not vary over the course of the day. A three-year trial period was followed by a successful referendum in 2011. The Milan system underwent a redesign in 2012, reopening under the name "Area C," and has been successful in improving the city's air quality.[25]

Road Pricing Concepts Considered

The Panel reviewed several types of road pricing systems that have been used successfully in the United States and internationally. Most road pricing concepts are used on highway corridors, bridges, and tunnels. The experience in the United States has mainly been focused on priced managed lanes (sometimes called High-Occupancy Toll (HOT) lanes) to help manage traffic demand and maximize capacity. A second focus of road pricing in the United States is conventional toll facilities for roads, bridges, and tunnels to fund their construction. Internationally, various cities have introduced cordon or zone-based charging to help control congestion in the Central Business Districts. In addition, numerous countries have introduced truck tolling programs to help offset the costs of highway deterioration and environmental degradation caused by trucks. The Panel also reviewed the use of adjusting parking surcharges and vehicle registration fees for their potential impact on congestion and revenue.

Conventional toll facilities to help pay for the construction of infrastructure were not considered appropriate for the Fix NYC Program since specific infrastructure is not being constructed (such as a new road, bridge, or tunnel). Given the nature of Manhattan's street system, where it is difficult to channelize traffic given the required access to residences, businesses and attractions, price managed lanes would be extraordinarily difficult to implement and enforce. Finally, increasing registration fees would unfairly penalize residents of the CBD who own cars and are not the only contributors to roadway congestion.

Given the indisputable success of congestion charging using a cordon or zone-based system, the Panel finds this option best suited for controlling congestion within the CBD especially with Manhattan's street network layout and access options from points east and west. However, the panel recognizes that we now live in the new era of urbanized transportation where more and more of the congestion on city streets is the result of increased use of app-based transportation companies. These vehicles are now the most significant source of congestion and the panel suggests unprecedented approaches for tackling the challenge head on.

A Phased Approach is Essential

> **"Enhanced public transportation services are an essential component of a zone-based pricing system and must be comprehensively planned and deployed well in advance of zone-based charging."**
>
> **– Federal Highway Administration, February 2017**

The Panel recommends a comprehensive, phased congestion reduction plan that steps up enforcement of existing traffic laws and initiates transit improvements for the outer boroughs and suburbs. As confidence is restored in the subway system, it becomes appropriate to implement a surcharge on taxi and FHV trips in the CBD, followed by the installation of a zone pricing program, first for trucks, and then for all vehicles entering Manhattan's CBD below 60th Street.

While expectations are high for the introduction of a traffic reduction plan that will provide immediate relief from congestion, the Panel has concluded that there are lessons to learn from experiences abroad. London and Stockholm invested in public transportation improvements in advance of implementing a zone pricing system, including substantial capacity expansion to accommodate diverted commuters. We must commit to doing the same in NYC, recognizing that such projects cannot happen overnight.

Similarly, the installation of infrastructure such as gantries, E-ZPass equipment, and cameras in support of a zone pricing program require extensive planning and environmental review, as well as input from local communities.

Most importantly, the installation of zone pricing infrastructure and the implementation of public transportation improvements require capital investments for which no funding is currently identified.

For these reasons, the Panel suggests that a phased approach is essential for a congestion reduction and revenue generation program in NYC. A methodical approach, coupled with an ongoing awareness of how the myriad other transportation projects underway around NYC impact residents and their mobility, will ensure the congestion reduction program's success in the long run.

Phase One Recommendation: Create a Plan Foundation

The first phase includes identifying capital investments needed to improve public transportation in the outer boroughs and suburban counties, and increasing enforcement of existing traffic laws. Phase 1 should begin in 2018.

1. Identify Public Transportation Improvements for the Outer Boroughs and Suburbs

Having learned from the experiences of cities that have already successfully implemented cordon pricing, the Panel recommends investments in public transportation to connect the outer boroughs and suburbs to the CBD and to each other to accommodate commuters willing to change their mode of travel.

Decisions on appropriate investments must include input from elected officials, business groups, transit experts, community representatives, the MTA, PANYNJ, the NYS Department of Transportation and the NYC Department of Transportation.

The City and State should consider investments that will support the diverted trips resulting from the installation of the zone pricing system. It should consider, for example, investments in transportation options and technologies serving residents of Staten Island, Brooklyn, Queens, and the Bronx, as well as the suburban counties within the MTA district. Non-capital-intensive solutions, including alternative fare structures, should also receive consideration.

The MTA's infrastructure must be maintained in a state of good repair, while necessary upgrades are made to improve service especially in the outer boroughs and our transit deserts. In order to meet these goals, the MTA is constantly making historic and significant investments into its facilities, but it faces two challenges in maximizing returns on such investments.

First, these investments yield significant private economic benefit to surrounding properties and businesses, but these are not returned to the MTA. It is only fair that the customers of the MTA recoup these significant benefits, paid for by their fares and tolls. Therefore, the Panel recommends that the Legislature support the Governor's budget proposal to authorize Tax Increment Financing for the MTA. Doing so would allow the MTA to recoup significant returns on its capital investments, which could then be leveraged into future projects.

Second, the MTA's current procurement processes required by law are cumbersome, inefficient, and obsolete. The Governor has recommended changes to these processes that will allow the MTA to make necessary investments identified as part of this recommendation at a faster pace. The Panel strongly supports the Governor's recommended procurement process modifications. Time is of the essence, and the Panel suggests wasting no time in delivering these necessary investments for NYC residents.

2. Improve Enforcement of Traffic Laws Within the CBD

Throughout the day, vehicles clog intersections by "blocking the box," illegally weaving in and out of designated bus lanes to make pickups and drop offs, and parking illegally in travel lanes and at the curb. All of these actions restrict the free flow of traffic and prevent responsible use of curbside space for deliveries. To point fingers at the drivers of cars, trucks and buses alone while assessing blame for the outrageous level of congestion in the CBD ignores human nature: no one will change their behavior when no one is holding them accountable. NYC is responsible for issuing violations for these offenses, which are broken into two classes – moving violations and parking violations.

FIGURE 5: SELECT NYPD MOVING VIOLATIONS (CITYWIDE 2016)		
Rank	Offense Description	Violations
1	Disobey Traffic Control Device	194,388
2	Speeding	137,260
3	Improper Turn	82,360
7	Tinted Windows	75,128
15	Defective/Improper Brake Lights	11,167
26	Passing Stopped School Bus	3,420
28	Spillback (Blocking the Box)	2,544
29	Driving in Bus Lane	1,948

Source: New York City Police Department; Traffic Data Archive - Moving Violations Report, Citywide December 2016.

The disparity seen in NYPD's enforcement efforts, which are overwhelmingly focused on parking violations, is stunning. According to the Office of the NYC Comptroller, NYPD issues about 10 times more parking tickets than moving violations. In 2016, NYPD issued only 1,042,703 tickets for moving violations, compared to 13,193,113 parking violation tickets issued in the same period.[26]

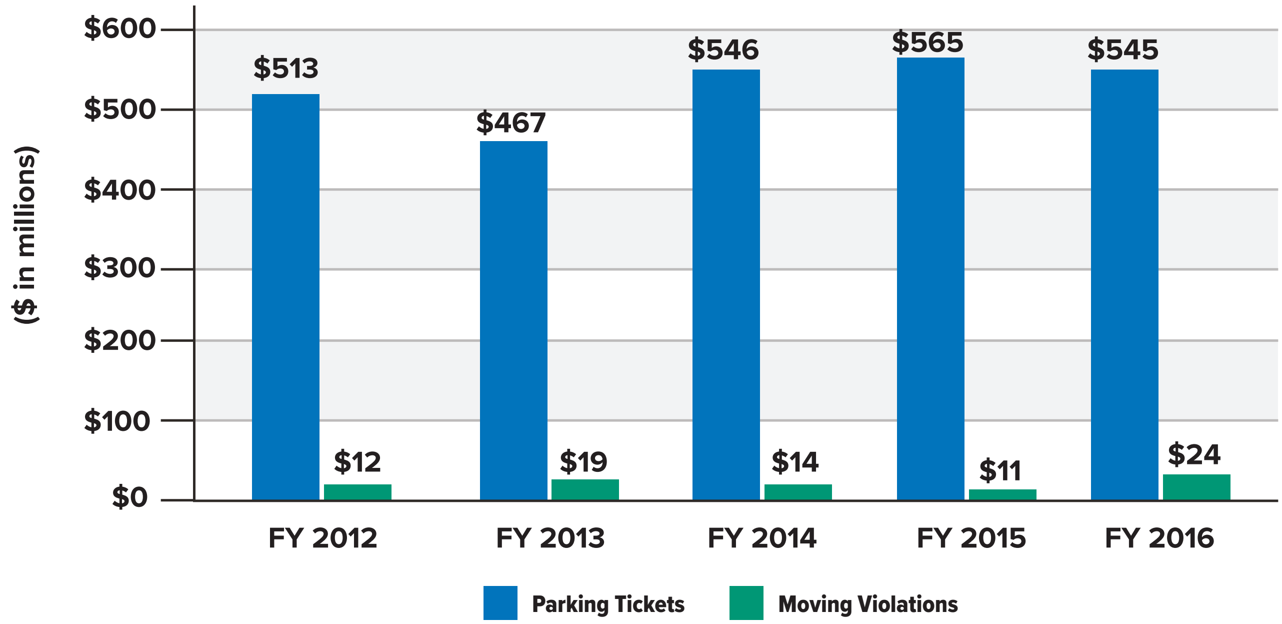
NYC revenues from moving violations averaged just 3 percent of the revenues collected for parking tickets over the last five years. While several offenses can draw a moving or parking violation, the fines and penalties associated with parking violations tend to be less onerous than those associated with moving violations. Issuance of a parking violation, therefore, represents less disincentive to change behaviors.

Of the more than one million summonses issued by NYPD for moving violations in 2016, less than one quarter of one percent (2,544) were handed out for a violation called spillback, more commonly known as "blocking the box," an offense understood to contribute considerably to traffic congestion. Even fewer moving violations, 1,948 or 0.19 percent, were issued to drivers illegally using bus lanes (see Figure 5).

The Panel believes that increased enforcement of existing traffic laws can have significant positive impacts on congestion relief in the CBD in the short term. Proper adherence to and enforcement of all traffic safety laws and regulations increases road safety for both drivers and pedestrians while eliminating factors leading to gridlock. Though the Panel is encouraged that expanding block-the-box enforcement has been identified by the Mayor as a key component of his October 2017 congestion reduction announcement, more must be done to improve enforcement in the CBD.

The Panel recommends a thorough review of all available technologies for monitoring and enforcing moving violations. Specifically, the Panel recommends that the State give the City broad authorization for camera enforcement to capture spillback/block the box infractions that most impact congestion within the CBD. The State should also consider reducing its share of revenues from moving violations in an effort to encourage NYC enforcement agencies to modify their priorities on issuing tickets (see Figure 6).

FIGURE 6. New York City Parking Ticket & Moving Violation Revenues (FY 2012-2016)



Source: New York City Comptroller Scott Stringer; New York City Fine Revenues Update; May 3, 2017.

3. Overhaul the NYC Placard Program

The Panel strongly recommends that NYS and NYC create a joint review board to assess the impacts of parking placard use within the CBD and establish criteria for the retention of existing placards and the distribution of new ones. NYC has issued approximately 160,500 placards, with roughly 114,600 of those held by NYC employees.[27] All too often, these placards are used illegally. Cars with placards are often seen parked illegally at bus stops, in loading zones, and at unpaid meters, none of which are allowable uses. Placard abuse significantly contributes to congestion, by taking up curbside parking without paying the meter, which, in turn, forces buses to stop in travel lanes to serve riders and trucks to double park instead of accessing the curb to make deliveries.

4. Assess and Address the Impacts of Bus Congestion in the CBD

The significant rise in the number of buses in the CBD and the evolution of their function have negative impacts on street congestion, road safety, and air quality. The increase in volume has occurred at the same time as parking lots and spaces available for commuter, charter and tour buses on the West Side are disappearing. The Hudson Yards development is rapidly shrinking the capacity to handle bus volumes due to loss of road space, parking lots and suitable curb space.[28] With no place to park, buses are routinely circling around West Side neighborhoods, parking illegally, or heading out to New Jersey to park. The trip to NJ creates two additional trans-Hudson trips, exacerbating congestion in the already crowded Holland and Lincoln Tunnels.

As New York continues to see record high tourism numbers, more intercity and private charter buses are clogging traffic lanes than ever before, particularly on the West Side of Midtown and Lower Manhattan. The number of tour buses licensed to operate in NYC has risen from 54 in 2003[29] to 237 in 2016.[30] Making matters worse, tour buses fall into a murky regulatory area where they evade many regulations, leading to numerous safety violations and accidents in recent years.

The panel recommends that NYSDOT initiate a comprehensive review, along with PANYNJ and NYCDOT, of parking and operating regulations and licensing of motor coaches operating in Midtown and in downtown.

5. Reform TLC Regulations

Massive shifts have taken place within NYC's transportation service industry and action must be taken to reexamine State and local laws and regulations that guide it. As an example, the lines between livery, black car, and app-based transportation companies have now blurred beyond recognition; regulations must be updated to accurately guide the industry.

> *Incentives currently exist to increase the supply of transportation service vehicles during peak hours. Now that the supply exceeds demand, these incentives should be examined.*

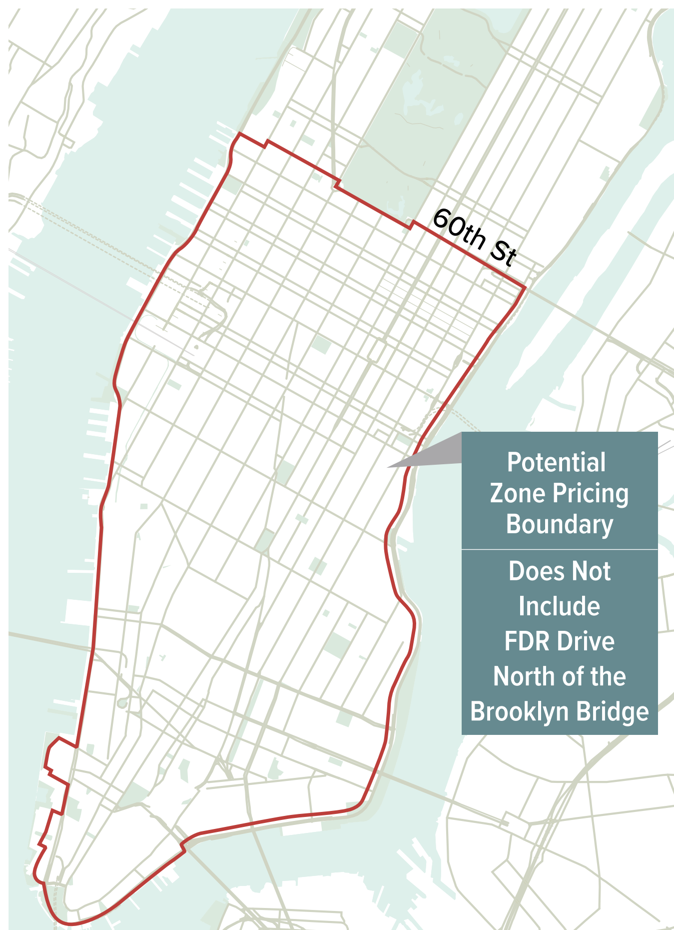
6. Begin Early Work on Zone Pricing Infrastructure Installation

Work must begin now on the development of policies, environmental and legal reviews, and design for the zone pricing program. The Panel has received estimates of approximately 24 months for the planning, environmental work, design, and construction of the infrastructure and establishing the software systems and business processes required for a pricing program. Much of this work can proceed in advance of final decisions on pricing rates, times of the day, exemptions, special conditions, and other aspects of the zone pricing program. The Panel recommends that the early work commence as soon as possible, undertaken by the MTA.

The Panel recommends that the zone encompass the CBD in Manhattan extending from 60th Street to the south, with the exception of FDR Drive from the Brooklyn Bridge to 60th Street (see Figure 7). Vehicles will be charged electronically to enter this zone by a system of cameras or transponders and readers, which we already know as E-ZPass. The fee can vary by time of day, route, and vehicle type. This is consistent with all previous congestion reduction proposals for NYC.

The panel recommends that the existing Payroll Mobility Tax (PMT) be dedicated to the MTA to cover the bonding and debt service costs of the infrastructure necessary to operate the zone pricing program. Right now, the PMT must be appropriated annually by the State legislature. This step is unnecessary; every dollar of the PMT belongs to the MTA. Eliminating this appropriation ensures that if PMT revenue is pledged to bondholders, it will flow in a timely manner, making bonds secured by it stronger. The Panel commends the Governor for including this proposal in his budget submission.

FIGURE 7. Potential Zone Pricing Boundary



Phase Two Recommendation: Implement Surcharges on Taxi and FHV Trips in the CBD

Once the SAP is well underway and a sense of reliability and dependability has returned to the subway system, more attention and resources can be focused on the congestion crisis above ground. We now know that app-based FHVs are a significant contributor to the dramatic increase in road congestion. The goal of Phase Two is to raise additional revenues to provide funding to meet ongoing subway and transit improvement needs and potentially reduce the number of vehicles in the CBD. Phase 2 should begin in 2019.

7. Implement a Surcharge on FHV and Taxi Trips in the CBD

> *"No anti-congestion plan will be successful unless it deals head-on with the proliferation of on-demand ride services."*
>
> *– Bruce Schaller, NY Daily News, December 28, 2017*

The widely held belief that the unchecked proliferation of app-based FHVs in the CBD is a significant contributor to congestion has been confirmed. A recent report found that taxis and app-based FHVs now contribute to as much as half of the congestion in the CBD.[31] The Panel recommends that the State introduce a uniform surcharge policy for all transportation service trips (taxis, limousines, liveries, black cars, and app-based FHVs) that touch the CBD.

All vehicles must have the appropriate GPS technology installed within ten months for accurate tracking to ensure swift implementation, uniform enforcement and monitoring of conditions within the CBD. Potential methods of enforcement must also be considered.

Options for consideration for the initial FHV and taxi surcharging program should include a charging zone with a northern boundary at 60th Street or 96th Street (see Figure 8). As traffic congestion in Manhattan is hardly a weekday-only phenomenon, consideration should also be given to extending the effective hours into weekday evenings and weekends (see Figure 9). Revenue raised under these various surcharge options should flow to the MTA to be utilized for the SAP and for transit improvements in the outer boroughs or suburban counties, including bus systems. A significantly lower surcharge should apply to pooled trips and pool services.

Cruising Charges

The tremendous rise in FHV trip volumes has contributed to increasing congestion in yet another way – an increase in time spent idling in the CBD without passengers, waiting for the next fare. Schaller

FIGURE 8. Potential Taxi and FHV Charging Zones

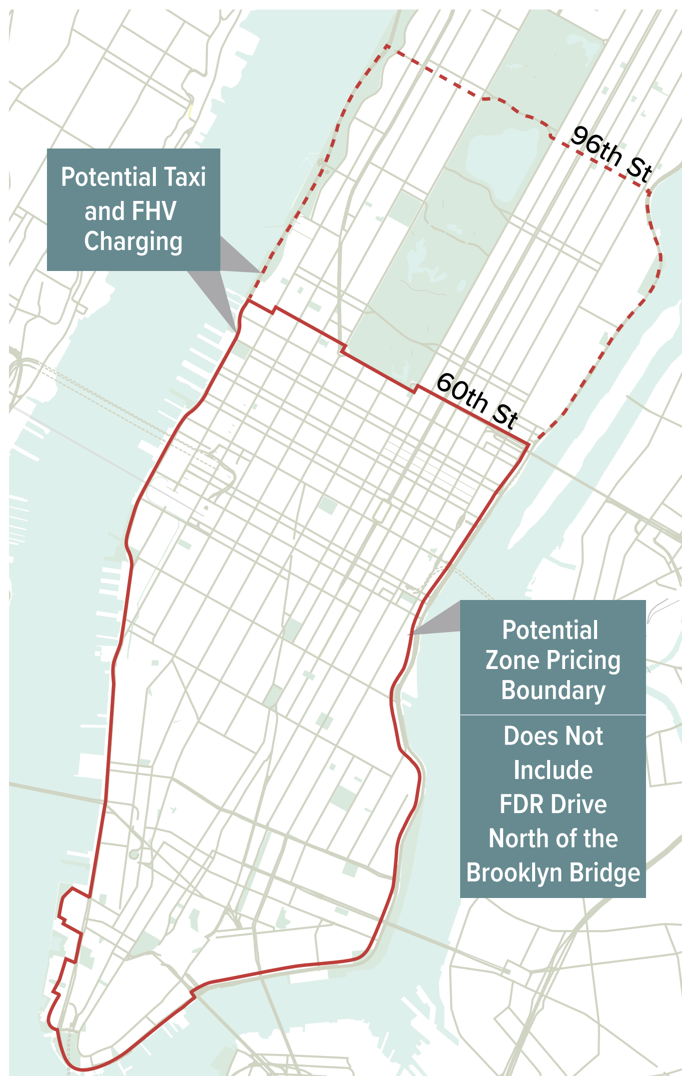


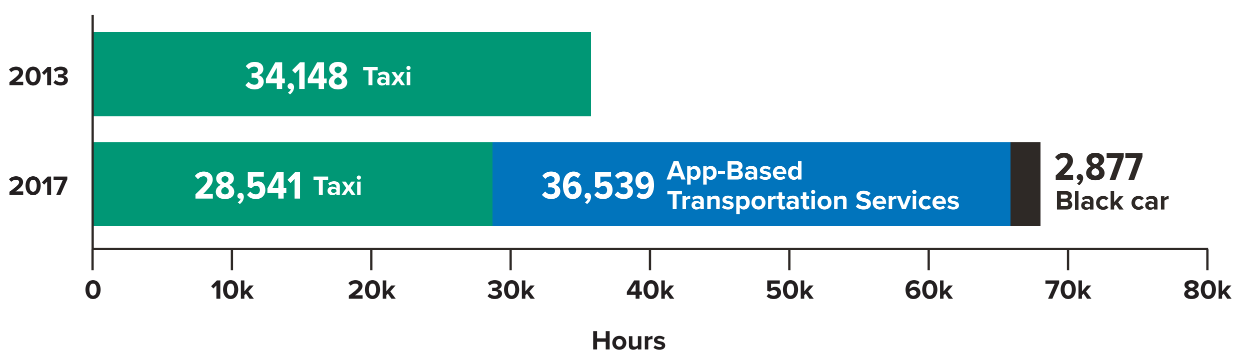
FIGURE 9. ESTIMATED FHV & TAXI TRIP SURCHARGE GROSS REVENUE (IN $MILLIONS)

SURCHARGE OPTIONS	Below 60th Street			Below 96th Street		
Within CBD/Touching CBD weekend rate	Mon–Fri 6am–8pm	Mon–Fri 6am–11pm	Mon–Fri 6am–11pm Sat and Sun 12pm–10pm	Mon–Fri 6am–8pm	Mon–Fri 6am–11pm	Mon–Fri 6am–11pm Sat and Sun 12pm–10pm
$2.00 fee (all CBD-touching trips)	$155	$195	$245	$190	$235	$295
$4.00/$2.00 $2.00 weekends	$225	$285	$335	$305	$380	$440
$4.00/$2.00 weekdays and weekends	$225	$285	$360	$305	$380	$480
$5.00/$3.00 (6am - 8pm) $2.50/$1.50 (8pm - 11pm) $2.00 weekends	$290	$330	$380	$385	$435	$495
$5.00/$3.00 $2.00 weekends	$290	$370	$420	$385	$480	$540
$5.00/$3.00 weekdays and weekends	$290	$370	$465	$385	$480	$600
$5.00 fee (all trips) $2.00 weekends	$355	$450	$500	$430	$545	$605

estimates that unoccupied FHV hours rose from virtually zero in 2013 to 36,500 by 2017. He also estimates that FHV drivers spend an average of 11 minutes between dropping off one passenger and picking up the next. The result is a "proliferation of waiting drivers ... in the CBD, particularly in Midtown"[32] (see Figure 10).

To reduce the duration of idling within the CBD, the Panel recommends exploring both regulatory and fee-based solutions that permit app-based companies and their drivers to determine the most efficient strategy for achieving the desired goal. New strategies would likely emerge as dispatch technologies become even more sophisticated.

FIGURE 10. Taxi and App-Based Transportation Services unoccupied vehicle hours (between passengers) in Manhattan CBD, 2013-17



Schaller, Bruce. "Empty Seats, Full Streets. Fixing Manhattan's Traffic Problem," Schaller Consulting, December 2017

Phase Three Recommendations: Implement Zone Pricing for Vehicles Entering the CBD

The goal of Phase Three is to reduce the number of vehicles into the CBD during peak hours and raise additional revenues to provide the necessary funding for the MTA to meet ongoing subway and transit improvement needs. Phase 3 should begin in 2020.

8. Implement Zone Pricing for Trucks Entering the CBD

The Panel believes that trucks are a significant contributor to congestion in the CBD. Once the design and construction of the zone pricing infrastructure is complete the Panel recommends that zone pricing begin with a congestion fee only on trucks. While truck volumes into the CBD represent less than 8 percent of total vehicles, truck emissions account for 18 percent of total emissions from the transportation sector in NYC.[33] Based on the analysis performed by the technical team supporting the Panel, the suggested zone entry fee E-ZPass rate for trucks should be 2.2 times the automobile rate, consistent with the existing range of rates for the toll tunnels connecting lower Manhattan to the outer boroughs and New Jersey, where trucks are currently tolled at approximately 2.2 times automobile tolls. A one-way charge of $25.34 is equivalent to 2.2 times the MOVE NY suggested two-way charge of $5.76 (see Figure 11). This scenario would raise more than $100 million gross revenue, depending on the hours of operation.

In addition to consideration of the pricing schedule shown below, the Panel recommends consideration of the use of truck zone pricing to encourage shifts in delivery schedules and reductions in congestion during the peak periods.

The Panel looks forward to the study of traffic congestion resulting from truck deliveries in Manhattan below 59th Street undertaken by the NYC Department of Transportation due later this year. In the meantime, the Panel encourages the Governor and Mayor to undertake a comprehensive review of options to incentivize companies to receive deliveries during the overnight periods. Any review, however, must also focus on ensuring that residents within the CBD continue to receive essential and urgent deliveries without any delay related to road pricing.

FIGURE 11. ESTIMATED TRUCK ZONE ENTRY PRICE GROSS REVENUE (ASSUMES ONCE PER DAY) (IN $MILLIONS)

	Mon–Fri 6am–8pm	Mon–Fri 6am–8pm Sat and Sun 12pm–10pm	All days 24hrs/day
$25.34 fee	**$105**	**$120**	**$180**

*Chart above presumes MOVE NY's two-way automobile E-ZPass toll rate of $11.52

9. Implement Zone Pricing for All Vehicles Entering the CBD

After an appropriate period of truck-only zone pricing, during which the system is deemed to be functioning properly and smoothly, zone pricing should be extended to all vehicles. This should coincide with the re-opening of the L Train connecting Manhattan with Brooklyn.

By then, the infrastructure and back office operations of the zone pricing program will have been operational for several months, ensuring a smooth transition to an all-vehicles policy. The revenues collected from the zone pricing program shall flow to the MTA and will provide funding for both the on-going transit improvements supporting diversion and continued rehabilitation and restoration of the subway system for future generations.

Proposed Zone Pricing Program

To bring about a meaningful reduction in traffic congestion within the CBD, the Panel considered a one-way pricing zone E-ZPass charge of $11.52 for passenger vehicles, once per day, Monday through Friday, between the hours of 6am to 8pm. This charge is identical to the two-way charge of $5.76 suggested by MOVE NY, and aligned with average E-ZPass toll rates for automobiles at the MTA and PANYNJ tolled tunnels. In addition to raising revenues, the program is designed to incentivize drivers to shift to either commuting to work or making deliveries during off-peak hours where possible.

The Panel recommends that all buses, taxis and FHVs be exempt from the zone charge.

It is also recommended that the program exempt drivers using the FDR Drive from the Brooklyn Bridge to 60th Street. An example of this route would be a car entering Manhattan via the Brooklyn Bridge, immediately accessing the FDR Drive and driving north to a doctor's office on the Upper East Side.

This scenario is estimated to raise gross revenues of $705 million from autos and $105 million from commercial vehicles for a total of $810 million, not including FHVs. The plan is expected to reduce entries into the CBD between 6am and 8pm by an estimated 13 percent. The economic benefit associated with an increase in average vehicle speeds of 9 percent will help to mitigate the new cost to drivers engendered by this plan (see Figure 12).

Congestion in the CBD, of course, is not limited to weekdays alone. The Panel recommends exploration of expanding the period during which the drivers face a zone charge if congestion reduction targets are not being met. This could include the weekend hours between 11am and 9pm, consistent with Port Authority's weekend peak toll rates at the Holland and Lincoln Tunnels. Due to weekend mass transit service plans offering slightly less frequent services relative to weekday options, the Panel suggests a lower charge for weekend travelers. Expanding to weekends raises gross revenues collected from autos and trucks to $1.025 billion.

Another option for consideration is a variable pricing schedule. Under such a scenario, higher rates are charged during peak traffic periods and lower rates are charged outside of this peak period. Under this scenario, the zone fee is in effect 365 days a year, 24 hours a day. An analysis of traffic data indicates that the volume of cars entering the CBD is greatest between 6am and 9am on weekdays and 12pm to 10pm on weekends. This scenario raises gross revenues of $1.1 billion from autos and trucks, not including revenues from FHVs (see Figure 13).

Moreover, those who choose to highlight these proposals as regressive also choose to ignore the facts. Census data indicate that only four percent of outer borough working residents commute to jobs in Manhattan in a vehicle, or approximately 118,000 residents. Of those 118,000, more than half are higher income individuals, more than a quarter are moderate income individuals and less than 5,000 of them qualify as working poor. Compare those numbers to the 2.2 million New York City residents, including 190,000 of the working poor, who rely on mass transit to get to work day in and day out, and who would benefit from transit improvements paid for by the zone pricing plan.[34] Consideration should be given to a tax benefit for these lower income commuters most impacted by the pricing zone who have no choice but to commute in vehicles.

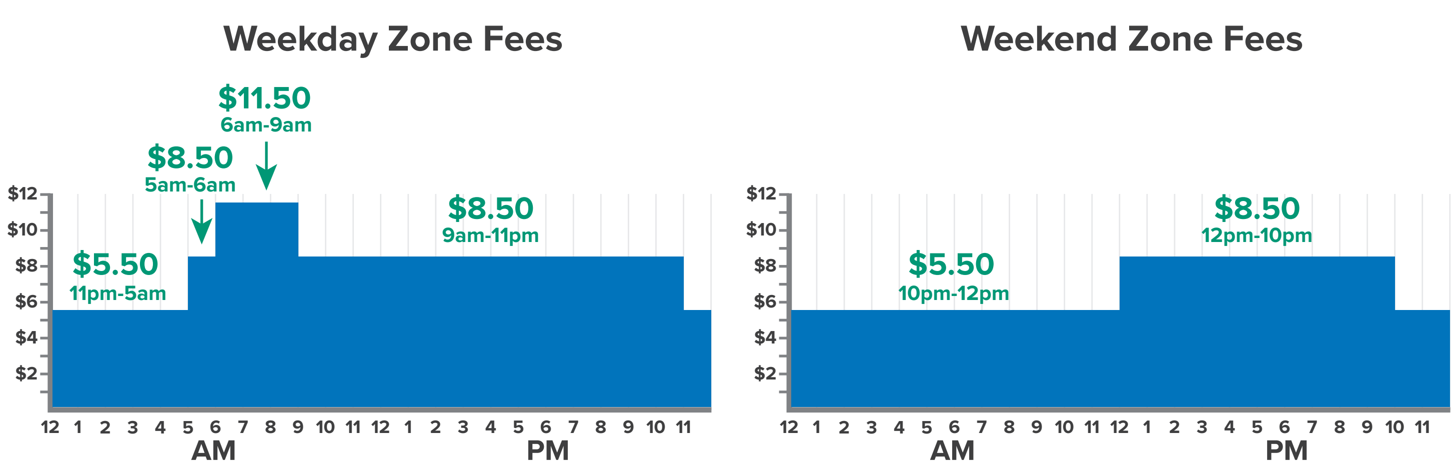
FIGURE 12. ESTIMATED ZONE FEE GROSS REVENUE (ASSUMES ONCE PER DAY) (IN $MILLIONS)

	Below 60th Street		
	Mon–Fri 6am–8pm	Mon–Fri 6am–8pm Sat and Sun 12pm–10pm	Variable Pricing – See Rate Tables Below Mon–Sun 24-hours per Day
Revenue: Autos ($11.52 fee)	$705	$905	$970
Revenue: Trucks ($25.34 fee)	$105	$120	$130
Total: Autos/Trucks	$810	$1,025	$1,100
Congestion Reduction (Reduction in CBD entries during specified charging periods)	13%	14%	8%
Average CBD Speed Increase	9%	9%	8%

Congestion reduction and average speed increase estimates are based on a flat $2 pickup charge on CBD originating taxi and FHV trips.

Chart above presumes MOVE NY's two-way automobile E-ZPass toll rate of $11.52 unless otherwise specified

FIGURE 13. Variable Zone Pricing Rate Tables



Performance Measures

A successful congestion reduction program will require attention well beyond enactment of a budget agreement. Fair and frequent review of the program, and the opportunity to make modifications when necessary, are critical to earning and maintaining public support. This evaluation must pay particular attention to determining whether the program is having disproportionate impact on any particular set of individuals.

To this end, the panel suggests consideration of performance measures utilized by the U.S. Department of Transportation, and endorsed by the U.S. Government Accountability Office, to monitor and evaluate similar projects.[35] These metrics provide an approach for ensuring that the established policies are successful in achieving their goals:

1) Availability of funds for transportation programs: The implemented program must raise sufficient funding to produce measurable and perceptible improvements in the NYC transit system.

2) Driver behavior, traffic volumes, and travel speeds: Similarly, a zone pricing program must produce measurable and perceptible declines in traffic volume and improvements in CBD travel speeds.

3) Transit ridership: If disincentives for driving into the CBD are appropriately presented with significant transit improvements, daily trips on public transportation should rise as a result.

4) Air quality: Reduced traffic congestion should improve the NYC air quality and have positive impacts on public health.

5) Equity for low-income individuals: Congestion reduction should have a positive impact on the City's economy and all of its residents. If the impact of zone pricing is shown to be overly burden-some on any subgroup, the program must be reformed and amelioration should be considered.

Fortunately, certain data on vehicle movements and vehicular speeds in the CBD are already collected on a routine basis and can be used to determine the impacts of the zone pricing charges. These include:

- Vehicle-miles traveled for each trip within the CBD, collected by TLC;
- Volume of vehicles entering the CBD annually, collected by NYMTC; and
- Transit ridership and average bus speeds for routes within the CBD, collected by the MTA.

The Panel recommends twice yearly evaluation of these metrics, as well as data from newly required GPS technologies implemented in Phase 2. These should be published in public reports that assess the efficacy of the zone pricing program. If the stated goals are not met, the MTA should recommend to the Governor a set of policy adjustments designed to improve the program.

Conclusions

Zone pricing very effectively reduced congestion in London, Stockholm and Singapore. It also increased average speeds, spurred increased mass transit use and improved air quality in each city. The level of congestion within Manhattan's CBD requires action, and it is time to move forward on the concept which has been studied and debated in NYC for over a decade. To remain a world-class city and region, New York must address the increasing congestion on our roadways and bring the subway system back to a reliable state. The Fix NYC Panel's proposed strategies in this report are the first step toward tackling congestion and providing a dedicated funding stream for the region's future transportation needs. The strategies presented in the report are proposed for implementation in a phased manner that will require political will and transparency about the goals of the program.

Implementing new fees and surcharges should always be viewed as a last resort, but the dire state of the NYC subway system demands action. Environmental author David Owen describes NYC as having the smallest carbon footprint of any city in the United States and one of the smallest in the world.[36] The NYC subway system is critical to making that possible. The Fix NYC Panel's recommendations help to put the MTA's plan to fix that system on an affordable path.

Though millions of New Yorkers will benefit from transit improvements paid for by the zone pricing plan, the State should consider ways to ease the burden on those outer borough commuters who must drive to work in Manhattan's CBD.

The recommendations contained herein are informed by international examples of success and lessons learned in cities that have adopted zone pricing as a means to reduce traffic in their business districts and generate revenues. The Panel encourages our City, State and regional leaders to carefully review these recommendations and work together in the coming months to improve NYC's transit system – sustaining the region's economic competitiveness, enhancing the quality of life for all New Yorkers, and retaining NYC's place as the greatest city in the world.

Appendix A

Previous NYC Congestion Pricing Proposals

Proposals for the implementation of congestion pricing in NYC have been in existence for more than a decade (see Figure 14). The first formal proposal was unveiled in 2006 by the Citizens Budget Commission.[37] That was followed in 2007 by former Mayor Michael Bloomberg's PlaNYC proposal.[38] During Governor David A. Paterson's administration in 2008, another proposal was advanced by then Lieutenant Governor Richard Ravitch.[39] While each concept had certain unique features, all three of these plans represented variations on the same theme: the implementation of cordon around the CBD, with charges for crossing into the CBD ranging up to $10. Another common feature of the three plans was the dedication of the revenues collected from congestion charging toward transportation improvements.

More recently, a proposal issued by Sam Schwartz and carried forward under the name 'MoveNY' in 2015 includes tolls on the currently untolled East River bridges and a cordon charge at 60th Street to be applied in both directions at a charge of $5.76 each way (for a total trip charge of $11.52).[40] Essentially, this plan eliminates the common practice of "bridge shopping" where car and truck drivers weave their way around the City to utilize the cheapest crossing into the CBD. MoveNY's proposal equalizes the total fee paid by drivers to enter and exit the CBD at about $11.50 no matter which crossing is chosen. The Schwartz plan also charges FHV trips in the CBD below 96th Street based on time and distance traveled, and reduces tolls on MTA bridges located outside of the CBD. Like other previous plans, MoveNY dedicates most of the revenue collected net of toll reductions toward transportation improvements, including MTA system upgrades and certain road and bridge repairs. The MoveNY plan estimates congestion reduction to be 20 percent upon full implementation.

FIGURE 14. PREVIOUS NYC CONGESTION PRICING PROPOSALS

Features	Citizens Budget Commission (2006 & 2015)	Mayor Bloomberg's plaNYC (2007)	Commission on MTA Financing (2008)	MoveNY (2017)
Cordon Fee • Amount • Hours • Boundary • Direction	**Yes (2006)** • $4/night, $7/day, $10/peak • 24/7 • 60th Street • In	**Yes** • $8/cars; $21/trucks • 6am – 6pm, M-F • 86th Street (60th Street) • In, Intra-Zone	**No**	**Yes** • $5.76 each way ($11.52)/ cars, higher/trucks • 24/7 • 60th Street for Cordon • In, Out
Toll Offsets	• N/A	• Deduct tolls paid by E-ZPass for NYC bridges and tunnels	• N/A	• $5 decrease in tolls for MTA major bridges, $2 decrease for MTA minor bridges
Exemptions	• N/A	• Emergency, transit, medallion taxis, handicapped plates, neighborhood car services	• N/A	• No double tolling (East River MTA crossings and Lincoln and Holland Tunnels) • Taxis and FHVs exempt from cordon
Taxis and TNCs	• N/A	• N/A	• N/A	• 35% surcharge plus $0.50 drop charge south of 96th Street/trip
Other fees/ taxes	• Increase motor vehicle fees or fuel taxes • Vehicle-Miles Traveled tax of $2.80/ cars & $7.63/trucks (2015)	• N/A	• 0.33% Regional Mobility Tax	• Elimination of reduction for parking garage sales tax (Manhattan)
Other revenues	• Increase MTA tolls 25% - 50%	• N/A	• Regular increase in MTA fares & tolls (bi-annual, Regional CPI)	• N/A
Other tolling	• MTA to toll East River Bridges at cordon rates in each direction	• N/A	• MTA to toll Harlem River and East River bridges at same rates as subway fares	• Toll East River Bridges $5.76 each way ($11.52)

Appendix B

Zone Pricing Tolling Analysis Methodologies

The traffic and revenue estimates of various tolling strategies were performed using the Balanced Transportation Analyzer, or BTA. This spreadsheet model, developed by Charles Komanoff, provides a framework for assessing the extent to which zone pricing can both generate revenue and improve traffic conditions in the Central Business District (CBD). The BTA was chosen as the tool for this study because it offers four key advantages in supporting the zone pricing analysis:

- As a spreadsheet model, it can rapidly evaluate and compare multiple tolling strategies.
- The model draws from a broad array of well-documented sources of traffic and transportation data.
- It is transparent. The underlying data is clearly identified and the assumptions governing the use of this data are highlighted.
- It yields the outputs that are most relevant to our analysis—namely, increase in revenue, improvement in average vehicular speed, and reduction in congestion.
- The version of the BTA used to generate the results contained in this report includes:
- Updated taxi and FHV data to include 2017 conditions.
- Updated data on through traffic (i.e. traffic passing through the CBD without making an intermediate stop).
- A revised volume of truck traffic.
- The most recent Hub-bound traffic volumes available from NYMTC (2016).
- Updated time- and price-elasticities based on the latest available research.

The team's efforts were focused on validating and running pricing scenarios using the latest version of the BTA which entailed the following tasks:

- The team reviewed the functionality of the BTA, including a review of the model's structure, its key formulas, and the relationships among the various tabs that comprise the model. Though HNTB had performed a similar review in 2015, the model had evolved in the interim. It was essential to understand how the model had changed.
- Reviewed the key assumptions made by the BTA, the input data used, and the limitations of the model. This was especially critical given the exponential growth in app-based transportation services, accompanied by a gradual decline in the use of yellow cabs.
- Identified and updated data sources to latest available data. This involved a detailed scrub of taxi and for-hire vehicle (FHV) data captured by the Taxi and Limousine Commission (TLC).
- Identified preliminary pricing scenarios.
- Modified the model as needed to accommodate unique characteristics of the various pricing scenarios.
- Ran initial model validation scenarios to develop baseline test cases and to test sensitivities of key variables.
- Interacted with the developer (Charles Komanoff) to provide feedback on functionality, to identify potential modifications to the model, and to update data sources as required.
- Ran zone-based and surcharge based pricing scenarios varying truck volumes, time-based elasticities and cost-based elasticities.
- Evaluated results, which included gross revenue estimation, reduction in vehicular congestion, and increases in average vehicle speed.

A critical component of the analysis was to understand and validate the BTA's handling of trip elasticities. The model uses various elasticity values to help estimate the following:

- First, the "price-elasticity" values measure how vehicles respond to the imposition of new tolls. When drivers are faced with an additional charge, they may choose to either (a) not make the trip at all, (b) change modes (if that is an option), or (c) change their time of travel (if they have the flexibility to do so).
- Second, the "time-elasticity" values measure how vehicles respond to a change in travel time. As drivers are "tolled off" the roadway network, the vehicles that remain experience faster travel times. This improvement in performance will entice some vehicles to re-enter the network.

The BTA captures the current volume of vehicles that enter the CBD in Manhattan, the current toll and taxi and FHV fare structures as the baseline scenario. The team then input various zone pricing scenarios that represent new fees to enter the CBD, including new toll rates and taxi and FHV fare structures. Using the price and time elasticities, the BTA estimates how drivers will respond to these changes and generates post zone charging vehicle volumes. These volumes are then used to generate estimates of revenue for each scenario. Using the new vehicular volumes, the BTA can also estimate the reduction in vehicle miles traveled (VMT) and the associated increases in average speeds.

Because the model's results are strongly related to the assumed values for price-elasticity and time-elasticity the team considered a range of elasticity values to evaluate the sensitivity of the key outputs to these assumed values. The team also studied available elasticity data from the MTA and the PANYNJ from previous reports and studies.

The end result of the analysis was an updated and reliable BTA model that could readily generate results tailored to a diverse array of pricing scenarios.

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2018
Metropolitan Transportation Sustainability Advisory Workgroup Recommendation

REPORT

Metropolitan Transportation Sustainability Advisory Workgroup

December 2018

Table of Contents

December 18, 2018

Workgroup Members
Hon. Michael Benedetto
Hon. Fernando Ferrer
Hon. Michael Gianaris
Rhonda Herman
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Hon. Amy Paulin
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Kathryn S. Wylde

Dear Governor Andrew Cuomo, Assembly Speaker Carl Heastie, Senate Majority Leader John Flanagan, Senate Majority Leader-elect Andrea Stewart-Cousins, Assembly Minority Leader Brian Kolb, Mayor Bill de Blasio, NYC DOT Commissioner Polly Trottenberg, NYS DOT Commissioner Paul Karas, MTA President Pat Foye:

On behalf of the members of the Metropolitan Transportation Sustainability Advisory Workgroup, I am transmitting our report and recommendations regarding the region's mobility crisis. The report summarizes extensive research and discussions we have had over the past 16 weeks focusing on transit and traffic problems and possible solutions. We hope this information is helpful to your deliberations in the coming legislative session and to the broader public understanding of actions required to ensure the continued livability and economic vitality of our New York metropolitan region.

The efforts of this diverse panel are intended be a useful resource to you and your colleagues and to result in better informed public discussion about important transit and mobility issues. We have had the full cooperation of the MTA and its operating agencies in gathering data and developing insight into the deterioration of transit services and what will be required to fix them. We have also benefited from the input and data of a number of other public, private and nonprofit sector experts.

Members of the panel were not in full agreement on all the recommendations in the report, but the majority endorsed recommendations for substantial reform and reorganization of the MTA and transit operating agencies and for reducing traffic congestion and generating a new, sustainable revenue source through creation of a congestion pricing district in the Manhattan Central Business District.

My thanks to members of the Workgroup for giving an enormous about of time and intellectual energy to this effort and for approaching our advisory work with a commitment to get the facts, understand their implications, and develop our recommendations solely on that basis.

Sincerely,

Kathryn Wylde

Kathryn S. Wylde, Chairperson, MTSAW

Executive Summary

Transit delays and traffic gridlock are not simply daily annoyances for New Yorkers. They are a manifestation of the failure to keep pace with the rapid growth of the city and region over the past two decades.

The Metropolitan Transportation Sustainability Advisory Workgroup ("the Workgroup") was established in the fiscal year 2019 New York state Enacted Budget for the purpose of highlighting issues and recommending actions, where possible, that state and local government could take to deal with the multiple challenges confronting the transportation system upon which the New York metropolitan region depends. The Workgroup included appointees of the governor, the state Legislature, the New York City mayor, the Metropolitan Transportation Authority (MTA) and the New York state and New York City Departments of Transportation. Its charge was to explore regional transportation needs, including excess traffic congestion, and to suggest new sources of sustainable funding that will be required to stabilize, modernize and expand the region's public transit system.

The MTA is the state authority created in 1968 to oversee the region's subway, bus, commuter rail, and bridge and tunnel systems. It essentially functions as a holding company for five operating entities: Triborough Bridge & Tunnel Authority (TBTA), New York City Transit (NYC Transit), Long Island Rail Road (LIRR), Metro-North Railroad (Metro-North) and MTA Bus. MTA Capital Construction (MTACC) is also a subsidiary of the authority.

MTA agencies are currently in the process of updating their projected needs for system modernization, expansion and state of good repair over the next twenty years and preparing their five-year Capital Plan for 2020–2024. The capital program is the primary source of funding for both upgrading of the existing system and expansion projects such as the Penn Station Access (which calls for the construction of four new stations in the Bronx along Metro-North's New Haven Line), completion of the Third Track on the LIRR, and a new LIRR depot under Grand Central Terminal known as East Side Access.

In addition to their long-term planning process, the MTA's operating agencies are working on accelerated investment proposals to make more immediate improvements that respond to the public outcry over deterioration in regional transit services. New York City Transit needs to aggressively upgrade the subway signal system to restore dependable service and increase system capacity and subway station accessibility, re-organize bus routes to better meet community needs, and improve the customer experience through more aggressive maintenance and management of stations and equipment. Similarly, the LIRR and Metro-North have plans to purchase new rolling stock, build and renovate yards and maintenance facilities, and fast-track repair of the Grand Central Terminal Train Shed and Park Avenue Tunnel and Viaduct.

MTA leadership has shared with the Workgroup their early budget projections and the difficult choices they believe they will be forced to make if substantial new funding is not available. Absent full funding, they make clear that transit priorities would be deferred or eliminated and services will continue to decline. MTA estimates of the size of their 2020–2024 capital funding needs range from $41 billion on the low side to as much as $60 billion. This is a substantial increase over the 2015–2019 Capital Plan, which was funded at $33 billion.

Since the Workgroup convened in September 2018, MTA estimates of its capital and operating needs have been a moving target. Its executives acknowledge that their capital plan is essentially an inflation adjusted update of current plan costs. Their estimate for *Fast Forward* is not adjusted for overlap with the capital plan and its costs will depend on whether new technology will work. As of the date of this report, only 21 percent of funding for the current five-year plan that ends December 2019 has actually been expended and another 57 percent is committed, casting doubt on MTA capacity to execute on an even larger capital program within five years. On the operating side, the MTA is legally required to break even, but as of November is projecting a deficit that could reach $1 billion by 2022, even with regular fare and toll increases.

No final conclusions about the accuracy of the MTA's estimates of their funding needs can be reached without independent verification and value engineering of cost projections and timing. It is still the Workgroup's unanimous view that a serious and significant effort to find stable, dedicated funding for the regional transit system must proceed, recognizing that defining precisely how much is required—and how quickly the agencies can actually deploy it—remains open to question. It will ultimately be up to the governor, the New York City Mayor and the Legislature to determine the appropriate allocation of state and city resources respectively to ensure adequate funding is made available. The state and city will have to make this determination and satisfy themselves that the money will be well spent. To do so, a far greater degree of transparency and accountability will be required on the part of the MTA. Therefore, elected officials and the mayor should evaluate the MTA's estimates and funding needs for future MTA capital plans and determine the appropriate funding levels.

The transit agencies must also bear significant responsibility for closing their budget gaps and not depend solely on growing public subsidies. The MTA must be better managed and be far more entrepreneurial in generating revenues from its real estate, advertising and other assets. It should seek to replicate the Port Authority of New York and New Jersey's success in leveraging private investment and expertise, which reduced the need for public funds in rebuilding the Goethals Bridge and LaGuardia Airport. In partnership with local government, the MTA should aggressively pursue opportunities to share in the appreciation of property values that future major transit improvements create.

In terms of generating new, sustainable funding, a majority of the members of the Workgroup agreed that the most promising option is the creation of a congestion pricing zone in the Manhattan Central Business District (CBD) and recommend its adoption. The experiences of other jurisdictions around the world demonstrate the utility of congestion pricing, both to reduce excess traffic and to raise funds for transit. By encouraging people to move from cars to transit, introducing congestion pricing will also contribute to increases in bus and subway fare revenues and provide significant benefits to the economy and the environment. Annual proceeds from a pricing zone are projected to exceed $1 billion, contingent on the size of the zone and the congestion charge, which would support at least $15 billion or more in bonded capital financing for the MTA over ten years.

The Workgroup discussed other ideas to modify or expand existing mechanisms of revenue generation, but reached no agreement on recommending them. For example, a “cruising” charge on all for-hire vehicles (FHVs) spending time in the Manhattan CBDs could raise $400 million a year, which would support another $6 billion in bonding over ten years. This would be in addition to the flat per ride charge imposed on all for-hire vehicles doing business in Manhattan south of 96th Street that was enacted in last year’s budget.

The state and local governments will also need to determine how much of their own capital budget authority should be dedicated to funding regional transit. The MTA estimates that the federal government will continue to fund about 20 percent of their capital budget. Certainly, there should be collective advocacy to increase federal support for mass transit. Given the particularly desperate condition of the subways, the Workgroup urges the governor, mayor, New York City Council and legislative leaders to work together to quickly find the funds that they determine are necessary to support the MTA.

The decline in subway, bus and commuter rail services is attributable to many things, of which a shortage of predictable, long-term funding is only one. Contributing factors include the age of the system and its equipment; investment decisions that sacrificed maintenance and state of good repair to spending on capital projects that were often poorly executed and grossly over budget; outdated management practices and contract requirements; the dysfunctional structure of the MTA; bureaucratic resistance to innovation; and loss of revenues due to decline in certain tax receipts, loss of ridership to app-based vehicles, and, recently, significant increases in fare evasion.

It will require the combined and sustained efforts of state and local officials, legislators and organized labor—with support from the general public—to correct the dysfunction of the MTA and assure adequate funding for transit. Equally important is to contain costs that are growing at unsustainable rates. The Workgroup has done considerable research, carefully considered the issues and made recommendations that are intended to advance a comprehensive approach to achieving the high-quality transportation system that New Yorkers deserve.

Introduction: The Transit Crisis

Across America, aging public infrastructure is breaking down, particularly in older urban centers. The nation has $4.6 trillion in unmet infrastructure needs, but the federal government has done very little to address this fundamental threat to public safety, jobs and the economy. In contrast to countries in the rest of the world, the U.S. government is effectively putting the burden for funding essential infrastructure on state and local governments and the private sector.

In New York, nowhere is this public infrastructure crisis more acute than in the metropolitan region's mass transit and commuter rail systems. The MTA is responsible for the 6th busiest transit system in the world, and also one of the oldest. The original subways—still in service—date back to 1904. With annual economic output of $1.7 trillion and a population of over 20 million, the New York metro region is among the largest and fastest growing urban centers in the world. This places huge demands on a transit system which has failed to keep pace.

Deterioration of the subways and commuter rail accelerated as population growth and increased economic activity put new demands on an aging system. Multiple subway lines are currently operating at capacity during peak times. Without additional investment, even more of the system is expected to be over capacity by 2035. Damage to the Lower Manhattan subway infrastructure after 9/11 and again after Superstorm Sandy brought new federal recovery funding, but further distracted from the routine capital requirements of the rest of the system. Simultaneously, there was huge acceleration in demand for expanded transit services from new centers of employment and housing in areas that are not well served by the existing system, most notably in boroughs outside Manhattan.

The MTA has struggled and largely failed to meet expectations of the tristate region for dependable, modern and accessible transit. Customer dissatisfaction culminated in 2017, when breakdowns, derailments, fires and service interruptions reached a level that became unbearable, especially to commuters and their employers.

In response to the crisis, Governor Andrew M. Cuomo in June 2017, declared a state of emergency for the mass transit system. Executive Order 168 allowed the MTA agencies to expedite contracts and agreements to immediately repair critical infrastructure assets such as tracks, signals and switches, in order to rapidly improve service on the subway, bus and commuter rail network with new innovative means. The largest intervention was the Subway Action Plan which required more than $800 million to put boots on the ground for expedited repair of tracks and equipment and is now delivering positive results.

Exhibit 1: Subway Action Plan Accomplishments, July 2017–December 2018

- Aggressive focus on critical subway system components, performing overdue corrective repairs in accelerated timeframe and instituting an ongoing maintenance cycle
- Implemented operational improvements by better coordinating work and resources, maximizing efficiency and increasing productivity while maintaining safety such as increasing active work hours from 2.2 to 5+ hours per night
- Gathered data and built foundation for better maintenance planning, such as developing a database of drainage maps for the full system for the first time ever

Track: Cleaning track and improving ride quality
Cleaned over 450 miles of track
Repaired over 18,000 high priority defects
Installed nearly 39 miles of seamless Continuous Welded Rail, minimizing the number of rail joints and providing strong tracks requiring less maintenance, and a smoother ride for customers
Installed nearly 135,000 friction pads to prevent fractured rails
Added 11 specialized, multidisciplinary teams for a total of 19, to improve incident response and recovery times

Infrastructure: Remediates conditions that damages track, signals and power sources
Grouted over 3,600 leaks
Cleared 381 track miles, freeing it of debris blocking drain boxes and pipes
Cleaned nearly 41,000 street grates systemwide

Power: Ensure supporting infrastructure reliability
Installed nearly 350 voltage correctors and nearly 1,250 transformers, to mitigate the impact of electric voltage variations that could cause signal failures
Inspected and repaired more than 600 Energy Distribution and Signal Relay Rooms
Inspected and repaired over 14,600 pieces of signal equipment along 692 track miles

Signals: Improves signal reliability
Repaired over 1,700 signal components and rebuilt over 200 signal stops
Inspected over 700 air switches, and instituted a 30-day inspection cycle
123 new signal positions added, including 91 for maintenance and repair

Cars: Reduce downtime and upgrade critical components
Accelerated the major car overhaul cycle from 7 years to 6 years for nearly 2,200 cars
Inspected over 6,400 doors to help reduce preventable door failures
Completed replacing unreliable equipment in our fleet—including nearly 1,000 limit switches, and installing improved shielding on 700 master controllers
Refurbished 38 work trains, increasing the availability of flat cars for essential maintenance and capital work

Despite these actions, New York's transit crisis is far from over. Solving it is made more difficult by the pervasive lack of trust in the MTA that has built up over many years and persists regardless of who is running the system. Virtually all concerned parties have recognized that any new commitment of funds to the agency must be conditioned on profound changes in its organizational structure, management practices and financial controls.

When asked, "What is the single factor that could do the most to change the perception and performance of the agency?" MTA executives cite the need for "culture change"—away from risk-averse bureaucrats and toward innovators, decision-makers, strong managers and team builders. Overhaul of organizational culture is necessary to keep pace with the needs of customers, ensure efficient business operations, and establish and develop systems that include the most up-to-date technology trends. Senior management must foster an environment where employees are encouraged to share new ideas and perspectives. The "old way of doing business" is no longer acceptable.

Recommendation: Reform the Governance Structure of the MTA

While there is no consensus on how the MTA should be reorganized, there is universal agreement among the Workgroup that the current structure does not provide for transparency, discipline or efficiency that is required to run a complex regional transportation system. Additionally, the resultant makeup diffuses accountability.

The MTA was created in state statute as a public authority and is made up of 17 board members. The governor nominates the chairman and five other members of the board, each entitled to cast full votes, while certain other members are nominated by local governments: the New York City Mayor nominates four members; Nassau, Suffolk and Westchester counties each appoint one member, each of whom are entitled to cast a full vote; and Putnam, Orange, Dutchess and Rockland counties each appoint one member, and such four members cast one collective vote. Board nominees are subject to approval by the governor and the State Senate.

The MTA Board's job is to exercise budget and oversight responsibility for the authority and its five independent operating entities that collectively employ about 75,000 people, the majority in NYC Transit. With respect to the capital budget, there is additional oversight through the Capital Program Review Board (CPRB), a six-member body (two non-voting) with appointees from the governor, Senate, Assembly, and the NYC Mayor. The appointees of the governor, Senate or Assembly may veto the entire MTA capital plan, whereas the mayor's appointee may veto only the NYC Transit and Staten Island Railway portion of the capital plan.

The MTA has intergovernmental relationships with units of government that require coordination on a daily basis. One example of such a relationship is policing. The New York Police Department (NYPD) polices the subway, while the MTA Police control terminals (Grand Central and Penn Station) and the commuter lines, and also have joint jurisdiction in the subways. Another example is engaging the homeless population which is a multi-agency effort at all MTA facilities that includes social service agencies, not-for-profit organizations and law enforcement. Likewise, emergency operations require coordination. The MTA management is responsible for managing the stations, but is reliant on close cooperation from government and non-government partners to address this issue. One final example is labor and civil service. The MTA has 70 union contracts and all hiring for the New York City subway and bus system is handled through New York City's civil service process, which designates the city as the municipal oversight entity for the Transit Authority pursuant to state law. It should also be noted that in most instances MTA and its subsidiaries own respective assets while in other instances assets are controlled pursuant to a master lease.

The operational and governance structure is not conducive to effective management for an organization of this size and import. The need for major reform is evident but beyond the scope of the Workgroup. In addition to all of the aforementioned, the operating agencies have to deal with layers of MTA bureaucrats who routinely intervene in agency management and slow decision-making. Each agency has its own legal division and other professional managerial staff with no streamlined operation to eliminate redundancy.

There are a variety of options for governance reform that the governor and Legislature should explore. The most obvious is moving to a more centralized organization, with integration and consolidation of redundant agency functions, such as shared procurement and legal functions. A more radical move would be to merge the separate operating agencies into a single organizational structure under the MTA Board and executive leadership, or at least merge the commuter railroads. Capital construction functions, which have been so problematic, could be put in an entirely separate entity, like the New York City School Construction Authority.

Alternatively, restructuring could go in the other direction: acknowledge that the MTA construct has failed and call for its dissolution. Some, including the New York City Council Speaker, have suggested that the city should assume control of NYC Transit or enter into a permanent joint management and funding arrangement with the state. The Port Authority of New York and New Jersey is an example of joint control of a transportation agency with clear lines of responsibility and accountability that seems to be working relatively well.

In short, the Workgroup concluded that optimizing investment in the MTA requires a new, more accountable and streamlined governance structure. Whatever direction this takes, organizational reform of the MTA needs to be part of any major new funding commitment.

Unsustainable Growth in Operating and Capital Costs

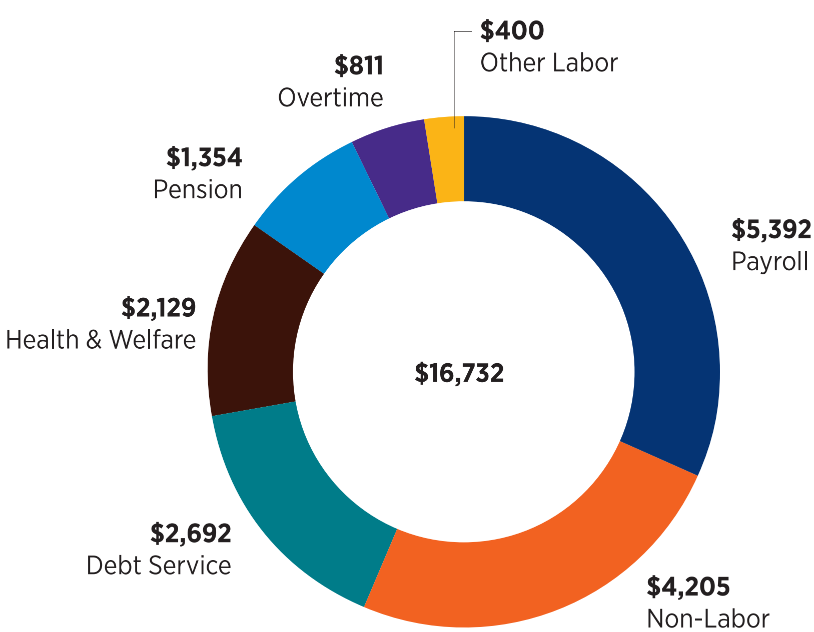
The MTA has a $17 billion annual operating expense budget. Over the past five years, MTA operating costs have grown 4.2 percent per year. Despite initiatives undertaken since 2010 that the MTA indicates have achieved $2 billion in recurring cost savings, the MTA has recently projected an operating deficit of $510 million in 2020, growing to $1 billion by 2022 even with the proposed 4 percent fare increases in 2019 and 2021. (These figures have not been subjected to independent scrutiny.)

Chapter 314 of the Laws of 1981 set forth a capital planning framework that generally authorized the MTA to develop capital plans and to finance them through the issuance of bonds. The MTA currently has bonded debt of $39 billion and debt service is 16 percent of its operating budget. It has little capacity for additional borrowing without new revenue streams to support it. The MTA receives over $6 billion a year from dedicated city and state taxes.

While still a strong credit, the MTA rating has been downgraded by S&P twice in the past year and remains on "Negative Outlook". The MTA's overall expenses are expected to increase 3 percent next year, while debt service is projected to grow by 5 percent.

Exhibit 2: MTA Operating Budget Expenses–2019 Final Proposed Budget
in millions

Total Operating Expenses: $16,732M
Below the line adjustments of ~$251M



Labor is 60 percent of the MTA expense budget. The authority and its agencies have 70 union contracts with 32 unions and 82 locals/lodges. The important Transport Workers Union Local 100 contract covering NYC Transit employees is coming up for renewal the first quarter of 2019. The MTA's collective bargaining partners in labor tend to share the public's distrust of the agency.

Exhibit 3A: MTA Funding Sources–2019 Final Proposed Budget
in millions

Total Revenue Sources: $16,750M

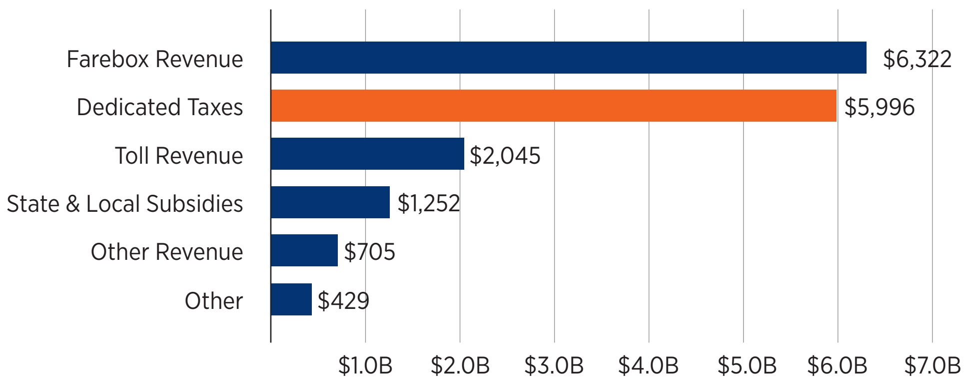
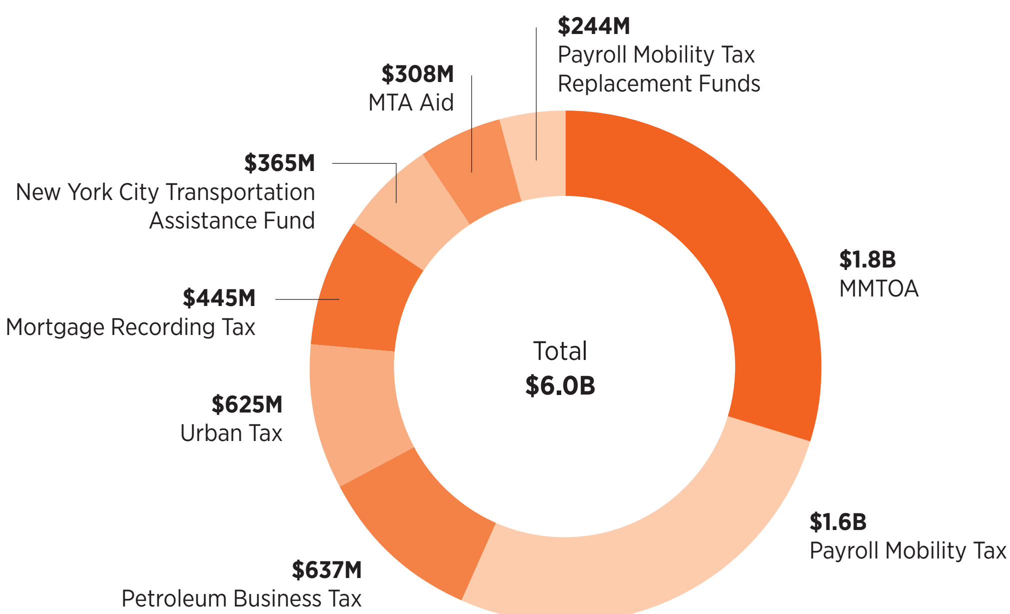


Exhibit 3B: MTA Dedicated Tax Revenues



Details in appendix

Exhibit 4: MTA Operating Costs Per Trip Versus Fare by Transit Mode

Transit Mode	Operating Expense* (2017)	Ridership (2017)	Revenue (2017)	Operating Cost per Trip *(Operating Expense/ Ridership)*	Fare Per Rider *(Revenue/ Ridership)*
MTA Subways	$4,709,987,000	1,727,366,607	$3,546,908,000	$2.73	$2.05
MTA Express Bus	$230,143,000	10,863,369	$60,584,000	$21.19	$5.58
MTA Bus Service (Select/Regular)	$2,716,625,000	591,756,987	$945,754,000	$4.59	$1.60
LIRR	$1,912,893,622	89,158,421	$727,600,000	$21.45	$8.16
Metro-North Railroad	$1,301,476,881	86,494,753	$733,409,000	$15.05	$8.48

Note: This chart and these calculations are based on operating costs only and do not include capital costs.

The MTA and its agencies have a checkered history when it comes to management of their capital program, as noted in the October 2018 report by the New York State Comptroller, "Financial Outlook for the MTA". The approach to construction procurement has been conventional design-bid-build, with all risk and liability on the contractor. While this sounds advantageous to the authority, it has not turned out that way. MTA projects, whether expansion projects or improvements to the existing system, have been generally late and over budget for as long as anyone can remember. Reports from contractors, workers and unions directly involved in both mega projects and upgrades of the existing systems are consistent. This has been the case regardless of the leadership of the authority, suggesting that the problems are endemic to the procurement, contracting and project management system of the MTA. Unsurprisingly, contractors build these risks and dysfunctions into their bids.

The MTA created the Capital Construction subsidiary (MTACC) in 2003 to apply special expertise to the management of mega projects, but the results have been unimpressive. Most notably, East Side Access—which was originally conceived as a $4.3 billion project to bring Long Island Rail Road into Grand Central Terminal—is now projected to cost $11 billion when completed in late 2022. This has led some to call for complete separation of the MTACC from the MTA or even a spinoff of the function.

New York state has moved to design-build procurement for its capital construction program with incentives for early delivery and sanctions for delay. The state's new system has been proven effective on projects ranging from both the new Governor Mario M. Cuomo and Kosciuszko Bridges to dozens of road projects. The state's "debarment" sanction for failed contractors is practical and effective. Losing all state agency and authority work is a powerful disincentive to contractors. The MTA has been slow to change, resulting in extended time for its capital projects, which translate into delayed commutes, traffic congestion, and cost New Yorkers BILLIONS.

The experience on delivery of Phase 1 of the Second Avenue Subway illustrates the problem. After the MTACC missed multiple deadlines for completion, Governor Cuomo effectively assumed operational control of the project, holding weekly meetings and instilling a culture of accountability on the project managers. The governor instituted a new policy of performance requirements on the firms building the subway and achieved a massive, although isolated, "culture change", which resulted in unusual on time completion.

The MTA must similarly re-engineer its approach to construction activity, employing design-build and other innovative contracting techniques that promise to bring down the projected costs of its capital program. Where they have done it, success has been achieved, with the LIRR's 13 mile Farmingdale to Ronkonkoma Double Track project being delivered 15 months early. But the MTA must move much more quickly to implement new contracting and project delivery options that have been available to the agency for a long while, but seldom utilized.

Recommendation: Perform Independent Audits of Capital Costs & State of Good Repair

Despite any organizational changes within the MTA, there remains a skepticism of the MTA's assessment of its capital costs. Independent third parties should be utilized to examine the MTA's infrastructure and identify which resources require renovation or replacement in order to maintain a state of good repair. An independent audit of capital costs would help ensure appropriate and efficient investments and help reestablish public confidence.

The MTA should require that all capital projects, including maintenance and good repair, are subject to standardized performance metrics for planning, design, approvals, change orders, project management and delivery with strict transparency and reporting requirements. To avoid deferred maintenance in the future, the MTA should establish and publish a state of good repair budget and spending plan (indexed to inflation) by asset, to report quarterly on expenditures and disclose in financials. These documents should be prepared for readership by the public and not just financial and engineering experts. Furthermore, a chief engineer should sign and stamp certifying the accuracy of the report.

Recommendation: Management and labor should identify mutually beneficial ways to contain costs, increase productivity and provide increased upward mobility opportunities for all employees

Like most public agencies, the MTA faces a human resource challenge—how to attract and grow the next generation of skilled and tech savvy transit workers and executives—within the confines of outdated civil service classifications and restrictions on compensation, hiring and promotion. Union leaders note that there is limited upward mobility opportunity for their members in supervisory positions and point to the aging out and retirement of the real experts on system equipment and operations. This suggests the need for additional investment in professional development of the workforce to reflect changing needs that have come with technology and new equipment. Management is concerned about the disincentives for employees who will not leave the represented ranks due to compensation concerns. The collective bargaining process should consider these issues and also include discussion of updating work rules, many of which are obsolete and add unnecessarily to MTA expenses.

Recommendation: Reform Procurement Practices

This year, committees of the MTA Board focused on the need for administrative reforms of construction contracting and procurement practices and came out with recommendations to achieve cost savings and efficiencies. Management should adopt the administrative actions and the Legislature should consider actions it can take to support them in areas that will have significant impact on timely and more cost-effective construction and service delivery. In addition to design-build contracting, the MTA should make better use of "best value" procurements. Historically the use of traditional "low bid" procurements has been seen as a way to save on costs, but this selection process does not allow for comprehensive assessment of the means and methods of the project, at times resulting in overruns and delays. Another issue is over-customization of specifications for procurement and construction, adding to cost by limiting flexibility and standardization.

Recommendation: Contain Unsustainable Growth in Costs

Cost containment is critical to the MTA's long-term financial sustainability. There are a number of major expenditure items that should be carefully examined to identify opportunities for curbing unsustainable growth in operating costs. For example, it is reported that New York City has worked with its municipal unions to substantially reduce health care costs without reducing benefits. The MTA's final proposed budget for 2019 includes $1.448 billion for health and welfare (principally health insurance for active employees), an increase of almost 20 percent compared to 2017 actuals. An additional $682 million is projected for retiree health care or other post-employment benefits, more than a 20 percent increase over 2017 actuals. The MTA's unfunded actuarial accrued liability for all its Postemployment Benefit Plans was $19.5 billion as of the end of 2017, up 7.3 percent from 2016.

The MTA should also examine other cost containment opportunities, including but not limited to, consolidating civil service administration, leveraging alternative strategies for managing MTA assets, and measures to help control litigation costs, which run about $500 million a year for claims associated with loss and injury for which the MTA is largely self-insured through its captive insurance company.

Recommendation: Establish an Entrepreneurial Unit to Champion Commercial Revenue Opportunities

Unlike most other systems in global cities, the MTA has no office of "Strategic Partnerships" with revenue targets and charged with initiating and pursuing commercial endeavors or private sector sponsorships. The New Jersey Legislature recently enacted a law that requires New Jersey Transit (NJ Transit) to establish an office of real estate and transit-oriented development charged with turning property it owns into revenue-generating opportunities. The bill sponsor declared, "Exploring ways to increase NJ Transit revenue without hiking fares on riders is absolutely critical to reforming the agency." The same could be said of the MTA.

Only 3 percent of MTA revenues are associated with income earned from its estimated $1 trillion in physical assets. This includes advertising, retail rentals, real estate payments in lieu of taxes (PILOTs) and contributions from private developers. Grand Central Terminal, which is the highlight of the MTA's asset monetization efforts, represents 42 percent of all its system wide retail and land license revenue income. The majority of MTA stations have no commercial activity.

London, Boston and many other transit systems around the world reduce operating costs and generate commercial revenues through strategic partnerships with the private sector to develop commercial activities, including retail and advertising, in stations and other facilities.

In 2017, the MTA concluded a new deal to install digital advertising and customer information signage throughout the entire bus, subway and commuter rail system. However, the revenue potential hinges on the pace of installation, which the MTA needs to accelerate.

On the real estate front, a few years ago the MTA made a first attempt with "Turnstyle", a small cluster of food stands that a private developer created in an unused subway passage under Columbus Circle. While a charming amenity, the project was so encumbered with MTA bureaucratic requirements and delays that it almost failed and the MTA had to reduce its rent to avoid the project going bankrupt.

Until recently, Turnstyle had no advocate within the MTA and its developer struggled to navigate pervasive bureaucratic resistance to accommodating business intrusion. The MTA offices responsible for this type of development need to be empowered to aggressively promote and expedite commercial projects like this that could be sources of income and make stations far more attractive to the riding public.

Recommendation: In Certain Cases, the MTA Must Invest to Save

The Workgroup heard from experts about a number of areas where timely investment can result in significant ongoing savings. These opportunities are often tied to upgrades in technology, preventive or "predictive" maintenance, and prudent capital investments.

One example is the NYC Transit plan to accelerate investments in making subway stations more accessible, which will allow more people with disabilities and mobility needs, such as the growing aging population of New York, to use the subway system. Improving accessibility—with capital investments such as elevators or ramps, improved Paratransit service, and other audio and visual improvements—will require a significant investment. At the same time, mandated services currently provided through the MTA Access-A-Ride program cost the MTA $77 per trip, or a total of $474 million in 2017. Despite the cost, there is a high level of customer dissatisfaction with the current service.

The MTA is conducting an e-hail pilot offering on-demand trips with a limited group of customers that costs a fraction of the traditional service on a per ride basis. It has been so well received that customer utilization has increased dramatically, driving overall costs up. It is important to refine the model for a cost effective on-demand paratransit services program, which tech mobility companies are prepared to help with, at the same time accelerated investment in station accessibility moves forward.

Technology and communications systems also require big up-front investments but can result in significant long-term savings and productivity gains. One place this principle should be applied is upgrading the subway Rail Control Center which relies on a system of yellow Post-its, pagers and walkie talkies to manage system emergencies. Half of the subway lines cannot be tracked on real-time dynamic screens. The MTA and the governor's Genius Transit Challenge are exploring alternative new technologies that could, if proven, expedite signal system innovation even further. The process for amending the capital plan should be transparent with regard to which projects are being added or removed, and how additional projects will be paid for.

Recommendation: Reduce Fare Evasion

In 2018, NYC Transit estimates $215 million of revenue loss on subways and buses due to fare evasion. Official observations are conducted on a quarterly basis where staff visit a sample of subway stations and bus routes to record various instances of evasion. In addition, special Eagle teams for Select Bus Service conduct periodic exercises where there are counts of paid versus unpaid passengers boarding a bus. Based on these methods, NYC Transit estimates 350,000 (16.3 percent) daily evaders on the bus system and approximately 200,000 (3.8 percent) daily evaders on the subway. There are legitimate concerns about the disproportionate impact on racial and ethnic minorities in the criminal prosecution of fare evaders. At the same time, tolerance of fare evasion is unfair to other riders and taxpayers who have to subsidize fare evaders. Since summer 2018, the NYPD has changed its Theft-of-Service policy to provide officers with greater discretion to write summonses rather than make arrests, with the effect of officers spending more time in the transit system. Nonetheless fare evasion continues to increase. Non-criminal sanctions for discouraging fare evasion should be jointly developed by the state, MTA and the NYPD.

Recommendation: MTA Should Not Absorb Losses from Fare & Toll Discounts

Fare and toll discounts are a substantial cost to the MTA, totaling a net unreimbursed annual loss of $314 million, exclusive of discounts for seniors and the disabled the MTA must provide as conditional on federal grants. The MTA has some discount mandates associated with federal funding, including discounts for seniors in off peak hours. It also provides student subway discounts and resident discounts for certain bridge tolls that are partially offset by city and state funding. In the future, funding for any additional discount programs not originated by the MTA should be funded by entities other than the MTA.

Exhibit 5: Current Fare and Toll Discounts

Agency	Program/Outside Contributions	MTA Net Revenue Loss* (2017, in $M)
	Agency Provided Discounts	
NYCT	Student Fares *Contributions: City $47M, State $25.3M*	$167.4
NYCT	Peak Period Reduced Fare & Zero-Fare MetroCard *Contributions: City $13.8M for overall Reduced Fare program*	$49.5
Metro-North	School/Student Programs	$1.2
Metro-North	Charity/Military Program	$0.1
LIRR	School/Student Programs	$1.0
LIRR	Charity/Military Program	$0.4
B&T	Staten Island Resident Discount/Carpool Discount *Contributions: State $10.4M*	$80.5
B&T	Verrazano Commercial Vehicle Discount *Contributions: State $3.4M*	$3.5
B&T	Rockaway Resident Discount	$10.4
Total (Agency Provided Discounts)		**$314.1**

* MTA Net Revenue Loss does not include City or State contributions noted in "Program/Outside Contributions"

Recommendation: Eliminate the 25 Percent "MTA Premium"

To compensate for poor construction practices at the MTA, the construction industry has reportedly incorporated a roughly 25 percent premium into their bids for MTA projects. This was largely confirmed by the MTA Board's intensive review last year of the reasons for high construction costs and delayed project delivery. The board came out with recommendations that can and should be implemented through administrative actions.

Exhibit 6: Cost Containment-Recommended Reforms

Reforms Underway
Empower project leadership
Streamline change order process
Accelerate payments to contractors
Make contract and design specifications less prescriptive
Reduce bond performance requirements from 100% to 50%
Guarantee track outages
Allow partial payments for undisputed portion of invoices
Allow contractors to submit alternate forms of security
Move to performance-based compensation with bonuses for success and penalties for poor performance
Revise contracts and use expedited dispute resolution process with neutral, third-party arbiter

Recommendation: Encourage Public Support for More Flexibility in Closing Lines for Construction & Maintenance

NYC Transit is one of only a handful of systems in the world that runs 24/7, and one of a few that operates all lines in such a manner. A major reason for high construction costs and delayed delivery is the pressure to keep the system running or only interrupt service for short periods in the middle of the night or weekends. Closing services can be a significant inconvenience, but the benefits are huge in terms of the ability to complete maintenance and repair upgrades can be greatly accelerated, resulting in far better service over the long term. The MTA has recently almost doubled the amount of time actually worked during planned subway outages, from what had been under three hours to five hours in an eight-hour shift. This is a start on what must be a much greater increase in productivity.

Recommendation: Encourage Expanded Private Sector Innovation

The MTA has taken several steps to modernize its approach to operations and project development in the past year, including the governor's Genius Award competition and co-venturing with the Partnership for New York City to set up the Transit Innovation Partnership and Transit Tech Lab. In October 2018 close to 100 early stage tech companies responded to an invitation to compete for a spot in the Transit Tech Lab, where winners will have an opportunity to test their solutions for better bus service and subway communications.

One current opportunity for partnering with the private sector is on rapid replacement of the subway signal system in order to run more trains closer together: a higher frequency of train traffic to accommodate high volume demand. This requires a new signal system to be designed and installed on 600 miles of track. Higher subway frequency also requires more safety precautions. There is no proven technology that achieves the combined goals of frequency and safety and a technological solution is unlikely to come from traditional MTA vendors. One idea that emerged from the governor's Genius Award competition and shows great promise is the deployment of ultra-wide band technology, which could significantly reduce the time and cost to re-signal subway lines starting as early as 2019. The state should assemble experts in the field to assess the situation and expedite its testing and development.

Recommendation: Establish Intergovernmental Planning & Real Estate Coordination Office

Coordination between the MTA and local governments on capital planning and construction has been an ongoing challenge ever since the MTA's creation. The need for coordination will only intensify as the MTA seeks to take advantage of innovative project financing and delivery strategies such as public-private partnerships and tax increment financing that necessarily implicate municipal assets and interests. And it is essential for the region's future that MTA investments and local land use policies be coordinated to maximize "bang for the buck"—opportunities for Transit-Oriented Development (TOD) to support a healthy and sustainable pattern of growth.

To provide an institutional framework for enhanced coordination and local input going forward, the Workgroup recommends the establishment of an agency-wide "Intergovernmental Planning and Real Estate Coordination Office" empowered to perform several key functions. Examples could include:

- Planning and executing TOD projects in close cooperation with local government.
- Coordinating and expediting agency review of real estate development/construction projects undertaken by local government or private developers that require approvals from MTA offices before plans can be finalized, permits issued and construction can proceed. Often, MTA agency processes hold these projects up for several years and add considerably to development costs. A faster, more predictable process could also generate revenues, since fast track approvals are likely something that developers would be willing to pay for.
- Enlisting local input into the planning process. During recent months, the MTA and NYC Department of Transportation (NYC DOT) have started working together on allocation of the $50 million a year that will be available for "transit desert" improvements in the four boroughs outside Manhattan, funded by FHV fees. NYC Transit has recently engaged in community town meetings for ideas to inform major reconfiguration of bus routes. These efforts can be institutionalized to increase trust in the MTA and improve its response to local needs.

- Structuring station enhancement and other improvements generated by private development, such as the $200 million in subway improvements generated by development of One Vanderbilt, next to Grand Central Terminal; the pending deal to develop the MTA's former Madison Avenue headquarters; and the TOD projects advancing on MTA parking lots in both Westchester and Long Island.

- The Democratic majority that will take over the U.S. House of Representatives in January has as its top priority the funding of a major national infrastructure program. The MTA and New York City and state need to be ready with projects that are in a position to move quickly on a cost-effective basis and able to leverage substantial private funds. The MTA should be preparing RFPs for release immediately upon passage of such a program. The MTA should also be looking to access private investment through the new federal Opportunity Zones program, which, if applied appropriately, should be a source of long term, lower cost funding for transit and TOD in low income areas.

Recommendation: Optimize the Value Created by Transit Improvements

History demonstrates that transit capital improvements generate significant increases in nearby property values, which in turn boost real property tax receipts. In recent decades, transit agencies worldwide have leveraged incremental increases in tax receipts to help finance transit improvements. The Workgroup recommends that the MTA and the localities it serves work together, pursuant to existing law, to realize the full potential of such financing alternatives.

New York City has specific, successful experience with tax increment financing. The city used both tax increment financing and a PILOT arrangement to finance the cost of extending the #7 line to the Far West Side and other infrastructure improvements in support of the massive Hudson Yards redevelopment. There are pending projects in the city and around the region that offer similar opportunities for the MTA. Specifically, tax increment financing could support transit-oriented development near new stations along Metro-North's lines, the later phases of the Second Avenue Subway, or the LIRR's Third Track, subject to municipal approval of any forgone taxes.

State law already authorizes tax increment financing for MTA capital improvements. New York State General Municipal Law Section 119-r, enacted in 2016, authorizes local governments in the MTA Commuter Transportation District to enter into contracts with the MTA that redirect local real estate tax revenues to finance future transit improvements within designated mass transportation capital project districts.

Other Recommendations

Recommendation: Provide New York City and other Localities with Greater Flexibility to Enforce Traffic Laws

Local government controls the infrastructure for surface transit (streets, bus lanes) and has responsibility for the enforcement actions that the MTA relies on for surface transit. To maximize congestion relief in the CBD, the city and MTA need additional automated enforcement authority for bus lane camera enforcement and, for New York City, new automated enforcement authority for block-the-box violations. Any such expanded automated enforcement authority should take into consideration due process rights, adequate public awareness, fair adjudication procedures, reasonable penalties & fines, procurement standards, public safety concerns and privacy protections.

Recommendation: Lock Box and Dedicate New Revenues Exclusively for MTA Capital

Funding from congestion pricing should be deposited in a “lock box” for capital needs and associated operating costs of the MTA and for installation and necessary upgrading of the congestion pricing system. The same conditions should be applied to any other new revenues that the Legislature might authorize and the dedicated city and state taxes that are already in place. Funds meant for the MTA should not be diverted for other purposes. Assurance of predictable funding is critical to MTA planning, contracting and leveraging of other resources.

Recommendation: End Placard Abuse to Reduce Congestion

New York City and New York State Departments of Transportation should make recommendations regarding vehicle placards, including a ceiling on the number of placards that are allowed by city, state and federal agencies. Reserved or dedicated parking for private cars should be eliminated and there should be strict enforcement of penalties for placard abuses by an entity with independence from the civil servants it would need to enforce. Use of government vehicles for official commutation should be greatly reduced. Private cars with government placards and free E-ZPasses should not be automatically exempted from congestion pricing if implemented. Thousands of government vehicles are used for daily commuting.

Recommendation: Relieve Congestion Caused by Tour & Sightseeing Bus Activity

Tour buses, which obstruct public buses and clog streets in the most congested parts of Manhattan, should be severely limited. There are plenty of transit options for tourists and Manhattan simply cannot accommodate tour bus activity without creating hardship for business and residents. With respect to private commuter buses, there must be an effort to find adequate off-street parking to reduce their contribution to congestion. They should not be assigned curb space needed for commercial deliveries and other purposes.

Recommendation: Recognize Commuter Rail Interstate Challenge

Services that Metro-North provides to customers in the northern suburbs are inter-connected with operations of commuter rail in Connecticut and New Jersey. West of Hudson service in New Jersey, however, is a significant problem. With more than 1.6 million West of Hudson riders in 2017, NJ Transit trains that provided the service were over-crowded and unreliable. There is also a need to improve service where lack of adequate sidings causes conflicts between NJ Transit and New York commuters using the Pascack Valley Line. New York state needs to extend more assistance to Metro-North and work with promising new leadership at NJ Transit to improve rail services to Rockland and Orange County residents.

Recommendation: Allow MTA to Migrate to a Ten-Year Capital Planning Process

The MTA has a five-year capital planning process that they would like to extend, since planning and execution of complex capital projects frequently takes longer than five years. It should be possible to move to a ten-year capital planning process without reducing CPRB oversight. This could still require legislative review and CPRB approval mid-way through a capital program—much like the current process for amending the capital plan—or the MTA could be required to submit rolling ten-year capital spending programs every five years. The Port Authority of New York and New Jersey has a ten-year planning and budget cycle. It may be helpful to move the MTA to a fiscal year that is consistent with the state, April 1 through March 31, rather than the calendar year.

Recommendation: Accelerate Expanded Commuter Rail and Bus Service to Transit Deserts

For congestion pricing to be equitable to all New York residents, it is essential that those who cannot afford the charge for driving into or through the pricing zone have reasonable public transit options. The MTA and NYC Transit have initiated a planning process to ensure that the needs of "transit deserts"—specifically those areas of the boroughs underserved by subways—are addressed.

A good model for prioritizing specific projects for underserved areas has been developed by the MTA and the New York City and state Departments of Transportation to determine how the $50 million generated annually from the new FHV charges that will begin in 2019 will be allocated for transit improvements in the four boroughs outside Manhattan. This same type of process should be used to determine the additions to the MTA capital plan that will be necessary to deal with transit deserts.

NYC Transit has also instituted borough consultation to gain community input on its *Fast Forward* plan for updating bus routes, a process that is reportedly providing communities and legislators with welcome input into the MTA capital planning process. A similar process is being developed by the commuter rail lines for consultation with elected officials in the suburbs.

In the longer term, after stabilization and modernization of the transit system, higher prioritization of certain projects with potential to solve the problem will be required—for example, the Metro-North

Penn Station Access project that will provide direct commuter rail connections to four underserved areas of the East Bronx.

The LIRR and Metro-North commuter rails run through transit deserts in Queens and the Bronx where stations should be opened to accommodate riders who have no subway alternative. This will likely add to capital and operating costs of the MTA and raises concerns about capacity of the rail lines and lengthening the commute of suburban passengers. Completion of East Side Access and Penn Station Access should allow for additional capacity. Increasing commuter rail service to city riders is a complicated issue, but worth pursuing.

Recommendation: Reduce Subway Delays & Improve Station Conditions

New leadership at NYC Transit is focused on addressing issues that contribute to train delays and make the customer experience on subways uncomfortable or unpleasant. Several require close cooperation from the NYPD and other city agencies. Routine delays occur when someone gets sick on a train or has a health or personal issue. It can take a long time to address these issues. The NYPD and New York Fire Department have personnel devoted to rail operations 24/7 to address sick passengers and crime scenes and are working closely with NYC Transit to reduce extended service interruptions, balancing law enforcement and transit operational needs. The NYPD, FDNY and MTA Police should enhance their protocols for emergency response.

There is also a growing presence of homeless in the subway system that requires a combination of efforts by the NYPD, the city and nonprofit outreach organizations to bring the homeless to appropriate shelters. The Department of Homeless Services and NYC Transit have established a cooperative pilot project at the terminal station of the E line where homeless individuals are engaged and encouraged to seek services. This pilot should be expanded.

Sustainable Funding Options

In 2009, the state authorized new funding that was intended to provide both operating and capital program funding. The Payroll Mobility Tax has been completely used to fund operating expenses, pay-as-you go capital funding and debt service for both the 2010–2014 and 2015–2019 Capital Programs. Since that time, MTA expenses have grown faster than these revenues. The MTA's ability to finance the next capital plan will be very limited unless it receives new dedicated and sustainable sources of funding.

There are no easy solutions to the MTA's funding needs. A majority of the Workgroup recommends that the governor and Legislature adopt a congestion pricing plan. The Workgroup has considered a number of other proposals to generate new revenues and to modify or expand existing revenues, but did not reach consensus.

Recommendation: Establish a congestion pricing zone in the region's commercial center, with revenues exclusively dedicated to the MTA capital program and associated operating expenses

The theory behind congestion pricing is that, as cities grow, their streets are an increasingly scarce resource and should be priced accordingly. Owners of private and commercial vehicles that traverse the city contribute far less than their fair share toward funding the high-value infrastructure and public services that are necessary to maintain the Manhattan CBD and the rapidly growing communities that surround it. Congestion pricing should be a win-win solution since those who pay the charge benefit directly from the productivity gains and cost reduction that result from reduced traffic. This is not a small benefit, since excess congestion currently costs the region more than $20 billion a year.

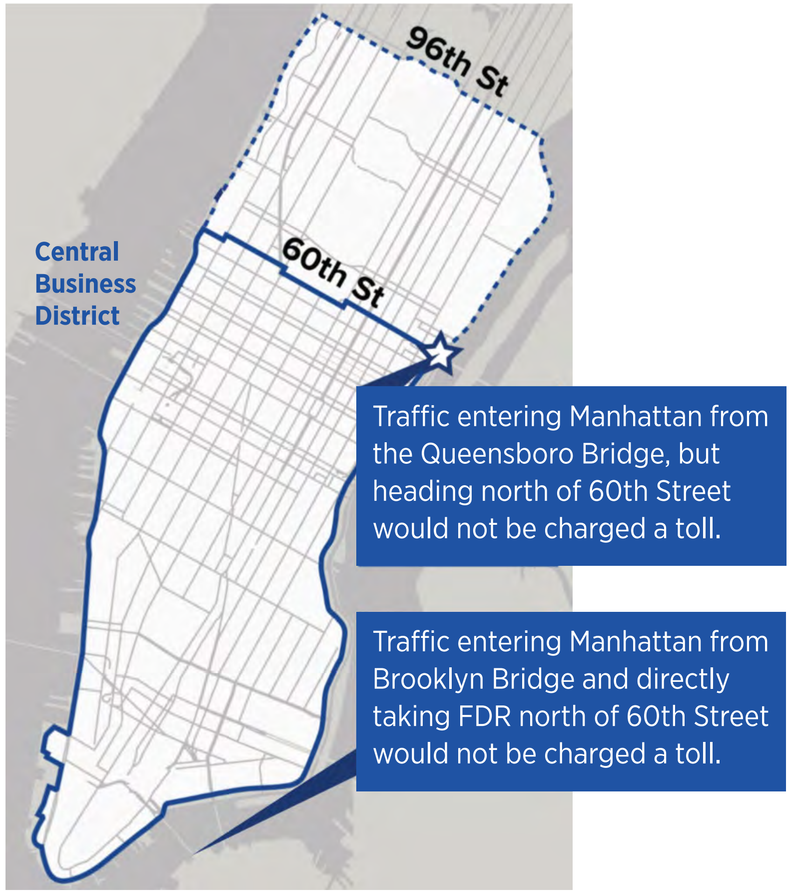
The size and density of economic activity in Manhattan makes it the biggest concentration of excess traffic congestion and a source of much of the traffic in the surrounding region. One of the worst consequences of excess congestion is that it slows down bus service, both local and express, which has caused a huge loss of ridership and increase in cost of bus operations. With few protected bus lanes and severe restrictions on local authority to enforce bus lanes, New York enjoys none of the efficiency and predictability of bus systems in most major cities.

A cordon pricing zone that would charge vehicles entering the Manhattan CBD and could generate $1 billion a year or more, contingent on the size of the zone and the congestion charge, for the MTA and a 15 percent to 20 percent increase in average vehicle speed (currently 7.1 miles per hour). This assumes charges during periods of high traffic volume that are roughly comparable to current tolls on tunnels and bridges. Variable pricing that correlates the size of fees with traffic congestion would result in minimal charges on most weekends and evening hours, while peak period trips would be at a premium.

Any congestion pricing zone plan must consider the transit capacity required to absorb additional ridership, the need to provide new services to areas that currently lack adequate transit, the possible need for hardship exemptions, and the responsibility of New York City for the management of its streets and equipment installed to control traffic.

Exhibit 7: Models of Pricing and Gross Revenue Options for Congestion Mitigation in Manhattan's Central Business District

Map shows cordon zone south of 60th Street as proposed by FixNYC Panel. Calculations were made using this zone for illustration. The FHV congestion zone south of 96th Street will be implemented in 2019.



Option 1: Today's Rates

Rate* $5.76 charge on cordon entry/exit or $11.52 charge on cordon entry only

Pricing options by time of day	Estimated gross revenue
24/7/365	$1.45B
Monday–Friday, 6 a.m.–8 p.m. Weekends 12 p.m.–10 p.m.	$1.0B
Monday–Friday, 6 a.m.–8 p.m.	$0.79B

Estimated traffic speed gains: 15–20%

* Current toll on Queens Midtown Tunnel and Hugh Carey Tunnel is $5.76 each way with E-ZPass

Option 2: 8% Toll Increase

Rate $6.22 charge on cordon entry/exit or $12.44 charge on cordon entry only

Pricing options by time of day	Estimated gross revenue
24/7/365	$1.56B
Monday–Friday, 6 a.m.–8 p.m. Weekends 12 p.m.–10 p.m.	$1.08B
Monday–Friday, 6 a.m.–8 p.m.	$0.85B

Estimated traffic speed gains: 15–20%

The 8 percent reflects an increase that is being considered for MTA-controlled bridges and tunnels. This figure could be higher for the CBD.

Additional Funding Measures Raised for Consideration without Consensus:

Accelerate Existing State and City Commitments to the Capital Program

The MTA faces growing operating deficits and short-term capital needs, particularly for *Fast Forward* and priority measures to improve commuter rail. To secure the resources necessary to move forward with these important capital initiatives while also providing operating budget relief to the MTA in the form of reduced additional debt service, the state and city should consider accelerating their existing capital commitments to provide bonding relief to the MTA's capital program. In 2015, New York state and city committed $8.3 and $2.5 billion, respectively, to help fund the 2015–2019 MTA Capital Plan. Only a portion of these commitments has been drawn down because the terms of funding required the MTA to advance its resources first. The MTA currently estimates the potential savings from acceleration of the estimated $9.2 billion state and city funding during the plan years at $31 million in 2019; $176 million in 2020; $391 million in 2021; and $532 million in 2022. The acceleration would not increase funding for or the size of the MTA capital program, but simply defer MTA spending its own funds to later years, however, any acceleration must be accompanied with sureties that the MTA will execute the capital plan on time and on budget.

Exhibit 8A: MTA 2015–2019 Capital Plan Commitments (as of Q3 2018)

Agency	Budget	Encumbered	% Encumbered	Expended	% of Encumbered already Expended
NYCT/SIR	$16,741,997,862	$9,782,163,517	58%	$3,511,536,511	36%
LIRR	$2,858,956,601	$1,998,518,224	70%	$1,040,425,663	52%
MNR	$2,464,452,346	$1,413,741,549	57%	$332,411,005	24%
MTA CC	$7,650,171,942	$4,098,804,254	54%	$1,457,796,811	36%
MTA Interagency	$242,776,128	$68,691,561	28%	$16,771,987	24%
B&T	$2,936,305,926	$1,531,335,298	52%	$595,816,732	39%
MTA Bus	$375,965,811	$96,432,534	26%	$6,159,112	6%
Total	**$33,270,626,616**	**$18,989,686,937**	**57%**	**$6,960,917,821**	**37%**

Notes: The current capital plan commenced 18 months after the original start date and 20 months after its proposal; the award of contracts and the disbursement of funds was delayed.
Funds are encumbered when contracts have been awarded.

Exhibit 8B: Historic MTA Capital Program Funding Levels (2010–2014)
in millions

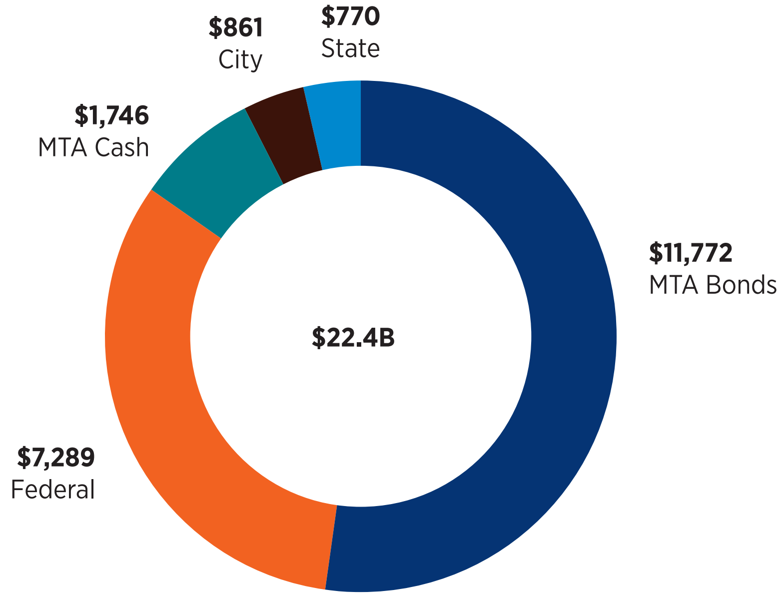
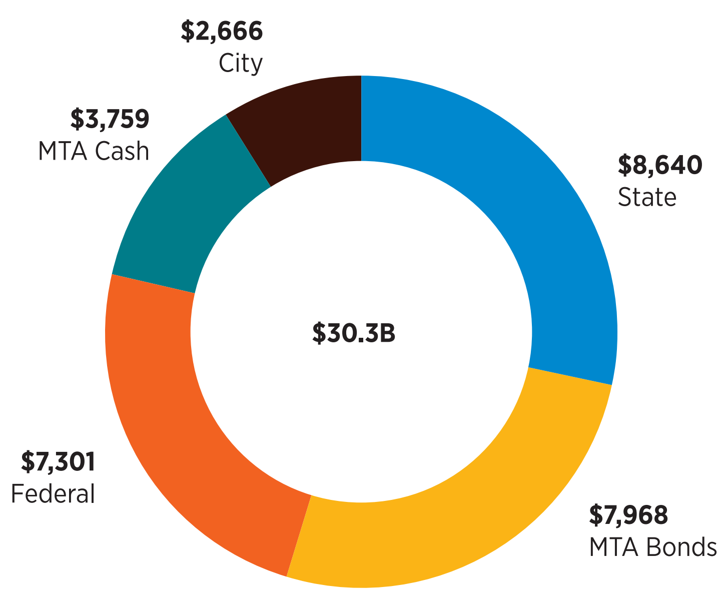


Exhibit 8C: Current MTA Capital Program Funding Levels (2015–2019)
in millions



Note: These charts do not include MTA B&T and Sandy Recovery Funds.

A Cruising Charge on FHVs

The number of FHVs operating in the city has increased 104 percent since 2014, reaching 107,000. FHVs have been identified as significant contributors to excess traffic congestion and to reductions in subway and bus ridership. Beginning in 2019, an estimated $300 million a year will be provided to the Subway Action Plan from new, flat fees on all FHVs doing business in Manhattan below 96th Street that was enacted in the fiscal year 2018 state budget. Transit experts have proposed imposing an additional roaming charge on these vehicles based on vehicle miles traveled or time spent in CBD. Many FHVs wait for fares at curbside forcing trucks to double park. A "time in CBD" charge would discourage FHVs from lingering within the CBD without passengers, a practice known as "cruising." Any FHV policy should also encourage pooled trips and shared rides.

Reconfigure the "Urban Tax"

Currently, as part of what is known as the "Urban Tax," the MTA is a beneficiary of a property transfer tax (1 percent) and a mortgage recording tax (0.625 percent) on commercial property transactions over $500,000 in New York City. Because many high-end and non-resident commercial property owners do not take mortgages, they avoid that portion of the tax. Recasting the mortgage tax as a transfer tax would likely capture more revenues from those who are benefiting most from real estate appreciation in the city.

Expand the Real Estate Transfer Tax

In addition to the urban tax imposed by New York City, New York state currently imposes a tax on the transfer of any residential and commercial real property. Some have proposed that this tax could be adjusted to add progressive tax rates on the sale of properties over $5 million, with some or all additional revenue dedicated to the MTA.

Capture Federal Corporate Tax Reduction 'Windfalls'

Federal tax code changes enacted in 2017 reduced corporate taxes and could create opportunities to amend New York state tax law to capture any "windfalls" it confers. During 2019, the implications of federal tax code changes will become clearer, as will the potential for a serious national infrastructure program that the MTA can tap into.

MTA Share of New Revenues

A number of new sources of revenues are in public discussion, such as taxes on the sale of marijuana, if legalized; pollution taxes; proceeds from expanded gaming revenues and taxes specific to New York City residents, among others. Transit should be a priority for any new authorized funding source.

Monetization of MTA Assets

Many MTA assets are located in and around buildings that have historic landmark or historic district status. Many of these properties have potentially valuable air rights, but currently no way to monetize them because of a lack of development opportunities on contiguous sites. Working with the MTA and owners of historic properties, the city might consider expanding the area eligible for air rights transfer for historic properties, in compliance with local zoning and land use requirements, in order to generate new funding from private development for both historic properties and to support the transit system.

Conclusion

Failure of the public transportation system is the single biggest threat to the continued livability and prosperity of the New York metropolitan region. It is, therefore, imperative that state and local government work together to ensure that the transportation system is adequately funded, effectively run, and that its priority investments are consistent with the transit needs of the region and its communities. The members of this Workgroup have reached consensus on a number of recommendations that are intended to jump start collaborative deliberations over transportation system funding, reorganization, and reform in 2019.

The option of funding transit through congestion pricing is particularly attractive because it reduces the economic and environmental costs of excess traffic, while allowing surface transit to move faster and increasing transit ridership. A cordon pricing zone in the Manhattan CBD would raise the most money for the MTA capital program among the options currently available, but may not completely solve immediate and longer-term capital funding needs. At the same time, there is almost universal concern that funds sent to the MTA disappear down a black hole. To generate necessary support for congestion pricing and any additional new funding sources it will be necessary to restore public trust in the MTA and the operating agencies that build and run the system. This will take independent verification of cost projections and better oversight of execution on the MTA's capital program. It will require the MTA and its subsidiaries, or their successor agencies, to be responsive to the communities they serve, transparent in planning and finance, and far more efficient in carrying out their work and reining in costs. This will require significant changes in organizational structure, operations and management practices, many of which are suggested in this report.

The members of the Metropolitan Transportation Sustainability Advisory Workgroup worked hard to come up with the recommendations set forward in this report. This reflects the importance every member attaches to prompt resolution of the funding and operational crisis that the regional transit system is experiencing. It will be up to state and local elected officials and leadership of the MTA and other relevant agencies to similarly reach agreement on the actions they need to take to ensure that the New York metropolitan region has a transportation system that is second to none.

Appendices

Metropolitan Transportation Sustainability Advisory Workgroup Enacting Language

(Chapter 59 of the laws of 2018)

§ 7. Metropolitan transportation sustainability advisory workgroup.

1. There is hereby established the metropolitan transportation sustainability advisory workgroup (the "workgroup") which shall consist of ten members, two of whom shall be appointed by the governor, two of whom shall be appointed by the speaker of the assembly, two of whom shall be appointed by the temporary president of the senate, one of whom shall be appointed by the mayor of the city of New York, one of whom shall be appointed by the chairman of the metropolitan transportation authority, one of whom shall be appointed by the commissioner of the New York city department of transportation and one of whom shall be appointed by the commissioner of the New York state department of transportation. The chair of the workgroup shall be nominated by the governor.

2. The advisory workgroup shall undertake a review of the actions and measures that are necessary to provide safe, adequate, efficient, and reliable transportation within the city of New York and the metropolitan commuter transportation district within any available resources and shall review and make recommendations regarding: (a) the adequacy of public transportation provided by the MTA, the Metro-North Commuter Railroad, the New York City Transit Authority and the Long Island Rail Road, including but not limited to the reliability, sustainability, and transparency on project selection; (b) sustainable funding for public transportation needs; (c) motor vehicular traffic within the city of New York, including, but not limited to, taxicab and for-hire vehicle trips; (d) transportation strategies to advance the furtherance of environmental goals; (e) tolling of intra-borough bridges within the city of New York; (f) taxicab and for-hire vehicle trips including those originating and/or terminating within, or transiting, particular geographic areas using publicly available information; and (g) the feasibility of a reduced fare program for transportation on New York city transit authority systems, the Long Island Rail Road and the Metro-North Commuter Railroad for students attending a university, college, community college, or post-secondary vocational institution, which is located within the city of New York.

3. The advisory workgroup shall, on or before December 31, 2018, by a majority vote approve and issue a final report and recommendations to the governor, the temporary president of the senate, the speaker of the assembly, the mayor of the city of New York, and the Metropolitan Transportation Authority.

4. For the purposes of this section, the following terms shall have the following meanings: (a) "Metropolitan Commuter Transportation District" shall mean the commuter transportation district as established by section 1262 of the public authorities law; (b) "Metropolitan transportation authority"

or “MTA” shall mean the corporation created by section 1263 of the public authorities law; (c) “Taxicab” shall have the same meaning as such term is defined by section 148-a of the vehicle and traffic law and section 19-502 of the administrative code of the city of New York; and (d) “For-hire vehicle” shall mean a motor vehicle, other than an ambulance as defined by section 100-b of the vehicle and traffic law and a bus as defined in paragraph 34 of subdivision (b) of section 1101 of the tax law, carrying passengers for hire.

§ 8. This act shall take effect immediately; provided that: a. the amendments to section 1111-c of the vehicle and traffic law made by section six of this act shall not affect the repeal of such section and shall be deemed repealed therewith; and b. the provisions of section seven of this act shall expire and be deemed repealed April 1, 2019.

Metropolitan Transportation Sustainability Advisory Workgroup Members

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Appointed by New York State Assembly Speaker Carl Heastie

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Appointed by Former MTA Chairman, Joe Lhota

Hon. Michael Gianaris, Deputy Democratic Conference Leader, New York State Senate
Appointed by New York City Mayor Bill de Blasio

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Acknowledgements

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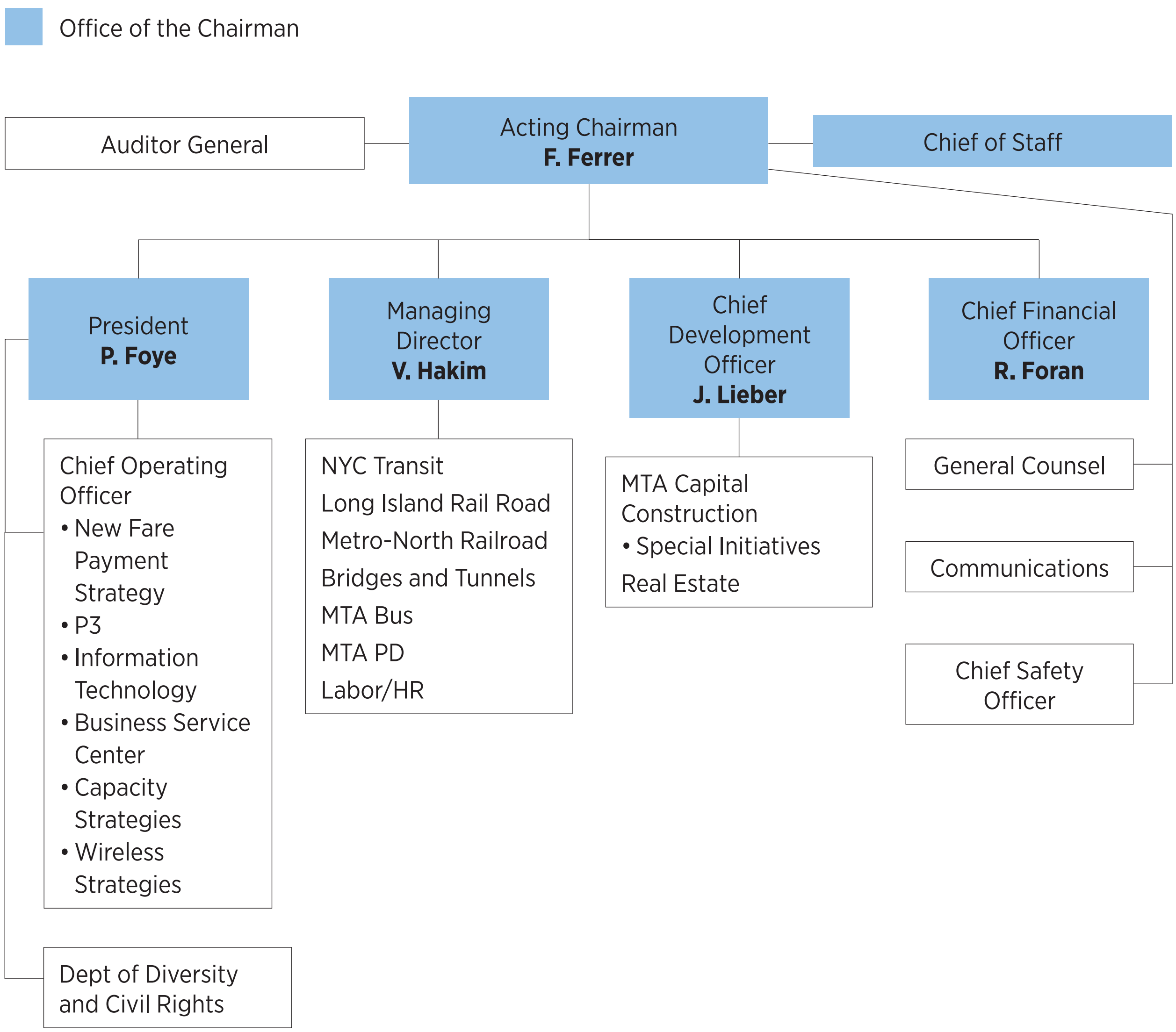
The Workgroup would like to remember Bill Wheeler, Senior Director of Special Project Development and Planning at the MTA, who provided valuable insight and perspective before his sudden passing.

MTA Organization Chart



Dedicated Taxes

Metropolitan Mass Transportation Operating Assistance Fund (MMTOA)

Includes a surcharge on corporations and a general sales tax applied in the 12-county MTA region. The MTA receives 82% of total MMTOA receipts, with the other 18% available to other transportation properties within the MTA district.
Rate: 28.6% surcharge;
0.375% sales tax

Payroll Mobility Tax

Tax on employers and self-employed individuals in the 12-county MTA region.
Rate: 0.11%–0.34%,
depending on payroll size

Petroleum Business Tax

A portion of the state's petroleum business tax, which taxes each gallon of petroleum products sold.

Urban Tax

Two-part tax that only applies in New York City on commerical properties valued at over $500,000. Includes a tax on property transfers and a tax on mortgage recordings.
Rate: 1% property transfer tax;
0.625% mortgage recording tax

Mortgage Recording Tax

Tax on mortgages recorded in the 12-county MTA region.
MRT 1 Rate–Tax Paid on all mortgages by borrower: 0.3%
MRT 2 Rate–Tax paid on mortgages for residential properties with six or fewer units: 0.25% paid by the mortage lender
Rate: 0.55%

New York City Transportation Assistance Fund

Beginning January 1, 2019, a surcharge of $2.75 per ride for all for-hire vehicles within or traversing the congestion zone, $2.50 per ride for yellow cabs within the congestion zone and $0.75 per ride on for-hire pool vehicles within the congestion zone will be added. The congestion zone is defined as the area south of 96th Street in Manhattan.

MTA Aid

Includes fees on auto rentals, vehicle registrations, driver's licenses, and taxicab rides.

Payroll Mobility Tax Replacement Funds

Funding from state to replace revenue lost from 2011 cut to Payroll Mobility Tax.

2B, MTA Reform and Traffic Mobility Act

- New York State Vehicle and Traffic Law as amended, Title 8, Respective Powers of State and Local Authorities
  - Article 38, Regulation of Traffic by Public Authorities and Commissions, Section 1630(4)
  - Article 44-c, Central Business District Tolling Program (Sections 1701 – 1706)
- New York State Public Authorities Law as amended, Article 3, Bridge and Tunnel Authorities, Title 3, Triborough Bridge Authority
  - Section 553(9-s and 12-a) – Powers of the authority
  - Section 553-j – Additional powers and provisions in relation to central business district tolling program
  - Section 553-k – Traffic mobility review board
  - Section 566-a – Tax contract by the state
- New York State Public Officers Law, Article 6, Freedom of Information Law, Section 87(2)(p)
- New York State Tax Law as amended, Article 22, Personal Income Tax, Part 1, General, Section 606 – Credits Against Tax

New York State Vehicle and Traffic Law, as amended, Title 8, Respective Powers of State and Local Authorities

- Article 38, Regulation of Traffic by Public Authorities and Commissions, Section 1630(4)
- Article 44-c, Central Business District Tolling Program (Sections 1701 – 1706)

New York State Vehicle and Traffic Law, as amended, Title 8, Respective Powers of State and Local Authorities Article 38, Regulation of Traffic by Public Authorities and Commissions Section 1630(4)

§ 1630. Regulation of traffic on highways under the jurisdiction of certain public authorities and commissions.

The New York state thruway authority, a county park commission, the Niagara Falls bridge commission, a parkway authority, a bridge authority, including the Buffalo and Fort Erie public bridge authority, the metropolitan transportation authority, the Long Island Rail Road, the Metro-North Commuter Railroad, the office of parks, recreation and historic preservation, the department of environmental conservation, the department of agriculture and markets, the industrial exhibit authority or a bridge and tunnel authority may by ordinance, order, rule or regulation prohibit, restrict or regulate traffic on or pedestrian use of any highway, property or facility under its jurisdiction. The provisions of section sixteen hundred of this title shall be applicable to such ordinances, orders, rules and regulations, provided, however, that such ordinances, orders, rules and regulations shall supersede the provisions of this chapter where inconsistent or in conflict with respect to the following enumerated subjects:

. . .

4. Charging of tolls, taxes, fees, licenses or permits for the use of the highway or any of its parts or entry into or remaining within the central business district established by article forty-four-C of this chapter, where the imposition thereof is authorized by law.

New York State Vehicle and Traffic Law, as amended, Title 8, Respective Powers of State and Local Authorities Article 44-c, Central Business District Tolling Program (§§ 1701 – 1706)

§ 1701. Legislative findings and declaration.

The ongoing failures of the tracks, signals, switches, electrical power, and other transportation infrastructure throughout the subway system in the city of New York continue to have a significant deleterious impact on the health, safety, and livelihood of commuters, tourists, resident New Yorkers, as well as business and commerce in the metropolitan commuter transportation district, which is the recognized economic engine of the state of New York, and thereby have adversely affected the economy of the state of New York. Temporary actions have been taken to address the safety of subway, bus and commuter rail riders in the short term including an emergency declaration and increased capital funding for the subways in the most recently adopted state budget. The legislature, however, determines that a long-term and sustainable solution is necessary in order to ensure stable and reliable funding to repair and revitalize this significantly important mass transit asset.

The legislature further finds and declares that traffic congestion in the city of New York ranks second worst among cities in the United States and third worst among cities in the world, and results in significant cost to the New York metropolitan area economy and in turn the state's economy at estimates exceeding one hundred billion dollars over the next five years. Travel speeds in the city of New York's central business district have dropped more than seventeen percent in two thousand sixteen to an average of 6.8 miles per hour and in Midtown Manhattan, the most congested area of the city-the area from fifty-ninth street to thirty-fifth street and from ninth avenue to the east river-the average vehicular speed is 4.7 miles per hour. Congestion in these areas is crippling and impacts the everyday lives of residents, commuters, taxi and for-hire vehicle traffic, bus transit and emergency services, and is a significant contributor to decreased air quality.

These issues have been recognized by both the Fix NYC Advisory Panel and the Metropolitan Transportation Sustainability Advisory Workgroup as significant impediments to everyday New Yorkers.

In order to ensure a safe and efficient mass transit system within the city of New York and to protect the public health and safety of New York's residents, a program to establish tolls for vehicles entering or remaining in the most congested area of the state is found to be necessary and to be a matter of substantial state concern.

§ 1702. Short title.

This act shall be known as and may be cited as "the traffic mobility act".

§ 1703. Definitions.

For the purposes of this article, unless the context otherwise requires:

1. "City" means the city of New York.

2. "Central business district toll" means a toll charged for entry into or remaining in the central business district as described in section seventeen hundred four of this article.

3. "Central business district tolling program" means the program for charging tolls for vehicles that enter or remain in the central business district and includes the central business district tolling infrastructure, the central business district tolling collection system and the central business district tolling customer service center.

4. "Central business district" means the area described in section seventeen hundred four of this article for which tolls shall be charged for a vehicle's entry into or remaining in such district.

5. "Central business district tolling infrastructure" means the devices and structures including but not limited to gantries, clear signage delineating entry into the central business district and toll amounts, and power and communication lines that the Triborough bridge and tunnel authority will plan, design, construct, and use as part of the central business district tolling program. Such infrastructure shall be planned, designed, installed and constructed pursuant to the memorandum of understanding executed pursuant to subdivision two-a of section seventeen hundred four of this article.

6. "Central business district tolling collection system" means the electronic system of collecting tolls or other charges using electronic data and/or images that the Triborough bridge and tunnel authority will plan, design, install and construct pursuant to the memorandum of understanding executed pursuant to subdivision two-a of section seventeen hundred four of this article, and that such authority shall operate as part of the central business district tolling program.

7. "Central business district tolling customer service center" means the customer contact and back-office system and operation services for the collection of central business district tolls and enforcement of central business district toll violations that the Triborough bridge and tunnel authority will plan, design, implement and operate as part of the central business district tolling program.

8. "Operation date" means the date determined by the Triborough bridge and tunnel authority, which shall not be earlier than December thirty-first, two thousand twenty, for the beginning of the operation and enforcement of the central business district tolling program. The operation and enforcement date shall commence only after an initial program testing period of thirty days where no collection of any tolls, fees, or other charges shall be authorized. As of the commencement date of operation and enforcement, there shall be a period of sixty days where only the established tolls may be collected without the collection of other fees or charges or fines.

9. "Triborough bridge and tunnel authority" means the corporation organized pursuant to section five hundred fifty-two of the public authorities law as consolidated pursuant to section five hundred fifty-two-a of the public authorities law or any successor corporation or corporation into which it may be consolidated.

§ 1704. Establishment of central business district tolling program.

1. The Triborough bridge and tunnel authority shall establish the central business district tolling program.

2. The central business district tolling program will operate in the central business district. The central business district shall include the geographic area in the borough of Manhattan south of and inclusive of sixtieth street to the extent practicable but shall not include the FDR Drive, and New York state route 9A otherwise known as the "West Side highway" including the Battery Park underpass and any surface roadway portion of the Hugh L. Carey Tunnel connecting to West St. The boundaries of the central business district shall not be modified, expanded, or reduced and shall incorporate the outer bounds of the aforementioned district to the extent practicable.

2-a. The Triborough bridge and tunnel authority shall enter into a memorandum of understanding with the city department of transportation for purposes of coordinating the planning, design, installation, construction and maintenance of the central business district tolling infrastructure including required signage. The Memorandum shall address the use of existing systems, devices and other facilities owned and operated by the city for the purposes of a central business district tolling program, as well as reimbursable costs associated with the planning, design, installation, construction and maintenance of such program. Such memorandum of understanding shall be entered into no later than sixty days from the effective date of this article.

3. (a) Notwithstanding any law to the contrary, the Triborough bridge and tunnel authority, pursuant to the memorandum of understanding executed pursuant to subdivision two-a of this section with the city department of transportation shall plan, design, install, construct, and maintain the central business district tolling infrastructure. The city of New York shall cooperate and consult with the Triborough bridge and tunnel authority to facilitate the planning, design, construction, timely implementation, and maintenance of the central business district tolling infrastructure and shall not unduly hinder or delay the planning, designing, installation, operation, construction, timely implementation, or maintenance of the same. Notwithstanding any provision of law to the contrary, the city of New York shall, pursuant to the memorandum of understanding executed pursuant to subdivision two-a of this section with the Triborough bridge and tunnel authority, be authorized to provide for the use of existing systems, devices and other facilities owned and operated by the city, including, but not limited to systems and devices installed pursuant to sections one thousand one hundred eleven-a, one thousand one hundred eleven-c, and one thousand one hundred eighty-b of this chapter to facilitate the Triborough bridge and tunnel authority's central business district tolling program and shall work with the Triborough bridge and tunnel authority to facilitate the same.

(b) The Triborough bridge and tunnel authority shall, pursuant to the memorandum of understanding executed pursuant to subdivision two-a of this section with the city department of transportation, plan, design, install, construct, and maintain a central business district toll collection system and implement and operate the same to collect the central business district toll.

(c) The Triborough bridge and tunnel authority shall plan, design, implement and operate a central business district toll customer service center.

(d) The central business district tolling program shall be planned, designed, implemented and operated to facilitate payment of central business district tolls by credit or debit card, check or automated clearing house payment, by telephone or over the internet or any other method of payment that the Triborough bridge and tunnel authority may implement.

(e) All procurements of goods, services or construction of any kind by the Triborough bridge and tunnel authority for the central business district tolling program shall be deemed to be subject only to the same requirements that otherwise apply to procurements by the Triborough bridge and tunnel authority.

(f) Signage shall be clearly delineated to provide notice at a reasonable distance prior to, and upon entry into, the central business district and upon exit from the central business district. Signage prior to entry must include the toll rates to be charged. Additionally, signage shall be provided, where practicable, to provide drivers adequate notice to avoid entry into the central business district. Design, placement and installation of signage by the Triborough bridge and tunnel authority shall be performed pursuant to the memorandum of understanding executed pursuant to subdivision two-a of this section with the city department of transportation.

4. The central business district tolling infrastructure, the central business district toll collection system and the central business district tolling customer service center shall be completed by the operation date.

5. Responsibility for maintenance of the central business district tolling infrastructure after the operation date shall be performed by the Triborough bridge and tunnel authority pursuant to the memorandum of understanding executed pursuant to subdivision two-a of this section with the city department of transportation.

6. The planning, designing, constructing, installing or maintaining of the central business district tolling program and the planning, designing, installing, constructing, operating or maintaining of the central business district toll collection system by the Triborough bridge and tunnel authority including the establishment by such authority of central business district tolls, and any other fees or rentals for the use of its projects and any changes thereafter shall not be subject to the provisions of article eight of the environmental conservation law, the provisions of chapter six of article forty-three or chapter five of title sixty-two of the rules of the city of New York, or the provisions of section one hundred ninety-seven-c of the New York city charter, relating to a uniform land use review procedure, nor the provisions of any other local law of the city of New York of like or similar effect including approvals or charges associated with the use of property owned and maintained by the city of New York necessary for the installation of central business district tolling infrastructure nor shall the determination of the central business district toll amounts by the Triborough bridge and tunnel authority board be subject to any such provisions of law. The planning, designing, installing, constructing or maintaining of the central business district tolling program by the Triborough bridge and tunnel authority shall be performed pursuant to the memorandum of understanding executed pursuant to subdivision two-a of this section.

§ 1704-a. Central business district toll.

1. Consistent with the goals of reducing traffic congestion within the central business district and funding capital projects the Triborough bridge and tunnel authority shall have the power, subject to agreements with its bondholders, and applicable federal law to establish and charge variable tolls and fees for vehicles entering or remaining in the central business district at any time and shall have the power, subject to agreements with bondholders, and applicable federal law to make rules and regulations for the establishment and collection of central business district tolls, fees, and other charges. For purposes of establishing a central business district toll or tolls the board shall, at minimum, ensure annual revenues and fees collected under such program, less costs of operation of the same, provide for sufficient revenues into the central business district tolling capital lockbox fund, established pursuant to section five hundred fifty-three-j of the public authorities law necessary to fund fifteen billion dollars for capital projects for the 2020 to 2024 MTA capital program, and any additional revenues above that amount to be available for any successor programs. Additionally, no toll may be established and charged on passenger vehicles registered pursuant to subdivision six of section four hundred one of this chapter more than once per day for purposes of entering the central business district.

2. No qualifying authorized emergency vehicle as defined pursuant to section one hundred one of this chapter or a qualifying vehicle transporting a person with disabilities shall be charged a central business district toll if it enters or remains in the central business district. Application for such toll exemption shall be made in such manner as prescribed by the Triborough bridge and tunnel authority and shall contain such information as the authority may reasonably require.

3. (a) The Triborough bridge and tunnel authority shall implement a plan for credits, discounts and/or exemptions for tolls paid on bridges and crossings informed by the recommendations of the traffic mobility review board.

(b) The Triborough bridge and tunnel authority shall be authorized to provide additional credits, discounts and exemptions informed by the recommendations of the traffic mobility review board and a traffic study that considers impact.

4. The Triborough bridge and tunnel authority shall implement a plan to address credits, discounts, and/or exemptions for for-hire vehicles as defined by, and subject to a surcharge imposed by, article twenty-nine-C of the tax law for a for-hire transportation trip, informed by the recommendation of the traffic mobility review board.

§ 1705. Disposition of revenue and penalties.

The Triborough bridge and tunnel authority shall establish and collect central business district tolls, fees and other charges as provided in subdivision twelve-a of section five hundred fifty-three of the public authorities law.

§ 1706. Reporting.

Beginning one year after the operation date and every two years thereafter, the Triborough bridge and tunnel authority, in consultation with the city department of transportation shall report on the effect of the central business district tolling program on traffic congestion in and around the central business district and on mass transit use and taxi and for-hire vehicle use including the vehicle-miles traveled for each trip within the central business district for taxis and for-hire vehicles; the current and historic volume and type of vehicles including, but not limited to, commercial trucks, transportation network companies, taxis, private cars, and tour buses, entering the central business district; environmental improvements, including but not limited to, air quality, and emissions trends in and around the central business district; congestion reduction measures; and transit ridership and average bus speeds within the central business district, and on all receipts and expenditures relating to the central business district tolling program. The department of transportation of the city of New York shall be required to assist in gathering and providing to the Triborough bridge and tunnel authority traffic impact data and other related data as directed by the Triborough bridge and tunnel authority for purposes of compiling such report. The report shall be readily available to the public, and shall be posted on the authority's website and be submitted to the governor, the director of the budget, the temporary president of the senate, the speaker of the assembly, the mayor and council speaker of the city of New York, the metropolitan transportation authority board and the metropolitan transportation authority capital program review board.

New York State Public Authorities Law, as amended, Article 3, Bridge and Tunnel Authorities, Title 3, Triborough Bridge Authority

- Section 553(9-s and 12-a) – Powers of the authority
- Section 553-j – Additional powers and provisions in relation to central business district tolling program
- Section 553-k – Traffic mobility review board
- Section 566-a – Tax contract by the state

New York State Public Authorities Law, as amended
Article 3: Bridge and Tunnel Authorities
Title 3: Triborough Bridge Authority

§ 553. Powers of the authority.

The authority shall have the power

. . .

9-s. To acquire, design, construct, maintain, operate, improve and reconstruct, so long as its corporate existence shall continue, the following projects,

. . .

(s) The central business district tolling program to the extent specified in article forty-four-C of the vehicle and traffic law and in this title.

12-a. To establish and charge variable tolls, fees and other charges for vehicles entering or remaining within the central business district and to make rules and regulations for the collection of such tolls, fees and other charges, subject to and in accordance with such agreement with bondholders and applicable federal law as may be made as hereinafter provided. Subject to agreements with bondholders and applicable federal law, all tolls, fees and other revenues derived from the central business district tolling program shall be applied to the payment of operating, administration, and other necessary expenses of the authority properly allocable to such program, including the capital costs of such program, and to the payment of interest or principal of bonds, notes or other obligations of the authority or the metropolitan transportation authority issued for transit and commuter projects as provided in section five hundred fifty-three-j of this title, and shall not be subject to distribution under section five hundred sixty-nine-c of this title or section twelve hundred nineteen-a of this chapter. The provisions of section twenty-eight hundred four of this chapter shall not be applicable to the tolls and fees established by the authority pursuant to this subdivision. Any such fares, tolls, and other charges shall be established and changed only if approved by resolution of the authority adopted by not less than a majority vote of the whole number of members of the authority then in office, with the chairman having one additional vote in the event of a tie vote, and only after a public hearing.

New York State Public Authorities Law, as amended
Article 3: Bridge and Tunnel Authorities
Title 3: Triborough Bridge Authority

§ 553-j. Additional powers and provisions in relation to central business district tolling program

1. The authority shall establish a fund to be known as the central business district tolling capital lockbox fund which shall be kept separate from and shall not be commingled with any other monies of the authority. The fund shall consist of all monies received by the authority pursuant to article forty-four-C of the vehicle and traffic law, subdivision twelve-a of section five hundred fifty-three of this title, and revenues of the real estate transfer tax deposited pursuant to subdivision (b) of section fourteen hundred twenty-one of the tax law, and sales tax pursuant to subdivision (c) of section eleven hundred forty-eight of the tax law, subparagraph (B) of paragraph five of subdivision (c) of section twelve hundred sixty-one of the tax law, and funds appropriated from the central business district trust fund established pursuant to section ninety-nine-ff of the state finance law.

* 2. Monies in the fund shall be applied, subject to agreements with bondholders and applicable federal law, to the payment of operating, administration, and other necessary expenses of the authority, or to the city of New York subject to the memorandum of understanding executed pursuant to subdivision two-a of section seventeen hundred four of the vehicle and traffic law properly allocable to such program, including the planning, designing, constructing, installing or maintaining of the central business district tolling program, including, without limitation, the central business district tolling infrastructure, the central business district tolling collection system and the central business district tolling customer service center, and the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs. Monies in the fund may be: (a) pledged by the authority to secure and be applied to the payment of the bonds, notes or other obligations of the authority to finance the costs of the central business district tolling program, including, without limitation, the central business district tolling infrastructure, the central business district tolling collection system and the central business district tolling customer service center, and the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs, including debt service, reserve requirements, if any, the payment of amounts required under bond and note facilities or agreements related thereto, the payment of federal government loans, security or credit arrangements or other agreements related thereto; or (b) used by the authority for the payment of such capital costs of the central business district tolling program and the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs; or (c) transferred to the metropolitan transportation authority and (1) pledged by the metropolitan transportation authority to secure and be applied to the payment of the bonds, notes or other obligations of the metropolitan transportation authority to finance the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs, including debt service, reserve requirements, if any, the payment of amounts required under bond and note facilities or agreements related thereto, the payment of federal government loans,

security or credit arrangements or other agreements related thereto, or (2) used by the metropolitan transportation authority for the payment of the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs, or (3) subject to approval by the board of the metropolitan transportation authority and the director of the budget, used by the metropolitan transportation authority in all or any of the fiscal years of the authority beginning in 2020 through 2021 to offset decreases in revenue, including but not limited to, lost taxes, fees, charges, fares and tolls, due in whole or in part, or increases in operating costs due in whole to the state disaster emergency caused by the novel coronavirus, COVID-19. Such revenues shall only supplement and shall not supplant any federal, state, or local funds expended by the authority or the metropolitan transportation authority, or such authority's or metropolitan transportation authority's affiliates or subsidiaries for such respective purposes. Central business district toll revenues may be used as required to obtain, utilize, or maintain federal authorization to collect tolls on federal aid highways. Provided further that, in the event the authority or metropolitan transportation authority receives funds or reimbursements, including without limitation from the federal government or insurance maintained by the authority or metropolitan transportation authority, due in whole or in part to the novel coronavirus, COVID-19, any monies from the fund used to offset decreases in revenue or increases in operating costs due in whole or in part to the state disaster emergency caused by the novel coronavirus, COVID-19, shall be repaid after the authority or the metropolitan transportation authority fully repays any public or private borrowings, draws on any lines of credit, issuances of revenue anticipation notes, any internal loans, and use of corpus of OPEB Trust to pay current retiree healthcare cost necessitated by COVID-19 revenue shortfall. Such obligation to repay shall be limited to the availability of any excess monies, and any such funds or reimbursements in excess of the amounts needed to fully repay such amounts shall be transferred to the fund and used for the purposes originally intended for such fund.

* NB Effective until April 3, 2022

* 2. Monies in the fund shall be applied, subject to agreements with bondholders and applicable federal law, to the payment of operating, administration, and other necessary expenses of the authority, or to the city of New York subject to the memorandum of understanding executed pursuant to subdivision two-a of section seventeen hundred four of the vehicle and traffic law properly allocable to such program, including the planning, designing, constructing, installing or maintaining of the central business district tolling program, including, without limitation, the central business district tolling infrastructure, the central business district tolling collection system and the central business district tolling customer service center, and the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs. Monies in the fund may be: (a) pledged by the authority to secure and be applied to the payment of the bonds, notes or other obligations of the authority to finance the costs of the central business district tolling program, including, without limitation, the central business district tolling infrastructure, the central business district tolling collection system and the central business district tolling customer service center, and the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs, including debt service, reserve requirements, if any, the payment of amounts required under bond and note facilities or agreements related thereto, the payment of federal government loans, security or credit

arrangements or other agreements related thereto; or (b) used by the authority for the payment of such capital costs of the central business district tolling program and the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs; or (c) transferred to the metropolitan transportation authority and (1) pledged by the metropolitan transportation authority to secure and be applied to the payment of the bonds, notes or other obligations of the metropolitan transportation authority to finance the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs, including debt service, reserve requirements, if any, the payment of amounts required under bond and note facilities or agreements related thereto, the payment of federal government loans, security or credit arrangements or other agreements related thereto, or (2) used by the metropolitan transportation authority for the payment of the costs of any metropolitan transportation authority capital projects included within the 2020 to 2024 MTA capital program or any successor programs. Such revenues shall only supplement and shall not supplant any federal, state, or local funds expended by the authority or the metropolitan transportation authority, or such authority's or metropolitan transportation authority's affiliates or subsidiaries for such respective purposes. Central business district toll revenues may be used as required to obtain, utilize, or maintain federal authorization to collect tolls on federal aid highways.

* NB Effective April 3, 2022

3. Any monies deposited in the fund shall be held in the fund free and clear of any claim by any person arising out of or in connection with article forty-four-C of the vehicle and traffic law and subdivision twelve-a of section five hundred fifty-three of this title. Without limiting the generality of the foregoing, no person paying any amount that is deposited into the fund shall have any right or claim against the authority or the metropolitan transportation authority, any of their bondholders, any of the authority's or the metropolitan transportation authority's subsidiaries or affiliates to any monies in or distributed from the fund or in respect of a refund, rebate, credit or reimbursement of monies arising out of or in connection with article forty-four-C of the vehicle and traffic law and subdivision twelve-a of section five hundred fifty-three of this title.

3-a. Of the capital project costs paid by this fund: eighty percent shall be capital project costs of the New York city transit authority and its subsidiary, Staten Island Rapid Transit Operating Authority, and MTA Bus with priority given to the subway system, new signaling, new subway cars, track and car repair, accessibility, buses and bus system improvements and further investments in expanding transit availability to areas in the outer boroughs that have limited mass transit options; ten percent shall be capital project costs of the Long Island Rail Road, including but not limited to, parking facilities, rolling stock, capacity enhancements, accessibility, and expanding transit availability to areas in the Metropolitan Commuter Transportation District that have limited mass transit options; and ten percent shall be capital project costs of the Metro-North Commuter Railroad Company, including but not limited to, parking facilities, rolling stock, capacity enhancements, accessibility, and expanding transit availability to areas in the Metropolitan Commuter Transportation District that have limited mass transit options.

* 4. The authority shall report annually on all receipts and expenditures of the fund. The report shall detail operating expenses of the central business district tolling program and all fund expenditures including capital projects. If, during the period of the report, any monies in the fund were used by the authority or the metropolitan transportation authority to offset decreases in revenue lost in whole or in part due to the state disaster emergency caused by novel coronavirus, COVID-19, or increases in operating costs in whole due to the novel coronavirus, COVID-19, the report shall also provide: (a) details of such decreases in revenue in whole, (b) details of such decreases in revenue in part, (c) details of such increases in costs, (d) the methodology used by the authority or metropolitan transportation authority to calculate such changes, and (e) explanation for attributing a particular increase in cost or a particular decrease in revenue, to the state disaster emergency caused by coronavirus, COVID-19. The report shall be readily available to the public, and shall be posted on the authority's website and be submitted to the governor, the temporary president of the senate, the speaker of the assembly, the comptroller, the director of the budget, the mayor and council of the city of New York, the metropolitan transportation authority board, and the metropolitan transportation authority capital program review board.

* NB Effective until April 3, 2022

* 4. The authority shall report annually on all receipts and expenditures of the fund. The report shall detail operating expenses of the central business district tolling program and all fund expenditures including capital projects. The report shall be readily available to the public, and shall be posted on the authority's website and be submitted to the governor, the temporary president of the senate, the speaker of the assembly, the mayor and council of the city of New York, the metropolitan transportation authority board, and the metropolitan transportation authority capital program review board.

* NB Effective April 3, 2022

5. Any operating funding used for the purposes of a central business district tolling program from this fund shall be approved, annually, in a plan of expenditures, by the director of the budget.

New York State Public Authorities Law, as amended
Article 3: Bridge and Tunnel Authorities
Title 3: Triborough Bridge Authority

§ 553-k. Traffic mobility review board

1. The authority's board shall establish the "traffic mobility review" board (board), which shall consist of a chair and five members, that shall be made up of regional representation, one of whom shall be recommended by the mayor of the city of New York, one of whom shall reside in the Metro North Region, and one of whom shall reside in the Long Island Rail Road Region. Members of the board must have experience in at least one of the following areas: public finance; transportation; mass transit; or management. The chair and the members of the board shall be appointed by the authority.

2. The board shall make a recommendation regarding the central business district toll amounts to be established pursuant to article forty-four-C of the vehicle and traffic law, which shall include a variable-pricing structure, no sooner than November fifteenth, two thousand twenty and no later than December thirty-first, two thousand twenty, or no later than thirty days before a central business district tolling program is initiated, whichever is later. Such recommendation shall be submitted to the board of the Triborough bridge and tunnel authority for consideration before the Triborough bridge and tunnel authority board may approve central business district toll amounts that may be established and adopted.

3. For purposes of recommending a central business district toll or tolls in addition to the goal of reducing traffic within the central business district, the board shall, at minimum, ensure that annual revenues and fees collected under such program, less costs of such program, provide for revenues into the central business district tolling capital lockbox fund, established pursuant to section five hundred fifty-three-j of this chapter, necessary to fund fifteen billion dollars for capital projects for the 2020 to 2024 capital program, and any additional revenues above that amount to be available for any successor program. The board shall consider for purposes of its recommendations, factors including but not limited to, traffic patterns, traffic mitigation measures, operating costs, public impact, public safety, hardships, vehicle type, discounts for motorcycles, peak and off-peak rates and environmental impacts, including but not limited to air quality and emissions trends. The board shall recommend a plan for credits, discounts, and/or exemptions for tolls paid on bridges and crossings which shall be informed by a traffic study associated with the impact of any such credits, discounts and/or exemptions on the recommended toll. The board shall recommend a plan for credits, discounts, and/or exemptions for for-hire vehicles defined, and subject to a surcharge imposed by, article twenty-nine-C of the tax law for a for-hire transportation trip based on factors including, but not limited to, initial market entry costs associated with licensing and regulation, comparative contribution to congestion in the central business district, and general industry impact. The board shall produce a detailed report that provides information regarding the board's review and analysis for purposes of establishing its recommendations, including but not limited to, all of the considerations referred to in this subdivision. The board shall not recommend a toll that provides for charging passenger vehicles registered pursuant to subdivision six of section four hundred one of the vehicle and traffic law more than once per day.

4. The authority, its subsidiaries, affiliates, and subsidiaries of affiliates, the city of New York, and any state agency or authority shall provide any assistance necessary to assist in the completion of the board's work and promptly respond to any requests for information or consultation consistent with the purposes of this section.

5. The Metropolitan Transportation Authority capital plan shall be reviewed by the traffic mobility review board.

6. Members of the board shall serve without compensation.

New York State Public Authorities Law, as amended
Article 3: Bridge and Tunnel Authorities
Title 3: Triborough Bridge Authority

§ 566-a. Tax contract by the state

1. It is hereby found, determined and declared that the authority and the carrying out of its corporate purposes is in all respects for the benefit of the people of the state of New York, for the improvement of their health, welfare and prosperity, and, in the case of some of the said purposes, for the promotion of their traffic, and that said purposes are public purposes and, in the case of those purposes which consist of vehicular bridges, vehicular tunnels and approaches thereto and the central business district tolling program, the project is an essential part of the public highway system and the authority will be performing an essential governmental function in the exercise of the powers conferred by this title, and the state of New York covenants with the purchasers and with all subsequent holders and transferees of bonds issued after January first, nineteen hundred thirty-nine by the authority pursuant to this title, in consideration of the acceptance of any payment for the bonds that the bonds of the authority issued after January first, nineteen hundred thirty-nine pursuant to this title and the income therefrom, and all moneys, funds, tolls and other revenues pledged to pay or secure the payment of such bonds, shall at all times be free from taxation except for estate taxes and taxes on transfers by or in contemplation of death.

2. Nothing herein shall be construed to repeal or supersede any tax exemptions heretofore or hereafter granted by general or other laws.

New York State Public Officers Law, as amended
Article 6, Freedom of Information Law

– Section 87(2)(p) – Access to agency records

New York State Public Officers Law, as amended
Article 6, Freedom of Information Law
Section 87(2)(p)

§ 87. Access to agency records.

2. Each agency shall, in accordance with its published rules, make available for public inspection and copying all records, except those records or portions thereof that may be withheld pursuant to the exceptions of rights of access appearing in this subdivision. A denial of access shall not be based solely on the category or type of such record and shall be valid only when there is a particularized and specific justification for such denial. Each agency shall, in accordance with its published rules, make available for public inspection and copying all records, except that such agency may deny access to records or portions thereof that:

. . .

* (p) are data or images produced by an electronic toll collection system under authority of article forty-four-C of the vehicle and traffic law and in title three of article three of the public authorities law.

* NB There are 2 par (p)'s

New York State Tax Law, as amended
Article 2, Personal Income Tax
Part 1, General

- Section 606 -Credits Against Tax

New York State Tax Law, as amended
Article 22, Personal Income Tax
Part 1, General

§ 606. Credits Against Tax.

* (jjj) Central business district toll credit.

(1) For taxable years beginning on or after January first, two thousand twenty-one, a resident individual whose primary residence is located in the central business district established pursuant to article forty-four-C of the vehicle and traffic law and whose New York adjusted gross income for the taxable year is less than sixty thousand dollars shall be entitled to a credit as calculated pursuant to paragraph two of this subsection.

(2) The credit shall be equal to the aggregate amount of central business district tolls paid by the taxpayer during the taxable year pursuant to the central business district tolling program authorized by article forty-four-C of the vehicle and traffic law. Provided, however, that any toll that would constitute a trade or business expense under section 162 of the internal revenue code shall be excluded.

(3) If the amount of the credit allowed under this subsection for any taxable year shall exceed the taxpayer's tax for such year, the excess shall be treated as an overpayment of tax to be credited or refunded in accordance with the provisions of section six hundred eighty-six of this article, provided, however, that no interest shall be paid thereon.

* NB There are 3 subsection (jjj)'s

2C, Memorandum of Understanding between TBTA and NYCDOT

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY
2 Broadway
New York, NY 10004

-and-

THE CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
55 Water Street
New York, NY 10041

Memorandum of Understanding ("Agreement")

This Agreement, made and effective on the 11th day of June 2019 (the "Effective Date"), is entered into between the City of New York (the "City"), a municipal corporation acting on behalf of its Department of Transportation with offices at 55 Water Street, New York, NY 10041 ("NYCDOT"), and the Triborough Bridge and Tunnel Authority, a public benefit corporation of the State of New York with offices at 2 Broadway, New York, NY 10004 ("TBTA").

WHEREAS, pursuant to the MTA reform and traffic mobility act (the "Act") TBTA is establishing a "central business district tolling program" (the "Program"), as defined in Article 44-C of the New York State Vehicle and Traffic Law ("VTL")

WHEREAS, TBTA will operate the Program in the "central business district" (the "CBD"), as defined in VTL §1703(4), commencing on the "operation date" ("Operation Date"), as defined in VTL § 1703(8).

WHEREAS, pursuant to VTL §1704(2-a), TBTA and NYCDOT enter into this Agreement for purposes of coordinating and facilitating the planning, design, installation, construction, and maintenance of the central business district tolling infrastructure as defined by VTL §1703, including required signage ("infrastructure").

WHEREAS, pursuant to VTL §1704(3), TBTA and NYCDOT enter into this Agreement for purposes of coordinating and facilitating the planning, design, installation, construction, and maintenance of the equipment and devices which are located in the Impacted Public Right of Way (as defined herein) to collect electronic data and/or images as part of the central business district toll collection system as defined by VTL §1703 ("toll collection system equipment").

WHEREAS, TBTA, in consultation with NYCDOT, shall plan, design, implement, and maintain the infrastructure and toll collection system equipment in such a way as to protect public safety.

WHEREAS, this Agreement also addresses TBTA's right to use existing systems, devices and other facilities owned and operated by NYCDOT for the purposes of the Program, as well as actual reimbursable costs to the City of New York, including NYCDOT and other agencies, associated with the planning, design, installation, construction, operation and maintenance of the Program, in accordance with VTL §1704(2-a), properly allocable to the Program;

1

WHEREAS,TBTA requires access to a portion of the street and sidewalk, as well as any other poles, lines or appurtenances (the "Impacted Public Right of Way") in order to install, maintain, and repair the infrastructure; and

WHEREAS, TBTA requires access to the Impacted Public Right of Way in order to install, maintain, and repair the toll collection system equipment; and

WHEREAS, by this Agreement, NYCDOT has agreed to allow TBTA to use the Impacted Public Right of Way, subject to the following terms and conditions.

IT IS HEREBY AGREED:

1. Access Granted. (a) NYCDOT hereby grants to TBTA and its designees (e.g. contractors, subcontractors and suppliers) a license to use and maintain the Impacted Public Right of Way and within the same to install, inspect, maintain, repair or remove the infrastructure in strict accordance with Exhibit A attached hereto and Section 6, Permitting, herein. (b) NYCDOT hereby grants to TBTA and its designees (e.g. contractors, subcontractors and suppliers) a license to use and maintain the Impacted Public Right of Way and within the same to install, inspect, maintain, repair or remove the toll collection system equipment in strict accordance with Section 6, Permitting, herein.

2. TBTA's Right To Operate the Infrastructure and Toll Collection System Equipment. NYCDOT agrees that TBTA has the right to operate the infrastructure and toll collection system equipment in the Impacted Public Right of Way.

3. Term. This Agreement is for a ten (10) year term, commencing on the Effective Date, and it will automatically renew for successive ten (10) year terms, unless terminated earlier in accordance with this Agreement, provided however that it shall not be terminated in whole or in part in any way that would prevent TBTA's collection of Program tolls so long as there are any outstanding bonds, notes or other obligations that have been secured by funds in the Central Business District Tolling Capital Lockbox Fund established pursuant to Public Authorities Law §553-j.

4. Reimbursement to NYCDOT and other City Agencies. TBTA shall reimburse NYCDOT and other City entities ("City Agencies") for actual costs of work performed and services provided by NYCDOT and other City Agencies, their consultants and contractors: (i) associated with the planning, design, installation, construction and maintenance of the infrastructure, including signage, and the toll collection system equipment that is subject to this Agreement, in accordance with VTL §1704(2-a); (ii) associated with the Traffic Study (described in Section 9, Traffic Study, herein), Evaluation Report (described in Section 10, Evaluation Report, herein) and Parking Study (described in §9 of the Act); and (iii) otherwise requested by TBTA and agreed to by NYCDOT, properly allocable to the Program as determined by TBTA.

   NYCDOT shall keep and cause their consultants and contractors to keep, for a minimum of six (6) years, all appropriate cost records and accounts relating to the NYCDOT's reimbursable costs under this Agreement. NYCDOT will notify and request that other City Agencies require the same of their consultants and contractors.

NYCDOT shall submit quarterly reimbursement requests and projected costs for the next quarter to TBTA for costs pertaining to the Program. Upon approval of each reimbursement request pursuant to New York State Public Authorities Law § 553-j(2), TBTA shall make such payment to NYCDOT within three (3) months of receipt of each quarterly reimbursement request. NYCDOT shall submit such reimbursement requests within six (6) months of the cost being incurred.

5. <u>TBTA Special Obligation</u>.

a. TBTA is authorized to undertake this Program by virtue of the provisions of Article 44-C of the VTL, Central Business District Tolling Program.

b. For reimbursable costs payable to NYCDOT before the Program has begun collecting tolls, this Agreement constitutes a special obligation of TBTA, payable solely from the $100 million appropriated by the Legislature as an advance to the Metropolitan Transportation Authority ("MTA") for the capital project costs of the planning, design, acquisition and construction, required or expected to be required to implement the Program or from other financing mechanisms to be determined which will also be fully reimbursed from net revenues generated from the Program. TBTA represents that these monies will be adequate to fund the NYCDOT reimbursable costs under the Agreement. NYCDOT reimbursable costs under this Agreement are not payable from any other monies of TBTA, including, without limitation, monies received by TBTA from the operation of the other projects and facilities set forth in subdivision 9 of Section 553 of the New York State Public Authorities Law, other than the Central Business District Tolling Program, except as otherwise provided above.

c. For reimbursable costs payable to NYCDOT after the Program has begun collecting tolls, the Agreement constitutes a special obligation of TBTA, payable solely from monies deposited into the central business district tolling capital lockbox fund and available for use by TBTA thereunder ("Central Business District Tolling Program Receipts"), which fund has been established in accordance with Section 553-j of the New York State Public Authorities Law (the "CBD Lockbox Fund"), subject to agreements with bondholders secured by the Central Business District Tolling Program Receipts. NYCDOT reimbursable costs under this Agreement are not payable from any other monies of TBTA, including, without limitation, monies received by TBTA from the operation of the other projects and facilities set forth in subdivision 9 of Section 553 of the New York State Public Authorities Law, other than the Central Business District Tolling Program. TBTA represents that the estimated Central Business District Tolling Program Receipts to be deposited in the CBD Lockbox Fund will be adequate to fund the NYCDOT reimbursable costs under this Agreement.

6. <u>Permitting.</u>

a. TBTA voluntarily agrees to direct its contractors to obtain permits to occupy, open or close City roadways and sidewalks from the NYCDOT

Office of Construction Mitigation and Coordination ("OCMC") for the installation, maintenance, repair or removal of the infrastructure and toll collection system equipment ("Contractor OCMC Permits").

b. In accordance with NYCDOT's obligation to not unduly hinder or delay the planning, designing, installation, operation, construction, timely implementation, or maintenance of the infrastructure, NYCDOT agrees that OCMC shall implement an expedited process for the issuance of Contractor OCMC Permits. OCMC shall dedicate the necessary staff to process Contractor OCMC Permits in an expedited and prioritized manner and shall issue Contractor OCMC Permits within two (2) business days of application from TBTA contractors, except for an event deemed to be a force majeure. NYCDOT will also provide a process for TBTA's contractor to receive an immediate Contractor OCMC Permit for required work in the event of an emergency that imperils life, health, safety or operation of the infrastructure or toll collection system equipment.

c. Notwithstanding anything to the contrary herein, TBTA expressly reserves its right to assert in the Dispute Resolution process herein that it is not legally obligated to obtain Contractor OCMC Permits and pending a final determination rendered as a result of the Dispute Resolution process, to immediately direct its contractor to stop obtaining Contractor OCMC Permits for the installation, maintenance, repair or removal of the infrastructure or toll collection system equipment.

d. All disputes regarding Contractor OCMC Permits shall be resolved solely in accordance with Section 24, Dispute Resolution, in lieu of any OCMC appeals process.

7. NYCDOT Responsibilities and TBTA Responsibilities. In support of the Program, NYCDOT shall cooperate and consult with TBTA to facilitate the planning, design, construction, timely implementation, and maintenance of the infrastructure and toll collection system equipment, and shall not unduly hinder or delay the planning, designing, installation, operation, construction, timely implementation, or maintenance of the same. NYCDOT shall provide assistance for the planning, design, construction, timely implementation, and maintenance of the infrastructure and toll collection system equipment including, but not limited to the following:

a. NYCDOT shall provide to TBTA detailed information on all NYCDOT planned projects that may impact the collection of Program tolls including but not limited to street improvement projects, capital street reconstruction projects, and capital bridge maintenance and repair projects in the vicinity of the 60th Street cordon, on FDR Drive south of 61St Street, on Route 9A south of 61St Street, on the Battery Park Underpass, and on the four East River Bridges or connecting ramps. NYCDOT will seek to schedule and implement such projects so as to minimize interference with the Program.

b. NYCDOT shall facilitate TBTA engagement with other City Agencies, including but not limited to the New York City Department of Parks and Recreation, the New York City Department of Design and Construction, the

4

New York City Department of Environmental Protection, the New York City Police Department, and the New York City Fire Department regarding the Program. This engagement shall include the identification and coordination of other City Agency construction and maintenance projects in the vicinity of the 60th Street cordon, the FDR Drive south of 61St Street, on Route 9A south of 61St Street, the Battery Park Underpass and on the four East River Bridges or connecting ramps.

c. NYCDOT shall review in a timely manner all TBTA requests for street design changes in support of the Program, including but not limited to changes in street direction, street geometry, curb regulations, or turn restrictions. If NYCDOT finds such changes feasible, NYCDOT will implement such changes or allow the TBTA or its contractor to implement such changes.

d. NYCDOT shall provide to TBTA traffic impact data and other related data, as requested by TBTA, for the Evaluation Report and other uses relevant to the Program.

e. NYCDOT shall promptly furnish TBTA any necessary available records, engineering reports, inspection reports and other technical information that may be required for the planning, design, installation, construction and maintenance of the infrastructure and toll collection system equipment.

f. Upon request by TBTA for specific locations, NYCDOT will provide to TBTA existing engineering drawings for bridges, streets, and other NYCDOT structures, as well as other street furniture drawings that NYCDOT may have. The drawings may be subject to non-disclosure conditions as determined by NYCDOT.

g. NYCDOT will provide to TBTA the locations of existing NYCDOT cameras, E-ZPass readers, and fiber optic communication network. The disclosure of the locations may be subject to non-disclosure conditions as determined by NYCDOT.

h. NYCDOT will provide the maintenance, repair and regular replacement of signage required for the Program within the City of New York in strict accordance with Exhibit C attached hereto.

i. NYCDOT shall provide Contractor OCMC Permits for access required by TBTA's designers and contractors for the purpose of planning, evaluating, surveying, designing, construction, maintaining and operating the infrastructure and the toll collection system equipment. Such Contractor OCMC Permits shall include lane closures, street closures, bridge closures, street opening, sidewalk closures and sidewalk opening, as set forth in Section 6, Permitting, herein.

j. NYCDOT shall facilitate TBTA's engagement with other City Agencies for the use of existing systems, devices and other facilities owned and operated by other City Agencies for the purposes of the Program.

5

Unless expressly set forth in this Agreement as a NYCDOT responsibility, TBTA will be responsible for installing, inspecting, maintaining and repairing or replacing the infrastructure. TBTA's responsibilities shall also include providing utility support to the infrastructure, including electricity, and any and all changes in sewers or other subsurface structures necessitated by the construction or removal of the infrastructure, including the laying or relaying of pipes, conduits, sewers or other structures. TBTA shall protect all property, which may in any way be disturbed by the construction of the infrastructure or toll collection system equipment, and it shall replace or restore the Impacted Public Right of Way and any other affected property, which is disturbed during the construction of the infrastructure or toll collection system equipment, consistent with Section 19, Removal or Deactivation of the Infrastructure, herein.

TBTA will be responsible for installing, inspecting, maintaining and repairing or replacing the toll collection system equipment. TBTA's responsibilities shall also include providing utility support to the toll collection system equipment, including electricity, and any and all changes in sewers or other subsurface structures necessitated by the construction or removal of the toll collection system equipment, including the laying or relaying of pipes, conduits, sewers or other structures. TBTA shall protect all property, which may in any way be disturbed by the construction of the infrastructure or toll collection system equipment, and it shall replace or restore the Impacted Public Right of Way and any other affected property, which is disturbed during the construction of the infrastructure or toll collection system equipment, consistent with Section 19, Removal or Deactivation of the Infrastructure, herein.

NYCDOT's review and consultation on any elements of the infrastructure or other components of the Program, or its failure to exercise its right to consult or seek changes in any elements of the infrastructure or other components of the Program, shall not relieve TBTA of its obligation to install, operate, inspect, maintain, repair or remove the infrastructure and to install, operate, inspect, maintain, repair or remove the toll collection system equipment as provided in this Agreement.

8. Engagement with Federal Agencies. It is possible that approval from the United States Department of Transportation ("USDOT"), acting through the Federal Highway Administration ("FHWA"), will be required to implement the Program. If the USDOT determines that the Program requires federal approval:

a. TBTA, NYCDOT and the New York State Department of Transportation ("NYSDOT") shall jointly submit an application for such approval.

b. TBTA, NYCDOT and NYSDOT shall jointly negotiate any required agreement with USDOT for approval of the Program.

c. TBTA, NYCDOT and NYSDOT shall not execute any agreement for the Program with USDOT that bars or limits access to or the use of federal funding by the City, NYSDOT or the MTA.

d. TBTA and MTA have hired a consultant to prepare federally-compliant environmental documents for the Program, pursuant to the National

6

Environmental Policy Act ("NEPA"), Section 4(f) of the Department of Transportation Act, Section 106 of the National Historic Preservation Act, and any other relevant laws. TBTA, MTA and NYCDOT shall establish an environmental review working group that will collaboratively develop the environmental documentation, with NYSDOT. TBTA shall provide NYCDOT with the opportunity to review and comment on draft environmental documents prior to submission to USDOT.

9. Traffic Study. Pursuant to §10 of the Act, TBTA and NYCDOT shall jointly undertake a Traffic Study (the "Traffic Study") that includes the CBD and surrounding areas that shall be provided to the Traffic Mobility Review Board (as defined in Public Authorities Law §553-k) for purposes of allowing such Board to make recommendations consistent with Public Authorities Law §553-k. The Traffic Study will include an evaluation of the impact of various variable pricing structures and the impacts of any credits, discounts and/or exemptions on traffic and thus on the recommended toll as well as of traffic patterns and environmental impacts including but not limited to air quality and emission trends.

10. Evaluation Report. TBTA may jointly with NYCDOT or individually prepare an Evaluation Report (the "Evaluation Report") beginning one year after the Operation Date and every two years thereafter. Each Evaluation Report will include but not be limited to an evaluation of the effect of the Program after the Operation Date on traffic congestion in and around the CBD, travel patterns, mass transit usage, environmental improvements and receipts and expenditures relating to the Program. NYCDOT shall assist in gathering and providing TBTA with traffic impact and other related data.

11. Public Outreach. NYCDOT and TBTA agree that the success of the Program depends on public acceptance and understanding and to that end, the parties agree to cooperate and collaborate on a public outreach campaign for the Program.

a. TBTA or MTA will provide the draft Public Outreach Plan (POP) to NYCDOT for the purpose of review and consultation.

b. To the extent feasible, TBTA or MTA will provide five (5) days advance notice to NYCDOT of all public meetings relating to the infrastructure.

c. To the extent feasible, TBTA or MTA will provide outreach materials related to the infrastructure to NYCDOT for review and comment five (5) days prior to public release.

d. TBTA or MTA will notify NYCDOT of all meetings with stakeholders related to the installation and operation of the infrastructure.

e. NYCDOT will provide staff support to all public outreach meetings related to the infrastructure to the extent practicable and provided NYCDOT received advance notice as detailed above.

12. Design Requirements. TBTA will site and design the infrastructure in accordance with the Design Requirements outlined in Exhibit A hereto, so far as practicable. TBTA will site and design the toll collection system equipment in accordance with applicable Design Requirements outlined in Exhibit A hereto, so far as practicable.

a. TBTA will provide proposed sites, designs, and engineering drawings to NYCDOT for review and consultation, in accordance with Exhibit A herein.

b. NYCDOT and TBTA will designate at least one technical subject matter expert to serve on a Technical Expert Panel and be available for consultation by the TBTA selection committee for the contractor that will design, build, and maintain the infrastructure and toll collection system equipment. The NYCDOT technical subject matter expert will attend all oral presentations by proposers and TBTA will provide to the NYCDOT technical subject matter expert portions of all proposals pertaining to the infrastructure. Each subject matter expert shall execute a Conflict of Interest/Non-disclosure Form.

13. Construction Requirements. TBTA will perform all work in strict accordance with the Release for Construction Design Drawings (as defined in Exhibit A) for the infrastructure, in consultation with NYCDOT.

TBTA will take all reasonable efforts to minimize disruption to activities on, and to prevent damage to, any personal property and structures of the NYCDOT and others located at, on or near the Impacted Public Right of Way.

TBTA shall furnish, within ninety (90) days of receipt, to the NYCDOT as-built record documents, showing accurately and distinctly the location, size and type of such construction, and complete dimensions of the infrastructure and toll collection system equipment, as well as the location and dimensions of all substructures encountered during the progress of the work.

14. Coordination with Full and Partial Road Closures. NYCDOT streets and bridges are regularly closed to traffic for maintenance, repair, capital reconstruction, special events (such as parades and street fairs), emergency response, and security purposes (such as during presidential visits and United Nations General Assembly). NYCDOT shall provide advance notice to TBTA of planned closures of any streets that could have an impact on the Program including but not limited to streets in the immediate vicinity of the 60th Street cordon, the FDR Drive, Route 9A, West Street, the Battery Park Underpass, and the Ed Koch Queensboro, Williamsburg, Manhattan, and Brooklyn Bridges. NYCDOT will close streets and bridges at its sole discretion, and it will not be liable for any damages or loss of revenue in connection with the Program resulting from such closures. NYCDOT will make reasonable efforts to mitigate the impact on the program due to such closures, and may facilitate engagement between TBTA and other City Agencies to do the same. NYCDOT, in coordination with NYPD, will develop a process to provide the TBTA Operations Command Center with notifications of unplanned closures as soon as NYCDOT becomes aware of such closures.

15. Maintenance and Repair of Infrastructure and Impacted Public Right of Way. TBTA shall be responsible for the maintenance and repair of the infrastructure and toll collection system.

a. The TBTA shall submit a maintenance and repair plan to NYCDOT five (5) to seven (7) days prior to the Operation Date for NYCDOT review and consultation. The plan shall detail TBTA's standard procedures for routine

8

and emergency maintenance and repair of the infrastructure and the toll collection system equipment, including locations, equipment or vehicles to be used, typical maintenance and protection of traffic plans, time of day restrictions, and typical work duration.

b. TBTA shall address safety critical repairs, including a fallen or listing infrastructure or any other condition that poses an immediate threat to public safety, as soon as practicable upon notification.

c. TBTA shall keep the infrastructure, toll collection system equipment and the Impacted Public Right of Way in good, clean, graffiti-free, and safe condition at all times.

d. TBTA shall give written notice to the NYCDOT at least forty-eight (48) hours before it performs any work to replace any major structural component of the infrastructure, except that no such notice shall be required with respect to any routine maintenance of, or repairs made to, the infrastructure, however, TBTA and its contractors will obtain Contractor OCMC Permits associated with such work as described in Section 6, Permitting.

16. NYCDOT's Rights to Access Impacted Public Right of Way. TBTA shall allow NYCDOT a right of way under, through and above any and all parts of the infrastructure and any portions of the Impacted Public Right of Way subject to the terms below.

NYCDOT will give written notice to TBTA if the infrastructure and toll collection system equipment may be disturbed by work, including but not limited to capital street reconstruction, water main and sewer maintenance, repair, or replacement, or sidewalk reconstruction. At the beginning of each fiscal year, NYCDOT shall provide TBTA with a list of anticipated capital street reconstruction, water main and sewer maintenance, repair or replacement or sidewalk reconstruction projects for the year. NYCDOT shall seek to stage its work in a manner so as to minimize any impact on the infrastructure and toll collection system equipment and shall assist the TBTA in coordination with other City Agencies regarding their work. TBTA or its contractor shall accommodate the work of NYCDOT and other City Agencies by protecting the infrastructure and toll collection system equipment or by replacing the permanently installed infrastructure with temporary infrastructure and toll collection system equipment, deploying mobile toll collection equipment, temporarily relocating the toll collection equipment, or by employing another strategy. The cost of all such replacement, protection, temporary relocation, or use of mobile toll collection equipment shall be at the sole cost and expense of TBTA. The NYCDOT will endeavor to provide thirty (30) day notice of such condition, but it reserves the right to require action sooner in cases of emergency.

17. Preventing NYCDOT Interference with the Infrastructure, Toll Collection System Equipment and/or the Collection of Program Tolls. NYCDOT and its contractors shall not install any street light poles, traffic signal poles, gantries or other street furniture in locations that would interfere with, impair or impede in any way the infrastructure, toll collection system equipment and/or TBTA's collection of Program tolls.

9

18. Use of NYCDOT Existing Systems, Devices and other Facilities. NYCDOT shall, consistent with this Agreement, grant TBTA permission to mount toll collection system equipment on existing NYCDOT infrastructure, including bridge structures and existing gantry structures.

    a. No toll collection system equipment will be placed on existing streetlight or signal poles if the poles cannot withstand the additional load or if the mounting of such equipment is technically infeasible. NYCDOT may grant TBTA permission to site infrastructure at the location of existing streetlight poles which cannot be used because they cannot withstand the additional load.

    b. At locations where TBTA places infrastructure at the site of an existing NYCDOT streetlight pole, the infrastructure will include a streetlight luminaire to provide illumination of the vehicle detection area. TBTA shall maintain the luminaire as necessary at its sole cost.

19. Removal or Deactivation of the Infrastructure. If TBTA ceases to use the infrastructure and toll collection system equipment for the Program or after the expiration or termination of this Agreement, within a reasonable period of time, TBTA shall remove the infrastructure and toll collection system equipment, and restore the Impacted Public Right of Way, as well as any other affected City property, to its condition immediately prior to the installation of the infrastructure and toll collection system equipment or to a condition otherwise agreed upon by NYCDOT and TBTA. The removal and restoration shall be at the sole cost and expense of TBTA.

    Notwithstanding the foregoing, TBTA shall be bound by all the terms and conditions of this Agreement, until the infrastructure is removed and the Impacted Public Right of Way and any such other affected City property is restored.

20. Data Sharing. TBTA shall work to share data with NYCDOT. TBTA will provide NYCDOT with a real time data feed, as it becomes available, of vehicles entering the CBD at all entry points to the CBD. At NYCDOT's sole cost (to be deducted by TBTA from an reimbursable costs due to NYCDOT under Section 4, Reimbursement to NYCDOT and Other City Agencies), TBTA shall anonymize the real time data to exclude any personally identifiable information, including license plate numbers or E-ZPass account numbers but the data will include vehicle classifications. On or before the Effective Date, TBTA shall provide NYCDOT with historical data from 2015 to the present of vehicle volumes and classifications on all TBTA crossings.

21. Safety. TBTA shall cause its contractors and consultants to perform work to the infrastructure and toll collection system equipment in the Impacted Public Right of Way with regard to the safety of life and property.

22. Labor. NYCDOT and TBTA agree that nothing in the Agreement or the Program shall be construed to impede, infringe or diminish the rights and benefits that accrue to employees and employers through collective bargaining agreements.

23. Notices. The parties agree that the following persons shall serve as designated persons for the giving or receipt of notices under this Agreement and all notices shall be provided by email and, unless receipt of the e-mail is acknowledged by the recipient by e-mail, by regular mail, as follows:

If to NYCDOT:

Senior Director for Special Projects
New York City Department of Transportation
55 Water Street, 9th floor
New York, NY 10041
Currently: wcarry@dot.nyc.gov

With copy to:
Deputy General Counsel
New York City Department of Transportation
55 Water Street, 9th floor
New York, NY 10041
Currently: spondish@dot.nyc.gov

If to TBTA:

Senior Vice President, Business Operations & Transformation Officer
Triborough Bridge and Tunnel Authority
2 Broadway, 23rd Floor
New York, NY 10004
Currently: acdecerreno@mtabt.org

With copy to:
Senior Vice President and General Counsel
Triborough Bridge and Tunnel Authority
2 Broadway, 24th Floor
New York, NY 10004
Currently: mterry@mtabt.org

24. Dispute Resolution.

a. If a dispute arises in connection with this Agreement, NYCDOT and TBTA will first attempt to resolve the dispute at the staff level. If the dispute cannot be resolved at the staff level, the parties will elevate the dispute to the NYCDOT Commissioner (or her/his designee) and the MTA Chairman (or her/his designee) (collectively "Parties' Executives"). The Parties' Executives will review the dispute with their respective staffs and participate in a meeting in an attempt to resolve the dispute. If the dispute cannot be resolved at the meeting between the Parties' Executives, then either party may institute a legal action to resolve the dispute.

b. Choice of law. This Agreement shall be governed by and construed in accordance with the laws of the State of New York.

c. Venue. Any action under this Agreement shall be brought in a Court of competent jurisdiction in the State of New York, County of New York.

25. Agreement Subject to Existing Rights. This Agreement is subject to whatever right, title or interests the owners of abutting property or others may have and TBTA acquires no right, title or interest in the property occupied by the infrastructure and toll system equipment.

26. Restrictions Against Transfer of Use of Agreement. This Agreement shall not, either in whole or in part, be sold, assigned, leased or sublet in any manner, without the express written consent of the NYCDOT, which may be granted in its sole, reasonable discretion. Notwithstanding the foregoing, TBTA may freely transfer or sublicense its license to use, maintain and operate the infrastructure and toll collection system equipment to any subsidiary or affiliate agency of TBTA or any successor corporation or corporation into which it may be consolidated or the Metropolitan Transportation Authority ("MTA") without the express written consent of NYCDOT.

27. Laws, Rules and Regulations. TBTA shall strictly conform to all laws, rules and regulations in connection with the Program consistent with Article 44-C of the Vehicle and Traffic Law and it will require that its contractors and consultants obtain Contractor OCMC Permits, in accordance with the requirements of Section 6, Permitting, for all activities including site assessment, construction staging, construction activities, maintenance and repair work requiring TBTA's contractor to occupy, open or close City roadways and sidewalks in connection with the infrastructure and toll collection system equipment in the Impacted Public Right of Way, subject to TBTA's rights pursuant Section 6, Permitting, above.

28. Indemnification and Insurance – TBTA.

To the extent permitted by law, TBTA agrees to defend, indemnify and hold harmless the City, including its officials and employees, against claims for damages by reason of bodily injury or death or damage arising out of work performed by TBTA or its employees, agents, servants, contractors and subcontractors in connection with the infrastructure and/or toll collection system equipment of the Program in the Impacted Public Right of Way and Program signage, as defined in Exhibit C, installed by TBTA or its employees, agents, servants, contractors or subcontractors to the extent that claims for such damages are not covered and paid by insurers or paid by the third parties. However, this indemnification shall not include any damages that result from the acts, omissions or negligence of the City, its agents, employees or representatives.

a. TBTA shall be solely responsible for the safety and protection of its employees, agents, servants, contractors and subcontractors, and for the safety and protection of the employees, agents, or servants, of its contractors and subcontractors for work performed by TBTA or its employees, agents, servants, contractors and subcontractors on the infrastructure and/or toll collection system equipment in the Impacted Public Right of Way and Program signage.

b. TBTA shall be solely responsible for taking all reasonable precautions to protect the persons and property of the City or others from damage, loss or injury resulting from any and all work performed by TBTA or its employees, agents, servants, contractors and subcontractors on the infrastructure and/or toll collection system equipment in the Impacted Public Right of Way and Program signage under this Agreement.

c. TBTA shall conduct operations in connection with work performed by TBTA or its agents and assigns on the infrastructure and/or toll collection system equipment in the Impacted Public Right of Way and Program signage in compliance with, and shall not cause or permit violation of any and all applicable federal, or state environmental, health and/or safety-related laws, regulations, standards, decisions of the courts consistent with Article 44-C of the Vehicle and Traffic Law, Contractor OCMC Permits or Contractor OCMC Permit conditions consistent with this Agreement, currently existing or as amended or adapted in the future which are or become applicable to operations under this Agreement (collectively "Environmental Laws"). Except as may be agreed by the NYCDOT as part of this Agreement, TBTA shall not cause or permit, or allow any of TBTA's personnel to cause or permit any Hazardous Materials to be brought upon, stored, used, generated, treated or disposed of on any property in connection with operations under this Agreement. Existing Hazardous Materials which may be disturbed by the work shall be abated and disposed of in accordance with TBTA Standard Specifications. As used herein, "Hazardous Materials" means any chemical, substance or material which is now or becomes in the future listed, defined or regulated in any manner by any Environmental Law based upon, directly or indirectly, its properties or effects.

d. During the entire term of this Agreement, TBTA shall require that any of its contractors performing work in connection with the infrastructure and/or toll collection system equipment in the Impacted Public Right of Way and Program signage add the City, including its officials and employees, as additional insureds to any insurance policy required by NYCDOT pursuant to Exhibit B attached hereto.

29. <u>Indemnification and Insurance – NYCDOT.</u>

NYCDOT agrees to defend, indemnify and hold harmless TBTA, including its officials and employees, against claims for damages by reason of bodily injury or death or damage arising out of work performed by NYCDOT or its employees, agents, servants, contractors and subcontractors in or around the Impacted Public Right of Way that impacts the infrastructure or toll collection system equipment and in connection with Program signage, as defined in Exhibit C, to the extent that claims for such damages are not covered and paid by insurers or paid by the third parties, excluding, however, this indemnification shall not include any damages that result from the acts, omissions or negligence of TBTA, its employees, agents, servants, contractors and subcontractors.

a. NYCDOT shall be solely responsible for the safety and protection of its employees, agents, servants, contractors and subcontractors, and for the safety and protection of the employees, agents, or servants of its contractors and subcontractors for work performed in or around the Impacted Public Right of Way that impacts the infrastructure or toll collection system equipment and in connection with Program signage.

b. NYCDOT shall be solely responsible for taking all reasonable precautions to protect the persons and property of TBTA or others from damage, loss or injury resulting from any and all work by NYCDOT.

c. NYCDOT shall conduct operations in connection with the work performed in and around the Impacted Public Right of Way that impacts the infrastructure or toll collection system equipment and in connection with Program signage in compliance with, and shall not cause or permit violation of any and all applicable federal, state or local environmental, health and/or safety-related laws, regulations, standards, decisions of the courts, authorizations, currently existing or as amended or adapted in the future which are or become applicable to operations under this Agreement (collectively "Environmental Laws"). Except as may be agreed by TBTA as part of this Agreement, NYCDOT shall not cause or permit, or allow any of NYCDOT's personnel to cause or permit any Hazardous Materials to be brought upon, stored, used, generated, treated or disposed of on any property in connection with operations under this Agreement. As used herein, "Hazardous Materials" means any chemical, substance or material which is now or becomes in the future listed, defined or regulated in any manner by any Environmental Law based upon, directly or indirectly, its properties or effects.

d. During the entire term of this Agreement, NYCDOT shall require that any of its contractors performing work in connection with Program signage to add TBTA, the Metropolitan Transportation Authority, including its subsidiaries and affiliates and their officials and employees, as additional insureds to any insurance policy required by TBTA.

30. Notice of Claims. The parties will (i) notify each other promptly of any personal injury or property damage occurring to or claimed by any occupant, individual or entity on or relating to the Impacted Public Right of Way in connection with the Program of which it has knowledge; (ii) forward to each other copies of any summons, subpoena, or other like legal document received relating to the Impacted Public Right of Way and Program signage, as defined in Exhibit C, in connection with the Program; and (iii) notify each other promptly of any subpoena, demand for documents under the Freedom of Information Law ("FOIL") or other like legal document received relating to Program documents that NYCDOT has obtained from TBTA, on the one hand, and that TBTA has obtained from NYCDOT, on the other.

31. All Legal Provisions Deemed Included. Each and every provision required by law applicable to this Agreement is hereby deemed to be a part of this Agreement, whether actually inserted or not.

32. Severability/Unlawful Provisions Deemed Stricken. If this Agreement contains any unlawful provision not an essential part of the Agreement, the unlawful provision shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the Agreement without affecting the binding force of the remainder.

33. Advertising. No advertisement or other materials unrelated to the operation of the Program shall be placed on, affixed to, programed from, or in any way displayed on the Impacted Public Right of Way by TBTA or its contractor unless expressly authorized in writing by the NYCDOT.

34. Modification or Amendment. This Agreement may not be modified or amended except by written agreement executed by the parties hereto.

35. No Third Party Beneficiaries. Nothing in this Agreement, express or implied is intended to confer on any person or entity, other than TBTA, MTA, the City and NYCDOT, any rights or remedies under or by reason of this Agreement.

36. Counterparts. This Agreement may be executed in one or more counterparts which, when taken together, shall constitute one and the same.

37. NYCDOT Signage. Notwithstanding any other provisions of this agreement, NYCDOT may place regulatory street signage on infrastructure in locations that do not obstruct the operation of the Program with prior written permission from TBTA. Upon request from TBTA, NYCDOT will remove any such signage from the infrastructure.

In Witness Whereof, the parties hereto have caused this Agreement to be executed.

Accepted and agreed to:

NYCDOT:	TBTA:
The City of New York	Triborough Bridge and Tunnel Authority
By: (Signature)	By: (Signature)
Dean Fuleihan (Print Name of Signatory)	PATRICK J. FOYE (Print Name of Signatory)
First Deputy Mayor (Title)	CHAIRMAN + CEO (Title)
6/11/2019 (Date)	6/11/2019 (Date)

Approved as to Form

Acting Corporation Counsel
Date: 6/11/2019

16

Exhibit A: Design Requirements

The design of the infrastructure shall adhere to the following principles and guidelines, so far as practicable:

Design and Siting Principles:

1. The infrastructure will be sited and designed so as to protect the safety of all road users, including pedestrians, cyclists, and motorists.
2. The infrastructure will be sited and designed so as to not further impede pedestrian and cyclist circulation, the path of travel for persons with disabilities, bus boarding at bus stops, curb access for pick-ups and drop-offs, and access for emergency vehicles.
3. At surface street locations where sidewalk space is constrained and/or there are very high pedestrian volumes, TBTA will consider expanding the sidewalk to accommodate the infrastructure.
4. Infrastructure should be designed to have as minimal a visual profile where feasible as determined by TBTA.
5. At surface street locations, the infrastructure will have the same or similar appearance to the extent feasible as determined by TBTA as adjacent NYCDOT standard signal and streetlight poles or as NYCDOT's family of street furniture.
6. At surface street locations within landmark districts, the infrastructure will have the same or similar appearance as the decorative light and signal poles or other street furniture used in that district to the extent feasible as determined by TBTA.
7. Infrastructure on NYCDOT structures, including ramps and bridges, shall be designed so as to minimize any structural impacts on the underlying structures.

Siting Guidelines:

8. At surface street locations, new poles will be placed at the location of existing streetlight poles where feasible as determined by TBTA. The streetlight will be replaced with a new structure, which shall include a streetlight luminaire to provide illumination of the vehicle detection area. TBTA shall maintain the structure and the vehicle detection area luminaire.
9. At surface street locations, infrastructure will be placed in accordance with NYCDOT's required clearances for street furniture, to the greatest extent possible.
10. At surface street locations, infrastructure will be placed so as not to block sightlines for traffic control signs and signals.
11. At surface street locations, supporting cabinets will be placed on poles, underground, or in adjacent buildings to the extent feasible as determined by TBTA. In areas with constrained pedestrian circulation, pole-mounted equipment should be placed above the pedestrian plane to the extent feasible as determined by TBTA.
12. Infrastructure will not be placed directly at intersections; TBTA will use mid-block locations to avoid conflicts with pedestrians, ADA requirements, and street user sightlines to the extent feasible as determined by TBTA.
13. Infrastructure will not be placed immediately in front of historic landmarks to the extent feasible as determined by TBTA.
14. Infrastructure will be placed so as to not block significant view corridors of historic landmarks, scenic landmarks, or open spaces, to the extent feasible as determined by TBTA.
15. TBTA will place infrastructure on the ramps of roadways with access and exit ramps and avoid placing structures in the immediate vicinity of where bridge ramps meet the surface street grid to the extent feasible as determined by TBTA.

16. On bridges, TBTA will consider maintenance access when siting cabinets and other supporting equipment so as not to necessitate lane closures for maintenance and repair.

Design and Engineering Standards

Notwithstanding anything to the contrary herein or in the requirements set forth below, in accordance with Vehicle & Traffic Law §1704(6), TBTA and its contractors shall not be subject to the provisions of article eight of the environmental conservation law, the provisions of chapter six of article forty-three or chapter five of title sixty-two of the rules of the City of New York, or the provisions of section one hundred ninety-seven-c of the New York City Charter, relating to a uniform land use review procedure, nor the provisions of any other local law of the City of New York of like or similar effect including approvals or charges associated with the use of property owned and maintained by the City of New York necessary for the installation of the infrastructure.

The guidance documents below are generally listed in the order of precedence; however, in the event of a conflict among them, TBTA will consult with NYCDOT to resolve or reconcile the conflict.

Only references to Materials, Products, Standards and Construction in the following documents apply. References to sections including but not limited to measurement, prices, items, pay units, payments, guarantees, lists of spare parts, delivery do not apply.

General

1. NYCDOT Specifications, including:
   - NYCDOT Standard Highway Specifications Vol. 1 and 2, specifically excluding Division 1
   - NYCDOT Standard Details of Construction
   - NYCDOT Specification for Traffic Signals and Intelligent Transportation Systems Construction and Equipment, specifically excluding Section GS.1 NYCDOT General Specifications
   - NYCDOT Standard Drawings for Traffic Signals
     NYCDOT Standard Typical Markings Specifications
2. FHWA Manual on Uniform Traffic Control Devices (MUTCD)
3. AASHTO Policy on Geometric Design of Highways and Streets (Green Book)
4. NYCDOT Street Design Manual
5. Other Relevant NYCDOT Specifications

Bridge Specific

1. NYSDOT bridge and construction standards which can be found at the NYSDOT website: https://www.dot.ny.gov/publications, with TBTA Exceptions.
2. AASHTO: LRFD Bridge Design Specifications, Manual for Bridge Evaluation, Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

General Guidance Documents

1. NACTO Street Design Guide

NYCDOT Review and Consultation.

TBTA intends to conduct a five step process for the design of the infrastructure. At each step, TBTA shall provide design documents to NYCDOT upon completion of TBTA's initial review of design documents from TBTA's contractor for completeness and applicability. TBTA shall convene a design review meeting with NYCDOT, and document NYCDOT design comments and TBTA responses to those comments. NYCDOT shall designate a team of design reviewers empowered to make design decisions on behalf of the agency. NYCDOT's design reviews shall be limited to ensuring compliance with the Contract Documents. The NYCDOT design review team will be afforded the same number of days to perform their reviews as the TBTA design review team.

The NYCDOT liaison team shall coordinate reviews among other City Agencies, such as but not limited to, the New York City Department of Design and Construction, the New York City Department of Environmental Protection, the New York City Department of Parks and Recreation, the New York City Fire Department, and the New York City Police Department, and provide consolidated comments to TBTA and assist in the timely resolution of such comments.

In the event that TBTA proposes placing infrastructure or toll collection system equipment on a NYCDOT bridge ramp, bridge, or bridge or highway gantry, TBTA shall conduct an inspection and structural analysis in accordance with the design and engineering standards, provide the analysis, including calculations, to NYCDOT for review, and document NYCDOT comments and TBTA responses to those comments. In the event that TBTA proposes placing toll collection system equipment on existing streetlight poles or on new poles or structures, TBTA shall conduct a structural analysis in accordance with the design and engineering standards, provide the analysis to NYCDOT for review, and document NYCDOT comments and TBTA responses to those comments. NYCDOT shall review and provide its response for both types of structural analyses within five (5) calendar days. NYCDOT shall not unreasonably withhold consent for TBTA's use of the existing streetlight poles, signal poles and sign gantries.

The TBTA design process is shown below. TBTA shall direct its contractor to incorporate NYCDOT reviews into the Design Review Plan. Design documents for steps 2-5 shall include at a minimum: civil, MPT, signage, street marking, and utility plans and elevations and sections of the infrastructure.

Step	**Description**	**Review Period**
1. Proposal	Review of infrastructure concepts for each of the respondents to the DBOM RFP	14 calendar days
2. Preliminary Design	Selected TBTA contractor's first submission; level to be determined	5 calendar days
3. Detailed Design	Selected TBTA contractor's second submission; level to be determined	5 calendar days
4. Final Design	100% design	5 calendar days
5. Release for Construction Design	Final review prior to construction	5 calendar days

19

Exhibit B

A. Insurance – TBTA's Contractor's Insurance

TBTA shall cause its contractor, at its contractor's sole cost and expense, to procure policies of insurance to be in force and maintained at all times during the installation and maintenance of the infrastructure and/or toll collection system equipment in the Impacted Public Right of Way and Program signage in accordance with the terms set forth below:

1. TBTA's contractor shall maintain or cause to be maintained Commercial General Liability (CGL) insurance protecting the insureds from claims for property damage and/or bodily injury, including death, arising out of or in connection with this Agreement or the construction, existence, use or removal of the infrastructure, toll collection system equipment and Program signage, as defined in Exhibit C. This insurance shall be in the amount of at least Two Million Dollars ($2,000,000) per occurrence and Ten Million Dollars ($10,000,000) aggregate. Coverage shall be at least as broad as that provided by the most recently issued Insurance Services Office ("ISO") Form CG 0001.

2. The CGL insurance shall name the City of New York, together with its officials and employees, as an Additional Insured with coverage at least as broad as the most recent edition of ISO Forms CG 2026 and 2037. The City's limits of coverage for the CGL insurance required shall be the greater of (i) the minimum limits set forth in this Agreement or (ii) the limits provided to TBTA under all primary, excess and umbrella policies covering operations under this Agreement.

3. Prior to commencement of any work within the Impacted Public Right of Way or in connection with Program signage, TBTA's contractor shall submit proof of the required insurance in a form acceptable to the NYCDOT prior to the beginning of any work within the Impacted Public Right of Way and/or in connection with Program signage. This shall include (i) a Certificate of Insurance certifying the issuance and effectiveness of such insurance with the specified minimum limits and the status of the City of New York as additional insured (with coverage at least as broad as the most recent edition of ISO Forms CG 2026 and 2037), and (ii) a duly executed Certification by Broker in the form required by the NYCDOT. In addition, prior to the expiration date of all policies, TBTA's contractor shall submit proof satisfactory to the NYCDOT of either renewals of such policies or the issuance of new policies in compliance with the requirements herein. Notwithstanding the foregoing, TBTA's contractor shall be obligated to provide the City with a copy of any policy of insurance required hereunder upon request.

4. Acceptance by NYCDOT of a Certificate of Insurance or any other action or inaction by NYCDOT does not waive the obligation of TBTA's contractor to ensure that insurance, fully consistent with the requirements herein, is secured and maintained, nor does it waive the liability of TBTA's contractor for its failure to do so.

5. TBTA's contractor may propose to satisfy its insurance obligations through a type of insurance other than Commercial General Liability insurance so long as such insurance provides materially the same level of coverage, both for TBTA and the City, as otherwise required herein. NYCDOT, in its sole discretion, will determine whether such insurance satisfies the insurance obligations of TBTA's contractor hereunder.

6. Where notice of loss, damage, occurrence, accident, claim or suit is required under a policy maintained in accordance with this Agreement, TBTA's contractor shall notify in writing all insurance carriers that issued potentially responsive policies of any such event relating to, arising out of or in connection with this Agreement or the construction, existence, use or removal of the infrastructure, toll collection system equipment and Program signage no later than twenty (20) days after such event. Such notice shall expressly specify that "this notice is being given on behalf of the City of New York as Insured as well as the Named Insured." Such notice shall also contain the following information: the number of the insurance policy, the name of the named insured, the date and location of the damage, occurrence, or accident, and the identity of the persons or things injured, damaged or lost. TBTA's contractor shall simultaneously send a copy of such notice to the City of New York c/o Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007.

7. In the event TBTA's contractor receives notice, from an insurance company or other person, that any insurance policy required under this Agreement shall expire or be cancelled or terminated (or has expired or been cancelled or terminated) for any reason, TBTA's contractor shall immediately forward a copy of such notice to NYCDOT. Notwithstanding the foregoing, TBTA's contractor shall ensure that there is no interruption in any of the insurance coverage required hereunder.

8. Policies of insurance required under this Agreement shall be primary and non-contributing to any insurance or self-insurance maintained by the City.

9. Wherever this Agreement requires that insurance coverage be "at least as broad" as a specified form (including all ISO forms), there is no obligation that the form itself be used, provided that TBTA's contractor can demonstrate that the alternative form or endorsement contained in its policy provides coverage at least as broad as the specified form.

10. The insurance coverage required herein shall not relieve TBTA of any liability under this Agreement, nor shall it preclude the City from exercising any rights or taking such other actions as are available to it under any other provisions of this Agreement or the law.

Exhibit C: Maintenance, Repair and Replacement of Program Signage

1. TBTA shall cause its contractor to fabricate and install the initial signage required for the Program within the City of New York ("Program signage").

2. NYCDOT shall perform maintenance, repair and regular replacement of static Program signage within the City of New York to the satisfaction of TBTA. NYCDOT shall commence such services when TBTA begins collecting tolls under the Program, or as directed by TBTA.

   a. If NYCDOT fails to perform such maintenance, repair and regular replacement of Program signage within the City of New York to the satisfaction of TBTA, TBTA shall have the right to terminate this portion of the Agreement with thirty (30) days' notice to NYCDOT ("termination notice").

   b. Upon receipt of the termination notice, NYCDOT shall stop all work in connection with the maintenance, repair and replacement of Program signage. NYCDOT shall be entitled only to those approved actual reimbursable costs incurred in connection with the maintenance, repair and replacement of Program signage prior to the receipt of the termination notice.

   c. If TBTA terminates this portion of the Agreement and undertakes its own signage maintenance, repair and replacement program, then TBTA shall install signs based on standards agreed upon with NYCDOT, and will conduct all work in accordance with Section 6, Permitting, of the Agreement.

3. NYCDOT shall address safety critical repairs within three (3) days. NYCDOT shall respond at its earliest availability to any situation where there is an imminent threat to life safety.

   a. If NYCDOT fails to repair or replace such Program signage within three (3) days of notice or immediate repair or replacement is necessary, TBTA shall have the right to cause such repair or replacement to be made and will conduct all work in accordance with Section 6, Permitting, of the Agreement.

   b. TBTA shall provide notification to NYCDOT of any such work occurring within one business day of that work, including time, date, location, support type, and sign type.

4. NYCDOT shall establish a process for TBTA or its contractor to submit routine maintenance, repair, and replacement requests to NYCDOT.

   a. NYCDOT will address TBTA maintenance, repair, or regular replacement requests within thirty (30) days.

   b. If NYCDOT fails to respond to a maintenance, repair and regular replacement request within thirty (30) days, TBTA shall have the right to cause such routine maintenance, repair or replacement and will conduct all work in accordance with Section 6, Permitting, of the Agreement.

c. TBTA shall provide notification to NYCDOT of any such work occurring within one business day of that work, including time, date, location, support type, and sign type.

5. NYCDOT will also perform other sign replacement or modifications as requested by TBTA in connection with the Program, beyond regular replacement, including but not limited to signs reflecting toll rate changes, provided that TBTA provides at least sixty (60) days' notice of any changes needed to signs.

a. If NYCDOT fails to respond to such sign replacement or modification request within sixty (60) days, TBTA shall have the right to cause such a replacement or modification and will conduct all work in accordance with Section 6, Permitting, of the Agreement.

b. TBTA shall provide notification to NYCDOT of any such work occurring within one business day of that work, including time, date, location, support type, and sign type.

6. During the first year of performing maintenance, repair and regular replacement of the Program signage, NYCDOT shall notify TBTA if it identifies any pattern of flaws or defects in Program signage that may arise from defects in the material or workmanship of such signage so that TBTA has an opportunity to have such defects repaired by TBTA's contractor.

2D, CBD Tolling Program Signage

Figure 2D-1. Overview of Areas Containing Project Signage

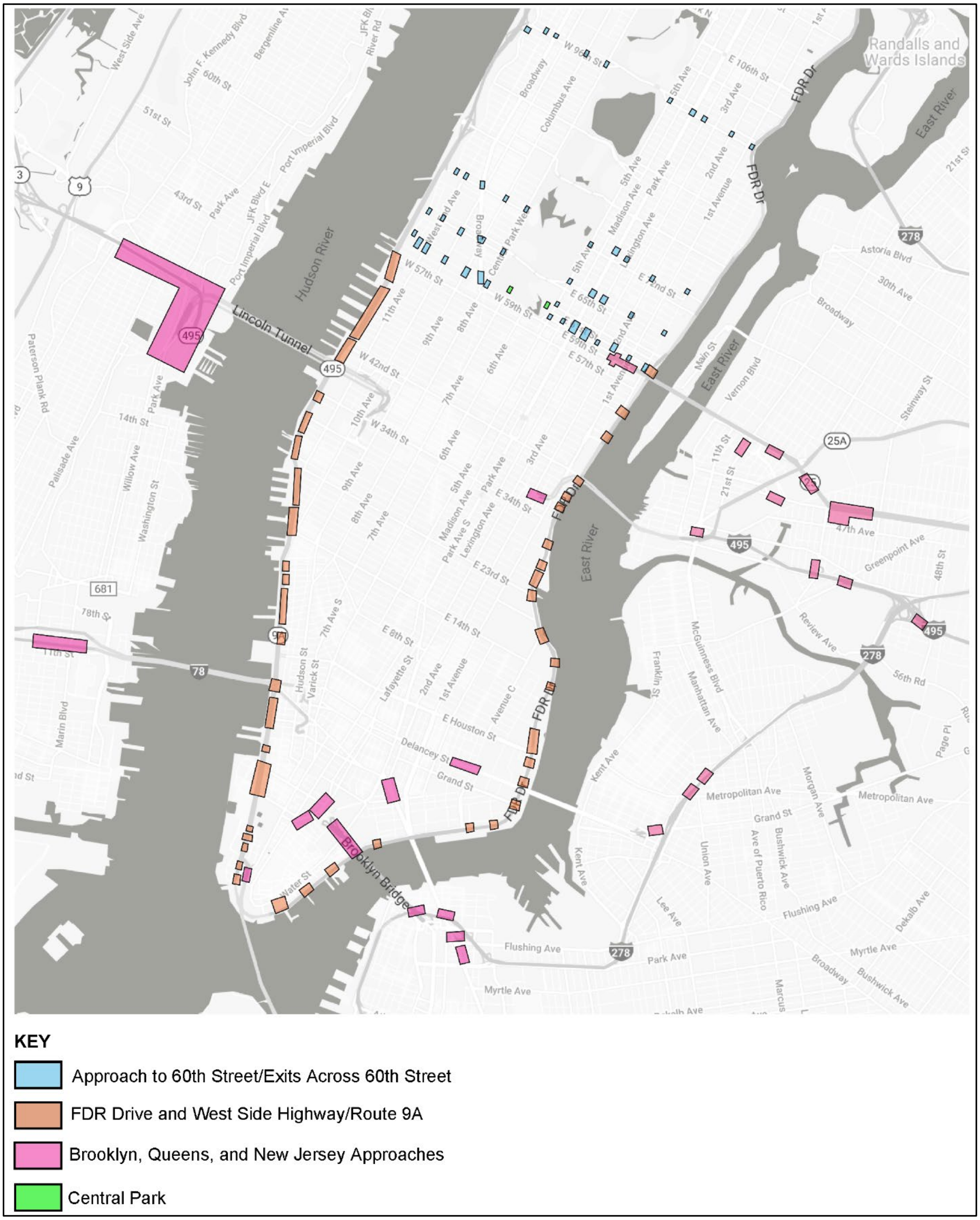
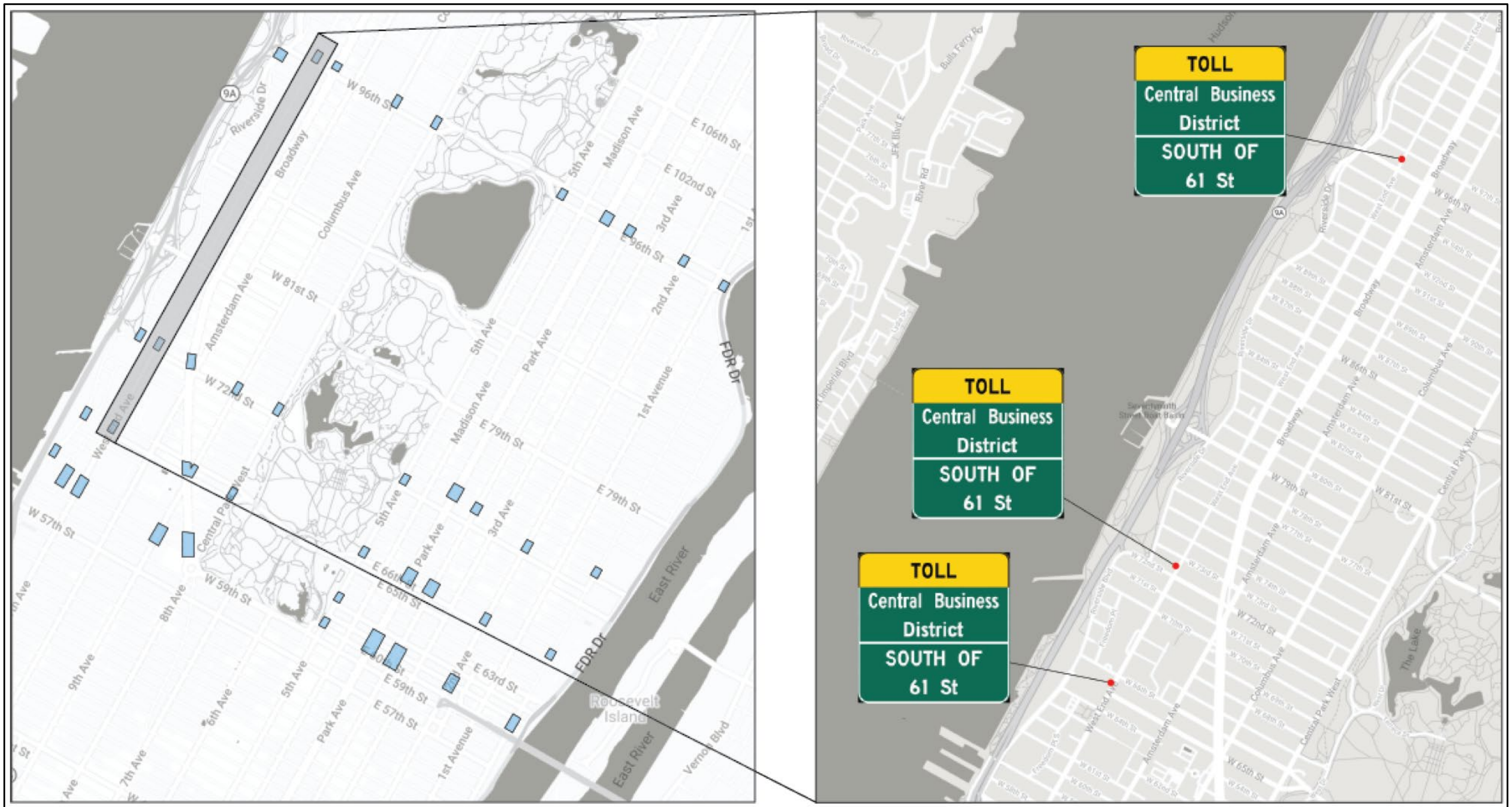
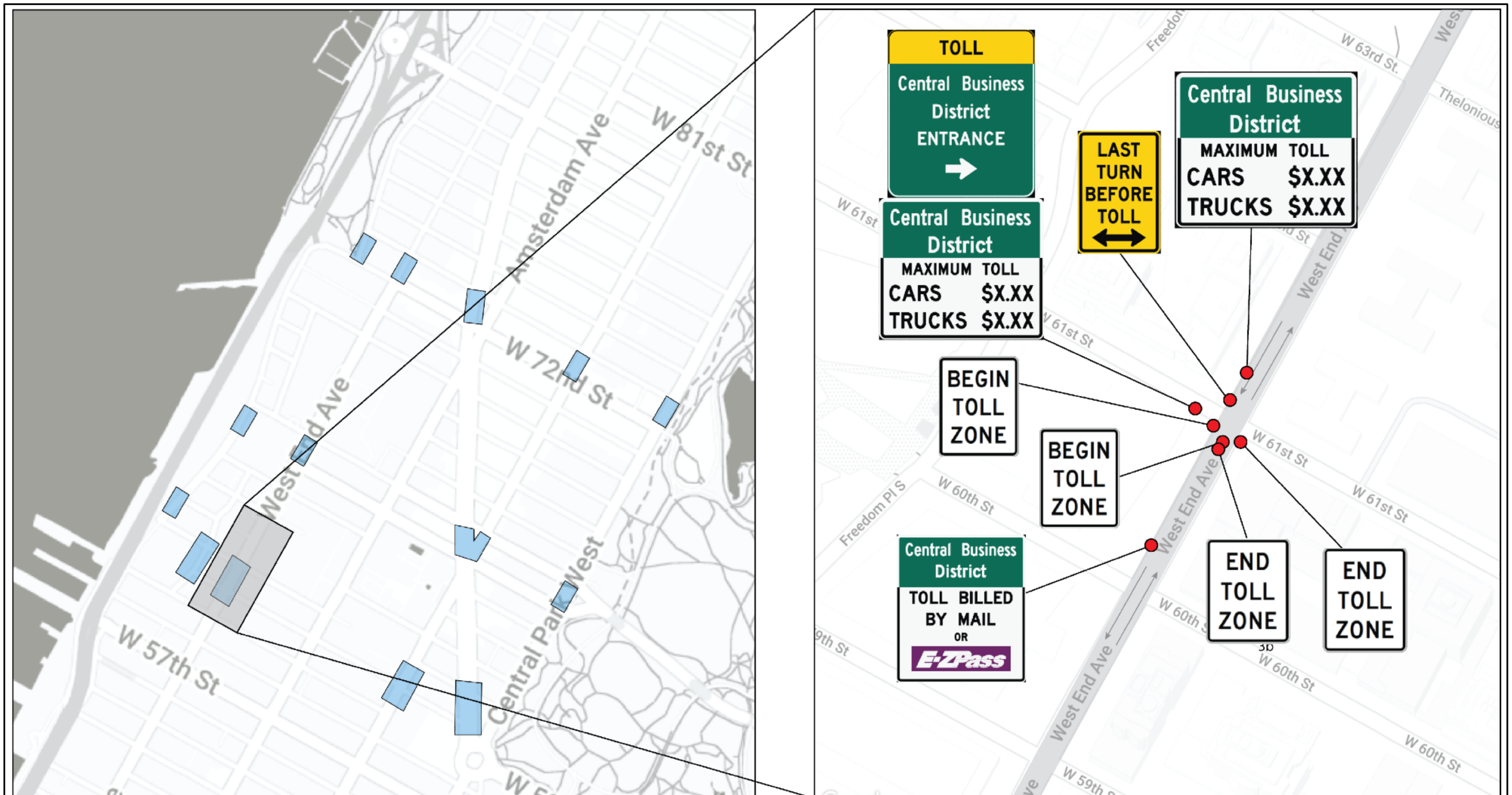


Figure 2D-2. Typical Signage along Avenues Approaching 60th Street



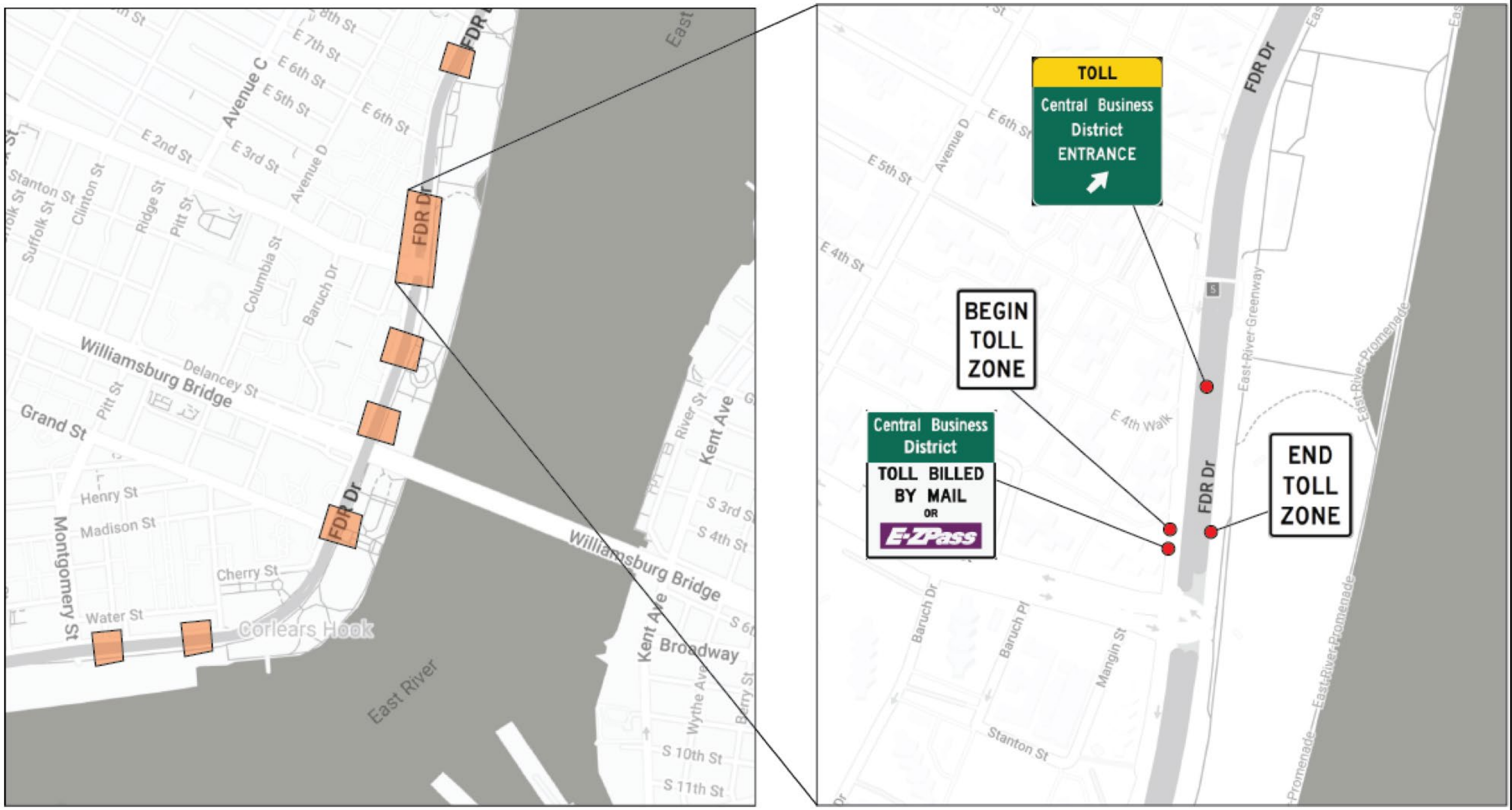
Signage sequence along West End Avenue approaching 60th Street is used as a representative example of signage along similar approaches.

Figure 2D-3. Typical Signage in Vicinity of 60th Street



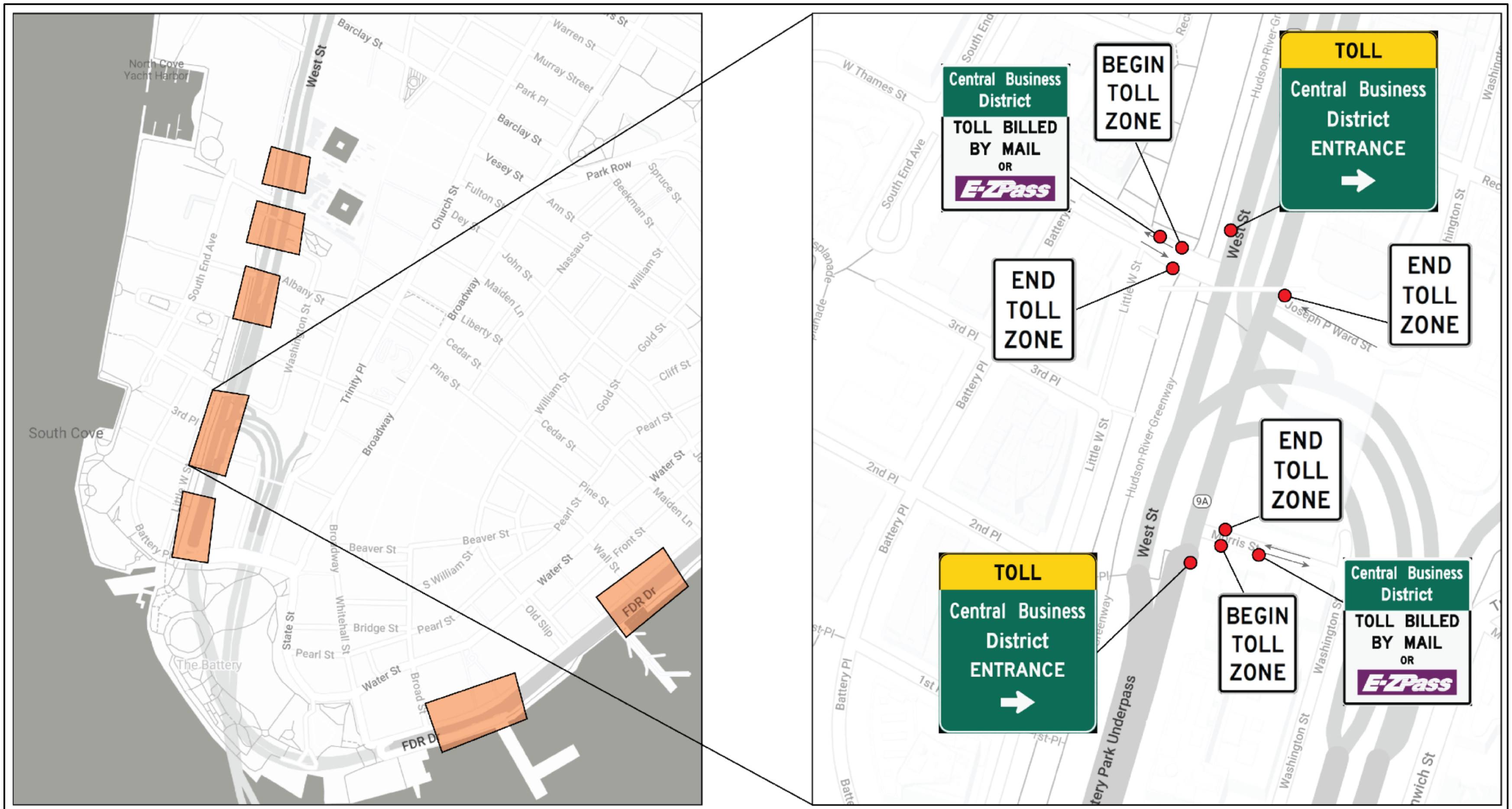
Signage sequence along at West End Avenue in the vicinity of 60th Street is used as a representative example of signage along similar approaches.

Figure 2D-4. Typical Signage at FDR Drive Entries and Exits



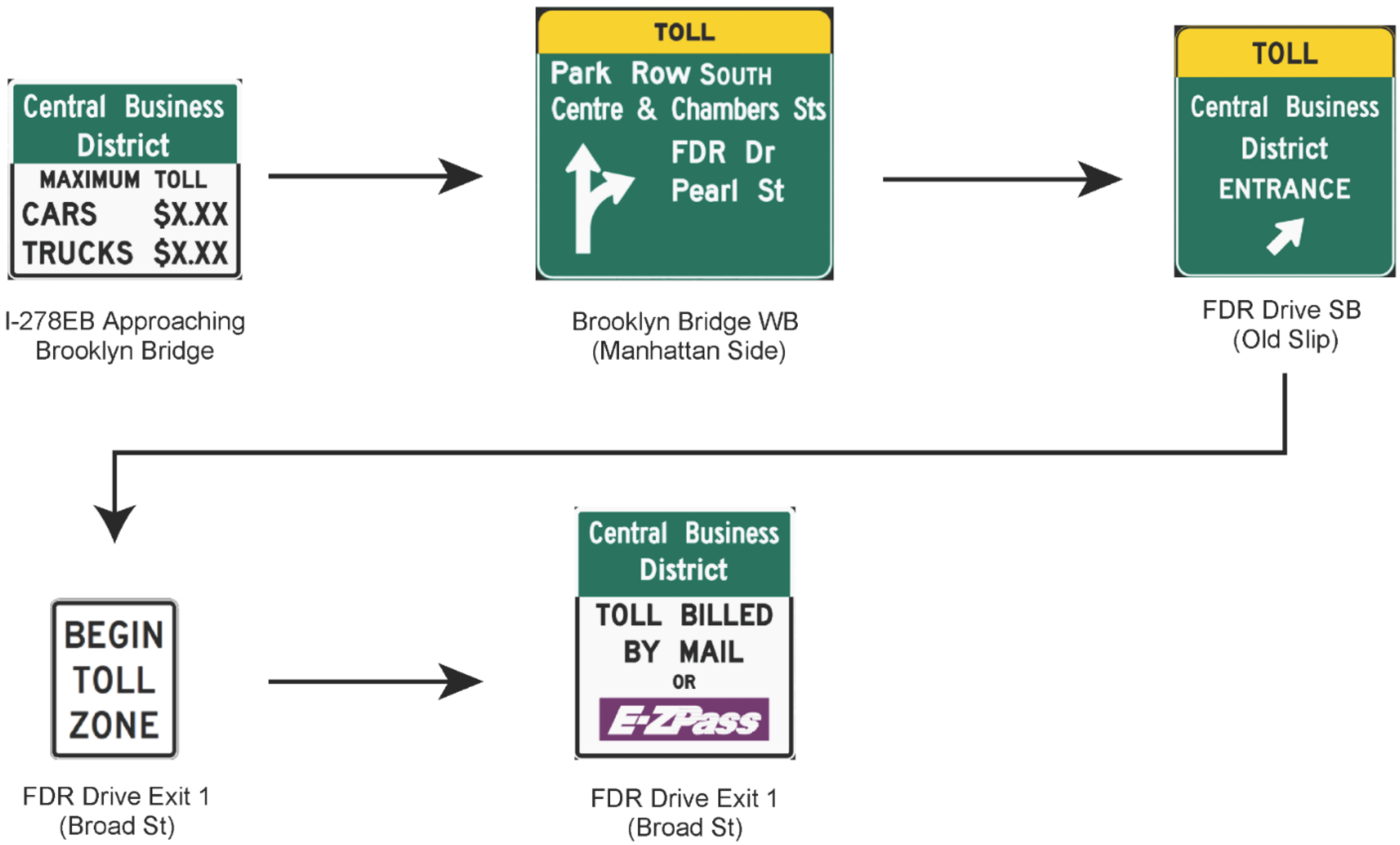
Signage sequence along FDR Drive between E. Houston St. and E. 6th St. is used as a representative example of signage along similar approaches.

Figure 2D-5. Typical Signage at a West Side Highway/Route 9A Intersection



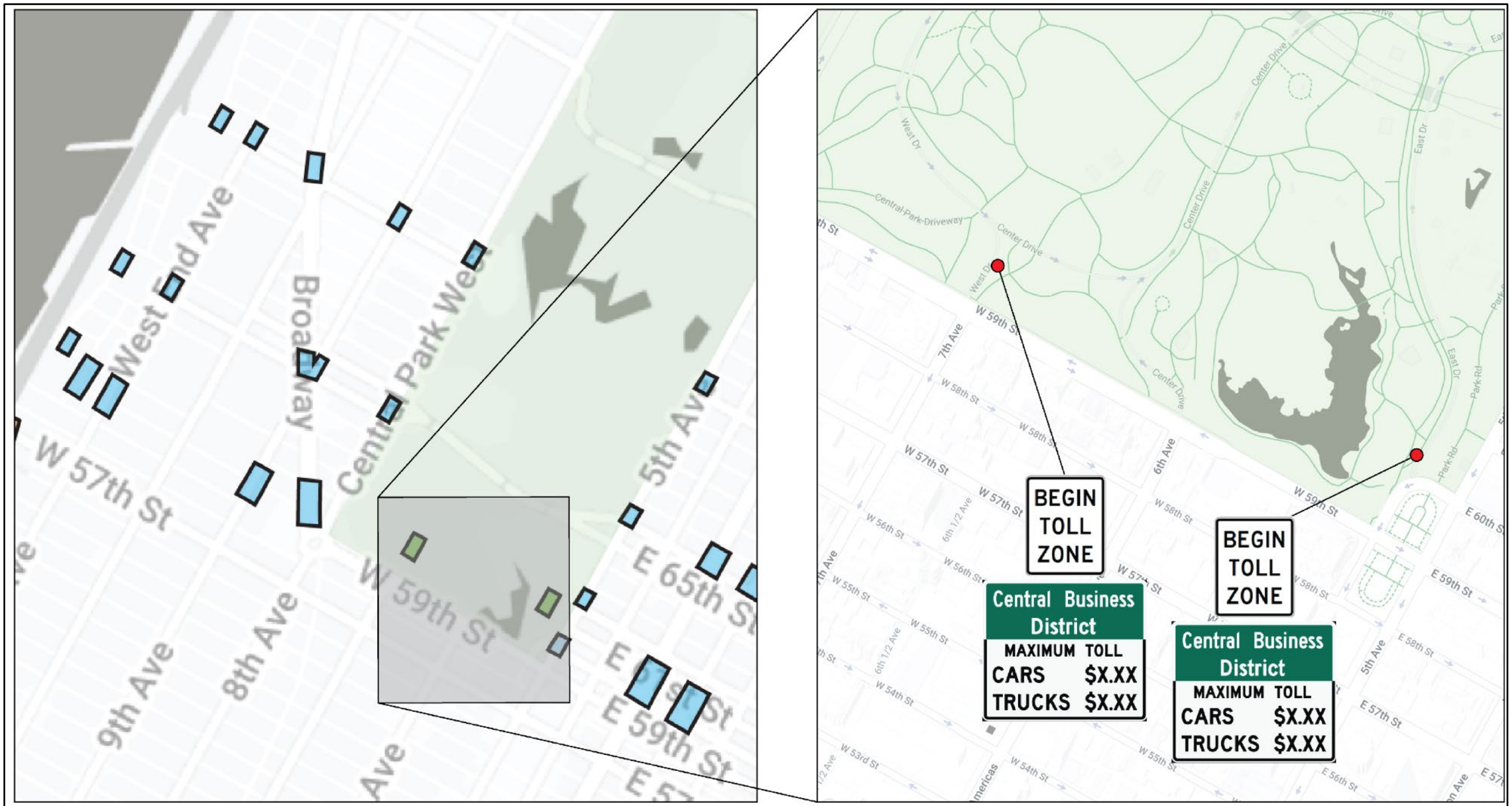
Signage sequence along West Side Highway/Route 9A between Morris St. and W. Thames St. is used as a representative example of the signage along similar approaches.

Figure 2D-6. Typical Signage from East River Crossing into Manhattan CBD



The signage sequence shown here represents a trip from Brooklyn using the Brooklyn Bridge and then entering the Manhattan CBD using the northbound lanes of FDR Drive. This is used as a representative example of signage along similar East River crossing approaches.

Figure 2D-7. Signage in Central Park



Signage shown here is a complete representation of the signage that would be erected in Central Park to notify authorized vehicles of their entry into the Manhattan CBD.

2E, Definition of Tolling Scenarios

Table 2E-1. Tolling Scenarios Evaluated in this Environmental Assessment

PARAMETER[1]	SCENARIO A Base Plan	SCENARIO B[4] Base Plan with Caps and Exemptions	SCENARIO C Low Crossing Credits for Vehicles Using Tunnels to Access the Manhattan CBD, with Some Caps and Exemptions	SCENARIO D High Crossing Credits for Vehicles Using Tunnels to Access the Manhattan CBD	SCENARIO E High Crossing Credits for Vehicles Using Tunnels to Access the Manhattan CBD, with Some Caps and Exemptions	SCENARIO F High Crossing Credits for Vehicles Using Manhattan Bridges and Tunnels to Access the Manhattan CBD, with Some Caps and Exemptions	SCENARIO G Base Plan with Same Tolls for All Vehicle Classes
TOLL RATES[2,3]							
Off-Peak Toll							
Weekday Off-Peak Hours	**8 p.m. to 10 p.m.**	**8 p.m. to 10 p.m.**	**8 p.m. to 10 p.m.**	**8 p.m. to 10 p.m.**	**8 p.m. to 10 p.m.**	**10 a.m. to 4 p.m.**	**8 p.m. to 10 p.m.**
Off-Peak Auto E-ZPass Rate	$6.90	$7.61	$10.50	$14.27	$17.25	$17.25	$8.70
Off-Peak Auto Tolls by Mail Rate	$10.35	$11.42	$15.75	$21.40	$25.88	$25.88	$12.15
Off-Peak Small Truck E-ZPass Rate	$13.80	$15.23	$21.00	$28.53	$34.50	$48.75	$8.70
Off-Peak Small Truck Tolls by Mail Rate	$20.70	$22.84	$31.50	$42.80	$51.75	$63.75	$12.15
Off-Peak Large Truck E-ZPass Rate	$20.70	$22.84	$31.50	$42.80	$51.75	$61.50	$8.70
Off-Peak Large Truck Tolls by Mail Rate	$31.05	$34.26	$47.25	$64.19	$77.63	$78.75	$12.15
Peak Toll							
Weekday Peak Hours	**6 a.m. to 8 p.m.**	**6 a.m. to 8 p.m.**	**6 a.m. to 8 p.m.**	**6 a.m. to 8 p.m.**	**6 a.m. to 8 p.m.**	**6 a.m. to 10 a.m.; 4 p.m. to 8 p.m.**	**6 a.m. to 8 p.m.**
Weekend Peak Hours	**10 a.m. to 10 p.m.**	**10 a.m. to 10 p.m.**	**10 a.m. to 10 p.m.**	**10 a.m. to 10 p.m.**	**10 a.m. to 10 p.m.**	**10 a.m. to 10 p.m.**	**10 a.m. to 10 p.m.**
Peak Auto E-ZPass Rate	$9.20	$10.15	$14.00	$19.02	$23.00	$23.00	$11.60
Peak Auto Tolls by Mail Rate	$13.80	$15.23	$21.00	$28.53	$34.50	$34.50	$16.20
Peak Small Truck E-ZPass Rate	$18.40	$20.30	$28.00	$38.04	$46.00	$65.00	$11.60
Peak Small Truck Tolls by Mail Rate	$27.60	$30.45	$42.00	$57.06	$69.00	$85.00	$16.20
Peak Large Truck E-ZPass Rate	$27.60	$30.45	$42.00	$57.06	$69.00	$82.00	$11.60
Peak Large Truck Tolls by Mail Rate	$41.40	$45.68	$63.00	$85.59	$103.50	$105.00	$16.20
Overnight Toll							
Weekday Overnight Hours	**10 p.m. to 6 a.m.**	**10 p.m. to 6 a.m.**	**10 p.m. to 6 a.m.**	**10 p.m. to 6 a.m.**	**10 p.m. to 6 a.m.**	**8 p.m. to 6 a.m.**	**10 p.m. to 6 a.m.**
Weekend Overnight Hours	**10 p.m. to 10 a.m.**	**10 p.m. to 10 a.m.**	**10 p.m. to 10 a.m.**	**10 p.m. to 10 a.m.**	**10 p.m. to 10 a.m.**	**10 p.m. to 10 a.m.**	**10 p.m. to 10 a.m.**
Overnight Auto E-ZPass Rate	$4.60	$5.08	$7.00	$9.51	$11.50	$11.50	$6.96
Overnight Auto Tolls by Mail Rate	$6.90	$7.61	$10.50	$14.27	$17.25	$17.25	$9.72
Overnight Small Truck E-ZPass Rate	$9.20	$10.15	$14.00	$19.02	$23.00	$32.50	$6.96
Overnight Small Truck Tolls by Mail Rate	$13.80	$15.23	$21.00	$28.53	$34.50	$42.50	$9.72
Overnight Large Truck E-ZPass Rate	$13.80	$15.23	$21.00	$28.53	$34.50	$41.00	$6.96
Overnight Large Truck Tolls by Mail Rate	$20.70	$22.84	$31.50	$42.80	$51.75	$52.50	$9.72

PARAMETER[1]	SCENARIO A Base Plan	SCENARIO B[4] Base Plan with Caps and Exemptions	SCENARIO C Low Crossing Credits for Vehicles Using Tunnels to Access the Manhattan CBD, with Some Caps and Exemptions	SCENARIO D High Crossing Credits for Vehicles Using Tunnels to Access the Manhattan CBD	SCENARIO E High Crossing Credits for Vehicles Using Tunnels to Access the Manhattan CBD, with Some Caps and Exemptions	SCENARIO F High Crossing Credits for Vehicles Using Manhattan Bridges and Tunnels to Access the Manhattan CBD, with Some Caps and Exemptions	SCENARIO G Base Plan with Same Tolls for All Vehicle Classes
POTENTIAL CROSSING CREDITS							
Credit Toward the CBD Toll for Tolls Paid at the Queens-Midtown, Hugh L. Carey, Lincoln, Holland Tunnels	No	No	Yes	Yes	Yes	Yes	No
Credit Toward the CBD Toll for Tolls Paid at the Robert F. Kennedy, Henry Hudson, George Washington Bridges	No	No	No	No	No	Yes	No
Level of Credits	NA	NA	Up to $6.55	Up to $13.10	Up to $13.10	Up to $13.10	NA
POTENTIAL EXEMPTIONS AND LIMITS (CAPS) ON NUMBER OF TOLLS PER DAY							
Autos and motorcycles	Once per day	Once per day	Once per day	Once per day	Once per day	Once per day	Once per day
Commercial vans	Once per day	Once per day	Once per day	Once per day	Once per day	Once per day	Once per day
Taxis	No cap	Once per day	Exempt	No cap	Exempt	Once per day	No cap
For-hire vehicles	No cap	Once per day	Three times per day	No cap	Three times per day	Once per day	No cap
Small and large trucks	No cap	Twice per day	No cap	No cap	No cap	Once per day	No cap
Buses	No cap	Exempt	No cap	No cap	Transit buses – Exempt No cap on other buses	Exempt	No cap

1 The parameters in this table were assumed for modeling purposes to allow an evaluation of the range of potential effects would result from implementation of the CBD Tolling Alternative. Actual toll rates, potential credits/exemptions, and/or other discounts, and the time of day when the toll rates would apply, would be determined by the TBTA Board after recommendation by the Traffic Mobility Review Board.

2 Tolls may be higher during peak periods, which are periods when traffic is greatest in the Manhattan CBD. These would be defined by TBTA in the final toll schedule. All tolling scenarios also include a variable toll on designated "Gridlock Alert" days, although the modeling conducted for the Project did not reflect this higher toll since it considers typical days rather than days with unusually high traffic levels.

3 Motorcycles and commercial vans would pay the auto rate.

4 For Tolling Scenario B, a toll rate of approximately $13.20 for autos would be necessary to meet the objective of raising sufficient revenue to fund $15 billion for the MTA Capital Program; see Table 2E-2 for more information on this modified tolling scenario, Tolling Scenario B1.

Table 2E2. Additional Tolling Scenarios Considered: Tolling Scenarios B1 and G1

PARAMETER[1]	SCENARIO B1 Base Plan with Caps and Exemptions, Higher Daytime Tolls, and No Overnight Tolls	SCENARIO G1 Base Plan with Same Tolls for All Vehicle Classes, and Cap for Taxis/FHVs
TOLL RATES[2, 3]		
Off-Peak Toll		
Weekday Off-Peak Hours	**8 p.m. to 10 p.m.**	**8 p.m. to 10 p.m.**
Off-Peak Auto E-ZPass Rate	$9.90	$9.57
Off-Peak Auto Tolls by Mail Rate	$14.84	$13.37
Off-Peak Small Truck E-ZPass Rate	$19.79	$9.57
Off-Peak Small Truck Tolls by Mail Rate	$29.69	$13.37
Off-Peak Large Truck E-ZPass Rate	$29.69	$9.57
Off-Peak Large Truck Tolls by Mail Rate	$44.53	$13.37
Peak Toll		
Weekday Peak Hours	**6 a.m. to 8 p.m.**	**6 a.m. to 8 p.m.**
Weekend Peak Hours	**10 a.m. to 10 p.m.**	**10 a.m. to 10 p.m.**
Peak Auto E-ZPass Rate	$13.20	$12.76
Peak Auto Tolls by Mail Rate	$19.79	$17.82
Peak Small Truck E-ZPass Rate	$26.39	$12.76
Peak Small Truck Tolls by Mail Rate	$39.59	$17.82
Peak Large Truck E-ZPass Rate	$39.59	12.76
Peak Large Truck Tolls by Mail Rate	$59.38	$17.82
Overnight Toll		
Weekday Overnight Hours	**10 p.m. to 6 a.m.**	**10 p.m. to 6 a.m.**
Weekend Overnight Hours	**10 p.m. to 10 a.m.**	**10 p.m. to 10 a.m.**
Overnight Auto E-ZPass Rate	$6.60	$7.66
Overnight Auto Tolls by Mail Rate	$9.90	$10.69
Overnight Small Truck E-ZPass Rate	$13.20	$7.66
Overnight Small Truck Tolls by Mail Rate	$19.79	$10.69
Overnight Large Truck E-ZPass Rate	$19.79	$7.66
Overnight Large Truck Tolls by Mail Rate	$29.69	$10.69

PARAMETER[1]	SCENARIO B1 Base Plan with Caps and Exemptions, Higher Daytime Tolls, and No Overnight Tolls	SCENARIO G1 Base Plan with Same Tolls for All Vehicle Classes, and Cap for Taxis/FHVs
POTENTIAL CROSSING CREDITS		
Credit Toward the CBD Toll for Tolls Paid at the Queens-Midtown, Hugh L. Carey, Lincoln, Holland Tunnels	No	No
Credit Toward the CBD Toll for Tolls Paid at the Robert F. Kennedy, Henry Hudson, George Washington Bridges	No	No
Level of Credits	NA	NA
Autos and motorcycles	Once per day	Once per day
Commercial vans	Once per day	Once per day
Taxis	Exempt	Once per day
For-hire vehicles	Exempt	Once per day
Small and large trucks	No cap	No cap
Buses	Transit buses – Exempt No cap on other buses	No cap

1 The parameters in this table were assumed for modeling purposes to allow an evaluation of the range of potential effects would result from implementation of the CBD Tolling Alternative. Actual toll rates, potential credits/exemptions, and/or other discounts, and the time of day when the toll rates would apply, would be determined by the TBTA Board after recommendation by the Traffic Mobility Review Board.

2 Tolls may be higher during peak periods, which are periods when traffic is greatest in the Manhattan CBD. These would be defined by TBTA in the final toll schedule. All tolling scenarios also include a variable toll on designated “Gridlock Alert” days, although the modeling conducted for the Project did not reflect this higher toll since it considers typical days rather than days with unusually high traffic levels.

3 Motorcycles and commercial vans would pay the auto rate.

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4A.1, Transportation: Implementation of Tolls in the Best Practice Model

August 2022

Contents

Tables

Acronyms

BPM .... Best Practice Model
CBD .... Central Business District
CTPP .... Census Transportation Planning Package
EA .... Environmental Assessment
FHV .... For-Hire Vehicle
HOV .... High-Occupancy Vehicle
MTA .... Metropolitan Transportation Authority
NYCDOT .... New York City Department of Transportation
PANYNJ .... Port Authority of New York and New Jersey
SOV .... Single-Occupancy Vehicle
TBTA .... Triborough Bridge and Tunnel Authority
TLC .... Taxi and Limousine Commission

Appendix 4A.1 Transportation: Implementation of Tolls in the Best Practice Model

4A.1-1 IMPLEMENTATION OF CROSSING CREDITS

Tolling Scenario A represents the tolling scenario under the CBD Tolling Alternative most closely defined by the New York State Legislature in enacting the MTA Reform and Traffic Mobility Act. The subsequent tolling scenarios represent variations on Tolling Scenario A, most notably in the application of crossing credits to drivers crossing bridges or tunnels into Manhattan that are already tolled and varying toll rates. **Chapter 2, "Project Alternatives**," describes these credit tolling scenarios.

For implementation in the Best Practice Model (BPM), crossing credits relative to the amount currently paid on the Port Authority of New York and New Jersey (PANYNJ) and TBTA facilities were added to trips in the BPM that are identified as crossing a PANYNJ or TBTA facility and also entering the Manhattan CBD.

To reflect the tolling scenarios for the CBD Tolling Alternative, the BPM required certain formulas to mimic crossing credits. For example, the BPM uses tolls as a general calibration value for the Hudson River and East River crossings, resulting in modeled toll values that vary slightly from observed values for each crossing. Crossing credits for the CBD Tolling Alternative needed to be consistent with the observed toll values, rather than the modeled toll values.

To overcome this issue for PANYNJ and TBTA facilities within the Manhattan CBD, the crossing credits were applied directly to the BPM's relevant toll links where the vehicle would enter the Manhattan CBD. For example, a one-way credit on the Queens-Midtown Tunnel was implemented by removing the Manhattan CBD toll link at the exit of the Queens-Midtown Tunnel. The Queens-Midtown Tunnel toll value was used as a proxy value for crediting tolls paid at the Hugh L. Carey Tunnel, the PANYNJ Manhattan Hudson River crossings, and the Robert F. Kennedy Bridge.

For PANYNJ and TBTA facilities in Upper Manhattan, a select link analysis was conducted to identify origins and destinations of trips that accessed the Manhattan CBD via the George Washington Bridge, Henry Hudson Bridge, or the Robert F. Kennedy Bridge. Trips identified by this select link analysis were then placed in unique trip tables and assigned to the network using discounted Manhattan CBD tolling rates based on the appropriate crossing credits for each tolling scenario.

4A.1-2 PUBLIC TRANSIT VEHICLES

In the BPM, all public transit vehicles (e.g., MTA New York City Transit, MTA Bus Company, and New Jersey Transit) and private commuter buses were considered insensitive to Manhattan CBD tolling, because such buses were assigned a fixed route and headway based on existing or planned service. Transit vehicles in the model were not allowed to deviate from those routes or headways based on tolls or congestion.

The BPM analysis did not adjust fares for public transit. This analysis assumed that if public transit vehicles were to pay the Manhattan CBD toll, the additional cost would not be passed to the customer. Thus, no additional cost was added in the BPM to the fares for transit passengers entering the Manhattan CBD.

4A.1-3 DESTINATION CHOICE AND MODE CHOICE UPDATES

Prior to the analysis in this EA, MTA and its consultants updated the destination and mode choice calibration in the BPM. The changes were introduced to better match 2012–2016 Census Transportation Planning Package (CTPP) worker travel flows from the U.S. Census Bureau and American Association of State Highway and Transportation Officials. The CTPP is derived from the U.S. Census Bureau's annual American Community Survey, and it reveals key information about how and where people travel to work.

The updated calibration was done by changing mode choice parameters, which indirectly change destination choice probabilities to better match observed data from the CTPP. The updates focused primarily on worker flows from Kings (Brooklyn) and Queens County into the Manhattan CBD. Table 4A.1-1 shows the worker flows from before and after the mode and destination choice adjustments compared to low and high estimates from the CTPP. The calibration was completed at a county level except for New York County (Manhattan), which was split between the Manhattan CBD and non-Manhattan CBD portion of the county. The high and low estimates from the CTPP represent the estimates from the U.S. Census Bureau plus or minus the reported margin of error.

Table 4A.1-1 Worker Flow Calibration to the Manhattan CBD

WORKER FLOWS (by Residency)	TARGET (Source: 2012–2016 CTPP)		CALIBRATION SCENARIO	
	Low	High	2017S	2017J7.1
New York City Counties	**1,050,720**	**1,117,785**	**1,187,255**	**1,079,639**
Bronx	100,194	108,994	143,016	81,541
Kings (Brooklyn)	280,015	291,057	91,492	255,552
New York (Manhattan CBD)	233,052	249,574	266,746	230,695
New York (Manhattan - Other)	196,029	211,499	276,514	224,101
Queens	212,049	223,067	389,958	255,571
Richmond (Staten Island)	29,381	33,594	19,529	32,179
Long Island	**93,322**	**104,074**	**126,898**	**145,995**
Nassau	67,875	74,273	123,153	96,937
Suffolk	25,447	29,801	3,745	49,058
New York Counties North of New York City	**82,091**	**92,579**	**69,180**	**94,084**
Westchester	61,142	67,446	36,487	65,442
Other New York Counties North of NYC	20,949	25,133	32,693	28,642
Portions of Northern and Central New Jersey	**148,572**	**162,640**	**199,272**	**214,733**
Hudson County	54,714	60,230	27,756	55,685
Other New Jersey Counties	93,858	102,410	171,516	159,048
Connecticut counties	**24,671**	**28,335**	**21,713**	**45,689**
TOTAL	**1,399,376**	**1,505,413**	**1,604,318**	**1,580,140**

Source: Best Practice Model, WSP 2021

4A.1-4 TAXIS AND OTHER FOR-HIRE VEHICLES

The BPM includes trips completed in taxis and for-hire vehicles (FHVs) like Uber, Lyft, and Via, in trip tables separate from other private autos. The BPM was updated to better reflect the most recent trends in taxi and FHV travel behavior in Manhattan. The BPM mode choice parameters were updated to match taxi and

FHV travel characteristics from the New York City Taxi and Limousine Commission (TLC) October 2017 data. Table 4A.1-2 includes a comparison of modeled and targeted 2017 taxi and FHV trips. Any changes in the calibration of taxis and FHVs largely came at the expense of reduced transit ridership.

Table 4A.1-2 Taxi and For-Hire Vehicle Model Results Compared with Target Data

MODEL	MANHATTAN	NON-MANHATTAN	TOTAL
Manhattan	306,742	1,742	308,484
Non-Manhattan	26,377	84,845	111,222
TOTAL	**333,119**	**86,587**	**419,706**

TARGETS	MANHATTAN	NON-MANHATTAN	TOTAL
Manhattan	310,640	1,734	312,374
Non-Manhattan	26,362	84,536	110,898
TOTAL	**337,002**	**86,270**	**423,272**

Sources: "Model" derived from Best Practice Model, WSP 2021; "Targets" derived from New York City Taxi and Limousine Commission October 2017 data

Note: Rows represent origins and columns represent destinations. For example, in the lower left of the top table, 26,377 taxi and FHV vehicle trips are modeled from locations outside of Manhattan to locations in Manhattan.

Unlike private autos, for the purpose of the model, each taxi or FHV entry into the Manhattan CBD would be assessed the Manhattan CBD toll in some tolling scenarios, and as a result, taxis and FHVs would be charged the full toll each time they would cross the 60th Street Manhattan CBD boundary for those tolling scenarios. For the actual implementation of the CBD Tolling Program, the Traffic Mobility Review Board will make recommendations on the treatment of taxis and FHVs, which will be considered by TBTA. Taxis and FHVs would potentially be exempt from the Manhattan CBD toll, receive a toll discount, or be subject to some other toll reduction such as a cap.

This EA evaluates taxi and FHV tolling policy by using a blended toll rate based on observed number of entries into the Manhattan CBD, toll policy, and Manhattan CBD toll rates by vehicle class. NYCDOT provided observed data from October 2017 that, on average, taxis enter the Manhattan CBD seven times per day, and FHV vehicles enter the Manhattan CBD two times per day. NYCDOT also provided data on total entries into the Manhattan CBD by vehicle class, indicating 83,000 taxi daily entries and 70,000 FHV daily entries into the zone. These two data points were then used to derive a weighted average of entries of 4.72 vehicle entries per day. The Manhattan CBD toll values used in the BPM used these observed data points to develop a weighted toll average for taxi and FHV vehicle class.

4A.1-5 BEST PRACTICE MODEL NETWORK UPDATES

The BPM networks were updated to add additional projects implemented since the adoption of New York Metropolitan Transportation Council Regional Transportation Plan in 2017. Table 4A.1-3 includes a complete list of the network coding changes implemented for this EA.

Table 4A.1-3 Best Practice Model Network Coding Changes for Projects after New York Metropolitan Transportation Council 2017 Regional Transportation Plan

	DESCRIPTION
1.	Fixed two-way coding of 63rd Street near Queensboro Bridge
2.	Fixed off-ramp on Queensboro from upper to lower roadway
3.	Corrected Queensboro Bridge lower level/upper roadway ramp on the Queens side
4.	Connected Queensboro upper/lower roadway to the correct on-ramps
5.	Dualized and tolled cordon links
6.	Moved the toll links north of 60th Street on the east side of Manhattan
7.	Updated HWYTRANS.DBF based on all the network changes
8.	Lowered the inbound Williamsburg Bridge capacity on the span
9.	Lowered West Side Highway/Route 9A hub bound link capacity
10.	Fixed two-way coding of 61st Street near Queensboro Bridge
11.	Added 60th Street between the ramp and First Avenue
12.	Connected Queensboro upper high-occupancy vehicle lane to 57th Street
13.	Updated Queensboro Bridge on-ramps lane attributes (due to the changes in item 4 of this list)
14.	Recoded 14th Street in Manhattan based on recent transit lane conversion
15.	Incorporated two-way tolling for the Verrazzano-Narrows Bridge
16.	SPDMOD (speed modification) update on High-Capacity Transit links
17.	Extended northbound L train to Canarsie-Rockaway Parkway Station
18.	Updated northbound L train headway and capacity
19.	Updated AM capacity on Long Island Rail Road Ronkonkoma branch
20.	Updated Queensboro Bridge capacity and high-occupancy vehicle lane calibration
21.	Updated Central Business District centroid connectors
22.	Removed 72nd Street traversal
23.	Incorporated Brooklyn Bridge bike lanes
24.	Incorporated Queensboro Bridge bike lanes
25.	Updated Fifth Avenue busway
26.	Updated 14th Street bus and truck lanes
27.	Incorporated Brooklyn-Queens Expressway modifications
28.	Updated Jay/Smith/Tillary bus and truck lanes
29.	Incorporated 21st Street (Queens) bus lane
30.	Updated Queensboro Bridge lower level links on Queens side
31.	Incorporated Queensboro Bridge high-occupancy vehicle and general-purpose lane swap (only in tolling scenarios)

Source: Best Practice Model, WSP 2021

4A.1-6 BEST PRACTICE MODEL ASSIGNMENT PROCEDURES

The BPM derives roadway volumes from a Multi-Modal, Multi-Class assignment routine in Caliper's TransCAD software. This is a capacity constrained roadway assignment process. The multiclass traffic assignment process assigns different user classes (e.g., income groups) and modes of traffic to a network simultaneously. In practice, this replicates the behavior that car, taxi, truck, and bus volumes affect travel speeds for everyone. This also allows for the model to replicate certain vehicle type restrictions like truck prohibitions and different toll policies by vehicle type.

Transit demand is derived using a TransCAD Equilibrium Pathfinder Assignment. This procedure minimizes the generalized cost of each traveler across all possible transit paths. The generalized cost for transit assignment is a combination of fares, travel time, and crowding. Transit assignment, like roadway assignment, use a multiclass assignment procedure to segment commuter rail and noncommuter rail transit markets.

Fares for all transit service in 2023 and 2045 are consistent with the NYMTC 2045 Regional Transportation Plan.

On-road vehicle and transit travel demand is a function of total person-level travel demand and mode choice. The BPM determines the total level of travel expected by purpose and income based on population and economic activity and then segments that travel into mode and time of day. These demand tables segmented by mode, purpose, income, and time of day are provided to the TransCAD assignment methods described above.

The BPM assignment procedures for roadway and transit both include capacity constraints on each facility. These capacity constraints vary based on the type of facility, so highways have more capacity than a local street and a subway has more capacity than a commuter bus. Because the model assigns roadway and transit traffic in iterative cycles, assigned volumes are compared to facility capacities and travel times on the facility are updated in successive iterations. This process represents the real-world conditions of congestion on roadways and the perceived travel time due to discomfort on transit vehicles. Through successive iterations, traffic finds new routes to complete their journeys. A completed or equilibrium assignment is one that has converged where no traveler is better off by choosing an alternative path.

4A.1-7 VALUE OF TIME

In this EA, the BPM stratifies the value of time across a journey's purpose and income. Value of time is the monetary value that a person considers their time is worth while traveling. This value varies by trip purpose and income. Work trips have the highest value of time while discretionary travels have lower values of time. High-income travelers have increased values of time than low-income travelers. This approach is consistent with Federal Highway Administration's *The Value of Travel Time Savings: Departmental Guidance for Conducting Economic Evaluations Revision 2 (2014 Update)*.

The BPM uses the following stratification for value of time in this environmental analysis (**Table 4A.1-4**). The BPM segments income into three categories:

- 15 percent lowest-income households
- 70 percent middle-income households
- 15 percent highest-income households

Table 4A.1-4 Value of Time Stratification

INCOME	PURPOSE	OCCUPANCY	VALUE ($/HOUR, 2010 DOLLARS)	VALUE ($/HOUR, 2019 DOLLARS)
Low	Work	SOV	$14.04	$18.39
Low	Work	HOV2	$22.81	$29.88
Low	Work	HOV3+	$31.00	$40.60
Low	Non-Work	SOV	$7.02	$9.20
Low	Non-Work	HOV2	$10.64	$13.94
Low	Non-Work	HOV3+	$13.84	$18.13
Med	Work	SOV	$21.94	$28.74
Med	Work	HOV2	$35.64	$46.69
Med	Work	HOV3+	$48.44	$63.46
Med	Non-Work	SOV	$10.97	$14.37
Med	Non-Work	HOV2	$16.63	$21.78
Med	Non-Work	HOV3+	$21.63	$28.33
High	Work	SOV	$35.78	$46.87
High	Work	HOV2	$58.13	$76.14
High	Work	HOV3+	$79.00	$103.48
High	Non-Work	SOV	$17.89	$23.44
High	Non-Work	HOV2	$27.12	$35.52
High	Non-Work	HOV3+	$35.27	$46.21

Note: SOV = Single-Occupancy Vehicle; HOV= High-Occupancy Vehicle

As one example of how income stratification affects travel into the Manhattan CBD, **Table 4A.1-5** reveals how drive-alone work-vehicle trips would decline at different rate by income class. Note that from **Table 4A.1-4**, the value of time in 2019 dollars for using a single-occupancy vehicles for work purpose is assumed as the following:

- $18.39/hour for the lowest-income households
- $28.74/hour for middle-income households
- $46.87/hour for highest-income households

Low-income work-vehicle trips into the Manhattan CBD would be reduced between 49 percent and 53 percent while high-income work-vehicle trips into the Manhattan CBD would be reduced between 32 percent and 40 percent. Because high-income travelers have a higher value of time, the BPM assumes that they would be less likely to switch modes or switch paths than lower-income households.

Table 4A.1-5 Daily Drive-Alone Work-Vehicle Trips by Income Entering the Manhattan CBD (2023)

INCOME CATEGORY		NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Lowest Income		5,234	2,614	2,566	2,608	2,652	2,468	2,452	2,517
	Difference		-2,620	-2,668	-2,626	-2,582	-2,766	-2,782	-2,717
	Percentage		-50.1%	-51.0%	-50.2%	-49.3%	-52.8%	-53.2%	-51.9%
Medium Income		209,971	122,856	120,637	118,821	116,793	112,310	114,648	117,643
	Difference		-87,115	-89,334	-91,150	-93,178	-97,661	-95,323	-92,337
	Percentage		-41.5%	-42.5%	-43.4%	-44.4%	-46.5%	-45.4%	-44.0%
Highest Income		111,053	76,074	74,472	72,976	71,215	67,233	69,071	73,252
	Difference		-34,978	-36,580	-38,077	-39,838	-43,820	-41,982	-37,801
	Percentage		-31.5%	-32.9%	-34.3%	-35.9%	-39.5%	-37.8%	-34.0%
TOTAL		**326,258**	**201,545**	**197,675**	**194,405**	**190,659**	**182,012**	**186,171**	**193,403**
	Difference		**-124,713**	**-128,583**	**-131,853**	**-135,599**	**-144,246**	**-140,087**	**-132,855**
	Percentage		**-38.2%**	**-39.4%**	**-40.4%**	**-41.6%**	**-44.2%**	**-42.9%**	**-40.7%**

Source: Best Practice Model, WSP 2021

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4A.2, Transportation:

Travel Forecast Tolling Scenario Summaries and Detailed Tables (2023 and 2045)

August 2022

Contents

Tables

Acronyms

CBD .... Central Business District
EA .... Environmental Assessment
FDR Drive .... Franklin D. Roosevelt Drive
FHV .... For-Hire Vehicle
MTA .... Metropolitan Transportation Authority
NYCDOT .... New York City Department of Transportation
NYMTC .... New York Metropolitan Transportation Council
PANYNJ .... Port Authority of New York and New Jersey
TBTA .... Triborough Bridge and Tunnel Authority
VMT .... Vehicle-Miles Traveled

4A.2.1 TRAVEL FORECAST TOLLING SCENARIO SUMMARIES

The following sections describe the opening year (2023) travel pattern changes for each tolling scenario followed by horizon year (2045) travel pattern changes for each tolling scenario compared to the No Action Alternative. While the results of the 2045 model runs are different in terms of actual numbers (because they reflect the longer-term background growth in the model's forecast), the patterns from tolling scenario to tolling scenario are consistent between 2023 and 2045. For reference, Chapter 2, "Project Alternatives," provides descriptions of each tolling scenario.

4A.2.1 Tolling Scenario A (2023)

All passenger and commercial vehicles (except those exempted by the enabling legislation) entering or remaining in the Manhattan CBD would pay the Manhattan CBD entry toll, which would vary by vehicle type, time of day, and payment method (e.g., E-ZPass, Tolls by Mail). There would be no crossing credits offered to reduce the Manhattan CBD toll. This tolling scenario would reduce vehicular demand to the Manhattan CBD and divert drivers who would have previously traveled through the Manhattan CBD between New Jersey and Brooklyn, Queens, and Long Island, to instead choose routes through Upper Manhattan, the Bronx, or Staten Island.

Under Tolling Scenario A, total vehicle-miles traveled (VMT) in the Manhattan CBD would be reduced by 7.8 percent compared to the No Action Alternative, with more modest reductions citywide and regionwide (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-7). Transit mode share to the Manhattan CBD would grow by 1.1 percent, from 78.2 percent to 79.3 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-8). Total vehicles entering the Manhattan CBD would also decline by 15.4 percent in this tolling scenario (see Subchapter 4A, Table 4A-5).

For Tolling Scenario A, traffic entering Manhattan via the Lincoln and Holland Tunnels would decrease, while traffic entering Manhattan on the George Washington Bridge would increase. The diversion to the George Washington Bridge would result from traffic attempting to avoid the Manhattan CBD when traveling between origins and destinations outside the Manhattan CBD. For example, in the No Action Alternative, an auto trip between Jersey City and the Upper West Side in Manhattan would likely use the Lincoln or Holland Tunnel because these facilities provide the most direct time-path, and no toll differential exists among the different Manhattan Hudson River crossings. With the introduction of Manhattan CBD tolling, drivers would pay the Manhattan CBD toll, in addition to the existing Port Authority of New York and New Jersey (PANYNJ) toll, for traveling through the Manhattan CBD. As a result, many of these trips would instead divert to the George Washington Bridge to avoid the Manhattan CBD toll despite the longer travel times.

For Tolling Scenario A, truck trips entering the Manhattan CBD would decline by 11.6 percent. Since this tolling scenario would toll trucks each time they enter or remain in the Manhattan CBD, trucks from New Jersey would be more likely to remain on West Side avenues in Manhattan to travel north and south rather than leave and re-enter the Manhattan CBD via the West Side Highway/Route 9A. This would result in additional truck traffic on these avenues near the Lincoln Tunnel.

4A.2.2 Tolling Scenario B (2023)

Tolling Scenario B differs from Tolling Scenario A in its treatment of potential tolling exemptions and caps for buses and commercial vehicles. For Tolling Scenario B, all buses (e.g., transit buses, charter buses) would be exempt from paying the Manhattan CBD toll, taxis and FHVs would be charged only once per day, and trucks would be charged up to two times a day. The Manhattan CBD toll for Tolling Scenario B would also be higher than for Tolling Scenario A.

Total VMT for Tolling Scenario B would be reduced by 7.6 percent in the Manhattan CBD compared to the No Action Alternative, with more modest reductions citywide and regionwide (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-7). The transit mode share to the Manhattan CBD would grow from 78.2 percent to 79.2 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-8). Total vehicles entering the Manhattan CBD would also decline by 15.7 percent in this tolling scenario (see Subchapter 4A, Table 4A-5).

Tolling Scenario B would not offer any crossing credits for vehicles entering Manhattan on TBTA and PANYNJ crossings. As a result, the diversion effects described for Tolling Scenario A would apply to Tolling Scenario B.

In Tolling Scenario B, the taxi and FHV toll would be charged only once per day per vehicle, and, as a result, the Manhattan CBD toll would likely be spread across multiple trips and passengers during the day. While the cost to access the Manhattan CBD would increase for taxis and FHVs relative to the No Action Alternative, the increased cost per trip would be greater for private automobiles, which are less able to spread the cost across multiple trips and drivers. This could encourage some drivers to switch to taxis, FHVs, or transit.[1]

For Tolling Scenario B, truck trips entering the Manhattan CBD would decline by 12.3 percent. On average, commercial trucks enter the Manhattan CBD only 1.5 times per day.[2] Because most trucks enter the Manhattan CBD fewer than two times per day, capping toll payments at twice per day for truck would have a minimal impact on trucks entering the Manhattan CBD.

Tolling Scenario B with 30 Percent Higher Tolls (2023). Model results indicate that Tolling Scenario B would not generate sufficient revenue to meet the Project objective related to raising sufficient annual net revenues to fund $15 billion for capital projects for the MTA Capital Program. It was retained in this analysis to provide consideration of a tolling scenario with lower toll rates and substantial caps and exemptions, which was a combination repeatedly requested by the public during development of this EA. To meet the revenue goal, an additional variation of the original Tolling Scenario B was modeled. In this variation, toll rates were increased 30 percent from the original Tolling Scenario B for all vehicle classes across all time periods. All other tolling policies in this variation are consistent with the original Tolling Scenario B.

This variation of Tolling Scenario B would reduce VMT in the Manhattan CBD by 8.6 percent compared to the No Action Alternative (Table 4A.2-1). This variation would also reduce traffic entering the Manhattan CBD by 17.5 percent (Table 4A.2-2). This variation would have minor changes to transit ridership where transit mode share to the Manhattan CBD would grow from 78.2 percent to 79.5 percent of the total journeys accessing the Manhattan CBD. This is a 0.3 percent greater transit mode share than the original Tolling Scenario B, and less than the transit mode share increases in Tolling Scenarios D, E, and F. For this variation of Tolling Scenario B, truck trips entering the Manhattan CBD would decline 13.8 percent.

[1] Taxis and FHVs would potentially be exempt from the CBD toll, receive a toll discount, or be subject to some other toll reduction such as a cap.

[2] TBTA Entry Data from November 7, 2019, from the Hugh L. Carey Tunnel and Queens-Midtown Tunnel.

Table 4A.2-1. Daily Vehicle-Miles Traveled: Tolling Scenario B and Tolling Scenario B with 30 Percent Higher Tolls (2023)

LOCATIONS	NO ACTION	SCENARIO B	SCENARIO B (PERCENTAGE CHANGE)	SCENARIO B (WITH 30% HIGHER TOLLS)	SCENARIO B (WITH 30% HIGHER TOLLS) (PERCENTAGE CHANGE)
New York State	**122,186,497**	**121,789,089**	**-0.3%**	**121,698,669**	**-0.4%**
New York City	47,131,752	46,784,237	-0.7%	46,708,460	-0.9%
Manhattan CBD	3,244,791	2,998,489	-7.6%	2,965,910	-8.6%
CBD Core	1,217,727	1,152,471	-5.4%	1,143,029	-6.1%
Peripheral Highways (south of 60th Street; excluded from the toll)	2,027,064	1,846,018	-8.9%	1,822,881	-10.1%
West Side Highway/Route 9A	610,657	513,887	-15.8%	508,096	-16.8%
FDR Drive	720,682	729,706	1.3%	727,868	1.0%
Bridges & Tunnels	695,725	602,425	-13.4%	586,917	-15.6%
NYC Subarea 1 (see Figure 4A-2)	2,218,077	2,049,528	-7.6%	2,029,541	-8.5%
NYC Subarea 2 (see Figure 4A-2)	6,660,953	6,630,016	-0.5%	6,617,073	-0.7%
NYC Subarea 3 (see Figure 4A-2)	35,007,931	35,106,204	0.3%	35,095,936	0.3%
Long Island Counties (2)	**41,585,545**	**41,595,736**	**0.0%**	**41,620,213**	**0.1%**
New York Counties North of New York City (5)	**33,469,200**	**33,409,116**	**-0.2%**	**33,369,996**	**-0.3%**
New Jersey Counties (14)	**97,578,100**	**97,590,826**	**0.0%**	**97,595,190**	**0.0%**
Connecticut Counties (2)	**34,909,870**	**34,856,848**	**-0.2%**	**34,873,079**	**-0.1%**
TOTAL	**254,674,467**	**254,236,763**	**-0.2%**	**254,166,938**	**-0.2%**

Note: The number of counties is indicated within parentheses ( ).

Table 4A.2-2. Daily Vehicles Entering the Manhattan CBD by Crossing Location: No Action Alternative, Tolling Scenario B, and Tolling Scenario B with 30 Percent Higher Tolls (2023)

CROSSING LOCATION	NO ACTION	SCENARIO B	SCENARIO B (Percentage Change)	SCENARIO B (WITH 30% HIGHER TOLLS)	SCENARIO B (WITH 30% HIGHER TOLLS) (Percentage Change)
60th Street	**276,466**	**221,318**	**-19.9%**	**217,484**	**-21.3%**
FDR Drive and West Side Highway/Route 9A[1]	161,696	152,322	-5.8%	151,952	-6.0%
West Side Avenues	28,026	22,743	-18.9%	22,128	-21.0%
East Side Avenues	86,744	46,253	-46.7%	43,404	-50.0%
Queens	**142,596**	**124,315**	**-12.8%**	**123,032**	**-13.7%**
Brooklyn	**187,486**	**167,624**	**-10.6%**	**164,160**	**-12.4%**
New Jersey	**109,602**	**90,704**	**-17.2%**	**86,219**	**-21.3%**
TOTAL Entering	**716,150**	**603,961**	**-15.7%**	**590,895**	**-17.5%**

1 Vehicle volumes entering the Manhattan CBD reported in this table for the Franklin D. Roosevelt (FDR) Drive and the West Side Highway/Route 9A are all vehicles traveling south on these facilities at 60th Street regardless of whether the vehicle eventually enters the Manhattan CBD from one of these facilities. Some vehicles reported in this table may use the West Side Highway/Route 9A and the FDR Drive to access the Hugh L. Carey Tunnel or Brooklyn Bridge without ever entering the Manhattan CBD. The volumes here are reported in this manner to be consistent with counts published in the annual New York Metropolitan Transportation Council (NYMTC) *Hub Bound Travel Data Report*.

4A.2.3 Tolling Scenario C (2023)

Tolling Scenario C differs from Tolling Scenario A in several ways:

- Tolling Scenario C would have a higher Manhattan CBD toll (approximately 50 percent greater than Tolling Scenario A).
- Tolling Scenario C would provide a crossing credit for vehicles that paid tolls on the Queens-Midtown Tunnel, Hugh L. Carey Tunnel, Lincoln Tunnel, and Holland Tunnel.
- Tolling Scenario C would provide an exemption for taxis and a three-time daily cap for FHVs.

Tolling Scenario C would have higher toll rates compared to Tolling Scenarios A and B. These increased tolls would offset the cost of providing crossing credits to Manhattan CBD tunnel customers. This tolling scenario would result in a larger reduction in VMT in the Manhattan CBD compared to Tolling Scenarios A and B, with an 8.0 percent decrease in Manhattan CBD VMT compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-7). Transit mode share to the Manhattan CBD would grow from 78.2 percent to 79.6 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-8). Total vehicles entering the Manhattan CBD would decline by 17.3 percent for Tolling Scenario C (see Subchapter 4A, Table 4A-5). In Tolling Scenario C, truck trips entering the Manhattan CBD would decline by 14.1 percent.

Potential crossing credits for Tolling Scenario C would reduce cost differences between NYCDOT and TBTA East River crossings entering the Manhattan CBD. In this tolling scenario, for example, a driver entering the Manhattan CBD during the day would pay the same combined toll with crossing credits entering on any East River crossing. As a result, the proportion of East River crossings via the Queens-Midtown Tunnel and Hugh L. Carey Tunnel would increase from 11 percent in the No Action Alternative to 17 percent for Tolling Scenario C. Even with the increased proportion of drive trips using these facilities to enter the Manhattan CBD, total drive journeys entering the Manhattan CBD would decline for Tolling Scenario C.

4A.2.4 Tolling Scenario D (2023)

Tolling Scenario D would offer Manhattan CBD crossing credits for vehicle trips using the Queens-Midtown Tunnel, Hugh L. Carey Tunnel, Holland Tunnel, or Lincoln Tunnel that would be higher than those offered for Tolling Scenario C. The higher crossing credits offered in this tolling scenario would result in a higher Manhattan CBD toll rate than Tolling Scenario C. Similar to Tolling Scenario A, taxis, FHVs, and commercial vehicles would be assessed a toll each time they enter or remain in the Manhattan CBD.

Tolling Scenario D would reduce VMT in the Manhattan CBD by 8.7 percent compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-7). This tolling scenario would result in greater VMT reductions than Tolling Scenarios A, B, and C in New York City Subarea 1. Because higher crossing credits would require higher tolls to meet the Project's net revenue goal, traffic would be reduced in areas of Upper Manhattan and Downtown Brooklyn nearest the crossings where no crossing credits would apply. In these areas, the TBTA crossing credits included for Tolling Scenario D would also reduce VMT due to driver diversions from untolled river crossings to more direct, tolled river crossings. Transit mode share to the Manhattan CBD would grow from 78.2 percent to 80.3 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-8). Total vehicles entering the Manhattan CBD would decline by 18.7 percent for Tolling Scenario D (see Subchapter 4A, Table 4A-5). In Tolling Scenario D, truck trips entering the Manhattan CBD would decline by 14.4 percent.

Recognizing that the tolls on the tunnels entering the Manhattan CBD would be higher than the crossing credit provided for Tolling Scenario C, Tolling Scenario D would provide a higher crossing credit against the Manhattan CBD toll that is closer to what PANYNJ customers, or TBTA customers traveling in both directions, would pay at the tunnels. This would increase the share of East River traffic on TBTA facilities connecting to the Manhattan CBD to 22 percent, from 11 percent in the No Action Alternative.

For the Hudson River crossings, volumes on the George Washington Bridge to Manhattan would decline. Some drivers bound to the Manhattan CBD from west of the Hudson River would divert to the Lincoln Tunnel and Holland Tunnel seeking crossing credits. These Manhattan CBD-bound driver diversions would be greater than the number of drivers switching to the bridge to avoid the Manhattan CBD toll for trips through the Manhattan CBD. This would lead to a net decline on Manhattan-bound vehicles on the George Washington Bridge.

4A.2.5 Tolling Scenario E (2023)

For Tolling Scenario E, increased tolls are the primary difference from Tolling Scenario D. Tolling Scenario E would exempt transit buses from paying the Manhattan CBD toll, which would result in a higher toll rate for other vehicle classes to maintain net revenue goals for the program. Tolling Scenario E along with Tolling Scenario F would have the highest tolls of any tolling scenario—approximately 20 percent higher than Tolling Scenario D and 150 percent higher than Tolling Scenario A. Tolling Scenario E would offer the same crossing credits as Tolling Scenario D on all tolled crossings into the Manhattan CBD.

Tolling Scenario E would reduce Manhattan CBD VMT by 9.2 percent compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-7). This tolling scenario would have the highest toll rates (along with Tolling Scenario F), which is the most significant factor in reducing VMT within the Manhattan CBD. Transit mode share to the Manhattan CBD would grow from 78.2 percent to 80.5 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-8). Total vehicles entering the Manhattan CBD would also decline by 19.9 percent in this tolling scenario (see Subchapter 4A, Table 4A-5). In Tolling Scenario E, truck trips entering the Manhattan CBD would decline by 17.1 percent.

The crossing credit impacts on diversions would be largely the same for Tolling Scenario E compared to Tolling Scenario D. The higher crossing credit for Tolling Scenario E would reduce the share of Hudson River traffic heading to Manhattan on the George Washington Bridge compared to the lower crossing credit for Tolling Scenario C. However, higher tolls would increase Hudson River diversions from the Lincoln and Holland Tunnels to the George Washington Bridge compared to Tolling Scenario D. In summary, traffic into Manhattan for Tolling Scenario E would decrease 1 percent compared to the No Action Alternative.

4A.2.6 Tolling Scenario F (2023)

Tolling Scenario F differs from the other tolling scenarios in its approach to tolling crossing credits and time periods for tolling. Tolling Scenario F would offer the same higher crossing credit as Tolling Scenarios D and E, but the crossing credit would apply to all tolled crossings into Manhattan. As a result, the crossing credit would also be available to drivers using the George Washington Bridge, Henry Hudson Bridge, and the Robert F. Kennedy Bridge to reach the Manhattan CBD. This tolling scenario would also reduce the amount of time the peak-period toll would be charged from 14 hours to 8 hours (4 hours in the AM peak and 4 hours in the PM peak) compared to the other tolling scenarios.

Tolling Scenario F would reduce VMT in the Manhattan CBD by 7.1 percent compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-7). Transit mode share to the Manhattan CBD would grow from 78.2 percent to 80.0 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-8). Total vehicles entering the Manhattan CBD would decline by 18.3 percent in this tolling scenario (see Subchapter 4A, Table 4A-5). In Tolling Scenario F, truck trips entering the Manhattan CBD would decline by 20.2 percent.

In Tolling Scenario F (along with Tolling Scenario B), the taxi and FHV toll would be charged only once per day per vehicle and, as a result, likely would be spread across multiple trips and passengers. While the cost to access the Manhattan CBD would increase for taxis and FHVs, it would increase more for private automobiles on a per trip rate. A low taxi and FHV toll spread across multiple trips plus improved travel times could encourage some drivers to switch to taxis and FHVs as well as transit.

4A.2.7 Tolling Scenario G (2023)

The Project Sponsors added Tolling Scenario G to this Environmental Assessment in response to concerns raised during early public outreach for the Project. This tolling scenario differs from all other tolling scenarios in that tolls would be the same for all vehicle classes. Like other tolling scenarios, tolls would vary by time period. No crossing credits would be offered in Tolling Scenario G, and by most metrics the tolling scenario would have similar effects to Tolling Scenarios A and B. One noticeable effect of Tolling Scenario G would be a significant reduction in truck diversions because through-trucks would be more likely to traverse the Manhattan CBD when the truck toll is equal to all other vehicle classes. As a result of equalizing tolls for trucks, the peak and off-peak E-ZPass rates would be 26 percent higher than Tolling Scenario A, and overnight tolls would be 60 percent of peak rates instead of 50 percent under Tolling Scenario A. Similar to Tolling Scenario A, taxis, FHVs, and trucks would be charged for each entry.

Tolling Scenario G would reduce VMT in the Manhattan CBD by 8.4 percent compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-7). Transit mode share to the Manhattan CBD would grow from 78.2 percent to 79.6 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-8). Total vehicles entering the Manhattan CBD would decline by 17.1 percent in this tolling scenario (see Subchapter 4A, Table 4A-5). In Tolling Scenario G, truck trips entering the Manhattan CBD would decline by 7.4 percent, compared to a decline of 11.6 percent in Tolling Scenario A and greater declines in other tolling scenarios.

During early public outreach for the Project, truck diversions were raised as a concern. Tolling Scenario G would decrease the level of truck diversions around the Manhattan CBD, as indicated by volumes on key bridges in the region. Tolling Scenario G would have a 0.5 percent decrease in daily truck volumes on the George Washington Bridge compared to the No Action Alternative, whereas every other tolling scenario would have an increase of 1 percent to 3 percent. On the Throgs Neck Bridge, Tolling Scenario G would have a 0.8 percent increase in daily truck volumes compared to the No Action Alternative, but this would be well below the 4 percent to 6 percent increases seen in other tolling scenarios. On the Verrazzano-Narrows Bridge, Tolling Scenario G would have a 0.8 percent increase in daily truck volumes compared to the No Action Alternative; other tolling scenarios would have increases of 2 percent to 6 percent. Within the Manhattan CBD, truck traffic would still decrease, but not as substantially as with other tolling scenarios.

Tolling Scenario G with Taxis/FHVs Capped at Once Per Day (2023). A variation of Tolling Scenario G was run to test the impact of adding a one-charge-per-day cap to taxis and FHVs. Adding this cap required increasing tolls on other vehicles by about 10 percent to meet the Project's revenue goal. This toll increase was low enough so as not to notably affect the results from Tolling Scenario G.

This Tolling Scenario G variation would reduce VMT in the Manhattan CBD by 8.2 percent compared to the No Action Alternative; the original Tolling Scenario G would reduce VMT by 8.4 percent. This variation would also reduce traffic entering the Manhattan CBD by 16.9 percent; the original Tolling Scenario G would reduce traffic entering the Manhattan CBD by 17.1 percent. This variation would have minor changes to transit ridership where transit mode share to the Manhattan CBD would grow from 78.2 percent to 79.2 percent of the total journeys accessing the Manhattan CBD; the transit mode share in the original Tolling Scenario G would be 79.4 percent.

In this variation of Tolling Scenario G, truck trips entering the Manhattan CBD would decline by 8.1 percent, compared to a decline of 7.4 percent in Tolling Scenario G. On key diversions bridges, this variation of Tolling Scenario G would perform as follows:

- a 0.2 percent decrease in daily truck volumes on the George Washington Bridge, versus a 0.5 percent decrease in Tolling Scenario G
- a 1.4 percent increase in daily truck volumes on the Throgs Neck Bridge, versus a 0.8 percent increase in Tolling Scenario G
- a 0.5 percent increase in daily truck volumes on the Verrazzano-Narrows Bridge, versus a 0.8 percent increase in Tolling Scenario G

4A.2.8 Tolling Scenario A (2045)

For Tolling Scenario A, total VMT in the Manhattan CBD would be reduced by 6.7 percent compared to the No Action Alternative, with more modest reductions citywide and regionwide (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-14). Transit mode share to the Manhattan CBD would grow by 1.1 percent, from 79.7 percent to 80.8 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-15). Total vehicles entering the Manhattan CBD would also decline by 13.7 percent in this tolling scenario (see Subchapter 4A, Table 4A-12).

For Tolling Scenario A, truck trips entering the Manhattan CBD would decline by 11.9 percent. Because this tolling scenario tolls trucks each time they enter or remain in the Manhattan CBD, trucks from New Jersey would be more likely to remain on West Side avenues in Manhattan to travel north and south rather than leave and re-enter the Manhattan CBD via the West Side Highway/Route 9A. This would result in additional truck traffic on these avenues near the Lincoln Tunnel.

4A.2.9 Tolling Scenario B (2045)

Total VMT for Tolling Scenario B would be reduced by 6.0 percent in the Manhattan CBD compared to the No Action Alternative, with more modest reductions citywide and regionwide (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-14). The transit mode share to the Manhattan CBD would grow from 79.7 percent to 80.5 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-15). Total vehicles entering the Manhattan CBD would also decline by 13.3 percent for this tolling scenario (see Subchapter 4A, Table 4A-12).

In Tolling Scenario B, the taxi and FHV toll would be charged only once per day per vehicle, and, as a result, the Manhattan CBD toll would likely be spread across multiple trips and passengers during the day. While the cost to access the Manhattan CBD would increase for taxis and FHVs relative to the No Action Alternative, the increased cost per trip would be greater for private automobiles, which are less able to spread the cost across multiple trips and drivers. This could encourage some drivers to switch to taxis, FHVs, and transit.

For Tolling Scenario B, truck trips entering the Manhattan CBD would decline by 12.5 percent. On average, commercial trucks enter the Manhattan CBD only 1.5 times per day.[3] Therefore, capping Manhattan CBD toll payments for trucks at twice per day would have minimal effect on truck-trip behavior compared to Tolling Scenario A, which would have no daily toll cap on trucks.

4A.2.10 Tolling Scenario C (2045)

Tolling Scenario C would have higher toll rates compared to Tolling Scenarios A and B. These increased tolls would offset the cost of providing crossing credits to Manhattan CBD tunnel customers. This tolling scenario would result in more reductions in VMT in the Manhattan CBD as Tolling Scenarios A and B, with a 7.2 percent decrease in Manhattan CBD VMT compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-14). Transit mode share to the Manhattan CBD would grow from 79.7 percent to 81 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-15). Total vehicles entering the Manhattan CBD would decline by 15.3 percent for Tolling Scenario C (see Subchapter 4A, Table 4A-12). In Tolling Scenario C, truck trips entering the Manhattan CBD would decline by 13.2 percent.

4A.2.11 Tolling Scenario D (2045)

Tolling Scenario D would reduce VMT in the Manhattan CBD by 8.4 percent compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-14). This tolling scenario would result in greater VMT reductions than Tolling Scenarios A, B, and C in New York City Subarea 1. Because higher crossing credits would require higher tolls to maintain net revenue goals, traffic would be reduced in areas of Upper Manhattan and Downtown Brooklyn nearest the crossings where no crossing credits would apply. In these areas, the TBTA crossing credits included in Tolling Scenario D would also reduce VMT because of driver diversions from untolled river crossings to more direct, tolled river crossings. Transit mode share to the Manhattan CBD would grow from 79.7 percent to 81.7 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-15). Total vehicles entering the Manhattan CBD would decline by 17.7 percent for Tolling Scenario D (see Subchapter 4A, Table 4A-12). In Tolling Scenario D, truck trips entering the Manhattan CBD would decline by 14.4 percent.

4A.2.12 Tolling Scenario E (2045)

Tolling Scenario E would reduce Manhattan CBD VMT by 8.7 percent compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-14). Transit mode share to the Manhattan CBD would grow from 79.7 percent to 81.9 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-15). Total vehicles entering the Manhattan CBD would also decline by 18.7 percent for this tolling scenario (see Subchapter 4A, Table 4A-12). In Tolling Scenario E, truck trips entering the Manhattan CBD would decline by 16.6 percent.

4A.2.13 Tolling Scenario F (2045)

Tolling Scenario F would reduce VMT in the Manhattan CBD by 7.5 percent compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-14). Transit mode share to the Manhattan CBD would grow from 79.7 percent to 81.5 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-15). Total vehicles entering the Manhattan CBD would decline by 17.2 percent for this tolling scenario (see Subchapter 4A, Table 4A-12). In Tolling Scenario F, truck trips entering the Manhattan CBD would decline by 16.5 percent.

4A.2.14 Tolling Scenario G (2045)

Tolling Scenario G would reduce VMT in the Manhattan CBD by 7.6 percent compared to the No Action Alternative (see Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling," Table 4A-14). Transit mode share to the Manhattan CBD would grow from 79.7 percent to 81.0 percent of the total journeys accessing the Manhattan CBD (see Subchapter 4A, Table 4A-15). Total vehicles entering the Manhattan CBD would decline by 15.3 percent (see Subchapter 4A, Table 4A-12), and truck trips entering the Manhattan CBD would decline by 6.1 percent.

[3] TBTA Entry Data from November 7, 2019, from the Hugh L. Carey Tunnel and Queens-Midtown Tunnel.

4A.2.2 TRAVEL FORECAST DETAILED TABLES

Table 4A.2-3. Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2023)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,414,585**	**1,213,964**	**1,209,856**	**1,186,011**	**1,165,190**	**1,148,053**	**1,171,689**	**1,190,707**	**-14%**	**-14%**	**-16%**	**-18%**	**-19%**	**-17%**	**-16%**
Inbound	**716,150**	**605,913**	**590,895**	**592,015**	**581,926**	**573,295**	**585,168**	**594,002**	**-15%**	**-17%**	**-17%**	**-19%**	**-20%**	**-18.3%**	**-17.1%**
Outbound	**698,410**	**608,023**	**593,230**	**593,964**	**583,232**	**574,733**	**586,493**	**596,676**	**-13%**	**-15%**	**-15%**	**-16%**	**-18%**	**-16%**	**-15%**
									-	-	-	-	-	-	-
60th Street	530,784	448,516	449,884	432,313	415,589	411,849	425,651	441,908	-15.5%	-15.2%	-18.6%	-21.7%	-22.4%	-19.8%	-16.7%
Inbound	276,466	220,659	217,484	208,405	198,437	196,294	204,011	216,999	-20.2%	-21.3%	-24.6%	-28.2%	-29.0%	-26.2%	-21.5%
Outbound	254,307	227,843	225,799	223,892	217,136	215,545	221,627	224,896	-10.4%	-11.2%	-12.0%	-14.6%	-15.2%	-12.9%	-11.6%
FDR DRIVE+WEST SIDE HWY	291,185	276,569	277,869	273,016	265,672	263,647	270,783	274,822	-5.0%	-4.6%	-6.2%	-8.8%	-9.5%	-7.0%	-5.6%
West Side Highway / Route 9A	122,140	112,694	113,191	110,074	106,877	105,727	108,784	111,538	-7.7%	-7.3%	-9.9%	-12.5%	-13.4%	-10.9%	-8.7%
am	*25,702*	*25,071*	*24,997*	*24,489*	*23,993*	*23,769*	*24,316*	*24,818*	*-2.5%*	*-2.7%*	*-4.7%*	*-6.6%*	*-7.5%*	*-5.4%*	*-3.4%*
md	*35,198*	*32,221*	*32,826*	*32,176*	*30,600*	*30,831*	*31,532*	*32,176*	*-8.5%*	*-6.7%*	*-8.6%*	*-13.1%*	*-12.4%*	*-10.4%*	*-8.6%*
pm	*26,248*	*25,281*	*25,353*	*24,786*	*24,381*	*24,288*	*24,750*	*25,098*	*-3.7%*	*-3.4%*	*-5.6%*	*-7.1%*	*-7.5%*	*-5.7%*	*-4.4%*
nt	*34,992*	*30,121*	*30,015*	*28,623*	*27,903*	*26,839*	*28,186*	*29,446*	*-13.9%*	*-14.2%*	*-18.2%*	*-20.3%*	*-23.3%*	*-19.5%*	*-15.8%*
FDR Drive	169,045	163,875	164,678	162,942	158,795	157,920	161,999	163,284	-3.1%	-2.6%	-3.6%	-6.1%	-6.6%	-4.2%	-3.4%
am	*34,583*	*34,087*	*34,140*	*34,092*	*33,858*	*33,882*	*34,483*	*34,020*	*-1.4%*	*-1.3%*	*-1.4%*	*-2.1%*	*-2.0%*	*-0.3%*	*-1.6%*
md	*47,506*	*45,244*	*46,147*	*46,139*	*45,226*	*45,310*	*46,489*	*45,180*	*-4.8%*	*-2.9%*	*-2.9%*	*-4.8%*	*-4.6%*	*-2.1%*	*-4.9%*
pm	*40,079*	*39,049*	*39,133*	*38,753*	*37,976*	*38,038*	*38,679*	*38,916*	*-2.6%*	*-2.4%*	*-3.3%*	*-5.2%*	*-5.1%*	*-3.5%*	*-2.9%*
nt	*46,877*	*45,495*	*45,258*	*43,958*	*41,735*	*40,690*	*42,348*	*45,168*	*-2.9%*	*-3.5%*	*-6.2%*	*-11.0%*	*-13.2%*	*-9.7%*	*-3.6%*
WEST AVENUES	68,392	52,383	53,572	50,586	47,820	47,219	49,818	51,662	-23.4%	-21.7%	-26.0%	-30.1%	-31.0%	-27.2%	-24.5%
West End Ave	9,898	3,684	3,763	2,894	2,325	2,136	2,721	3,747	-62.8%	-62.0%	-70.8%	-76.5%	-78.4%	-72.5%	-62.1%
am	*2,312*	*925*	*932*	*681*	*574*	*486*	*629*	*963*	*-60.0%*	*-59.7%*	*-70.5%*	*-75.2%*	*-79.0%*	*-72.8%*	*-58.3%*
md	*2,706*	*1,124*	*1,164*	*843*	*674*	*607*	*826*	*1,193*	*-58.5%*	*-57.0%*	*-68.8%*	*-75.1%*	*-77.6%*	*-69.5%*	*-55.9%*
pm	*2,930*	*1,090*	*1,151*	*1,001*	*733*	*744*	*898*	*1,084*	*-62.8%*	*-60.7%*	*-65.8%*	*-75.0%*	*-74.6%*	*-69.4%*	*-63.0%*
nt	*1,950*	*545*	*516*	*369*	*344*	*299*	*368*	*507*	*-72.1%*	*-73.5%*	*-81.1%*	*-82.4%*	*-84.7%*	*-81.1%*	*-74.0%*
Broadway	33,773	28,170	28,585	27,511	25,951	25,477	26,726	27,285	-16.6%	-15.4%	-18.5%	-23.2%	-24.6%	-20.9%	-19.2%
am	*7,916*	*6,807*	*6,792*	*6,480*	*6,053*	*5,825*	*6,349*	*6,542*	*-14.0%*	*-14.2%*	*-18.1%*	*-23.5%*	*-26.4%*	*-19.8%*	*-17.4%*
md	*9,108*	*7,000*	*7,239*	*6,826*	*6,094*	*6,065*	*6,520*	*6,773*	*-23.1%*	*-20.5%*	*-25.1%*	*-33.1%*	*-33.4%*	*-28.4%*	*-25.6%*
pm	*10,673*	*9,138*	*9,398*	*8,991*	*8,694*	*8,557*	*8,694*	*8,965*	*-14.4%*	*-11.9%*	*-15.8%*	*-18.5%*	*-19.8%*	*-18.5%*	*-16.0%*
nt	*6,076*	*5,225*	*5,156*	*5,214*	*5,110*	*5,030*	*5,163*	*5,005*	*-14.0%*	*-15.1%*	*-14.2%*	*-15.9%*	*-17.2%*	*-15.0%*	*-17.6%*
Amsterdam	12,033	7,318	7,711	7,099	6,696	6,671	7,265	7,388	-39.2%	-35.9%	-41.0%	-44.4%	-44.6%	-39.6%	-38.6%
am	*1,684*	*1,036*	*1,020*	*897*	*955*	*897*	*922*	*1,133*	*-38.5%*	*-39.4%*	*-46.7%*	*-43.3%*	*-46.7%*	*-45.2%*	*-32.7%*
md	*3,278*	*1,822*	*1,845*	*1,684*	*1,693*	*1,748*	*1,950*	*1,891*	*-44.4%*	*-43.7%*	*-48.6%*	*-48.4%*	*-46.7%*	*-40.5%*	*-42.3%*
pm	*5,264*	*3,502*	*3,862*	*3,352*	*2,815*	*2,992*	*3,155*	*3,349*	*-33.5%*	*-26.6%*	*-36.3%*	*-46.5%*	*-43.2%*	*-40.1%*	*-36.4%*
nt	*1,807*	*958*	*984*	*1,166*	*1,233*	*1,034*	*1,238*	*1,015*	*-47.0%*	*-45.5%*	*-35.5%*	*-31.8%*	*-42.8%*	*-31.5%*	*-43.8%*

Table 4A.2-3 Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2023) (continued)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,414,585**	**1,213,964**	**1,209,856**	**1,186,011**	**1,165,190**	**1,148,053**	**1,171,689**	**1,190,707**	**-14%**	**-14%**	**-16%**	**-18%**	**-19%**	**-17%**	**-16%**
Inbound	**716,150**	**605,913**	**590,895**	**592,015**	**581,926**	**573,295**	**585,168**	**594,002**	**-15%**	**-17%**	**-17%**	**-19%**	**-20%**	**-18.3%**	**-17.1%**
Outbound	**698,410**	**608,023**	**593,230**	**593,964**	**583,232**	**574,733**	**586,493**	**596,676**	**-13%**	**-15%**	**-15%**	**-16%**	**-18%**	**-16%**	**-15%**
									-	-	-	-	-	-	-
60th Street	530,784	448,516	449,884	432,313	415,589	411,849	425,651	441,908	-15.5%	-15.2%	-18.6%	-21.7%	-22.4%	-19.8%	-16.7%
Inbound	276,466	220,659	217,484	208,405	198,437	196,294	204,011	216,999	-20.2%	-21.3%	-24.6%	-28.2%	-29.0%	-26.2%	-21.5%
Outbound	254,307	227,843	225,799	223,892	217,136	215,545	221,627	224,896	-10.4%	-11.2%	-12.0%	-14.6%	-15.2%	-12.9%	-11.6%
Columbus Ave	8,945	9,615	9,955	9,318	9,112	9,237	9,233	9,751	7.5%	11.3%	4.2%	1.9%	3.3%	3.2%	9.0%
am	*2,651*	*2,663*	*2,790*	*2,598*	*2,566*	*2,609*	*2,629*	*2,753*	*0.5%*	*5.2%*	*-2.0%*	*-3.2%*	*-1.6%*	*-0.8%*	*3.8%*
md	*3,170*	*3,188*	*3,483*	*3,192*	*3,155*	*3,162*	*3,092*	*3,254*	*0.6%*	*9.9%*	*0.7%*	*-0.5%*	*-0.3%*	*-2.5%*	*2.6%*
pm	*1,801*	*1,781*	*1,837*	*1,749*	*1,715*	*1,755*	*1,778*	*1,772*	*-1.1%*	*2.0%*	*-2.9%*	*-4.8%*	*-2.6%*	*-1.3%*	*-1.6%*
nt	*1,323*	*1,983*	*1,845*	*1,779*	*1,676*	*1,711*	*1,734*	*1,972*	*49.9%*	*39.5%*	*34.5%*	*26.7%*	*29.3%*	*31.1%*	*49.1%*
Eighth Avenue	3,743	3,596	3,558	3,764	3,736	3,698	3,873	3,491	-3.9%	-4.9%	0.6%	-0.2%	-1.2%	3.5%	-6.7%
am	*643*	*698*	*664*	*770*	*932*	*871*	*921*	*633*	*8.6%*	*3.3%*	*19.8%*	*44.9%*	*35.5%*	*43.2%*	*-1.6%*
md	*1,011*	*880*	*910*	*896*	*854*	*867*	*864*	*832*	*-13.0%*	*-10.0%*	*-11.4%*	*-15.5%*	*-14.2%*	*-14.5%*	*-17.7%*
pm	*1,253*	*1,182*	*1,166*	*1,212*	*1,159*	*1,182*	*1,240*	*1,198*	*-5.7%*	*-6.9%*	*-3.3%*	*-7.5%*	*-5.7%*	*-1.0%*	*-4.4%*
nt	*836*	*836*	*818*	*886*	*791*	*778*	*848*	*828*	*0.0%*	*-2.2%*	*6.0%*	*-5.4%*	*-6.9%*	*1.4%*	*-1.0%*
EAST AVENUES	171,207	119,564	118,443	108,711	102,097	100,983	105,050	115,424	-30.2%	-30.8%	-36.5%	-40.4%	-41.0%	-38.6%	-32.6%
Fifth Avenue	12,394	9,575	9,598	9,055	8,318	8,258	8,660	9,327	-22.7%	-22.6%	-26.9%	-32.9%	-33.4%	-30.1%	-24.7%
am	*3,768*	*3,168*	*3,166*	*2,981*	*2,738*	*2,691*	*2,945*	*3,068*	*-15.9%*	*-16.0%*	*-20.9%*	*-27.3%*	*-28.6%*	*-21.8%*	*-18.6%*
md	*4,709*	*3,392*	*3,497*	*3,222*	*2,939*	*2,927*	*3,073*	*3,330*	*-28.0%*	*-25.7%*	*-31.6%*	*-37.6%*	*-37.8%*	*-34.7%*	*-29.3%*
pm	*2,150*	*1,606*	*1,634*	*1,582*	*1,465*	*1,493*	*1,530*	*1,614*	*-25.3%*	*-24.0%*	*-26.4%*	*-31.9%*	*-30.6%*	*-28.8%*	*-24.9%*
nt	*1,767*	*1,409*	*1,301*	*1,270*	*1,176*	*1,147*	*1,112*	*1,315*	*-20.3%*	*-26.4%*	*-28.1%*	*-33.4%*	*-35.1%*	*-37.1%*	*-25.6%*
Madison Avenue	3,727	3,171	3,231	3,118	2,959	2,878	2,926	3,140	-14.9%	-13.3%	-16.3%	-20.6%	-22.8%	-21.5%	-15.7%
am	*462*	*433*	*432*	*424*	*428*	*430*	*437*	*420*	*-6.3%*	*-6.5%*	*-8.2%*	*-7.4%*	*-6.9%*	*-5.4%*	*-9.1%*
md	*936*	*867*	*883*	*855*	*857*	*859*	*856*	*829*	*-7.4%*	*-5.7%*	*-8.7%*	*-8.4%*	*-8.2%*	*-8.5%*	*-11.4%*
pm	*2,091*	*1,679*	*1,716*	*1,653*	*1,481*	*1,414*	*1,431*	*1,694*	*-19.7%*	*-17.9%*	*-20.9%*	*-29.2%*	*-32.4%*	*-31.6%*	*-19.0%*
nt	*238*	*192*	*200*	*186*	*193*	*175*	*202*	*197*	*-19.3%*	*-16.0%*	*-21.8%*	*-18.9%*	*-26.5%*	*-15.1%*	*-17.2%*
Park Avenue	18,411	14,583	14,538	14,191	12,968	12,668	13,336	13,959	-20.8%	-21.0%	-22.9%	-29.6%	-31.2%	-27.6%	-24.2%
am	*4,828*	*3,901*	*3,905*	*3,799*	*3,558*	*3,353*	*3,652*	*3,772*	*-19.2%*	*-19.1%*	*-21.3%*	*-26.3%*	*-30.6%*	*-24.4%*	*-21.9%*
md	*4,860*	*3,590*	*3,676*	*3,420*	*3,176*	*3,012*	*3,205*	*3,533*	*-26.1%*	*-24.4%*	*-29.6%*	*-34.7%*	*-38.0%*	*-34.1%*	*-27.3%*
pm	*5,188*	*4,242*	*4,302*	*4,177*	*3,884*	*3,860*	*4,003*	*4,009*	*-18.2%*	*-17.1%*	*-19.5%*	*-25.1%*	*-25.6%*	*-22.8%*	*-22.7%*
nt	*3,535*	*2,850*	*2,655*	*2,795*	*2,350*	*2,443*	*2,476*	*2,645*	*-19.4%*	*-24.9%*	*-20.9%*	*-33.5%*	*-30.9%*	*-30.0%*	*-25.2%*

Table 4A.2-3 Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2023) (continued)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,414,585**	**1,213,964**	**1,209,856**	**1,186,011**	**1,165,190**	**1,148,053**	**1,171,689**	**1,190,707**	**-14%**	**-14%**	**-16%**	**-18%**	**-19%**	**-17%**	**-16%**
Inbound	**716,150**	**605,913**	**590,895**	**592,015**	**581,926**	**573,295**	**585,168**	**594,002**	**-15%**	**-17%**	**-17%**	**-19%**	**-20%**	**-18.3%**	**-17.1%**
Outbound	**698,410**	**608,023**	**593,230**	**593,964**	**583,232**	**574,733**	**586,493**	**596,676**	**-13%**	**-15%**	**-15%**	**-16%**	**-18%**	**-16%**	**-15%**
									-	-	-	-	-	-	-
60th Street	530,784	448,516	449,884	432,313	415,589	411,849	425,651	441,908	-15.5%	-15.2%	-18.6%	-21.7%	-22.4%	-19.8%	-16.7%
Inbound	276,466	220,659	217,484	208,405	198,437	196,294	204,011	216,999	-20.2%	-21.3%	-24.6%	-28.2%	-29.0%	-26.2%	-21.5%
Outbound	254,307	227,843	225,799	223,892	217,136	215,545	221,627	224,896	-10.4%	-11.2%	-12.0%	-14.6%	-15.2%	-12.9%	-11.6%
Lexington Avenue	14,798	10,597	10,671	9,140	7,982	7,718	8,448	10,751	-28.4%	-27.9%	-38.2%	-46.1%	-47.8%	-42.9%	-27.3%
am	*3,677*	*2,293*	*2,329*	*2,135*	*1,879*	*1,863*	*1,978*	*2,323*	*-37.6%*	*-36.7%*	*-41.9%*	*-48.9%*	*-49.3%*	*-46.2%*	*-36.8%*
md	*6,294*	*4,900*	*4,820*	*3,817*	*3,177*	*3,029*	*3,415*	*4,983*	*-22.1%*	*-23.4%*	*-39.4%*	*-49.5%*	*-51.9%*	*-45.7%*	*-20.8%*
pm	*2,134*	*1,432*	*1,462*	*1,474*	*1,363*	*1,414*	*1,449*	*1,481*	*-32.9%*	*-31.5%*	*-30.9%*	*-36.1%*	*-33.7%*	*-32.1%*	*-30.6%*
nt	*2,693*	*1,972*	*2,060*	*1,714*	*1,563*	*1,412*	*1,606*	*1,964*	*-26.8%*	*-23.5%*	*-36.4%*	*-42.0%*	*-47.6%*	*-40.4%*	*-27.1%*
Third Avenue	14,212	10,537	10,490	9,783	8,558	8,341	8,795	10,054	-25.9%	-26.2%	-31.2%	-39.8%	-41.3%	-38.1%	-29.3%
am	*2,388*	*1,990*	*1,826*	*1,834*	*1,676*	*1,553*	*1,659*	*1,859*	*-16.7%*	*-23.5%*	*-23.2%*	*-29.8%*	*-35.0%*	*-30.5%*	*-22.2%*
md	*5,207*	*3,833*	*3,842*	*3,554*	*2,811*	*2,795*	*2,920*	*3,599*	*-26.4%*	*-26.2%*	*-31.7%*	*-46.0%*	*-46.3%*	*-43.9%*	*-30.9%*
pm	*4,658*	*3,304*	*3,352*	*3,005*	*2,747*	*2,702*	*2,905*	*3,149*	*-29.1%*	*-28.0%*	*-35.5%*	*-41.0%*	*-42.0%*	*-37.6%*	*-32.4%*
nt	*1,959*	*1,410*	*1,470*	*1,390*	*1,324*	*1,291*	*1,311*	*1,447*	*-28.0%*	*-25.0%*	*-29.0%*	*-32.4%*	*-34.1%*	*-33.1%*	*-26.1%*
Second Avenue	39,264	17,362	16,626	14,152	13,485	13,301	14,184	15,297	-55.8%	-57.7%	-64.0%	-65.7%	-66.1%	-63.9%	-61.0%
am	*8,739*	*5,211*	*5,052*	*4,696*	*5,206*	*5,032*	*5,261*	*4,719*	*-40.4%*	*-42.2%*	*-46.3%*	*-40.4%*	*-42.4%*	*-39.8%*	*-46.0%*
md	*11,336*	*5,009*	*4,687*	*3,681*	*3,266*	*3,394*	*3,674*	*4,618*	*-55.8%*	*-58.7%*	*-67.5%*	*-71.2%*	*-70.1%*	*-67.6%*	*-59.3%*
pm	*8,793*	*3,753*	*3,710*	*3,362*	*3,274*	*3,143*	*3,337*	*3,437*	*-57.3%*	*-57.8%*	*-61.8%*	*-62.8%*	*-64.3%*	*-62.0%*	*-60.9%*
nt	*10,396*	*3,389*	*3,177*	*2,413*	*1,739*	*1,732*	*1,912*	*2,523*	*-67.4%*	*-69.4%*	*-76.8%*	*-83.3%*	*-83.3%*	*-81.6%*	*-75.7%*
First Avenue	5,642	5,019	5,272	4,967	5,276	5,111	5,418	5,193	-11.0%	-6.6%	-12.0%	-6.5%	-9.4%	-4.0%	-8.0%
am	*1,709*	*1,527*	*1,557*	*1,499*	*1,943*	*1,770*	*2,000*	*1,549*	*-10.6%*	*-8.9%*	*-12.3%*	*13.7%*	*3.6%*	*17.0%*	*-9.4%*
md	*1,319*	*1,416*	*1,407*	*1,341*	*1,226*	*1,226*	*1,358*	*1,432*	*7.4%*	*6.7%*	*1.7%*	*-7.1%*	*-7.1%*	*3.0%*	*8.6%*
pm	*1,724*	*1,436*	*1,670*	*1,547*	*1,585*	*1,387*	*1,443*	*1,546*	*-16.7%*	*-3.1%*	*-10.3%*	*-8.1%*	*-19.5%*	*-16.3%*	*-10.3%*
nt	*890*	*640*	*638*	*580*	*522*	*728*	*617*	*666*	*-28.1%*	*-28.3%*	*-34.8%*	*-41.3%*	*-18.2%*	*-30.7%*	*-25.2%*
York Avenue	23,046	13,733	13,591	12,481	11,842	11,793	12,225	13,239	-40.4%	-41.0%	-45.8%	-48.6%	-48.8%	-47.0%	-42.6%
am	*4,385*	*2,576*	*2,545*	*2,363*	*2,226*	*2,188*	*2,248*	*2,482*	*-41.3%*	*-42.0%*	*-46.1%*	*-49.2%*	*-50.1%*	*-48.7%*	*-43.4%*
md	*6,974*	*4,392*	*4,584*	*3,964*	*3,652*	*3,690*	*3,922*	*4,236*	*-37.0%*	*-34.3%*	*-43.2%*	*-47.6%*	*-47.1%*	*-43.8%*	*-39.3%*
pm	*4,325*	*2,728*	*2,446*	*2,267*	*2,030*	*2,153*	*2,048*	*2,669*	*-36.9%*	*-43.4%*	*-47.6%*	*-53.1%*	*-50.2%*	*-52.6%*	*-38.3%*
nt	*7,362*	*4,037*	*4,016*	*3,887*	*3,934*	*3,762*	*4,007*	*3,852*	*-45.2%*	*-45.4%*	*-47.2%*	*-46.6%*	*-48.9%*	*-45.6%*	*-47.7%*
Ed Koch Queensboro Ramp	39,713	34,987	34,426	31,824	30,709	30,915	31,058	34,464	-11.9%	-13.3%	-19.9%	-22.7%	-22.2%	-21.8%	-13.2%
am	*7,646*	*5,244*	*5,284*	*5,092*	*5,084*	*5,235*	*5,223*	*5,196*	*-31.4%*	*-30.9%*	*-33.4%*	*-33.5%*	*-31.5%*	*-31.7%*	*-32.0%*
md	*15,217*	*12,289*	*11,930*	*10,586*	*9,709*	*9,733*	*9,910*	*11,908*	*-19.2%*	*-21.6%*	*-30.4%*	*-36.2%*	*-36.0%*	*-34.9%*	*-21.7%*
pm	*7,954*	*5,429*	*5,402*	*4,908*	*4,911*	*4,748*	*4,928*	*5,368*	*-31.7%*	*-32.1%*	*-38.3%*	*-38.3%*	*-40.3%*	*-38.0%*	*-32.5%*
nt	*8,896*	*12,025*	*11,810*	*11,238*	*11,005*	*11,199*	*10,997*	*11,992*	*35.2%*	*32.8%*	*26.3%*	*23.7%*	*25.9%*	*23.6%*	*34.8%*

Table 4A.2-3 Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2023) (continued)

Daily Volumes									Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,414,585**	**1,213,964**	**1,209,856**	**1,186,011**	**1,165,190**	**1,148,053**	**1,171,689**	**1,190,707**	**-14%**	**-14%**	**-16%**	**-18%**	**-19%**	**-17%**	**-16%**
Inbound	**716,150**	**605,913**	**590,895**	**592,015**	**581,926**	**573,295**	**585,168**	**594,002**	**-15%**	**-17%**	**-17%**	**-19%**	**-20%**	**-18.3%**	**-17.1%**
Outbound	**698,410**	**608,023**	**593,230**	**593,964**	**583,232**	**574,733**	**586,493**	**596,676**	**-13%**	**-15%**	**-15%**	**-16%**	**-18%**	**-16%**	**-15%**
									-	-	-	-	-	-	-
Queens	268,300	226,698	225,076	226,946	237,025	235,706	238,171	222,545	-15.5%	-16.1%	-15.4%	-11.7%	-12.1%	-11.2%	-17.1%
Inbound	142,596	125,030	123,032	130,029	136,799	136,652	137,229	123,298	-12.3%	-13.7%	-8.8%	-4.1%	-4.2%	-3.8%	-13.5%
Outbound	125,702	101,665	98,264	96,913	100,223	99,051	100,940	99,242	-19.1%	-21.8%	-22.9%	-20.3%	-21.2%	-19.7%	-21.0%
Ed Koch Queensboro Bridge	186,973	152,370	150,390	130,569	113,066	112,169	113,833	148,715	-18.5%	-19.6%	-30.2%	-39.5%	-40.0%	-39.1%	-20.5%
am	*38,293*	*32,207*	*31,839*	*28,658*	*26,733*	*26,384*	*26,670*	*31,281*	*-15.9%*	*-16.9%*	*-25.2%*	*-30.2%*	*-31.1%*	*-30.4%*	*-18.3%*
md	*58,127*	*47,256*	*46,789*	*42,846*	*37,359*	*37,496*	*37,849*	*46,252*	*-18.7%*	*-19.5%*	*-26.3%*	*-35.7%*	*-35.5%*	*-34.9%*	*-20.4%*
pm	*40,997*	*32,279*	*31,961*	*27,824*	*25,524*	*24,984*	*25,738*	*31,564*	*-21.3%*	*-22.0%*	*-32.1%*	*-37.7%*	*-39.1%*	*-37.2%*	*-23.0%*
nt	*49,556*	*40,628*	*39,801*	*31,241*	*23,450*	*23,305*	*23,576*	*39,618*	*-18.0%*	*-19.7%*	*-37.0%*	*-52.7%*	*-53.0%*	*-52.4%*	*-20.1%*
Queens-Midtown Tunnel	81,327	74,328	74,686	96,377	123,959	123,537	124,338	73,830	-8.6%	-8.2%	18.5%	52.4%	51.9%	52.9%	-9.2%
am	*19,352*	*18,072*	*18,054*	*20,872*	*23,344*	*23,234*	*23,540*	*18,078*	*-6.6%*	*-6.7%*	*7.9%*	*20.6%*	*20.1%*	*21.6%*	*-6.6%*
md	*28,738*	*26,581*	*26,541*	*29,530*	*36,234*	*35,960*	*36,463*	*26,369*	*-7.5%*	*-7.6%*	*2.8%*	*26.1%*	*25.1%*	*26.9%*	*-8.2%*
pm	*19,615*	*17,474*	*17,660*	*21,456*	*25,582*	*25,387*	*25,443*	*17,326*	*-10.9%*	*-10.0%*	*9.4%*	*30.4%*	*29.4%*	*29.7%*	*-11.7%*
nt	*13,622*	*12,201*	*12,431*	*24,519*	*38,799*	*38,956*	*38,892*	*12,057*	*-10.4%*	*-8.7%*	*80.0%*	*184.8%*	*186.0%*	*185.5%*	*-11.5%*

Table 4A.2-3 Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2023) (continued)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,414,585**	**1,213,964**	**1,209,856**	**1,186,011**	**1,165,190**	**1,148,053**	**1,171,689**	**1,190,707**	**-14%**	**-14%**	**-16%**	**-18%**	**-19%**	**-17%**	**-16%**
Inbound	**716,150**	**605,913**	**590,895**	**592,015**	**581,926**	**573,295**	**585,168**	**594,002**	**-15%**	**-17%**	**-17%**	**-19%**	**-20%**	**-18.3%**	**-17.1%**
Outbound	**698,410**	**608,023**	**593,230**	**593,964**	**583,232**	**574,733**	**586,493**	**596,676**	**-13%**	**-15%**	**-15%**	**-16%**	**-18%**	**-16%**	**-15%**
									-	-	-	-	-	-	-
Brooklyn	391,603	350,510	349,383	333,372	314,584	309,743	311,458	344,495	-10.5%	-10.8%	-14.9%	-19.7%	-20.9%	-20.5%	-12.0%
Inbound	187,486	168,154	164,160	152,790	138,880	137,092	137,368	165,509	-10.3%	-12.4%	-18.5%	-25.9%	-26.9%	-26.7%	-11.7%
Outbound	204,111	182,347	177,994	180,571	175,696	172,644	174,082	178,980	-10.7%	-12.8%	-11.5%	-13.9%	-15.4%	-14.7%	-12.3%
Williamsburg Bridge	122,207	101,542	101,260	93,732	78,130	75,951	78,004	98,789	-16.9%	-17.1%	-23.3%	-36.1%	-37.9%	-36.2%	-19.2%
am	*25,067*	*20,643*	*20,367*	*19,853*	*18,651*	*18,153*	*18,242*	*20,011*	*-17.6%*	*-18.7%*	*-20.8%*	*-25.6%*	*-27.6%*	*-27.2%*	*-20.2%*
md	*34,143*	*28,314*	*28,522*	*27,192*	*23,711*	*23,398*	*24,101*	*27,740*	*-17.1%*	*-16.5%*	*-20.4%*	*-30.6%*	*-31.5%*	*-29.4%*	*-18.8%*
pm	*30,486*	*26,445*	*26,212*	*24,704*	*20,928*	*20,440*	*20,894*	*25,801*	*-13.3%*	*-14.0%*	*-19.0%*	*-31.4%*	*-33.0%*	*-31.5%*	*-15.4%*
nt	*32,511*	*26,140*	*26,159*	*21,983*	*14,840*	*13,960*	*14,767*	*25,237*	*-19.6%*	*-19.5%*	*-32.4%*	*-54.4%*	*-57.1%*	*-54.6%*	*-22.4%*
Manhattan Bridge	88,594	68,593	68,021	55,533	38,195	35,697	36,567	66,289	-22.6%	-23.2%	-37.3%	-56.9%	-59.7%	-58.7%	-25.2%
am	*23,956*	*18,859*	*18,743*	*15,548*	*11,715*	*11,042*	*10,791*	*18,221*	*-21.3%*	*-21.8%*	*-35.1%*	*-51.1%*	*-53.9%*	*-55.0%*	*-23.9%*
md	*24,322*	*19,680*	*19,369*	*16,184*	*10,759*	*10,020*	*10,688*	*18,987*	*-19.1%*	*-20.4%*	*-33.5%*	*-55.8%*	*-58.8%*	*-56.1%*	*-21.9%*
pm	*21,763*	*16,699*	*16,736*	*13,701*	*9,699*	*8,974*	*9,219*	*16,080*	*-23.3%*	*-23.1%*	*-37.0%*	*-55.4%*	*-58.8%*	*-57.6%*	*-26.1%*
nt	*18,553*	*13,355*	*13,173*	*10,100*	*6,022*	*5,661*	*5,869*	*13,001*	*-28.0%*	*-29.0%*	*-45.6%*	*-67.5%*	*-69.5%*	*-68.4%*	*-29.9%*
Brooklyn Bridge	121,147	119,354	118,751	113,780	99,005	97,657	96,384	118,810	-1.5%	-2.0%	-6.1%	-18.3%	-19.4%	-20.4%	-1.9%
am	*24,876*	*24,638*	*24,551*	*24,001*	*22,907*	*22,683*	*22,419*	*24,480*	*-1.0%*	*-1.3%*	*-3.5%*	*-7.9%*	*-8.8%*	*-9.9%*	*-1.6%*
md	*33,856*	*33,162*	*32,970*	*31,695*	*27,286*	*27,164*	*26,574*	*32,775*	*-2.0%*	*-2.6%*	*-6.4%*	*-19.4%*	*-19.8%*	*-21.5%*	*-3.2%*
pm	*27,157*	*26,147*	*25,932*	*25,090*	*23,246*	*23,114*	*22,988*	*25,899*	*-3.7%*	*-4.5%*	*-7.6%*	*-14.4%*	*-14.9%*	*-15.4%*	*-4.6%*
nt	*35,258*	*35,407*	*35,298*	*32,994*	*25,566*	*24,696*	*24,403*	*35,656*	*0.4%*	*0.1%*	*-6.4%*	*-27.5%*	*-30.0%*	*-30.8%*	*1.1%*
Hugh Carey Tunnel	59,655	61,021	61,351	70,327	99,254	100,438	100,503	60,607	2.3%	2.8%	17.9%	66.4%	68.4%	68.5%	1.6%
am	*16,739*	*17,349*	*17,445*	*18,493*	*21,045*	*21,096*	*21,440*	*17,352*	*3.6%*	*4.2%*	*10.5%*	*25.7%*	*26.0%*	*28.1%*	*3.7%*
md	*18,798*	*18,663*	*18,669*	*20,545*	*28,999*	*28,830*	*28,990*	*18,450*	*-0.7%*	*-0.7%*	*9.3%*	*54.3%*	*53.4%*	*54.2%*	*-1.9%*
pm	*18,908*	*18,624*	*18,590*	*20,647*	*25,589*	*25,367*	*25,619*	*18,468*	*-1.5%*	*-1.7%*	*9.2%*	*35.3%*	*34.2%*	*35.5%*	*-2.3%*
nt	*5,210*	*6,385*	*6,647*	*10,642*	*23,621*	*25,145*	*24,454*	*6,337*	*22.6%*	*27.6%*	*104.3%*	*353.4%*	*382.6%*	*369.4%*	*21.6%*

Table 4A.2-3 Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2023) (continued)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,414,585**	**1,213,964**	**1,209,856**	**1,186,011**	**1,165,190**	**1,148,053**	**1,171,689**	**1,190,707**	**-14%**	**-14%**	**-16%**	**-18%**	**-19%**	**-17%**	**-16%**
Inbound	**716,150**	**605,913**	**590,895**	**592,015**	**581,926**	**573,295**	**585,168**	**594,002**	**-15%**	**-17%**	**-17%**	**-19%**	**-20%**	**-18.3%**	**-17.1%**
Outbound	**698,410**	**608,023**	**593,230**	**593,964**	**583,232**	**574,733**	**586,493**	**596,676**	**-13%**	**-15%**	**-15%**	**-16%**	**-18%**	**-16%**	**-15%**
									-	-	-	-	-	-	-
New Jersey	223,898	188,240	185,513	193,380	197,992	190,755	196,409	181,759	-15.9%	-17.1%	-13.6%	-11.6%	-14.8%	-12.3%	-18.8%
Inbound	109,602	92,070	86,219	100,791	107,810	103,257	106,560	88,196	-16.0%	-21.3%	-8.0%	-1.6%	-5.8%	-2.8%	-19.5%
Outbound	114,290	96,168	91,173	92,588	90,177	87,493	89,844	93,558	-15.9%	-20.2%	-19.0%	-21.1%	-23.4%	-21.4%	-18.1%
Holland Tunnel	108,683	93,896	92,321	93,934	95,129	91,000	93,926	90,220	-13.6%	-15.1%	-13.6%	-12.5%	-16.3%	-13.6%	-17.0%
am	*23,564*	*21,004*	*20,749*	*20,935*	*20,961*	*20,459*	*20,478*	*20,454*	*-10.9%*	*-11.9%*	*-11.2%*	*-11.0%*	*-13.2%*	*-13.1%*	*-13.2%*
md	*29,507*	*25,253*	*24,765*	*24,970*	*25,026*	*23,860*	*25,310*	*24,329*	*-14.4%*	*-16.1%*	*-15.4%*	*-15.2%*	*-19.1%*	*-14.2%*	*-17.5%*
pm	*23,778*	*20,848*	*20,700*	*20,854*	*21,078*	*20,120*	*20,216*	*20,366*	*-12.3%*	*-12.9%*	*-12.3%*	*-11.4%*	*-15.4%*	*-15.0%*	*-14.3%*
nt	*31,834*	*26,791*	*26,107*	*27,175*	*28,064*	*26,561*	*27,922*	*25,071*	*-15.8%*	*-18.0%*	*-14.6%*	*-11.8%*	*-16.6%*	*-12.3%*	*-21.2%*
Lincoln Tunnel	115,215	94,344	93,192	99,446	102,863	99,755	102,483	91,539	-18.1%	-19.1%	-13.7%	-10.7%	-13.4%	-11.1%	-20.5%
am	*24,429*	*21,961*	*21,786*	*22,644*	*23,212*	*22,660*	*22,816*	*21,565*	*-10.1%*	*-10.8%*	*-7.3%*	*-5.0%*	*-7.2%*	*-6.6%*	*-11.7%*
md	*33,640*	*26,859*	*26,371*	*27,640*	*28,354*	*27,110*	*28,984*	*25,969*	*-20.2%*	*-21.6%*	*-17.8%*	*-15.7%*	*-19.4%*	*-13.8%*	*-22.8%*
pm	*26,946*	*22,931*	*22,784*	*23,454*	*23,263*	*22,480*	*22,804*	*22,679*	*-14.9%*	*-15.4%*	*-13.0%*	*-13.7%*	*-16.6%*	*-15.4%*	*-15.8%*
nt	*30,200*	*22,593*	*22,251*	*25,708*	*28,034*	*27,505*	*27,879*	*21,326*	*-25.2%*	*-26.3%*	*-14.9%*	*-7.2%*	*-8.9%*	*-7.7%*	*-29.4%*

Table 4A.2-4. Summary – Vehicle-Miles Traveled (2023)

	Daily VMT								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Manhattan CBD	**3,244,791**	**2,993,214**	**2,998,489**	**2,984,080**	**2,963,211**	**2,946,339**	**3,016,013**	**2,970,819**	**-7.8%**	**-7.6%**	**-8.0%**	**-8.7%**	**-9.2%**	**-7.1%**	**-8.4%**
New York City	**47,131,752**	**46,743,670**	**46,784,237**	**46,572,720**	**46,461,121**	**46,404,913**	**46,578,412**	**46,713,541**	**-0.8%**	**-0.7%**	**-1.2%**	**-1.4%**	**-1.5%**	**-1.2%**	**-0.9%**
Manhattan CBD	3,244,791	2,993,214	2,998,489	2,984,080	2,963,211	2,946,339	3,016,013	2,970,819	-7.8%	-7.6%	-8.0%	-8.7%	-9.2%	-7.1%	-8.4%
CBD Core	1,217,727	1,150,843	1,152,471	1,161,407	1,159,162	1,147,545	1,183,476	1,142,077	-5.5%	-5.4%	-4.6%	-4.8%	-5.8%	-2.8%	-6.2%
Peripheral Highways (south of 60th St	2,027,064	1,842,371	1,846,018	1,822,673	1,804,049	1,798,794	1,832,537	1,828,742	-9.1%	-8.9%	-10.1%	-11.0%	-11.3%	-9.6%	-9.8%
RT9A - S of 60th	*610,657*	*510,785*	*513,887*	*493,396*	*485,167*	*486,404*	*501,603*	*508,951*	*-16.4%*	*-15.8%*	*-19.2%*	*-20.5%*	*-20.3%*	*-17.9%*	*-16.7%*
FDR - S of 60th	*720,682*	*725,459*	*729,706*	*718,820*	*705,903*	*710,555*	*721,421*	*727,101*	*0.7%*	*1.3%*	*-0.3%*	*-2.1%*	*-1.4%*	*0.1%*	*0.9%*
*Bridge & Tunnels - S of 60th**	*695,725*	*606,127*	*602,425*	*610,457*	*612,979*	*601,835*	*609,513*	*592,690*	*-12.9%*	*-13.4%*	*-12.3%*	*-11.9%*	*-13.5%*	*-12.4%*	*-14.8%*
Zone 1	2,218,077	2,049,561	2,049,528	2,004,366	1,955,714	1,944,168	1,962,310	2,031,243	-7.6%	-7.6%	-9.6%	-11.8%	-12.3%	-11.5%	-8.4%
Manhattan: 60th St - 82nd St	687,178	611,298	614,228	596,527	579,197	576,383	588,785	605,889	-11.0%	-10.6%	-13.2%	-15.7%	-16.1%	-14.3%	-11.8%
Long Island City	634,642	576,941	574,378	573,434	584,367	581,662	585,542	569,080	-9.1%	-9.5%	-9.6%	-7.9%	-8.3%	-7.7%	-10.3%
Downtown Brooklyn	507,721	490,094	489,809	469,669	438,875	434,721	434,188	487,809	-3.5%	-3.5%	-7.5%	-13.6%	-14.4%	-14.5%	-3.9%
Williamsburg	388,536	371,228	371,113	364,736	353,275	351,402	353,795	368,465	-4.5%	-4.5%	-6.1%	-9.1%	-9.6%	-8.9%	-5.2%
Zone 2	6,660,953	6,626,001	6,630,016	6,588,313	6,578,676	6,568,162	6,596,549	6,615,308	-0.5%	-0.5%	-1.1%	-1.2%	-1.4%	-1.0%	-0.7%
Manhattan: 82nd St - 126th St	1,683,098	1,664,870	1,674,332	1,654,877	1,629,759	1,624,558	1,644,204	1,674,029	-1.1%	-0.5%	-1.7%	-3.2%	-3.5%	-2.3%	-0.5%
Inner Brooklyn	2,382,944	2,364,550	2,364,723	2,342,062	2,352,282	2,350,184	2,351,128	2,356,477	-0.8%	-0.8%	-1.7%	-1.3%	-1.4%	-1.3%	-1.1%
Inner Queens	2,594,911	2,596,581	2,590,961	2,591,374	2,596,635	2,593,420	2,601,217	2,584,802	0.1%	-0.2%	-0.1%	0.1%	-0.1%	0.2%	-0.4%
Zone 3	35,007,931	35,074,894	35,106,204	34,995,961	34,963,520	34,946,244	35,003,540	35,096,171	0.2%	0.3%	0.0%	-0.1%	-0.2%	0.0%	0.3%
Upper Manhattan: Above 126th St	1,668,523	1,666,606	1,673,122	1,655,734	1,629,152	1,623,144	1,633,549	1,676,495	-0.1%	0.3%	-0.8%	-2.4%	-2.7%	-2.1%	0.5%
Outer Brooklyn	6,682,723	6,685,405	6,695,192	6,683,132	6,677,077	6,672,230	6,674,480	6,701,884	0.0%	0.2%	0.0%	-0.1%	-0.2%	-0.1%	0.3%
Outer Queens	15,180,594	15,139,719	15,150,768	15,086,757	15,101,340	15,099,256	15,119,805	15,121,886	-0.3%	-0.2%	-0.6%	-0.5%	-0.5%	-0.4%	-0.4%
Staten Island	3,986,457	4,071,055	4,078,180	4,078,983	4,076,004	4,085,745	4,080,602	4,098,570	2.1%	2.3%	2.3%	2.2%	2.5%	2.4%	2.8%
Bronx	7,489,634	7,512,109	7,508,942	7,491,355	7,479,947	7,465,869	7,495,104	7,497,336	0.3%	0.3%	0.0%	-0.1%	-0.3%	0.1%	0.1%
New York State	122,186,497	121,752,302	121,789,089	121,438,634	121,227,956	121,111,122	121,464,091	121,662,622	-0.4%	-0.3%	-0.6%	-0.8%	-0.9%	-0.6%	-0.4%
New York City	47,131,752	46,743,670	46,784,237	46,572,720	46,461,121	46,404,913	46,578,412	46,713,541	-0.8%	-0.7%	-1.2%	-1.4%	-1.5%	-1.2%	-0.9%
Long Island	41,585,545	41,609,407	41,595,736	41,546,248	41,503,705	41,497,676	41,598,789	41,573,420	0.1%	0.0%	-0.1%	-0.2%	-0.2%	0.0%	0.0%
Upstate	33,469,200	33,399,225	33,409,116	33,319,666	33,263,130	33,208,533	33,286,890	33,375,661	-0.2%	-0.2%	-0.4%	-0.6%	-0.8%	-0.5%	-0.3%
Connecticut	34,909,870	34,878,673	34,856,848	34,830,279	34,846,493	34,842,671	34,893,239	34,844,682	-0.1%	-0.2%	-0.2%	-0.2%	-0.2%	0.0%	-0.2%
New Jersey	97,578,100	97,594,939	97,590,826	97,748,567	97,733,034	97,665,181	97,768,338	97,642,310	0.0%	0.0%	0.2%	0.2%	0.1%	0.2%	0.1%
Total	**254,674,467**	**254,225,914**	**254,236,763**	**254,017,480**	**253,807,483**	**253,618,974**	**254,125,668**	**254,149,614**	**-0.2%**	**-0.2%**	**-0.3%**	**-0.3%**	**-0.4%**	**-0.2%**	**-0.2%**

Table 4A.2-5. Transit Boardings by Mode (2023)

Mode	Transit Boardings (AM Period)								Change							Percent Change						
		Scenario							Scenario							Scenario						
	No Action	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Total Volume	**6,352,866**	**6,432,577**	**6,434,921**	**6,449,184**	**6,457,649**	**6,465,941**	**6,461,019**	**6,438,473**	**79,711**	**82,055**	**96,318**	**104,784**	**113,075**	**108,154**	**85,607**	**1.3%**	**1.3%**	**1.5%**	**1.6%**	**1.8%**	**1.7%**	**1.3%**
Commuter Rail	**454,520**	**456,756**	**457,863**	**459,632**	**461,635**	**463,109**	**462,013**	**458,867**	**2,236**	**3,343**	**5,112**	**7,115**	**8,589**	**7,493**	**4,346**	**0.5%**	**0.7%**	**1.1%**	**1.6%**	**1.9%**	**1.6%**	**1.0%**
Long Island Rail Road	142,651	143,452	143,989	144,244	144,733	145,544	144,560	144,084	802	1,339	1,593	2,083	2,894	1,910	1,433	0.6%	0.9%	1.1%	1.5%	2.0%	1.3%	1.0%
Metro-North Railroad	152,203	153,128	153,437	154,108	154,850	154,296	155,020	153,491	925	1,234	1,905	2,647	2,093	2,817	1,288	0.6%	0.8%	1.3%	1.7%	1.4%	1.9%	0.8%
New Jersey Transit Rail	159,666	160,175	160,437	161,280	162,051	163,268	162,433	161,292	509	770	1,614	2,385	3,602	2,767	1,626	0.3%	0.5%	1.0%	1.5%	2.3%	1.7%	1.0%
Urban Rail	**3,151,234**	**3,197,895**	**3,200,431**	**3,205,407**	**3,212,195**	**3,215,961**	**3,212,751**	**3,202,009**	**46,661**	**49,197**	**54,173**	**60,961**	**64,727**	**61,517**	**50,775**	**1.5%**	**1.6%**	**1.7%**	**1.9%**	**2.1%**	**2.0%**	**1.6%**
NYCT Subway	3,005,224	3,050,101	3,052,683	3,056,840	3,063,552	3,066,614	3,063,577	3,053,144	44,877	47,459	51,616	58,328	61,390	58,353	47,920	1.5%	1.6%	1.7%	1.9%	2.0%	1.9%	1.6%
PATH	133,736	134,860	134,691	135,588	135,818	136,438	136,206	135,934	1,124	955	1,852	2,082	2,702	2,471	2,198	0.8%	0.7%	1.4%	1.6%	2.0%	1.8%	1.6%
SIRR	12,274	12,934	13,057	12,978	12,826	12,909	12,967	12,931	660	783	704	552	635	694	657	5.4%	6.4%	5.7%	4.5%	5.2%	5.7%	5.4%
Bus	**2,689,564**	**2,718,960**	**2,717,507**	**2,724,787**	**2,724,456**	**2,727,511**	**2,726,657**	**2,718,457**	**29,396**	**27,943**	**35,224**	**34,892**	**37,948**	**37,093**	**28,893**	**1.1%**	**1.0%**	**1.3%**	**1.3%**	**1.4%**	**1.4%**	**1.1%**
NYCT Bus	2,037,319	2,063,136	2,062,997	2,068,001	2,067,753	2,069,107	2,068,898	2,062,926	25,817	25,678	30,682	30,434	31,788	31,579	25,607	1.3%	1.3%	1.5%	1.5%	1.6%	1.6%	1.3%
NJT Bus	471,109	474,344	473,456	474,079	474,279	476,321	475,663	474,260	3,235	2,347	2,970	3,170	5,212	4,554	3,151	0.7%	0.5%	0.6%	0.7%	1.1%	1.0%	0.7%
Others	181,136	181,480	181,053	182,707	182,424	182,084	182,096	181,271	345	-83	1,571	1,288	948	960	136	0.2%	0.0%	0.9%	0.7%	0.5%	0.5%	0.1%
Other Transit	**57,548**	**58,966**	**59,120**	**59,358**	**59,363**	**59,360**	**59,598**	**59,140**	**1,418**	**1,572**	**1,810**	**1,815**	**1,811**	**2,050**	**1,592**	**2.5%**	**2.7%**	**3.1%**	**3.2%**	**3.1%**	**3.6%**	**2.8%**
Ferries	57,548	58,966	59,120	59,358	59,363	59,360	59,598	59,140	1,418	1,572	1,810	1,815	1,811	2,050	1,592	2.5%	2.7%	3.1%	3.2%	3.1%	3.6%	2.8%
Roosevelt Tram	153	154	154	156	154	154	155	159	1	1	3	1	1	2	6	0.5%	0.8%	1.7%	0.6%	0.7%	1.0%	4.1%

Table 4A.2-6. Cordon Volumes by Station/Route (2023)

	Cordon Volumes (AM Peak Period)																Percent Change						
	Baseline	Scenario							Scenario							Scenario						
	No Action	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Commuter Rail																						
Inbound	240,930	242,734	243,593	244,140	245,232	245,754	245,205	243,572	1,804	2,663	3,210	4,302	4,824	4,274	2,641	**0.7%**	**1.1%**	**1.3%**	**1.8%**	**2.0%**	**1.8%**	**1.1%**
Long Island Rail Road (Penn Station)	83,870	84,697	84,929	84,903	85,326	85,825	85,285	84,960	827	1,059	1,033	1,456	1,955	1,416	1,091	1.0%	1.3%	1.2%	1.7%	2.3%	1.7%	1.3%
Metro-North Railroad (Grand Central Terminal)	97,340	97,832	98,426	99,003	99,215	98,861	99,258	98,133	492	1,086	1,663	1,875	1,521	1,918	793	0.5%	1.1%	1.7%	1.9%	1.6%	2.0%	0.8%
New Jersey Transit (New York - Penn Station)	59,721	60,205	60,239	60,235	60,691	61,068	60,662	60,478	484	518	514	970	1,348	941	757	0.8%	0.9%	0.9%	1.6%	2.3%	1.6%	1.3%
Scenario		**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
NYCT Subway																						
Inbound	878,509	891,951	892,551	894,951	898,214	899,469	898,532	892,734	13,442	14,043	16,442	19,705	20,960	20,023	14,225	1.5%	1.6%	1.9%	2.2%	2.4%	2.3%	1.6%
60th Street Cordon	276,917	280,723	280,491	281,147	282,960	283,386	282,138	280,980	3,806	3,575	4,230	6,043	6,470	5,221	4,063	1.4%	1.3%	1.5%	2.2%	2.3%	1.9%	1.5%
Broadway (1,2,3)	74,725	75,638	75,573	75,834	76,444	76,571	76,077	75,661	913	848	1,109	1,719	1,846	1,352	936	1.2%	1.1%	1.5%	2.3%	2.5%	1.8%	1.3%
8th Avenue (A, C, B, D)	88,153	89,321	89,270	89,419	89,950	90,086	89,703	89,413	1,168	1,117	1,266	1,797	1,933	1,550	1,260	1.3%	1.3%	1.4%	2.0%	2.2%	1.8%	1.4%
Lexington Avenue (4, 5, 6)	89,537	90,920	90,841	91,003	91,510	91,610	91,460	91,015	1,383	1,303	1,465	1,973	2,073	1,922	1,478	1.5%	1.5%	1.6%	2.2%	2.3%	2.1%	1.7%
2nd Avenue (Q)	24,502	24,843	24,808	24,891	25,055	25,119	24,898	24,890	342	307	390	553	618	397	389	1.4%	1.3%	1.6%	2.3%	2.5%	1.6%	1.6%
Queens Cordon	249,675	254,348	253,872	254,674	255,134	256,033	255,951	254,032	4,673	4,198	4,999	5,460	6,358	6,276	4,357	1.9%	1.7%	2.0%	2.2%	2.5%	2.5%	1.7%
63rd Street (F)	53,897	54,770	54,677	54,762	54,801	54,970	54,909	54,829	874	780	865	904	1,073	1,012	933	1.6%	1.4%	1.6%	1.7%	2.0%	1.9%	1.7%
60th Street (R)	18,272	18,816	18,772	18,907	18,905	19,073	19,062	18,805	544	500	635	633	801	790	533	3.0%	2.7%	3.5%	3.5%	4.4%	4.3%	2.9%
60th Street (N, W)	30,668	31,268	31,140	31,314	31,370	31,424	31,476	31,158	600	472	647	703	756	808	490	2.0%	1.5%	2.1%	2.3%	2.5%	2.6%	1.6%
53rd Street (E, M)	78,555	79,837	79,848	80,008	80,143	80,444	80,400	79,787	1,282	1,293	1,453	1,588	1,889	1,845	1,232	1.6%	1.6%	1.8%	2.0%	2.4%	2.3%	1.6%
Steinway Tunnel (7)	68,283	69,656	69,436	69,683	69,915	70,122	70,104	69,452	1,373	1,153	1,400	1,632	1,839	1,821	1,169	2.0%	1.7%	2.1%	2.4%	2.7%	2.7%	1.7%
Brooklyn Cordon	351,917	356,879	358,188	359,130	360,120	360,050	360,443	357,722	4,962	6,271	7,213	8,203	8,133	8,526	5,805	1.4%	1.8%	2.0%	2.3%	2.3%	2.4%	1.6%
14th Street (L)	42,607	43,209	43,337	43,466	43,573	43,562	43,583	43,316	602	730	859	966	955	976	709	1.4%	1.7%	2.0%	2.3%	2.2%	2.3%	1.7%
Williamsburg Bridge (J, M, Z)	37,216	37,924	38,050	38,256	38,366	38,408	38,411	38,070	708	834	1,040	1,150	1,193	1,195	854	1.9%	2.2%	2.8%	3.1%	3.2%	3.2%	2.3%
Rutgers Street (F)	37,006	37,403	37,504	37,709	37,807	37,822	37,921	37,495	397	498	702	801	815	915	488	1.1%	1.3%	1.9%	2.2%	2.2%	2.5%	1.3%
Manhattan Bridge (B, D, N, Q)	100,921	102,440	102,952	103,144	103,654	103,527	103,630	102,549	1,520	2,031	2,224	2,734	2,606	2,710	1,628	1.5%	2.0%	2.2%	2.7%	2.6%	2.7%	1.6%
Cranberry Street (A, C)	66,013	66,783	66,866	67,001	67,063	67,061	67,173	66,976	770	854	988	1,050	1,049	1,160	963	1.2%	1.3%	1.5%	1.6%	1.6%	1.8%	1.5%
Clark Street (2, 3)	29,316	29,788	29,874	29,944	29,992	30,073	30,030	29,845	472	557	628	676	757	714	529	1.6%	1.9%	2.1%	2.3%	2.6%	2.4%	1.8%
Montague Street (R)	10,143	10,164	10,167	10,243	10,218	10,258	10,301	10,205	21	25	101	75	116	158	63	0.2%	0.2%	1.0%	0.7%	1.1%	1.6%	0.6%
Joralmon Street (4, 5)	28,696	29,168	29,437	29,367	29,446	29,338	29,393	29,267	472	741	671	750	643	697	571	1.6%	2.6%	2.3%	2.6%	2.2%	2.4%	2.0%
PATH																						
Inbound	112,505	113,767	113,566	114,289	114,542	115,239	115,042	114,476	1,262	1,061	1,784	2,038	2,735	2,537	1,972	1.1%	0.9%	1.6%	1.6%	2.4%	2.3%	1.8%
Christopher Street	40,731	41,399	41,286	41,537	41,837	42,286	42,068	41,661	668	554	806	1,106	1,555	1,337	930	1.6%	1.4%	2.0%	2.7%	3.8%	3.3%	2.3%
World Trade Center	71,773	72,368	72,280	72,752	72,705	72,953	72,974	72,815	595	507	978	932	1,179	1,201	1,042	0.8%	0.7%	1.4%	1.3%	1.6%	1.7%	1.5%

Table 4A.2-7. Change in Mode Share to the Manhattan CBD (2023)

	Daily Journeys								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Total Person Journeys to CBD	**1,923,709**	**1,923,389**	**1,926,803**	**1,924,490**	**1,918,125**	**1,919,494**	**1,924,087**	**1,922,925**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Drive Alone	191,338	177,348	174,838	169,542	164,844	158,694	160,639	173,398	-7%	-9%	-11%	-14%	-17%	-16%	-9%
HOV / Shared Ride	143,494	143,308	141,797	141,450	140,446	137,800	139,564	143,075	0%	-1%	-1%	-2%	-4%	-3%	0%
Taxi / FHV	32,324	25,270	31,884	28,323	19,944	25,762	31,739	23,871	-22%	-1%	-12%	-38%	-20%	-2%	-26%
Commuter Rail	369,131	374,592	375,796	376,912	379,603	381,204	379,710	376,742	1%	2%	2%	3%	3%	3%	2%
Other Transit (e.g., subway / bus)	1,131,771	1,147,036	1,147,670	1,152,765	1,157,977	1,161,024	1,157,362	1,150,352	1%	1%	2%	2%	3%	2%	2%
Walk and Bike	51,958	51,873	50,891	51,547	51,227	51,059	51,138	51,648	0%	-2%	-1%	-1%	-2%	-2%	-1%
School Bus	3,693	3,962	3,927	3,951	4,084	3,951	3,935	3,839	7%	6%	7%	11%	7%	7%	4%
Total Person Journeys from CBD	**161,833**	**159,806**	**160,976**	**160,207**	**158,892**	**158,479**	**159,884**	**159,898**	**-1%**	**-1%**	**-1%**	**-2%**	**-2%**	**-1%**	**-1%**
Drive Alone	13,638	12,441	12,446	12,085	12,025	11,535	11,800	12,389	-9%	-9%	-11%	-12%	-15%	-13%	-9%
HOV / Shared Ride	30,100	29,714	29,269	29,160	28,667	28,300	28,587	29,225	-1%	-3%	-3%	-5%	-6%	-5%	-3%
Taxi / FHV	4,366	3,184	4,168	3,669	2,372	3,124	3,916	2,960	-27%	-5%	-16%	-46%	-28%	-10%	-32%
Commuter Rail	3,120	2,954	2,960	3,007	2,951	3,019	2,927	3,060	-5%	-5%	-4%	-5%	-3%	-6%	-2%
Other Transit (e.g., subway / bus)	78,771	79,372	79,771	79,881	80,507	80,096	80,195	79,856	1%	1%	1%	2%	2%	2%	1%
Walk and Bike	29,188	29,371	29,564	29,703	29,588	29,593	29,601	29,634	1%	1%	2%	1%	1%	1%	2%
School Bus	2,650	2,770	2,798	2,702	2,782	2,812	2,858	2,774	5%	6%	2%	5%	6%	8%	5%
Total Person Journeys within CBD	**879,667**	**880,292**	**879,506**	**882,033**	**883,365**	**883,222**	**880,713**	**881,592**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Drive Alone	7,581	7,576	7,652	7,679	7,650	7,610	7,546	7,778	0%	1%	1%	1%	0%	0%	3%
HOV / Shared Ride	26,570	26,798	27,222	27,220	27,024	26,846	26,607	27,705	1%	2%	2%	2%	1%	0%	4%
Taxi / FHV	28,005	27,711	28,262	28,003	28,397	28,195	28,082	28,619	-1%	1%	0%	1%	1%	0%	2%
Commuter Rail									-	-	-	-	-	-	-
Other Transit (e.g., subway / bus)	240,385	241,162	239,319	241,255	242,475	242,522	241,327	239,993	0%	0%	0%	1%	1%	0%	0%
Walk and Bike	572,877	572,877	572,805	573,716	573,689	573,977	573,110	573,376	0%	0%	0%	0%	0%	0%	0%
School Bus	4,249	4,168	4,246	4,160	4,130	4,072	4,041	4,121	-2%	0%	-2%	-3%	-4%	-5%	-3%

Table 4A.2-8. Taxi and FHV Toll Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2023)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**113,058**	**113,749**	**128,235**	**123,915**	**108,180**	**120,128**	**133,196**	**110,059**	**0.6%**	**13.4%**	**9.6%**	**-4.3%**	**6.3%**	**17.8%**	**-2.7%**
60th Street	39,536	36,877	45,022	45,026	37,509	43,401	50,894	34,730	-6.7%	13.9%	13.9%	-5.1%	9.8%	28.7%	-12.2%
Inbound	21,015	20,019	24,298	25,149	21,748	24,771	28,755	18,992	-4.7%	15.6%	19.7%	3.5%	17.9%	36.8%	-9.6%
Outbound	18,551	16,890	20,758	19,906	15,791	18,661	22,168	15,771	-9.0%	11.9%	7.3%	-14.9%	0.6%	19.5%	-15.0%
FDR DRIVE+WEST SIDE HWY	23,612	18,074	22,638	22,250	16,844	20,638	25,349	16,906	-23.5%	-4.1%	-5.8%	-28.7%	-12.6%	7.4%	-28.4%
West Side Highway / Route 9A	10,965	8,425	10,350	9,694	6,992	8,839	10,899	7,945	-23.2%	-5.6%	-11.6%	-36.2%	-19.4%	-0.6%	-27.5%
FDR Drive	12,647	9,649	12,288	12,556	9,852	11,799	14,450	8,961	-23.7%	-2.8%	-0.7%	-22.1%	-6.7%	14.3%	-29.1%
WEST AVENUES	6,720	4,749	6,108	5,172	4,408	5,320	6,114	4,499	-29.3%	-9.1%	-23.0%	-34.4%	-20.8%	-9.0%	-33.1%
West End Ave	946	626	813	623	340	506	728	545	-33.8%	-14.1%	-34.1%	-64.1%	-46.5%	-23.0%	-42.4%
Broadway	2,734	1,614	2,097	1,706	1,235	1,579	1,791	1,575	-41.0%	-23.3%	-37.6%	-54.8%	-42.2%	-34.5%	-42.4%
Amsterdam	1,292	1,227	1,602	1,406	1,475	1,732	1,895	1,156	-5.0%	24.0%	8.8%	14.2%	34.1%	46.7%	-10.5%
Columbus Ave	1,258	694	903	635	449	518	660	636	-44.8%	-28.2%	-49.5%	-64.3%	-58.8%	-47.5%	-49.4%
Eighth Avenue	490	588	693	802	909	985	1,040	587	20.0%	41.4%	63.7%	85.5%	101.0%	112.2%	19.8%
EAST AVENUES	9,204	14,054	16,276	17,604	16,257	17,443	19,431	13,325	52.7%	76.8%	91.3%	76.6%	89.5%	111.1%	44.8%
Fifth Avenue	1,472	914	1,142	863	623	706	877	801	-37.9%	-22.4%	-41.4%	-57.7%	-52.0%	-40.4%	-45.6%
Madison Avenue	236	162	179	178	125	101	104	136	-31.4%	-24.2%	-24.6%	-47.0%	-57.2%	-55.9%	-42.4%
Park Avenue	1,739	1,405	1,622	1,571	1,233	1,349	1,561	1,315	-19.2%	-6.7%	-9.7%	-29.1%	-22.4%	-10.2%	-24.4%
Lexington Avenue	651	906	1,045	1,550	1,192	1,338	1,426	852	39.2%	60.5%	138.1%	83.1%	105.5%	119.0%	30.9%
Third Avenue	898	580	791	852	705	872	999	590	-35.4%	-11.9%	-5.1%	-21.5%	-2.9%	11.2%	-34.3%
Second Avenue	1,086	5,247	5,852	6,360	6,964	7,292	7,863	5,107	383.1%	438.9%	485.6%	541.3%	571.5%	624.0%	370.3%
First Avenue	380	1,232	1,360	1,263	1,715	1,570	1,850	1,118	224.2%	257.9%	232.4%	351.3%	313.2%	386.8%	194.2%
York Avenue	2,108	1,649	1,899	1,616	1,321	1,522	1,821	1,562	-21.8%	-9.9%	-23.3%	-37.3%	-27.8%	-13.6%	-25.9%
Ed Koch Queensboro Ramp	634	1,959	2,386	3,351	2,379	2,693	2,930	1,844	209.0%	276.3%	428.5%	275.2%	324.8%	362.1%	190.9%
Queens	39,427	43,248	45,890	40,624	34,508	37,005	38,519	42,528	9.7%	16.4%	3.0%	-12.5%	-6.1%	-2.3%	7.9%
Inbound	20,102	21,565	22,906	17,668	14,714	15,785	16,512	21,119	7.3%	13.9%	-12.1%	-26.8%	-21.5%	-17.9%	5.1%
Outbound	19,327	21,685	22,985	22,960	19,797	21,223	22,011	21,412	12.2%	18.9%	18.8%	2.4%	9.8%	13.9%	10.8%
Ed Koch Queensboro Bridge	5,320	10,140	11,429	19,506	25,473	27,371	28,479	9,678	90.6%	114.8%	266.7%	378.8%	414.5%	435.3%	81.9%
Queens-Midtown Tunnel	34,107	33,108	34,461	21,118	9,035	9,634	10,040	32,850	-2.9%	1.0%	-38.1%	-73.5%	-71.8%	-70.6%	-3.7%
Brooklyn	23,211	19,207	22,881	24,457	22,499	25,535	29,748	18,339	-17.3%	-1.4%	5.4%	-3.1%	10.0%	28.2%	-21.0%
Inbound	10,709	8,597	10,322	13,250	12,184	13,659	15,808	8,189	-19.7%	-3.6%	23.7%	13.8%	27.5%	47.6%	-23.5%
Outbound	12,509	10,618	12,566	11,212	10,320	11,884	13,946	10,158	-15.1%	0.5%	-10.4%	-17.5%	-5.0%	11.5%	-18.8%
Williamsburg Bridge	5,544	5,468	7,013	9,046	10,687	12,260	13,904	5,435	-1.4%	26.5%	63.2%	92.8%	121.1%	150.8%	-2.0%
Manhattan Bridge	2,245	1,681	2,454	2,286	1,725	2,348	3,080	1,519	-25.1%	9.3%	1.8%	-23.2%	4.6%	37.2%	-32.3%
Brooklyn Bridge	2,576	1,455	1,870	1,902	2,503	2,832	3,630	1,278	-43.5%	-27.4%	-26.2%	-2.8%	9.9%	40.9%	-50.4%
Hugh Carey Tunnel	12,846	10,603	11,544	11,223	7,584	8,095	9,134	10,107	-17.5%	-10.1%	-12.6%	-41.0%	-37.0%	-28.9%	-21.3%
New Jersey	10,884	14,417	14,442	13,808	13,664	14,187	14,035	14,462	32.5%	32.7%	26.9%	25.5%	30.3%	29.0%	32.9%
Inbound	5,251	7,149	7,146	6,497	6,014	6,530	6,336	7,187	36.1%	36.1%	23.7%	14.5%	24.4%	20.7%	36.9%
Outbound	5,637	7,272	7,299	7,314	7,654	7,661	7,701	7,278	29.0%	29.5%	29.7%	35.8%	35.9%	36.6%	29.1%
Holland Tunnel	3,718	6,301	6,525	6,292	6,659	6,984	6,788	6,681	69.5%	75.5%	69.2%	79.1%	87.8%	82.6%	79.7%
Lincoln Tunnel	7,166	8,116	7,917	7,516	7,005	7,203	7,247	7,781	13.3%	10.5%	4.9%	-2.2%	0.5%	1.1%	8.6%

Note: Taxis and FHVs would potentially be exempt from the CBD toll, receive a toll discount, or be subject to some other toll reduction such as a cap.

Table 4A.2-9. Truck Toll Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2023)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**121,537**	**108,532**	**107,799**	**105,607**	**105,409**	**102,104**	**98,811**	**113,863**	**-10.7%**	**-11.3%**	**-13.1%**	**-13.3%**	**-16.0%**	**-18.7%**	**-6.3%**
60th Street	46,128	37,375	37,158	35,747	35,140	33,948	34,905	39,058	-19.0%	-19.4%	-22.5%	-23.8%	-26.4%	-24.3%	-15.3%
Inbound	23,792	18,572	18,388	17,224	16,602	15,978	16,584	19,559	-21.9%	-22.7%	-27.6%	-30.2%	-32.8%	-30.3%	-17.8%
Outbound	22,366	18,829	18,800	18,550	18,564	18,000	18,350	19,528	-15.8%	-15.9%	-17.1%	-17.0%	-19.5%	-18.0%	-12.7%
FDR DRIVE+WEST SIDE HWY	4,118	4,202	4,281	4,338	4,749	4,684	4,816	4,388	2.0%	4.0%	5.3%	15.3%	13.7%	16.9%	6.6%
West Side Highway / Route 9A	1,366	1,962	1,995	1,990	2,186	2,058	2,223	2,067	43.6%	46.0%	45.7%	60.0%	50.7%	62.7%	51.3%
FDR Drive	2,752	2,240	2,286	2,348	2,563	2,626	2,593	2,321	-18.6%	-16.9%	-14.7%	-6.9%	-4.6%	-5.8%	-15.7%
WEST AVENUES	16,382	13,660	13,505	12,789	12,718	12,321	12,642	14,132	-16.6%	-17.6%	-21.9%	-22.4%	-24.8%	-22.8%	-13.7%
West End Ave	3,555	1,974	1,883	1,261	1,118	839	1,066	2,161	-44.5%	-47.0%	-64.5%	-68.6%	-76.4%	-70.0%	-39.2%
Broadway	5,864	6,029	6,073	6,143	6,320	6,379	6,291	5,967	2.8%	3.6%	4.8%	7.8%	8.8%	7.3%	1.8%
Amsterdam	3,616	2,361	2,233	1,934	1,758	1,627	1,716	2,691	-34.7%	-38.2%	-46.5%	-51.4%	-55.0%	-52.5%	-25.6%
Columbus Ave	2,269	2,162	2,177	2,260	2,326	2,292	2,376	2,185	-4.7%	-4.1%	-0.4%	2.5%	1.0%	4.7%	-3.7%
Eighth Avenue	1,078	1,134	1,139	1,191	1,196	1,184	1,193	1,128	5.2%	5.7%	10.5%	10.9%	9.8%	10.7%	4.6%
EAST AVENUES	25,628	19,513	19,372	18,620	17,673	16,943	17,447	20,538	-23.9%	-24.4%	-27.3%	-31.0%	-33.9%	-31.9%	-19.9%
Fifth Avenue	1,933	1,596	1,579	1,498	1,476	1,483	1,461	1,592	-17.4%	-18.3%	-22.5%	-23.6%	-23.3%	-24.4%	-17.6%
Madison Avenue	773	755	752	758	753	730	748	706	-2.3%	-2.7%	-1.9%	-2.6%	-5.6%	-3.2%	-8.7%
Park Avenue	4,132	3,438	3,465	3,368	3,298	3,288	3,246	3,553	-16.8%	-16.1%	-18.5%	-20.2%	-20.4%	-21.4%	-14.0%
Lexington Avenue	3,086	2,568	2,536	2,661	2,672	2,662	2,720	2,505	-16.8%	-17.8%	-13.8%	-13.4%	-13.7%	-11.9%	-18.8%
Third Avenue	3,705	3,708	3,744	3,639	3,586	3,381	3,575	3,763	0.1%	1.1%	-1.8%	-3.2%	-8.7%	-3.5%	1.6%
Second Avenue	5,643	3,980	3,869	3,381	2,689	2,332	2,544	4,763	-29.5%	-31.4%	-40.1%	-52.3%	-58.7%	-54.9%	-15.6%
First Avenue	2,583	2,353	2,351	2,365	2,296	2,162	2,267	2,599	-8.9%	-9.0%	-8.4%	-11.1%	-16.3%	-12.2%	0.6%
York Avenue	1,189	779	737	630	584	575	576	721	-34.5%	-38.0%	-47.0%	-50.9%	-51.6%	-51.6%	-39.4%
Ed Koch Queensboro Ramp	2,584	336	339	320	319	330	310	336	-87.0%	-86.9%	-87.6%	-87.7%	-87.2%	-88.0%	-87.0%
Queens	23,198	21,929	21,746	21,178	20,879	20,143	20,635	23,063	-5.5%	-6.3%	-8.7%	-10.0%	-13.2%	-11.0%	-0.6%
Inbound	12,762	11,950	11,901	11,851	11,382	11,070	11,060	12,299	-6.4%	-6.7%	-7.1%	-10.8%	-13.3%	-13.3%	-3.6%
Outbound	10,440	9,983	9,848	9,330	9,501	9,077	9,579	10,767	-4.4%	-5.7%	-10.6%	-9.0%	-13.1%	-8.2%	3.1%
Ed Koch Queensboro Bridge	17,286	16,372	16,281	15,812	14,156	13,259	14,675	17,578	-5.3%	-5.8%	-8.5%	-18.1%	-23.3%	-15.1%	1.7%
Queens-Midtown Tunnel	5,912	5,557	5,465	5,366	6,723	6,884	5,960	5,485	-6.0%	-7.6%	-9.2%	13.7%	16.4%	0.8%	-7.2%
Brooklyn	33,616	32,029	31,900	31,460	31,774	30,914	25,829	33,088	-4.7%	-5.1%	-6.4%	-5.5%	-8.0%	-23.2%	-1.6%
Inbound	15,032	14,504	14,467	13,958	14,295	13,857	11,482	15,020	-3.5%	-3.8%	-7.1%	-4.9%	-7.8%	-23.6%	-0.1%
Outbound	18,590	17,534	17,439	17,510	17,486	17,064	14,353	18,075	-5.7%	-6.2%	-5.8%	-5.9%	-8.2%	-22.8%	-2.8%
Williamsburg Bridge	8,582	8,741	8,694	8,806	8,596	8,598	8,375	8,972	1.9%	1.3%	2.6%	0.2%	0.2%	-2.4%	4.5%
Manhattan Bridge	12,781	10,887	10,816	11,164	9,900	9,763	9,390	11,747	-14.8%	-15.4%	-12.7%	-22.5%	-23.6%	-26.5%	-8.1%
Brooklyn Bridge	4,486	4,255	4,256	4,332	4,934	4,973	3,717	4,298	-5.1%	-5.1%	-3.4%	10.0%	10.9%	-17.1%	-4.2%
Hugh Carey Tunnel	7,767	8,146	8,134	7,158	8,344	7,580	4,347	8,071	4.9%	4.7%	-7.8%	7.4%	-2.4%	-44.0%	3.9%
New Jersey	18,595	17,199	16,995	17,222	17,616	17,099	17,442	18,654	-7.5%	-8.6%	-7.4%	-5.3%	-8.0%	-6.2%	0.3%
Inbound	10,551	9,890	9,759	10,342	10,896	10,605	10,489	10,651	-6.3%	-7.5%	-2.0%	3.3%	0.5%	-0.6%	0.9%
Outbound	8,047	7,311	7,238	6,883	6,722	6,495	6,957	8,008	-9.1%	-10.1%	-14.5%	-16.5%	-19.3%	-13.5%	-0.5%
Holland Tunnel	9,305	9,131	9,065	9,078	9,152	8,935	9,209	9,941	-1.9%	-2.6%	-2.4%	-1.6%	-4.0%	-1.0%	6.8%
Lincoln Tunnel	9,290	8,068	7,930	8,144	8,464	8,164	8,233	8,713	-13.2%	-14.6%	-12.3%	-8.9%	-12.1%	-11.4%	-6.2%

Table 4A.2-10. Work Journeys to the Manhattan CBD by Origin County (2023)

	Daily Journeys								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Total Work Journeys to CBD	*1,561,067*	*1,561,030*	*1,561,015*	*1,561,093*	*1,561,040*	*1,561,081*	*1,561,059*	*1,561,017*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
CBD	**164,814**	**165,096**	**164,894**	**165,304**	**165,480**	**165,649**	**165,289**	**165,093**	**0%**	**0%**	**0%**	**0%**	**1%**	**0%**	**0%**
CBD	164,814	165,096	164,894	165,304	165,480	165,649	165,289	165,093	0%	0%	0%	0%	1%	0%	0%
New York City	**843,655**	**839,085**	**838,585**	**837,467**	**835,931**	**835,102**	**835,957**	**837,507**	**-1%**	**-1%**	**-1%**	**-1%**	**-1%**	**-1%**	**-1%**
Upper Manhattan	175,876	174,686	175,138	174,570	174,556	174,752	174,170	174,207	-1%	0%	-1%	-1%	-1%	-1%	-1%
Bronx	97,518	96,911	96,821	96,598	96,359	96,172	96,741	96,409	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Brooklyn	282,439	280,663	280,595	279,906	279,684	279,165	280,197	280,463	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Queens	260,444	258,756	257,996	257,996	257,335	256,897	256,624	258,367	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Staten Island	27,378	28,069	28,035	28,397	27,997	28,116	28,225	28,061	3%	2%	4%	2%	3%	3%	2%
Long Island	**128,802**	**131,412**	**131,993**	**131,253**	**131,272**	**131,777**	**130,636**	**132,202**	**2%**	**2%**	**2%**	**2%**	**2%**	**1%**	**3%**
Nassau	87,416	89,363	89,962	89,120	88,381	88,830	87,993	89,996	2%	3%	2%	1%	2%	1%	3%
Suffolk	41,386	42,049	42,031	42,133	42,891	42,947	42,643	42,206	2%	2%	2%	4%	4%	3%	2%
Upstate New York	**101,745**	**99,988**	**100,411**	**100,742**	**100,272**	**100,014**	**100,247**	**100,347**	**-2%**	**-1%**	**-1%**	**-1%**	**-2%**	**-1%**	**-1%**
Dutchess	5,989	5,960	5,909	5,982	5,987	6,031	5,961	6,065	0%	-1%	0%	0%	1%	0%	1%
Orange	14,672	14,595	14,741	14,940	15,391	15,585	15,418	14,754	-1%	0%	2%	5%	6%	5%	1%
Putnam	1,648	1,665	1,628	1,629	1,618	1,685	1,645	1,663	1%	-1%	-1%	-2%	2%	0%	1%
Rockland	8,569	8,310	8,504	8,396	8,526	8,509	8,247	8,518	-3%	-1%	-2%	-1%	-1%	-4%	-1%
Westchester	70,867	69,458	69,629	69,795	68,750	68,204	68,976	69,347	-2%	-2%	-2%	-3%	-4%	-3%	-2%
New Jersey	**264,412**	**268,175**	**267,738**	**269,024**	**271,000**	**272,034**	**271,413**	**269,303**	**1%**	**1%**	**2%**	**2%**	**3%**	**3%**	**2%**
Bergen	35,099	35,399	35,160	35,660	35,818	36,087	35,949	35,421	1%	0%	2%	2%	3%	2%	1%
Essex	31,127	31,297	31,485	31,602	31,715	31,901	31,840	31,816	1%	1%	2%	2%	2%	2%	2%
Hudson	82,484	83,408	83,175	83,495	83,911	84,762	84,609	83,716	1%	1%	1%	2%	3%	3%	1%
Hunterdon	3,050	3,074	3,124	3,102	3,126	3,161	3,136	3,094	1%	2%	2%	2%	4%	3%	1%
Mercer	7,175	7,206	7,238	7,284	7,295	7,287	7,254	7,254	0%	1%	2%	2%	2%	1%	1%
Middlesex	28,278	28,713	28,846	28,745	29,169	28,942	29,046	28,864	2%	2%	2%	3%	2%	3%	2%
Monmouth	19,481	19,879	19,522	19,674	19,935	19,727	19,655	19,424	2%	0%	1%	2%	1%	1%	0%
Morris	10,136	10,439	10,403	10,424	10,632	10,643	10,523	10,506	3%	3%	3%	5%	5%	4%	4%
Ocean	11,322	11,429	11,451	11,495	11,564	11,506	11,538	11,497	1%	1%	2%	2%	2%	2%	2%
Passaic	8,228	8,798	8,672	8,828	9,032	9,042	8,876	8,875	7%	5%	7%	10%	10%	8%	8%
Somerset	5,977	6,159	6,124	6,223	6,198	6,298	6,259	6,146	3%	2%	4%	4%	5%	5%	3%
Sussex	3,348	3,369	3,425	3,353	3,367	3,319	3,339	3,400	1%	2%	0%	1%	-1%	0%	2%
Union	17,759	18,059	18,162	18,188	18,273	18,404	18,429	18,324	2%	2%	2%	3%	4%	4%	3%
Warren	948	946	951	951	965	955	960	966	0%	0%	0%	2%	1%	1%	2%
Connecticut	**57,639**	**57,274**	**57,394**	**57,303**	**57,085**	**56,505**	**57,517**	**56,565**	**-1%**	**0%**	**-1%**	**-1%**	**-2%**	**0%**	**-2%**
Fairfield	37,853	37,404	37,634	37,596	37,104	36,530	37,532	36,665	-1%	-1%	-1%	-2%	-3%	-1%	-3%
New Haven	19,786	19,870	19,760	19,707	19,981	19,975	19,985	19,900	0%	0%	0%	1%	1%	1%	1%

Table 4A.2-11. Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2045)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,480,286**	**1,292,709**	**1,298,008**	**1,268,589**	**1,230,549**	**1,216,169**	**1,239,285**	**1,269,601**	**-13%**	**-12%**	**-14%**	**-17%**	**-18%**	**-16%**	**-14%**
Inbound	**750,695**	**647,822**	**650,479**	**635,851**	**617,517**	**610,279**	**621,900**	**636,184**	**-14%**	**-13%**	**-15%**	**-18%**	**-19%**	**-17%**	**-15.3%**
Outbound	**729,559**	**644,852**	**647,500**	**632,704**	**613,005**	**605,868**	**617,357**	**633,393**	**-12%**	**-11%**	**-13%**	**-16%**	**-17%**	**-15%**	**-13%**
									-	-	-	-	-	-	-
60th Street	549,072	473,220	479,431	460,828	438,623	436,372	446,477	469,509	-13.8%	-12.7%	-16.1%	-20.1%	-20.5%	-18.7%	-14.5%
Inbound	288,876	236,408	239,250	226,243	212,735	211,409	216,884	233,737	-18.2%	-17.2%	-21.7%	-26.4%	-26.8%	-24.9%	-19.1%
Outbound	260,182	236,796	240,172	234,572	225,878	224,955	229,583	235,764	-9.0%	-7.7%	-9.8%	-13.2%	-13.5%	-11.8%	-9.4%
FDR DRIVE+WEST SIDE HWY	301,343	288,193	291,892	285,093	276,703	275,597	280,729	287,393	-4.4%	-3.1%	-5.4%	-8.2%	-8.5%	-6.8%	-4.6%
West Side Highway / Route 9A	124,950	117,457	118,920	115,127	111,092	110,371	112,823	116,458	-6.0%	-4.8%	-7.9%	-11.1%	-11.7%	-9.7%	-6.8%
am	*26,409*	*25,842*	*26,232*	*25,580*	*25,080*	*25,175*	*25,424*	*25,745*	*-2.1%*	*-0.7%*	*-3.1%*	*-5.0%*	*-4.7%*	*-3.7%*	*-2.5%*
md	*35,767*	*33,953*	*34,492*	*33,809*	*32,466*	*32,622*	*33,110*	*33,621*	*-5.1%*	*-3.6%*	*-5.5%*	*-9.2%*	*-8.8%*	*-7.4%*	*-6.0%*
pm	*26,791*	*25,949*	*26,143*	*25,589*	*25,067*	*25,072*	*25,363*	*25,797*	*-3.1%*	*-2.4%*	*-4.5%*	*-6.4%*	*-6.4%*	*-5.3%*	*-3.7%*
nt	*35,983*	*31,713*	*32,053*	*30,149*	*28,479*	*27,502*	*28,926*	*31,295*	*-11.9%*	*-10.9%*	*-16.2%*	*-20.9%*	*-23.6%*	*-19.6%*	*-13.0%*
FDR Drive	176,393	170,736	172,972	169,966	165,611	165,226	167,906	170,935	-3.2%	-1.9%	-3.6%	-6.1%	-6.3%	-4.8%	-3.1%
am	*35,876*	*35,591*	*35,904*	*35,980*	*35,525*	*35,727*	*35,945*	*35,852*	*-0.8%*	*0.1%*	*0.3%*	*-1.0%*	*-0.4%*	*0.2%*	*-0.1%*
md	*49,880*	*48,193*	*49,129*	*48,748*	*47,821*	*47,663*	*48,944*	*48,246*	*-3.4%*	*-1.5%*	*-2.3%*	*-4.1%*	*-4.4%*	*-1.9%*	*-3.3%*
pm	*41,521*	*40,448*	*40,849*	*40,091*	*39,071*	*39,406*	*39,737*	*40,247*	*-2.6%*	*-1.6%*	*-3.4%*	*-5.9%*	*-5.1%*	*-4.3%*	*-3.1%*
nt	*49,116*	*46,504*	*47,090*	*45,147*	*43,194*	*42,430*	*43,280*	*46,590*	*-5.3%*	*-4.1%*	*-8.1%*	*-12.1%*	*-13.6%*	*-11.9%*	*-5.1%*
WEST AVENUES	72,502	56,201	57,660	54,867	50,856	50,545	52,999	56,491	-22.5%	-20.5%	-24.3%	-29.9%	-30.3%	-26.9%	-22.1%
West End Ave	10,141	3,914	4,226	3,391	2,516	2,424	3,024	4,322	-61.4%	-58.3%	-66.6%	-75.2%	-76.1%	-70.2%	-57.4%
am	*2,742*	*1,163*	*1,248*	*983*	*767*	*753*	*841*	*1,336*	*-57.6%*	*-54.5%*	*-64.2%*	*-72.0%*	*-72.5%*	*-69.3%*	*-51.3%*
md	*3,007*	*1,210*	*1,294*	*970*	*777*	*751*	*962*	*1,380*	*-59.8%*	*-57.0%*	*-67.7%*	*-74.2%*	*-75.0%*	*-68.0%*	*-54.1%*
pm	*2,280*	*1,008*	*1,130*	*990*	*610*	*607*	*814*	*1,020*	*-55.8%*	*-50.4%*	*-56.6%*	*-73.2%*	*-73.4%*	*-64.3%*	*-55.3%*
nt	*2,112*	*533*	*554*	*448*	*362*	*313*	*407*	*586*	*-74.8%*	*-73.8%*	*-78.8%*	*-82.9%*	*-85.2%*	*-80.7%*	*-72.3%*
Broadway	34,340	29,214	29,590	28,539	26,644	26,387	27,354	28,641	-14.9%	-13.8%	-16.9%	-22.4%	-23.2%	-20.3%	-16.6%
am	*8,486*	*7,413*	*7,356*	*7,314*	*6,655*	*6,584*	*6,769*	*7,238*	*-12.6%*	*-13.3%*	*-13.8%*	*-21.6%*	*-22.4%*	*-20.2%*	*-14.7%*
md	*9,086*	*7,245*	*7,487*	*7,070*	*6,345*	*6,246*	*6,738*	*7,205*	*-20.3%*	*-17.6%*	*-22.2%*	*-30.2%*	*-31.3%*	*-25.8%*	*-20.7%*
pm	*10,649*	*9,199*	*9,342*	*9,026*	*8,618*	*8,631*	*8,617*	*9,088*	*-13.6%*	*-12.3%*	*-15.2%*	*-19.1%*	*-19.0%*	*-19.1%*	*-14.7%*
nt	*6,119*	*5,357*	*5,405*	*5,129*	*5,026*	*4,926*	*5,230*	*5,110*	*-12.5%*	*-11.7%*	*-16.2%*	*-17.9%*	*-19.5%*	*-14.5%*	*-16.5%*
Amsterdam	13,296	8,508	8,776	8,388	7,821	7,614	8,283	8,730	-36.0%	-34.0%	-36.9%	-41.2%	-42.7%	-37.7%	-34.3%
am	*1,825*	*1,107*	*1,082*	*970*	*898*	*870*	*909*	*1,210*	*-39.3%*	*-40.7%*	*-46.8%*	*-50.8%*	*-52.3%*	*-50.2%*	*-33.7%*
md	*3,528*	*2,091*	*2,084*	*1,957*	*1,745*	*1,740*	*1,871*	*2,213*	*-40.7%*	*-40.9%*	*-44.5%*	*-50.5%*	*-50.7%*	*-47.0%*	*-37.3%*
pm	*6,075*	*4,241*	*4,587*	*4,265*	*3,860*	*3,814*	*4,185*	*4,193*	*-30.2%*	*-24.5%*	*-29.8%*	*-36.5%*	*-37.2%*	*-31.1%*	*-31.0%*
nt	*1,868*	*1,069*	*1,023*	*1,196*	*1,318*	*1,190*	*1,318*	*1,114*	*-42.8%*	*-45.2%*	*-36.0%*	*-29.4%*	*-36.3%*	*-29.4%*	*-40.4%*

Table 4A.2-11 Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2045) (continued)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,480,286**	**1,292,709**	**1,298,008**	**1,268,589**	**1,230,549**	**1,216,169**	**1,239,285**	**1,269,601**	**-13%**	**-12%**	**-14%**	**-17%**	**-18%**	**-16%**	**-14%**
Inbound	**750,695**	**647,822**	**650,479**	**635,851**	**617,517**	**610,279**	**621,900**	**636,184**	**-14%**	**-13%**	**-15%**	**-18%**	**-19%**	**-17%**	**-15.3%**
Outbound	**729,559**	**644,852**	**647,500**	**632,704**	**613,005**	**605,868**	**617,357**	**633,393**	**-12%**	**-11%**	**-13%**	**-16%**	**-17%**	**-15%**	**-13%**
									-	-	-	-	-	-	-
60th Street	549,072	473,220	479,431	460,828	438,623	436,372	446,477	469,509	-13.8%	-12.7%	-16.1%	-20.1%	-20.5%	-18.7%	-14.5%
Inbound	288,876	236,408	239,250	226,243	212,735	211,409	216,884	233,737	-18.2%	-17.2%	-21.7%	-26.4%	-26.8%	-24.9%	-19.1%
Outbound	260,182	236,796	240,172	234,572	225,878	224,955	229,583	235,764	-9.0%	-7.7%	-9.8%	-13.2%	-13.5%	-11.8%	-9.4%
Columbus Ave	10,785	10,941	11,335	10,628	10,040	10,246	10,362	11,120	1.4%	5.1%	-1.5%	-6.9%	-5.0%	-3.9%	3.1%
am	*3,422*	*3,297*	*3,412*	*3,262*	*3,025*	*3,091*	*3,183*	*3,316*	*-3.7%*	*-0.3%*	*-4.7%*	*-11.6%*	*-9.7%*	*-7.0%*	*-3.1%*
md	*3,964*	*3,742*	*3,950*	*3,617*	*3,452*	*3,601*	*3,518*	*3,806*	*-5.6%*	*-0.4%*	*-8.8%*	*-12.9%*	*-9.2%*	*-11.3%*	*-4.0%*
pm	*1,968*	*1,979*	*2,017*	*1,840*	*1,766*	*1,786*	*1,859*	*1,953*	*0.6%*	*2.5%*	*-6.5%*	*-10.3%*	*-9.2%*	*-5.5%*	*-0.8%*
nt	*1,431*	*1,923*	*1,956*	*1,909*	*1,797*	*1,768*	*1,802*	*2,045*	*34.4%*	*36.7%*	*33.4%*	*25.6%*	*23.5%*	*25.9%*	*42.9%*
Eighth Avenue	3,940	3,624	3,733	3,921	3,835	3,874	3,976	3,678	-8.0%	-5.3%	-0.5%	-2.7%	-1.7%	0.9%	-6.6%
am	*693*	*697*	*713*	*748*	*878*	*879*	*863*	*652*	*0.6%*	*2.9%*	*7.9%*	*26.7%*	*26.8%*	*24.5%*	*-5.9%*
md	*960*	*858*	*853*	*884*	*853*	*881*	*902*	*861*	*-10.6%*	*-11.1%*	*-7.9%*	*-11.1%*	*-8.2%*	*-6.0%*	*-10.3%*
pm	*1,468*	*1,248*	*1,314*	*1,365*	*1,235*	*1,236*	*1,277*	*1,292*	*-15.0%*	*-10.5%*	*-7.0%*	*-15.9%*	*-15.8%*	*-13.0%*	*-12.0%*
nt	*819*	*821*	*853*	*924*	*869*	*878*	*934*	*873*	*0.2%*	*4.2%*	*12.8%*	*6.1%*	*7.2%*	*14.0%*	*6.6%*
EAST AVENUES	175,227	128,826	129,879	120,868	111,064	110,230	112,749	125,625	-26.5%	-25.9%	-31.0%	-36.6%	-37.1%	-35.7%	-28.3%
Fifth Avenue	13,688	10,357	10,635	9,866	9,084	8,954	9,305	10,313	-24.3%	-22.3%	-27.9%	-33.6%	-34.6%	-32.0%	-24.7%
am	*4,262*	*3,688*	*3,718*	*3,606*	*3,340*	*3,250*	*3,382*	*3,603*	*-13.5%*	*-12.8%*	*-15.4%*	*-21.6%*	*-23.7%*	*-20.6%*	*-15.5%*
md	*5,324*	*3,600*	*3,749*	*3,492*	*3,075*	*3,091*	*3,237*	*3,668*	*-32.4%*	*-29.6%*	*-34.4%*	*-42.2%*	*-41.9%*	*-39.2%*	*-31.1%*
pm	*2,178*	*1,638*	*1,715*	*1,546*	*1,547*	*1,565*	*1,565*	*1,644*	*-24.8%*	*-21.3%*	*-29.0%*	*-29.0%*	*-28.1%*	*-28.1%*	*-24.5%*
nt	*1,924*	*1,431*	*1,453*	*1,222*	*1,122*	*1,048*	*1,121*	*1,398*	*-25.6%*	*-24.5%*	*-36.5%*	*-41.7%*	*-45.5%*	*-41.7%*	*-27.3%*
Madison Avenue	4,135	3,557	3,673	3,532	3,361	3,329	3,451	3,574	-14.0%	-11.2%	-14.6%	-18.7%	-19.5%	-16.5%	-13.6%
am	*504*	*478*	*483*	*475*	*467*	*466*	*471*	*473*	*-5.2%*	*-4.2%*	*-5.8%*	*-7.3%*	*-7.5%*	*-6.5%*	*-6.2%*
md	*933*	*894*	*888*	*878*	*882*	*876*	*877*	*881*	*-4.2%*	*-4.8%*	*-5.9%*	*-5.5%*	*-6.1%*	*-6.0%*	*-5.6%*
pm	*2,424*	*1,990*	*2,110*	*1,990*	*1,835*	*1,776*	*1,906*	*2,039*	*-17.9%*	*-13.0%*	*-17.9%*	*-24.3%*	*-26.7%*	*-21.4%*	*-15.9%*
nt	*274*	*195*	*192*	*189*	*177*	*211*	*197*	*181*	*-28.8%*	*-29.9%*	*-31.0%*	*-35.4%*	*-23.0%*	*-28.1%*	*-33.9%*
Park Avenue	19,120	15,565	15,774	15,288	14,537	13,927	14,552	15,240	-18.6%	-17.5%	-20.0%	-24.0%	-27.2%	-23.9%	-20.3%
am	*5,447*	*4,692*	*4,776*	*4,636*	*4,339*	*4,212*	*4,363*	*4,589*	*-13.9%*	*-12.3%*	*-14.9%*	*-20.3%*	*-22.7%*	*-19.9%*	*-15.8%*
md	*5,082*	*3,833*	*3,820*	*3,666*	*3,475*	*3,403*	*3,500*	*3,724*	*-24.6%*	*-24.8%*	*-27.9%*	*-31.6%*	*-33.0%*	*-31.1%*	*-26.7%*
pm	*5,339*	*4,419*	*4,465*	*4,384*	*4,323*	*4,085*	*4,172*	*4,322*	*-17.2%*	*-16.4%*	*-17.9%*	*-19.0%*	*-23.5%*	*-21.9%*	*-19.0%*
nt	*3,252*	*2,621*	*2,713*	*2,602*	*2,400*	*2,227*	*2,517*	*2,605*	*-19.4%*	*-16.6%*	*-20.0%*	*-26.2%*	*-31.5%*	*-22.6%*	*-19.9%*

Table 4A.2-11 Toll Vehicle Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2045) (continued)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**1,480,286**	**1,292,709**	**1,298,008**	**1,268,589**	**1,230,549**	**1,216,169**	**1,239,285**	**1,269,601**	**-13%**	**-12%**	**-14%**	**-17%**	**-18%**	**-16%**	**-14%**
Inbound	**750,695**	**647,822**	**650,479**	**635,851**	**617,517**	**610,279**	**621,900**	**636,184**	**-14%**	**-13%**	**-15%**	**-18%**	**-19%**	**-17%**	**-15.3%**
Outbound	**729,559**	**644,852**	**647,500**	**632,704**	**613,005**	**605,868**	**617,357**	**633,393**	**-12%**	**-11%**	**-13%**	**-16%**	**-17%**	**-15%**	**-13%**
									-	-	-	-	-	-	-
60th Street	549,072	473,220	479,431	460,828	438,623	436,372	446,477	469,509	-13.8%	-12.7%	-16.1%	-20.1%	-20.5%	-18.7%	-14.5%
Inbound	288,876	236,408	239,250	226,243	212,735	211,409	216,884	233,737	-18.2%	-17.2%	-21.7%	-26.4%	-26.8%	-24.9%	-19.1%
Outbound	260,182	236,796	240,172	234,572	225,878	224,955	229,583	235,764	-9.0%	-7.7%	-9.8%	-13.2%	-13.5%	-11.8%	-9.4%
Lexington Avenue	12,954	9,343	9,394	8,438	7,528	7,611	7,613	9,448	-27.9%	-27.5%	-34.9%	-41.9%	-41.2%	-41.2%	-27.1%
am	*4,078*	*2,531*	*2,615*	*2,444*	*2,237*	*2,173*	*2,294*	*2,566*	*-37.9%*	*-35.9%*	*-40.1%*	*-45.1%*	*-46.7%*	*-43.7%*	*-37.1%*
md	*4,945*	*4,249*	*4,113*	*3,683*	*3,003*	*3,158*	*2,998*	*4,397*	*-14.1%*	*-16.8%*	*-25.5%*	*-39.3%*	*-36.1%*	*-39.4%*	*-11.1%*
pm	*1,830*	*1,167*	*1,258*	*1,147*	*1,159*	*1,186*	*1,203*	*1,160*	*-36.2%*	*-31.3%*	*-37.3%*	*-36.7%*	*-35.2%*	*-34.3%*	*-36.6%*
nt	*2,101*	*1,396*	*1,408*	*1,164*	*1,129*	*1,094*	*1,118*	*1,325*	*-33.6%*	*-33.0%*	*-44.6%*	*-46.3%*	*-47.9%*	*-46.8%*	*-36.9%*
Third Avenue	14,732	11,117	11,374	10,467	8,672	8,892	8,798	10,586	-24.5%	-22.8%	-29.0%	-41.1%	-39.6%	-40.3%	-28.1%
am	*2,657*	*2,016*	*2,037*	*1,929*	*1,764*	*1,815*	*1,770*	*1,833*	*-24.1%*	*-23.3%*	*-27.4%*	*-33.6%*	*-31.7%*	*-33.4%*	*-31.0%*
md	*4,589*	*3,792*	*3,998*	*3,547*	*2,671*	*2,707*	*2,729*	*3,790*	*-17.4%*	*-12.9%*	*-22.7%*	*-41.8%*	*-41.0%*	*-40.5%*	*-17.4%*
pm	*5,105*	*3,847*	*3,867*	*3,545*	*2,998*	*3,072*	*3,015*	*3,547*	*-24.6%*	*-24.3%*	*-30.6%*	*-41.3%*	*-39.8%*	*-40.9%*	*-30.5%*
nt	*2,381*	*1,462*	*1,472*	*1,446*	*1,239*	*1,298*	*1,284*	*1,416*	*-38.6%*	*-38.2%*	*-39.3%*	*-48.0%*	*-45.5%*	*-46.1%*	*-40.5%*
Second Avenue	40,494	21,084	20,913	18,165	15,893	15,843	16,747	18,875	-47.9%	-48.4%	-55.1%	-60.8%	-60.9%	-58.6%	-53.4%
am	*9,631*	*6,535*	*6,568*	*6,140*	*5,685*	*5,698*	*5,921*	*5,890*	*-32.1%*	*-31.8%*	*-36.2%*	*-41.0%*	*-40.8%*	*-38.5%*	*-38.8%*
md	*11,156*	*6,460*	*6,568*	*5,419*	*4,417*	*4,545*	*4,685*	*6,186*	*-42.1%*	*-41.1%*	*-51.4%*	*-60.4%*	*-59.3%*	*-58.0%*	*-44.6%*
pm	*9,085*	*4,499*	*4,453*	*4,012*	*3,615*	*3,620*	*3,747*	*4,194*	*-50.5%*	*-51.0%*	*-55.8%*	*-60.2%*	*-60.2%*	*-58.8%*	*-53.8%*
nt	*10,622*	*3,590*	*3,324*	*2,594*	*2,176*	*1,980*	*2,394*	*2,605*	*-66.2%*	*-68.7%*	*-75.6%*	*-79.5%*	*-81.4%*	*-77.5%*	*-75.5%*
First Avenue	6,164	5,765	6,078	5,871	5,663	5,308	5,736	5,937	-6.5%	-1.4%	-4.8%	-8.1%	-13.9%	-6.9%	-3.7%
am	*2,202*	*1,993*	*2,014*	*1,952*	*1,867*	*1,844*	*1,911*	*1,987*	*-9.5%*	*-8.5%*	*-11.4%*	*-15.2%*	*-16.3%*	*-13.2%*	*-9.8%*
md	*1,430*	*1,601*	*1,640*	*1,585*	*1,564*	*1,496*	*1,561*	*1,640*	*12.0%*	*14.7%*	*10.8%*	*9.4%*	*4.6%*	*9.2%*	*14.7%*
pm	*1,755*	*1,488*	*1,774*	*1,733*	*1,641*	*1,417*	*1,635*	*1,622*	*-15.2%*	*1.1%*	*-1.3%*	*-6.5%*	*-19.3%*	*-6.8%*	*-7.6%*
nt	*777*	*683*	*650*	*601*	*591*	*551*	*629*	*688*	*-12.1%*	*-16.3%*	*-22.7%*	*-23.9%*	*-29.1%*	*-19.0%*	*-11.5%*
York Avenue	23,130	14,003	13,978	13,323	11,794	12,032	12,062	13,801	-39.5%	-39.6%	-42.4%	-49.0%	-48.0%	-47.9%	-40.3%
am	*4,535*	*2,600*	*2,627*	*2,392*	*2,200*	*2,157*	*2,098*	*2,448*	*-42.7%*	*-42.1%*	*-47.3%*	*-51.5%*	*-52.4%*	*-53.7%*	*-46.0%*
md	*7,308*	*4,514*	*4,721*	*4,475*	*3,785*	*3,805*	*4,073*	*4,507*	*-38.2%*	*-35.4%*	*-38.8%*	*-48.2%*	*-47.9%*	*-44.3%*	*-38.3%*
pm	*4,177*	*2,440*	*2,269*	*2,018*	*1,855*	*1,999*	*1,915*	*2,474*	*-41.6%*	*-45.7%*	*-51.7%*	*-55.6%*	*-52.1%*	*-54.2%*	*-40.8%*
nt	*7,110*	*4,449*	*4,361*	*4,438*	*3,954*	*4,071*	*3,976*	*4,372*	*-37.4%*	*-38.7%*	*-37.6%*	*-44.4%*	*-42.7%*	*-44.1%*	*-38.5%*
Ed Koch Queensboro Ramp	40,810	38,035	38,060	35,918	34,532	34,334	34,485	37,851	-6.8%	-6.7%	-12.0%	-15.4%	-15.9%	-15.5%	-7.3%
am	*8,172*	*6,250*	*6,294*	*6,108*	*6,041*	*5,972*	*6,002*	*6,237*	*-23.5%*	*-23.0%*	*-25.3%*	*-26.1%*	*-26.9%*	*-26.6%*	*-23.7%*
md	*15,526*	*13,262*	*13,453*	*12,756*	*11,677*	*11,523*	*11,669*	*13,353*	*-14.6%*	*-13.4%*	*-17.8%*	*-24.8%*	*-25.8%*	*-24.8%*	*-14.0%*
pm	*8,411*	*6,202*	*6,105*	*5,628*	*5,493*	*5,540*	*5,655*	*6,103*	*-26.3%*	*-27.4%*	*-33.1%*	*-34.7%*	*-34.1%*	*-32.8%*	*-27.4%*
nt	*8,701*	*12,321*	*12,208*	*11,426*	*11,321*	*11,299*	*11,159*	*12,158*	*41.6%*	*40.3%*	*31.3%*	*30.1%*	*29.9%*	*28.2%*	*39.7%*

Table 4A.2-12. Summary – Vehicle-Miles Traveled (2045)

	Daily VMT								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Manhattan CBD	**3,402,711**	**3,173,972**	**3,199,881**	**3,156,249**	**3,117,142**	**3,106,570**	**3,147,541**	**3,144,017**	**-6.7%**	**-6.0%**	**-7.2%**	**-8.4%**	**-8.7%**	**-7.5%**	**-7.6%**
New York City	**49,748,914**	**49,306,506**	**49,361,708**	**49,206,260**	**48,917,855**	**48,908,967**	**49,014,661**	**49,271,140**	**-0.9%**	**-0.8%**	**-1.1%**	**-1.7%**	**-1.7%**	**-1.5%**	**-1.0%**
Manhattan CBD	3,402,711	3,173,972	3,199,881	3,156,249	3,117,142	3,106,570	3,147,541	3,144,017	-6.7%	-6.0%	-7.2%	-8.4%	-8.7%	-7.5%	-7.6%
CBD Core	1,262,019	1,211,069	1,219,101	1,222,077	1,236,236	1,230,340	1,246,015	1,197,152	-4.0%	-3.4%	-3.2%	-2.0%	-2.5%	-1.3%	-5.1%
Peripheral Highways (south of 60th St	2,140,692	1,962,903	1,980,780	1,934,172	1,880,906	1,876,230	1,901,526	1,946,865	-8.3%	-7.5%	-9.6%	-12.1%	-12.4%	-11.2%	-9.1%
RT9A - S of 60th	*647,671*	*554,316*	*562,018*	*528,271*	*500,214*	*499,855*	*509,900*	*550,459*	*-14.4%*	*-13.2%*	*-18.4%*	*-22.8%*	*-22.8%*	*-21.3%*	*-15.0%*
FDR - S of 60th	*758,659*	*760,056*	*770,395*	*754,497*	*733,879*	*739,383*	*743,921*	*763,263*	*0.2%*	*1.5%*	*-0.5%*	*-3.3%*	*-2.5%*	*-1.9%*	*0.6%*
*Bridge & Tunnels - S of 60th**	*734,362*	*648,531*	*648,367*	*651,404*	*646,813*	*636,992*	*647,705*	*633,143*	*-11.7%*	*-11.7%*	*-11.3%*	*-11.9%*	*-13.3%*	*-11.8%*	*-13.8%*
Zone 1	2,349,929	2,195,311	2,199,825	2,155,278	2,113,309	2,104,806	2,123,309	2,173,895	-6.6%	-6.4%	-8.3%	-10.1%	-10.4%	-9.6%	-7.5%
Manhattan: 60th St - 82nd St	691,669	619,654	625,994	609,607	588,882	587,032	597,706	615,867	-10.4%	-9.5%	-11.9%	-14.9%	-15.1%	-13.6%	-11.0%
Long Island City	700,142	652,642	650,449	648,608	652,055	649,766	653,025	642,138	-6.8%	-7.1%	-7.4%	-6.9%	-7.2%	-6.7%	-8.3%
Downtown Brooklyn	530,763	515,559	515,095	495,020	479,948	477,863	479,718	511,255	-2.9%	-3.0%	-6.7%	-9.6%	-10.0%	-9.6%	-3.7%
Williamsburg	427,355	407,456	408,287	402,043	392,424	390,145	392,860	404,635	-4.7%	-4.5%	-5.9%	-8.2%	-8.7%	-8.1%	-5.3%
Zone 2	7,142,863	7,086,769	7,098,540	7,060,838	7,013,071	7,012,113	7,032,663	7,083,658	-0.8%	-0.6%	-1.1%	-1.8%	-1.8%	-1.5%	-0.8%
Manhattan: 82nd St - 126th St	1,812,034	1,776,710	1,791,117	1,769,374	1,739,044	1,735,671	1,749,819	1,786,850	-1.9%	-1.2%	-2.4%	-4.0%	-4.2%	-3.4%	-1.4%
Inner Brooklyn	2,542,834	2,523,392	2,524,419	2,502,611	2,492,284	2,490,072	2,492,966	2,511,791	-0.8%	-0.7%	-1.6%	-2.0%	-2.1%	-2.0%	-1.2%
Inner Queens	2,787,995	2,786,667	2,783,004	2,788,853	2,781,743	2,786,370	2,789,878	2,785,017	0.0%	-0.2%	0.0%	-0.2%	-0.1%	0.1%	-0.1%
Zone 3	36,853,411	36,850,454	36,863,462	36,833,895	36,674,333	36,685,478	36,711,148	36,869,570	0.0%	0.0%	-0.1%	-0.5%	-0.5%	-0.4%	0.0%
Upper Manhattan: Above 126th St	1,809,655	1,803,988	1,807,284	1,789,372	1,763,748	1,755,041	1,767,328	1,806,866	-0.3%	-0.1%	-1.1%	-2.5%	-3.0%	-2.3%	-0.2%
Outer Brooklyn	6,926,352	6,930,342	6,934,043	6,925,110	6,896,220	6,900,201	6,894,299	6,923,525	0.1%	0.1%	0.0%	-0.4%	-0.4%	-0.5%	0.0%
Outer Queens	15,879,972	15,790,320	15,792,442	15,789,011	15,733,285	15,740,134	15,760,898	15,782,430	-0.6%	-0.6%	-0.6%	-0.9%	-0.9%	-0.7%	-0.6%
Staten Island	4,158,480	4,235,660	4,234,612	4,246,527	4,227,463	4,242,170	4,224,254	4,252,251	1.9%	1.8%	2.1%	1.7%	2.0%	1.6%	2.3%
Bronx	8,078,952	8,090,144	8,095,081	8,083,875	8,053,617	8,047,932	8,064,369	8,104,498	0.1%	0.2%	0.1%	-0.3%	-0.4%	-0.2%	0.3%
New York State	134,186,361	133,549,102	133,603,123	133,407,441	133,011,541	132,941,187	133,056,675	133,576,575	-0.5%	-0.4%	-0.6%	-0.9%	-0.9%	-0.8%	-0.5%
New York City	49,748,914	49,306,506	49,361,708	49,206,260	48,917,855	48,908,967	49,014,661	49,271,140	-0.9%	-0.8%	-1.1%	-1.7%	-1.7%	-1.5%	-1.0%
Long Island	46,813,526	46,752,292	46,709,696	46,716,462	46,732,209	46,699,238	46,688,529	46,757,385	-0.1%	-0.2%	-0.2%	-0.2%	-0.2%	-0.3%	-0.1%
Upstate	37,623,921	37,490,304	37,531,719	37,484,719	37,361,477	37,332,982	37,353,485	37,548,050	-0.4%	-0.2%	-0.4%	-0.7%	-0.8%	-0.7%	-0.2%
Connecticut	35,063,470	35,045,234	35,006,855	35,042,347	35,004,182	35,002,445	34,998,648	35,059,459	-0.1%	-0.2%	-0.1%	-0.2%	-0.2%	-0.2%	0.0%
New Jersey	107,907,842	107,914,688	107,948,940	108,040,676	107,970,946	107,950,075	108,024,196	107,882,082	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%
Total	**277,157,673**	**276,509,024**	**276,558,918**	**276,490,464**	**275,986,669**	**275,893,707**	**276,079,519**	**276,518,116**	**-0.2%**	**-0.2%**	**-0.2%**	**-0.4%**	**-0.5%**	**-0.4%**	**-0.2%**

Table 4A.2-13. Transit Boardings by Mode (2045)

	Transit Boardings (AM Period)								Change							Percent Change						
Mode	Scenario								Scenario							Scenario						
	No Action	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Total Volume	**7,101,708**	**7,191,188**	**7,182,951**	**7,197,443**	**7,216,330**	**7,225,106**	**7,219,657**	**7,191,067**	**89,480**	**81,243**	**95,736**	**114,623**	**123,398**	**117,950**	**89,359**	**1.3%**	**1.1%**	**1.3%**	**1.6%**	**1.7%**	**1.7%**	**1.3%**
Commuter Rail	**566,907**	**571,260**	**571,647**	**572,767**	**575,243**	**575,759**	**575,844**	**571,840**	**4,353**	**4,740**	**5,859**	**8,336**	**8,852**	**8,937**	**4,932**	**0.8%**	**0.8%**	**1.0%**	**1.5%**	**1.6%**	**1.6%**	**0.9%**
Long Island Rail Road	182,379	183,350	183,968	183,855	184,739	184,062	184,856	183,867	971	1,589	1,476	2,360	1,684	2,477	1,488	0.5%	0.9%	0.8%	1.3%	0.9%	1.4%	0.8%
Metro-North Railroad	206,505	208,301	208,346	208,583	209,623	210,064	210,407	208,441	1,796	1,841	2,079	3,118	3,559	3,902	1,936	0.9%	0.9%	1.0%	1.5%	1.7%	1.9%	0.9%
New Jersey Transit Rail	178,024	179,609	179,334	180,329	180,881	181,634	180,582	179,532	1,585	1,310	2,305	2,857	3,610	2,558	1,508	0.9%	0.7%	1.3%	1.6%	2.0%	1.4%	0.8%
Urban Rail	**3,517,783**	**3,569,779**	**3,566,213**	**3,572,869**	**3,582,744**	**3,589,853**	**3,585,948**	**3,571,053**	**51,996**	**48,429**	**55,086**	**64,961**	**72,069**	**68,164**	**53,270**	**1.5%**	**1.4%**	**1.6%**	**1.8%**	**2.0%**	**1.9%**	**1.5%**
NYCT Subway	3,344,746	3,394,538	3,390,882	3,397,112	3,406,542	3,413,503	3,409,708	3,395,715	49,792	46,137	52,366	61,796	68,757	64,962	50,969	1.5%	1.4%	1.6%	1.8%	2.1%	1.9%	1.5%
PATH	160,294	161,896	162,044	162,348	162,744	162,808	162,830	162,030	1,601	1,750	2,054	2,450	2,514	2,536	1,736	1.0%	1.1%	1.3%	1.5%	1.6%	1.6%	1.1%
SIRR	12,743	13,346	13,286	13,410	13,459	13,541	13,409	13,308	603	543	667	715	798	666	565	4.7%	4.3%	5.2%	5.6%	6.3%	5.2%	4.4%
Bus	**2,958,355**	**2,990,052**	**2,985,085**	**2,991,551**	**2,997,749**	**2,998,714**	**2,997,421**	**2,988,399**	**31,697**	**26,730**	**33,197**	**39,395**	**40,359**	**39,066**	**30,044**	**1.1%**	**0.9%**	**1.1%**	**1.3%**	**1.4%**	**1.3%**	**1.0%**
NYCT Bus	2,182,751	2,209,043	2,206,110	2,211,296	2,215,888	2,217,583	2,214,448	2,210,288	26,292	23,358	28,544	33,136	34,831	31,697	27,537	1.2%	1.1%	1.3%	1.5%	1.6%	1.5%	1.3%
NJT Bus	562,497	567,619	566,723	567,631	567,841	568,634	569,748	566,447	5,122	4,225	5,134	5,344	6,137	7,251	3,950	0.9%	0.8%	0.9%	1.0%	1.1%	1.3%	0.7%
Others	213,106	213,389	212,253	212,625	214,021	212,497	213,224	211,664	283	-853	-481	915	-609	118	-1,442	0.1%	-0.4%	-0.2%	0.4%	-0.3%	0.1%	-0.7%
Other Transit	**58,663**	**60,097**	**60,006**	**60,256**	**60,594**	**60,780**	**60,444**	**59,775**	**1,435**	**1,343**	**1,594**	**1,931**	**2,117**	**1,782**	**1,113**	**2.4%**	**2.3%**	**2.7%**	**3.3%**	**3.6%**	**3.0%**	**1.9%**
Ferries	58,663	60,097	60,006	60,256	60,594	60,780	60,444	59,775	1,435	1,343	1,594	1,931	2,117	1,782	1,113	2.4%	2.3%	2.7%	3.3%	3.6%	3.0%	1.9%
Roosevelt Tram	195	202	201	202	203	204	204	206	6	6	7	7	9	9	10	3.3%	2.9%	3.4%	3.8%	4.8%	4.5%	5.4%

Table 4A.2-14. Cordon Volumes by Station/Route (2045)

Cordon Volumes (AM Peak Period)																	Percent Change					
		Scenario							Scenario								Scenario					
	No Action	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Commuter Rail																						
Inbound	309,638	313,033	312,689	313,316	315,353	315,608	314,947	313,359	3,395	3,051	3,678	5,715	5,970	5,308	3,721	1.1%	1.0%	1.2%	1.8%	1.9%	1.7%	1.2%
Long Island Rail Road (Penn Station)	72,372	73,202	73,362	73,243	73,570	73,493	73,654	73,388	830	990	872	1,199	1,121	1,283	1,016	1.1%	1.4%	1.2%	1.7%	1.5%	1.8%	1.4%
Long Island Rail Road (Grand Central Terminal	52,023	52,204	52,376	52,304	52,551	52,449	52,744	52,422	181	353	281	528	426	721	399	0.3%	0.7%	0.5%	1.0%	0.8%	1.4%	0.8%
Metro-North Railroad (Grand Central Terminal)	100,383	101,948	101,587	101,784	102,959	103,271	102,611	101,627	1,565	1,204	1,401	2,576	2,888	2,228	1,245	1.6%	1.2%	1.4%	2.6%	2.9%	2.2%	1.2%
Metro-North Railroad (Penn Station)	22,907	23,102	22,922	23,288	23,302	23,299	23,278	23,296	195	14	381	394	391	370	388	0.9%	0.1%	1.7%	1.7%	1.7%	1.6%	1.7%
New Jersey Transit (New York - Penn Station)	61,953	62,577	62,442	62,696	62,972	63,097	62,660	62,626	624	489	743	1,018	1,144	707	673	1.0%	0.8%	1.2%	1.6%	1.8%	1.1%	1.1%
Scenario		A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
NYCT Subway																						
Inbound	900,899	913,149	912,186	914,960	918,589	921,066	919,986	913,556	12,250	11,287	14,061	17,690	20,166	19,086	12,657	1.4%	1.3%	1.6%	2.0%	2.2%	2.1%	1.4%
60th Street Cordon	311,854	315,733	315,406	315,712	317,561	318,083	317,253	315,867	3,879	3,553	3,858	5,708	6,229	5,400	4,014	1.2%	1.1%	1.2%	1.8%	2.0%	1.7%	1.3%
Broadway (1,2,3)	77,497	78,349	78,356	78,328	78,800	78,943	78,727	78,407	853	860	832	1,303	1,446	1,231	910	1.1%	1.1%	1.1%	1.7%	1.9%	1.6%	1.2%
8th Avenue (A, C, B, D)	93,471	94,274	94,262	94,396	94,818	94,810	94,710	94,165	803	791	925	1,347	1,339	1,239	694	0.9%	0.8%	1.0%	1.4%	1.4%	1.3%	0.7%
Lexington Avenue (4, 5, 6)	69,415	70,708	70,455	70,606	70,967	71,251	70,951	70,680	1,294	1,040	1,191	1,553	1,836	1,536	1,266	1.9%	1.5%	1.7%	2.2%	2.6%	2.2%	1.8%
2nd Avenue (Q)	71,471	72,401	72,333	72,381	72,977	73,079	72,865	72,615	930	861	910	1,505	1,608	1,394	1,144	1.3%	1.2%	1.3%	2.1%	2.2%	2.0%	1.6%
Queens Cordon	216,444	219,084	218,732	219,880	220,478	221,276	221,502	218,757	2,639	2,288	3,436	4,033	4,832	5,058	2,313	1.2%	1.1%	1.6%	1.9%	2.2%	2.3%	1.1%
63rd Street (F)	51,020	51,428	51,545	51,757	51,778	51,913	52,072	51,535	408	525	737	758	893	1,052	515	0.8%	1.0%	1.4%	1.5%	1.7%	2.1%	1.0%
60th Street (R)	12,902	13,201	13,130	13,166	13,232	13,299	13,308	13,120	299	229	264	331	398	407	218	2.3%	1.8%	2.0%	2.6%	3.1%	3.2%	1.7%
60th Street (N, W)	28,709	29,302	29,273	29,335	29,478	29,557	29,612	29,243	593	564	626	769	848	903	534	2.1%	2.0%	2.2%	2.7%	3.0%	3.1%	1.9%
53rd Street (E, M)	60,056	60,820	60,652	61,069	61,387	61,587	61,494	60,770	764	595	1,013	1,330	1,531	1,438	713	1.3%	1.0%	1.7%	2.2%	2.5%	2.4%	1.2%
Steinway Tunnel (7)	63,757	64,332	64,132	64,553	64,603	64,920	65,015	64,090	575	374	796	845	1,163	1,258	332	0.9%	0.6%	1.2%	1.3%	1.8%	2.0%	0.5%
Brooklyn Cordon	372,601	378,333	378,048	379,369	380,550	381,707	381,230	378,932	5,732	5,446	6,767	7,949	9,105	8,629	6,330	1.5%	1.5%	1.8%	2.1%	2.4%	2.3%	1.7%
14th Street (L)	49,801	50,573	50,580	50,776	50,834	51,051	50,906	50,664	772	779	975	1,033	1,250	1,104	863	1.6%	1.6%	2.0%	2.1%	2.5%	2.2%	1.7%
Williamsburg Bridge (J, M, Z)	35,369	36,215	36,279	36,266	36,439	36,558	36,471	36,161	847	910	897	1,070	1,189	1,102	792	2.4%	2.6%	2.5%	3.0%	3.4%	3.1%	2.2%
Rutgers Street (F)	41,591	42,114	42,088	42,190	42,328	42,426	42,318	42,162	522	497	598	737	834	727	571	1.3%	1.2%	1.4%	1.8%	2.0%	1.7%	1.4%
Manhattan Bridge (B, D, N, Q)	107,696	109,253	109,141	109,823	110,234	110,557	110,340	109,597	1,557	1,445	2,127	2,538	2,861	2,643	1,901	1.4%	1.3%	2.0%	2.4%	2.7%	2.5%	1.8%
Cranberry Street (A, C)	71,587	72,583	72,481	72,701	72,852	73,038	72,947	72,610	995	894	1,114	1,265	1,450	1,360	1,023	1.4%	1.2%	1.6%	1.8%	2.0%	1.9%	1.4%
Clark Street (2, 3)	29,111	29,626	29,539	29,553	29,717	29,754	29,915	29,636	515	428	442	606	643	804	525	1.8%	1.5%	1.5%	2.1%	2.2%	2.8%	1.8%
Montague Street (R)	11,089	11,148	11,163	11,210	11,231	11,279	11,268	11,272	59	74	121	142	190	179	183	0.5%	0.7%	1.1%	1.3%	1.7%	1.6%	1.7%
Joralmon Street (4, 5)	26,356	26,821	26,776	26,850	26,914	27,043	27,065	26,829	465	420	493	558	686	709	473	1.8%	1.6%	1.9%	2.1%	2.6%	2.7%	1.8%
PATH																						
Inbound	134,735	136,302	136,291	136,790	137,253	137,339	137,264	136,396	1,567	1,556	2,055	2,518	2,604	2,529	1,661	1.2%	1.2%	1.5%	1.5%	1.9%	1.9%	1.2%
Christopher Street	43,258	44,123	43,992	44,361	44,498	44,538	44,611	44,112	865	733	1,103	1,240	1,280	1,352	853	2.0%	1.7%	2.5%	2.9%	3.0%	3.1%	2.0%
World Trade Center	91,477	92,179	92,300	92,429	92,755	92,801	92,653	92,284	702	823	952	1,278	1,324	1,176	807	0.8%	0.9%	1.0%	1.4%	1.4%	1.3%	0.9%

Table 4A.2-15. Change in Mode Share to the Manhattan CBD (2045)

	Daily Journeys								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Total Person Journeys to CBD	**2,060,217**	**2,059,673**	**2,063,862**	**2,061,591**	**2,056,916**	**2,058,663**	**2,061,603**	**2,058,403**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Drive Alone	195,550	179,719	179,065	172,758	166,999	160,143	161,776	177,186	-8%	-8%	-12%	-15%	-18%	-17%	-9%
HOV / Shared Ride	137,365	137,579	137,323	137,086	135,196	133,715	134,701	137,052	0%	0%	0%	-2%	-3%	-2%	0%
Taxi / FHV	32,052	24,713	31,887	27,656	19,757	25,329	30,582	23,340	-23%	-1%	-14%	-38%	-21%	-5%	-27%
Commuter Rail	434,018	441,246	440,810	442,498	446,877	447,609	445,970	443,261	2%	2%	2%	3%	3%	3%	2%
Other Transit (e.g., subway / bus)	1,204,475	1,220,058	1,218,095	1,224,960	1,231,326	1,235,246	1,232,204	1,220,754	1%	1%	2%	2%	3%	2%	1%
Walk and Bike	53,205	52,634	52,918	52,894	52,808	52,810	52,531	53,039	-1%	-1%	-1%	-1%	-1%	-1%	0%
School Bus	3,552	3,724	3,764	3,739	3,953	3,811	3,839	3,771	5%	6%	5%	11%	7%	8%	6%
Total Person Journeys from CBD	**176,050**	**175,227**	**176,212**	**174,978**	**173,235**	**173,467**	**174,685**	**174,340**	**0%**	**0%**	**-1%**	**-2%**	**-1%**	**-1%**	**-1%**
Drive Alone	14,103	13,096	13,145	12,919	12,217	12,147	12,140	12,895	-7%	-7%	-8%	-13%	-14%	-14%	-9%
HOV / Shared Ride	32,631	32,135	32,170	31,637	31,603	30,924	31,264	32,100	-2%	-1%	-3%	-3%	-5%	-4%	-2%
Taxi / FHV	4,689	3,548	4,454	3,832	2,507	3,302	4,270	3,183	-24%	-5%	-18%	-47%	-30%	-9%	-32%
Commuter Rail	3,310	3,408	3,518	3,291	3,413	3,314	3,373	3,409	3%	6%	-1%	3%	0%	2%	3%
Other Transit (e.g., subway / bus)	86,971	88,026	87,936	88,192	88,496	88,473	88,434	88,144	1%	1%	1%	2%	2%	2%	1%
Walk and Bike	31,641	32,207	32,264	32,351	32,188	32,561	32,462	32,038	2%	2%	2%	2%	3%	3%	1%
School Bus	2,705	2,807	2,725	2,756	2,811	2,746	2,742	2,571	4%	1%	2%	4%	2%	1%	-5%
Total Person Journeys within CBD	**920,923**	**921,442**	**919,896**	**923,570**	**924,139**	**924,368**	**922,735**	**922,384**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Drive Alone	7,792	7,631	7,861	7,439	7,601	7,765	7,594	7,630	-2%	1%	-5%	-2%	0%	-3%	-2%
HOV / Shared Ride	26,492	27,528	27,479	27,066	27,334	27,005	26,795	26,854	4%	4%	2%	3%	2%	1%	1%
Taxi / FHV	29,189	29,450	29,354	29,935	29,513	29,346	29,389	29,533	1%	1%	3%	1%	1%	1%	1%
Commuter Rail									-	-	-	-	-	-	-
Other Transit (e.g., subway / bus)	250,811	251,057	250,070	251,735	252,596	252,968	252,425	252,483	0%	0%	0%	1%	1%	1%	1%
Walk and Bike	602,457	601,649	600,870	603,242	602,958	603,087	602,497	601,645	0%	0%	0%	0%	0%	0%	0%
School Bus	4,182	4,127	4,262	4,153	4,137	4,197	4,035	4,239	-1%	2%	-1%	-1%	0%	-4%	1%

Table 4A.2-16. Taxi and FHV Toll Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2045)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**132,656**	**138,683**	**154,909**	**151,623**	**135,041**	**147,599**	**158,508**	**136,033**	**4.5%**	**16.8%**	**14.3%**	**1.8%**	**11.3%**	**19.5%**	**2.5%**
60th Street	41,578	41,765	50,684	51,367	43,181	49,315	55,614	40,153	0.4%	21.9%	23.5%	3.9%	18.6%	33.8%	-3.4%
Inbound	22,780	23,265	27,915	29,344	25,933	29,118	32,416	22,413	2.1%	22.5%	28.8%	13.8%	27.8%	42.3%	-1.6%
Outbound	18,825	18,530	22,801	22,055	17,277	20,226	23,226	17,772	-1.6%	21.1%	17.2%	-8.2%	7.4%	23.4%	-5.6%
FDR DRIVE+WEST SIDE HWY	24,426	17,867	22,244	21,729	18,256	21,771	25,592	16,884	-26.9%	-8.9%	-11.0%	-25.3%	-10.9%	4.8%	-30.9%
West Side Highway / Route 9A	11,197	7,805	9,461	8,713	7,094	8,544	10,067	7,447	-30.3%	-15.5%	-22.2%	-36.6%	-23.7%	-10.1%	-33.5%
FDR Drive	13,229	10,062	12,783	13,016	11,162	13,227	15,525	9,437	-23.9%	-3.4%	-1.6%	-15.6%	0.0%	17.4%	-28.7%
WEST AVENUES	6,880	5,755	7,255	6,334	4,763	5,556	6,674	5,291	-16.4%	5.5%	-7.9%	-30.8%	-19.2%	-3.0%	-23.1%
West End Ave	758	1,024	1,422	1,177	649	766	1,143	910	35.1%	87.6%	55.3%	-14.4%	1.1%	50.8%	20.1%
Broadway	2,756	1,672	1,991	1,668	1,161	1,437	1,665	1,479	-39.3%	-27.8%	-39.5%	-57.9%	-47.9%	-39.6%	-46.3%
Amsterdam	1,431	1,418	1,809	1,657	1,351	1,581	1,843	1,281	-0.9%	26.4%	15.8%	-5.6%	10.5%	28.8%	-10.5%
Columbus Ave	1,493	977	1,247	934	682	726	972	924	-34.6%	-16.5%	-37.4%	-54.3%	-51.4%	-34.9%	-38.1%
Eighth Avenue	442	664	786	898	920	1,046	1,051	697	50.2%	77.8%	103.2%	108.1%	136.7%	137.8%	57.7%
EAST AVENUES	10,272	18,143	21,185	23,304	20,162	21,988	23,348	17,978	76.6%	106.2%	126.9%	96.3%	114.1%	127.3%	75.0%
Fifth Avenue	1,929	940	1,166	788	529	658	780	958	-51.3%	-39.6%	-59.1%	-72.6%	-65.9%	-59.6%	-50.3%
Madison Avenue	209	110	184	152	154	127	204	127	-47.4%	-12.0%	-27.3%	-26.3%	-39.2%	-2.4%	-39.2%
Park Avenue	1,872	1,580	1,827	1,772	1,418	1,626	1,886	1,544	-15.6%	-2.4%	-5.3%	-24.3%	-13.1%	0.7%	-17.5%
Lexington Avenue	608	797	1,052	1,428	1,055	1,231	1,166	778	31.1%	73.0%	134.9%	73.5%	102.5%	91.8%	28.0%
Third Avenue	959	758	994	1,058	1,040	1,341	1,333	712	-21.0%	3.6%	10.3%	8.4%	39.8%	39.0%	-25.8%
Second Avenue	1,343	7,570	8,531	9,717	9,243	10,016	10,209	7,608	463.7%	535.2%	623.5%	588.2%	645.8%	660.2%	466.5%
First Avenue	554	1,855	1,994	2,099	1,849	1,837	1,997	1,835	234.8%	259.9%	278.9%	233.8%	231.6%	260.5%	231.2%
York Avenue	2,128	1,820	2,065	1,778	1,267	1,619	1,839	1,674	-14.5%	-3.0%	-16.4%	-40.5%	-23.9%	-13.6%	-21.3%
Ed Koch Queensboro Ramp	670	2,713	3,372	4,512	3,607	3,533	3,934	2,742	304.9%	403.3%	573.4%	438.4%	427.3%	487.2%	309.3%
Queens	51,738	57,927	60,848	55,870	51,454	53,728	54,879	57,848	12.0%	17.6%	8.0%	-0.5%	3.8%	6.1%	11.8%
Inbound	25,996	28,635	30,072	24,689	21,247	22,083	22,614	28,577	10.2%	15.7%	-5.0%	-18.3%	-15.1%	-13.0%	9.9%
Outbound	25,745	29,296	30,778	31,184	30,210	31,649	32,268	29,274	13.8%	19.5%	21.1%	17.3%	22.9%	25.3%	13.7%
Ed Koch Queensboro Bridge	7,468	14,678	16,418	27,707	31,369	33,102	33,680	14,513	96.5%	119.8%	271.0%	320.0%	343.3%	351.0%	94.3%
Queens-Midtown Tunnel	44,270	43,249	44,430	28,163	20,085	20,626	21,199	43,335	-2.3%	0.4%	-36.4%	-54.6%	-53.4%	-52.1%	-2.1%
Brooklyn	28,064	23,897	28,051	29,656	26,520	29,540	33,347	22,929	-14.8%	0.0%	5.7%	-5.5%	5.3%	18.8%	-18.3%
Inbound	12,826	10,654	12,596	15,798	15,189	16,714	18,682	10,197	-16.9%	-1.8%	23.2%	18.4%	30.3%	45.7%	-20.5%
Outbound	15,246	13,251	15,461	13,864	11,338	12,832	14,671	12,740	-13.1%	1.4%	-9.1%	-25.6%	-15.8%	-3.8%	-16.4%
Williamsburg Bridge	7,208	7,896	9,499	11,956	12,349	14,284	15,763	7,603	9.5%	31.8%	65.9%	71.3%	98.2%	118.7%	5.5%
Manhattan Bridge	2,253	1,955	2,921	2,595	1,618	2,117	2,963	1,797	-13.2%	29.6%	15.2%	-28.2%	-6.0%	31.5%	-20.2%
Brooklyn Bridge	3,497	1,887	2,473	2,253	1,737	2,042	2,597	1,657	-46.0%	-29.3%	-35.6%	-50.3%	-41.6%	-25.7%	-52.6%
Hugh Carey Tunnel	15,106	12,159	13,158	12,852	10,816	11,097	12,024	11,872	-19.5%	-12.9%	-14.9%	-28.4%	-26.5%	-20.4%	-21.4%
New Jersey	11,276	15,094	15,326	14,730	13,886	15,016	14,668	15,103	33.9%	35.9%	30.6%	23.1%	33.2%	30.1%	33.9%
Inbound	5,259	7,306	7,457	6,618	5,865	6,721	6,417	7,312	38.9%	41.8%	25.8%	11.5%	27.8%	22.0%	39.0%
Outbound	6,020	7,790	7,872	8,115	8,024	8,297	8,254	7,794	29.4%	30.8%	34.8%	33.3%	37.8%	37.1%	29.5%
Holland Tunnel	3,915	6,603	6,859	6,788	6,748	7,594	7,136	6,834	68.7%	75.2%	73.4%	72.4%	94.0%	82.3%	74.6%
Lincoln Tunnel	7,361	8,491	8,467	7,942	7,138	7,422	7,532	8,269	15.4%	15.0%	7.9%	-3.0%	0.8%	2.3%	12.3%

Note: Taxis and FHVs would potentially be exempt from the CBD toll, receive a toll discount, or be subject to some other toll reduction such as a cap.

Table 4A.2-17. Truck Toll Volumes Entering/Leaving the Manhattan CBD by Screen Line/Crossing (2045)

	Daily Volumes								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
(by Screen Line/ Crossing)															
Total	**140,805**	**124,489**	**123,697**	**122,869**	**121,203**	**118,152**	**118,163**	**133,112**	**-11.6%**	**-12.2%**	**-12.7%**	**-13.9%**	**-16.1%**	**-16.1%**	**-5.5%**
60th Street	52,051	41,877	41,575	40,337	39,157	38,317	38,943	43,833	-19.5%	-20.1%	-22.5%	-24.8%	-26.4%	-25.2%	-15.8%
Inbound	27,554	21,729	21,532	20,309	19,279	18,808	19,279	22,946	-21.1%	-21.9%	-26.3%	-30.0%	-31.7%	-30.0%	-16.7%
Outbound	24,527	20,172	20,073	20,058	19,909	19,540	19,696	20,954	-17.8%	-18.2%	-18.2%	-18.8%	-20.3%	-19.7%	-14.6%
FDR DRIVE+WEST SIDE HWY	4,739	4,684	4,653	4,979	5,295	5,370	5,228	4,803	-1.2%	-1.8%	5.1%	11.7%	13.3%	10.3%	1.4%
West Side Highway / Route 9A	1,609	2,180	2,183	2,372	2,493	2,492	2,443	2,242	35.5%	35.7%	47.4%	54.9%	54.9%	51.8%	39.3%
FDR Drive	3,130	2,504	2,470	2,607	2,802	2,878	2,785	2,561	-20.0%	-21.1%	-16.7%	-10.5%	-8.1%	-11.0%	-18.2%
WEST AVENUES	19,208	15,421	15,245	14,583	14,145	13,943	14,205	16,274	-19.7%	-20.6%	-24.1%	-26.4%	-27.4%	-26.0%	-15.3%
West End Ave	4,623	2,284	2,187	1,666	1,329	1,152	1,344	2,809	-50.6%	-52.7%	-64.0%	-71.3%	-75.1%	-70.9%	-39.2%
Broadway	6,450	6,596	6,635	6,849	6,956	7,060	6,988	6,517	2.3%	2.9%	6.2%	7.8%	9.5%	8.3%	1.0%
Amsterdam	4,247	2,700	2,585	2,279	2,056	1,944	2,043	3,172	-36.4%	-39.1%	-46.3%	-51.6%	-54.2%	-51.9%	-25.3%
Columbus Ave	2,771	2,675	2,669	2,587	2,553	2,545	2,587	2,642	-3.5%	-3.7%	-6.6%	-7.9%	-8.2%	-6.6%	-4.7%
Eighth Avenue	1,117	1,166	1,169	1,202	1,251	1,242	1,243	1,134	4.4%	4.7%	7.6%	12.0%	11.2%	11.3%	1.5%
EAST AVENUES	28,104	21,772	21,677	20,775	19,717	19,004	19,510	22,756	-22.5%	-22.9%	-26.1%	-29.8%	-32.4%	-30.6%	-19.0%
Fifth Avenue	2,013	1,856	1,853	1,720	1,643	1,616	1,670	1,869	-7.8%	-7.9%	-14.6%	-18.4%	-19.7%	-17.0%	-7.2%
Madison Avenue	887	831	828	825	824	823	831	818	-6.3%	-6.7%	-7.0%	-7.1%	-7.2%	-6.3%	-7.8%
Park Avenue	4,186	3,474	3,507	3,425	3,433	3,363	3,386	3,462	-17.0%	-16.2%	-18.2%	-18.0%	-19.7%	-19.1%	-17.3%
Lexington Avenue	3,803	3,281	3,253	3,266	3,275	3,293	3,361	3,222	-13.7%	-14.5%	-14.1%	-13.9%	-13.4%	-11.6%	-15.3%
Third Avenue	3,927	4,051	4,040	4,039	3,789	3,639	3,721	4,038	3.2%	2.9%	2.9%	-3.5%	-7.3%	-5.2%	2.8%
Second Avenue	6,070	4,432	4,341	3,790	3,091	2,729	2,951	5,289	-27.0%	-28.5%	-37.6%	-49.1%	-55.0%	-51.4%	-12.9%
First Avenue	2,753	2,653	2,663	2,665	2,689	2,567	2,628	2,919	-3.6%	-3.3%	-3.2%	-2.3%	-6.8%	-4.5%	6.0%
York Avenue	1,330	851	849	721	644	634	632	794	-36.0%	-36.2%	-45.8%	-51.6%	-52.3%	-52.5%	-40.3%
Ed Koch Queensboro Ramp	3,135	343	343	324	329	340	330	345	-89.1%	-89.1%	-89.7%	-89.5%	-89.2%	-89.5%	-89.0%
Queens	25,494	24,760	24,583	23,990	23,102	22,203	22,599	26,008	-2.9%	-3.6%	-5.9%	-9.4%	-12.9%	-11.4%	2.0%
Inbound	14,324	13,561	13,469	13,350	12,946	12,498	12,636	13,912	-5.3%	-6.0%	-6.8%	-9.6%	-12.7%	-11.8%	-2.9%
Outbound	11,174	11,202	11,116	10,642	10,159	9,707	9,968	12,107	0.3%	-0.5%	-4.8%	-9.1%	-13.1%	-10.8%	8.3%
Ed Koch Queensboro Bridge	19,337	19,124	18,998	18,354	17,339	16,401	17,884	20,399	-1.1%	-1.8%	-5.1%	-10.3%	-15.2%	-7.5%	5.5%
Queens-Midtown Tunnel	6,157	5,636	5,585	5,636	5,763	5,802	4,715	5,609	-8.5%	-9.3%	-8.5%	-6.4%	-5.8%	-23.4%	-8.9%
Brooklyn	34,484	31,412	31,265	31,554	31,733	31,150	30,743	33,905	-8.9%	-9.3%	-8.5%	-8.0%	-9.7%	-10.8%	-1.7%
Inbound	14,068	13,071	13,001	12,782	12,689	12,589	12,790	14,164	-7.1%	-7.6%	-9.1%	-9.8%	-10.5%	-9.1%	0.7%
Outbound	20,423	18,347	18,270	18,779	19,053	18,570	17,962	19,756	-10.2%	-10.5%	-8.0%	-6.7%	-9.1%	-12.1%	-3.3%
Williamsburg Bridge	10,192	10,141	10,073	10,221	10,491	10,334	10,309	11,200	-0.5%	-1.2%	0.3%	2.9%	1.4%	1.1%	9.9%
Manhattan Bridge	15,711	13,062	12,976	13,170	12,923	12,472	12,250	14,453	-16.9%	-17.4%	-16.2%	-17.7%	-20.6%	-22.0%	-8.0%
Brooklyn Bridge	3,920	3,578	3,594	3,613	3,838	3,884	3,831	3,655	-8.7%	-8.3%	-7.8%	-2.1%	-0.9%	-2.3%	-6.8%
Hugh Carey Tunnel	4,661	4,631	4,622	4,550	4,481	4,460	4,353	4,597	-0.6%	-0.8%	-2.4%	-3.9%	-4.3%	-6.6%	-1.4%
New Jersey	28,776	26,440	26,274	26,988	27,211	26,482	25,878	29,366	-8.1%	-8.7%	-6.2%	-5.4%	-8.0%	-10.1%	2.1%
Inbound	18,333	17,080	17,028	18,057	18,652	18,086	17,325	18,704	-6.8%	-7.1%	-1.5%	1.7%	-1.3%	-5.5%	2.0%
Outbound	10,447	9,363	9,248	8,934	8,561	8,400	8,556	10,669	-10.4%	-11.5%	-14.5%	-18.1%	-19.6%	-18.1%	2.1%
Holland Tunnel	14,154	13,032	13,013	13,260	13,355	12,993	12,409	15,178	-7.9%	-8.1%	-6.3%	-5.6%	-8.2%	-12.3%	7.2%
Lincoln Tunnel	14,622	13,408	13,261	13,728	13,856	13,489	13,469	14,188	-8.3%	-9.3%	-6.1%	-5.2%	-7.7%	-7.9%	-3.0%

Table 4A.2-18. Work Journeys to the Manhattan CBD by Origin County (2045)

	Daily Journeys								Percent Change						
		Scenario							Scenario						
Scenario	**No Action**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Total Work Journeys to CBD	*1,721,640*	*1,721,655*	*1,721,653*	*1,721,653*	*1,721,648*	*1,721,648*	*1,721,661*	*1,721,658*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
CBD	**176,850**	**176,489**	**176,318**	**176,869**	**177,285**	**177,255**	**176,945**	**176,898**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
CBD	176,850	176,489	176,318	176,869	177,285	177,255	176,945	176,898	0%	0%	0%	0%	0%	0%	0%
New York City	**900,213**	**896,111**	**895,284**	**894,681**	**892,272**	**891,895**	**892,553**	**893,645**	**0%**	**-1%**	**-1%**	**-1%**	**-1%**	**-1%**	**-1%**
Upper Manhattan	181,180	179,641	180,058	179,640	179,104	179,291	179,192	179,662	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Bronx	110,581	109,817	109,447	109,567	109,724	109,634	109,951	109,627	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Brooklyn	306,259	304,652	304,406	304,288	302,575	302,669	303,268	303,730	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Queens	274,950	274,259	273,649	273,230	272,605	271,943	272,024	273,063	0%	0%	-1%	-1%	-1%	-1%	-1%
Staten Island	27,243	27,742	27,724	27,956	28,264	28,358	28,118	27,563	2%	2%	3%	4%	4%	3%	1%
Long Island	**153,583**	**154,954**	**156,151**	**155,085**	**154,165**	**153,939**	**154,948**	**155,847**	**1%**	**2%**	**1%**	**0%**	**0%**	**1%**	**1%**
Nassau	106,854	107,027	108,324	107,046	105,860	105,833	106,850	107,663	0%	1%	0%	-1%	-1%	0%	1%
Suffolk	46,729	47,927	47,827	48,039	48,305	48,106	48,098	48,184	3%	2%	3%	3%	3%	3%	3%
Upstate New York	**123,941**	**122,506**	**123,195**	**122,872**	**123,358**	**122,661**	**123,197**	**123,330**	**-1%**	**-1%**	**-1%**	**0%**	**-1%**	**-1%**	**0%**
Dutchess	6,965	7,092	6,857	6,941	6,995	7,031	7,033	7,035	2%	-2%	0%	0%	1%	1%	1%
Orange	21,067	21,108	21,359	21,542	21,825	22,000	21,966	21,365	0%	1%	2%	4%	4%	4%	1%
Putnam	2,076	2,044	2,023	1,968	1,994	1,974	1,965	1,929	-2%	-3%	-5%	-4%	-5%	-5%	-7%
Rockland	10,303	9,752	10,279	10,534	10,212	10,069	10,435	10,202	-5%	0%	2%	-1%	-2%	1%	-1%
Westchester	83,530	82,510	82,677	81,887	82,332	81,587	81,798	82,799	-1%	-1%	-2%	-1%	-2%	-2%	-1%
New Jersey	**288,193**	**292,469**	**292,005**	**293,257**	**294,986**	**296,494**	**295,065**	**292,459**	**1%**	**1%**	**2%**	**2%**	**3%**	**2%**	**1%**
Bergen	37,798	37,866	37,844	38,344	38,555	38,674	38,729	37,651	0%	0%	1%	2%	2%	2%	0%
Essex	32,027	32,599	32,352	32,488	32,528	32,724	32,797	32,481	2%	1%	1%	2%	2%	2%	1%
Hudson	101,924	103,139	102,857	103,166	103,802	104,590	104,024	103,336	1%	1%	1%	2%	3%	2%	1%
Hunterdon	2,557	2,575	2,554	2,595	2,626	2,580	2,577	2,609	1%	0%	1%	3%	1%	1%	2%
Mercer	8,184	8,235	8,264	8,314	8,333	8,252	8,282	8,288	1%	1%	2%	2%	1%	1%	1%
Middlesex	29,124	29,635	29,510	29,645	29,982	29,791	29,670	29,558	2%	1%	2%	3%	2%	2%	1%
Monmouth	17,905	18,162	18,215	18,102	18,282	18,280	18,086	18,227	1%	2%	1%	2%	2%	1%	2%
Morris	8,629	8,881	9,006	9,080	9,024	9,219	9,026	8,900	3%	4%	5%	5%	7%	5%	3%
Ocean	12,604	12,650	12,759	12,695	12,633	12,725	12,706	12,639	0%	1%	1%	0%	1%	1%	0%
Passaic	9,327	10,028	10,035	10,190	10,319	10,409	10,171	10,112	8%	8%	9%	11%	12%	9%	8%
Somerset	5,287	5,494	5,464	5,517	5,490	5,661	5,561	5,476	4%	3%	4%	4%	7%	5%	4%
Sussex	3,248	3,263	3,285	3,333	3,279	3,338	3,305	3,297	0%	1%	3%	1%	3%	2%	2%
Union	18,494	18,829	18,764	18,689	19,013	19,132	19,029	18,759	2%	1%	1%	3%	3%	3%	1%
Warren	1,085	1,113	1,096	1,099	1,120	1,119	1,102	1,126	3%	1%	1%	3%	3%	2%	4%
Connecticut	**78,860**	**79,126**	**78,700**	**78,889**	**79,582**	**79,404**	**78,953**	**79,479**	**0%**	**0%**	**0%**	**1%**	**1%**	**0%**	**1%**
Fairfield	49,537	49,470	49,133	49,254	49,855	49,715	49,330	49,767	0%	-1%	-1%	1%	0%	0%	0%
New Haven	29,323	29,656	29,567	29,635	29,727	29,689	29,623	29,712	1%	1%	1%	1%	1%	1%	1%

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4A.3, Transportation: Representative Commuting Costs by Auto and Transit

August 2022

Contents

Table

Figure

4A.3-1 EXISTING/NO ACTION ALTERNATIVE BASELINE

Manhattan's CBD is the anchor of the regional economy and a destination for millions of daily trips. As discussed in many chapters of this EA, the vast majority of these trips are made by public transportation, but there are also tens of thousands of trips made by auto commuters. There are many reasons why a person may opt to drive to Manhattan, but choosing to drive is an expensive undertaking and it does not particularly result in substantial time savings compared to a transit journey.

As discussed in **Subchapter 4B, "Transportation: Highways and Local Intersections,"** the regional highway network carries traffic on a complex web of roads and highways that provide access to the Manhattan CBD through the key portals of the tunnels and bridges that access Manhattan Island. These roads are congested and prone to chronic delays and have associated bridge, tunnel, or turnpike tolls that together create an overall effect of slow travel speeds and expensive driver costs. Travel in Manhattan is on local streets and avenues with typically very slow speeds, and parking is limited and expensive.

To establish perspective, a representational typical commute from throughout the region has been evaluated to estimate the distance, duration, and daily cost of a trip either by auto or by transit.[1] As shown in **Figure 4A.3-1**, this includes locations in New York City (Bronx, Queens, Brooklyn, and Staten Island), on Long Island (Central Islip), in New York communities north of New York City (Spring Valley, Croton-on-Hudson, and Brewster), in New Jersey (Ridgewood to the north, Nutley in the central area, and Princeton to the south), and Connecticut (Fairfield). Trip destinations to both a lower and upper Manhattan CBD location were evaluated because they could reflect different routing and transit options.

As shown on **Figure 4A.3-1** and summarized in **Table 4A.3-1,** driving within New York City to and from the Manhattan CBD logically had the shortest distances travelled (between 9 miles and 16 miles) but also the slowest travel speeds (between 10 miles per hour and 19 miles per hour). Daily costs were generally between $55 and $78 per day, with the highest cost being to and from Staten Island with both longer travel distances and more tolls. In comparison, a transit trip costs between $8 and $14.

On Long Island, the representational trip from Central Islip to the Manhattan CBD is estimated at about $100 per day on a roughly 50-mile trip that can be expected to take up to 2 hours under normal conditions with travel speeds of about 27 miles per hour. A transit trip for the same destination would be about $20 per day and have similar, but somewhat faster, travel times compared to driving.

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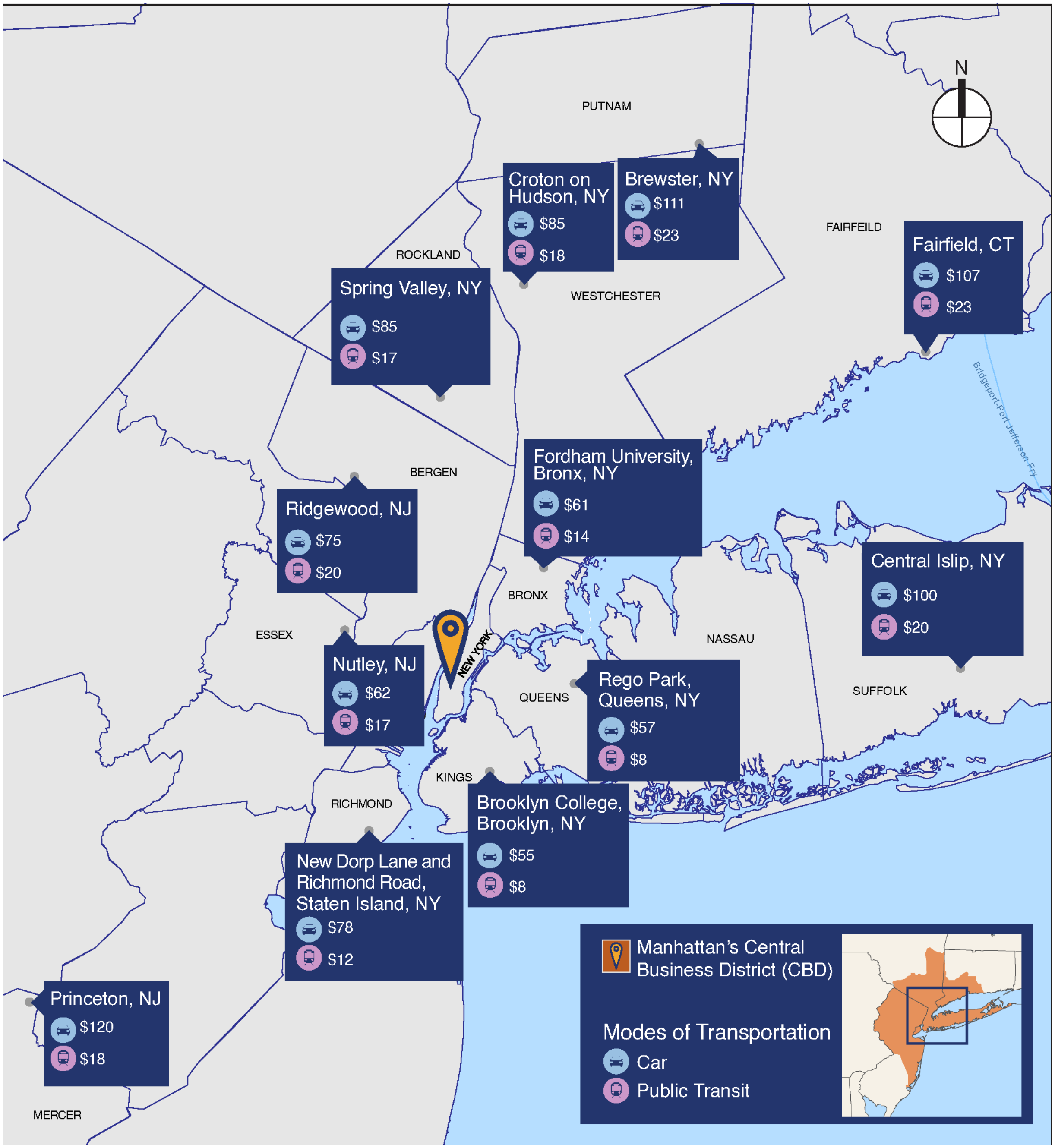
[1] The auto route distance and duration were measured by the Best Practice Model (BPM) travel demand model. (See **Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling"** for more information on the BPM.) The BPM duration estimates reflect typical levels of congestion and are within the range of total trip times that Google Maps predicts for any given route. A typical driving route and transit route were obtained by reviewing Google Map's recommended directions for an approximately 7:30 a.m. morning commute trip (and were compared for consistency with the BPM results). Costs include the daily round-trip mileage expense using IRS 2022 auto operating rate of 58.5 cents per mile, all applicable tolls, parking, and an added level of local destination travel once parked in Manhattan. For transit, the costs include the single or combination of fares and an added level of origin parking and destination travel.

For the northern suburbs, costs range from $85 to $111 per day and reflect more highway travel as average speeds are between 25 miles per hour and 38 miles per hour. Trip lengths are all well over 1 hour. Transit costs for these locations range from $17 to $23 per day and have similar travel times to the auto trips when travel to and from the transit origin and destination are added to the total travel time.

From New Jersey, the greater trip lengths from Princeton and Ridgewood combined with tunnel tolls and New Jersey Turnpike tolls result in daily auto trip costs of between $75 and $120. While these trips are more highway-oriented, travel speeds are still only 30 miles per hour or less with travel times that can reach or exceed 2 hours in each direction. In comparison, Nutley (located just about 15 miles west of the Lincoln Tunnel) has a cost similar to trips within New York City at about $62 per day but with slow travel times that result in over 1 hour of travel for the short distance. The transit costs for these locations range from $18 to $20 per day.

Figure 4A.3-1. Representative Commuting Costs in the Regional Study Area



Source: WSP, Best Practice Model, Google Maps

Notes: Table 4A.3-1 summarizes the assumed routes for these representative commutes.

1. Cost based on auto distance as measured by the Best Practice Model (BPM) travel demand model and averaged for two destinations within the CBD (World Trade Center and 42nd Street, Bryant Park).
2. A typical driving route and transit route were obtained by reviewing recommended directions from Google Maps for an approximately 7:30 a.m. commute trip (and were compared for consistency with the BPM results).
3. Costs include the daily round-trip mileage expense using IRS Q1 2022 auto operating rate of 58.5 cents per mile, all applicable tolls, and parking.
4. For transit, the costs include the single or combination of fares and an added level of origin parking and destination travel cost. Fares are calculated based on the per day cost of monthly passes (trip cost assumptions discussed in more detail further on in this appendix)

Table 4A.3-1. Travel Times and Cost

COUNTIES	MORNING COMMUTE TRIP ORIGIN	TRIP DESTINATION	AUTO				TRANSIT	
			BPM ONE-WAY DISTANCE (Miles)	BPM ONE-WAY DRIVE TIME Minutes (plus 10)[1]	AVERAGE SPEED (Miles per Hour)	ROUND TRIP AUTO COST (Total)	GOOGLE MAPS ONE-WAY TRAVEL TIME Minutes (plus 20)[1]	ROUND TRIP TRANSIT COST (Total)
New York City Counties	**The Bronx** **Fordham University**	Lower CBD	14.8	56.6	19.0	$61.88	60	$16.49
		Upper CBD	12.6	54.7	16.9	$59.33	42	$11.41
		AVERAGE	14	56		$61	51	$14
	Kings (Brooklyn) **Brooklyn College**	Lower CBD	7.8	38.8	16.2	$53.69	47	$7.85
		Upper CBD	9.6	63.3	10.8	$55.86	56	$7.85
		AVERAGE	9	51		$55	52	$8
	Queens **Rego Park**	Lower CBD	12.3	54.1	16.7	$58.98	59	$7.85
		Upper CBD	8.6	42.7	15.8	$54.70	49	$7.85
		AVERAGE	10	48		$57	54	$8
	Richmond (Staten Island) **New Dorp**	Lower CBD	14.6	63.8	16.3	$74.81	90	$15.17
		Upper CBD	18.4	78.8	16.0	$81.02	79	$7.85
		AVERAGE	16	71		$78	85	$12
Long Island Counties	**Nassau/Suffolk** **Central Islip**	Lower CBD	49.1	121.2	26.5	$102.04	106	$22.45
		Upper CBD	45.3	108.6	27.6	$97.66	96	$17.37
		AVERAGE	47	115		$100	101	$20
New York Counties North of New York City	**Dutchess/Putnam** **Brewster (Southeast)**	Lower CBD	60.8	103.0	39.2	$115.75	122	$25.33
		Upper CBD	58.4	102.0	38.1	$105.86	101	$20.25
		AVERAGE	60	103		$111	112	$23
	Orange/Rockland **Spring Valley**	Lower CBD	34.7	87.3	27.0	$85.91	98	$17.86
		Upper CBD	32.4	86.3	25.5	$83.13	90	$16.09
		AVERAGE	34	87		$85	94	$17
	Westchester **Croton-on-Hudson**	Lower CBD	41.8	84.2	33.8	$86.45	94	$20.73
		Upper CBD	39.4	83.2	32.3	$83.67	73	$15.65
		AVERAGE	41	84		$85	84	$18

COUNTIES	MORNING COMMUTE TRIP ORIGIN	TRIP DESTINATION	AUTO				TRANSIT	
			BPM ONE-WAY DISTANCE (Miles)	BPM ONE-WAY DRIVE TIME Minutes (plus 10)[1]	AVERAGE SPEED (Miles per Hour)	ROUND TRIP AUTO COST (Total)	GOOGLE MAPS ONE-WAY TRAVEL TIME Minutes (plus 20)[1]	ROUND TRIP TRANSIT COST (Total)
New Jersey Counties	**North New Jersey** **Ridgewood**	Lower CBD	26.4	80.1	22.6	$76.10	71	$17.34
		Upper CBD	24.0	79.1	20.8	$73.32	81	$23.47
		AVERAGE	25	80		$75	76	$20
	Central New Jersey **Nutley**	Lower CBD	16.1	67.3	16.9	$64.11	63	$19.20
		Upper CBD	13.0	62.4	14.9	$60.51	52	$14.17
		AVERAGE	15	65		$62	58	$17
	South New Jersey **Princeton**	Lower CBD	50.1	122.2	26.8	$116.06	82	$20.22
		Upper CBD	52.4	114.9	30.0	$124.79	96	$15.81
		AVERAGE	51	119		$120	89	$18
Connecticut Counties	**Fairfield** **Fairfield**	Lower CBD	58.5	111.4	34.6	$113.11	122	$25.33
		Upper CBD	55.0	114.9	31.5	$101.83	102	$20.25
		AVERAGE	57	113		$107	112	$23

Source: WSP, BPM, Google Maps
NOTES:
Miles = Route as determined by BPM.
Cost per mile = IRS standard operating costs of 58.5 cents per mile.
Auto and travel routes as established by Google Maps for a typical weekday 7:30 a.m. commute:

1 All trips include 10 minutes of final destination travel by other mode at Manhattan CBD destination (walk, bus, subway). All transit trips include 20 minutes of travel (10 minutes at origin and 10 minutes at destination)

2 Destination Parking = 50 percent monthly ($20/day) and 50 percent daily ($40/day) or a weighted average cost of $30.

3 Origin Parking = 75 percent free ($0) and 25 percent ($5) or a weighted average of $1.25.

4 Destination Travel Cost: assumes 75 percent walk ($0 cost), 20 percent bus/subway ($5.08 assuming 25 days on an unlimited past, and 5 percent taxi ($10 per trip) or a weighted average cost of $1.76.

5 Daily transit cost set at monthly/unlimited used over 25 days. (e.g., MTA Transit is $127/25=5.08.)

4A.3-2 NEW YORK CITY COUNTIES

4A.3-1 The Bronx (Fordham University)

To/From World Trade Center

- By Car
  - Bronx River Parkway
  - RFK Bridge (toll both ways)
  - FDR to Pearl Street Exit
- By Transit
  - Metro-North Railroad to Grand Central (Monthly pass used for 25 days: 216/25 = 8.64 per day)
  - Nos. 4/5 subway to Fulton Street (30-day unlimited used for 25 days: 127/25 = 5.08)

To/From Bryant Park

- By Car
  - Bronx River Parkway
  - RFK Bridge (tolls both ways)
  - FDR Drive to East 49th Street Exit
- By Transit
  - Metro-North Railroad to Grand Central (Monthly pass used for 25 days: 216/25 = 8.64 per day)

4A.3-2 Kings (Brooklyn College)

To/From World Trade Center

- By Car
  - NY 27
  - I-278
  - Hugh L. Carey Tunnel (toll both ways)
- By Transit
  - Q/5 subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

To/From Bryant Park

- By Car
  - NY 27
  - I-278
  - Hugh L. Carey Tunnel (toll each way)
  - FDR Drive
- By Transit
  - Q subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

4A.3-3 Queens (Rego Park—Queens Boulevard and 65th Avenue)

To/From World Trade Center

- By Car
  - I-495 Long Island Expressway
  - Queens–Midtown Tunnel (toll both ways)
  - FDR Drive
  - West Side Highway/Route 9A
- By Transit
  - M subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

To/From Bryant Park

- By Car
  - I-495 Long Island Expressway
  - Queens–Midtown Tunnel (toll each way)
- By Transit
  - M subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

4A.3-4 Richmond (Staten Island—New Dorp Lane and Richmond Road)

To/From World Trade Center

- By Car
  - I-278
  - Verrazzano Narrows Bridge (toll both directions)
  - Brooklyn–Queens Expressway (I-278)
  - Hugh L. Carey Tunnel (tolls both directions)
- By Transit
  - SIM15 (7-day pass used for 5 days: 62/5 = 12.4; also good for local bus/subway)

To/From Bryant Park

- By Car
  - I-278
  - Bayonne Bridge (toll southbound only)
  - NJ 440
  - I-78
  - Holland Tunnel (tolls eastbound only)
  - Sixth Avenue
- By Transit
  - SIM 15/2 (7-day pass used for 5 days: 62/5 = 12.4; also good for local bus/subway)
  - SIR—Ferry—2 Subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day; SI Ferry is free)

4A.3-3 LONG ISLAND COUNTIES

4A.3-1 Nassau and Suffolk Counties (Central Islip)

To/From World Trade Center

- By Car
  - I-495
  - I-278
  - Queens–Midtown Tunnel (tolls both way)
  - FDR Drive
- By Transit
  - LIRR Ronkonkoma Branch (365 monthly over 25 days, or 14.60 per day)
  - E subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

To/From Bryant Park

- By Car
  - I-495
  - Queens–Midtown Tunnel (tolls both ways)
- By Transit
  - LIRR Ronkonkoma Branch (365 monthly over 25 days, or 14.60 per day)

4A.3-4 NEW YORK COUNTIES NORTH OF NEW YORK CITY

4A.3-1 Dutchess/Putnam Counties (Brewster)

To/From World Trade Center

- By Car
  - I-684
  - Hutchinson River Parkway
  - I-278 Bruckner
  - RFK Bridge (tolls both ways)
  - FDR Drive
  - West Side Highway/Route 9A at West Street
- By Transit
  - Metro-North Railroad Harlem Line (437 monthly over 25 days, = 17.48 per day)
  - Nos. 4/5 subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

To/From Bryant Park

- By Car
  - I-684
  - Hutchinson River Parkway

  - Cross County Parkway
  - Saw Mill Parkway
  - Henry Hudson Bridge (tolls both ways)
  - West Side Highway/Route 9A

- By Transit
  - Metro-North Railroad Harlem Line (437 monthly over 25 days, or 17.48 per day)

4A.3-2 Orange/Rockland Counties (Spring Valley)

To/From World Trade Center

- By Car
  - Palisades Interstate Parkway
  - George Washington Bridge (tolls inbound)
  - West Side Highway/Route 9A

- By Transit
  - Metro-North Railroad Pascack Valley Train to Hoboken (267 monthly over 25 days, or 10.68 per day)
  - PATH (110.25 unlimited, used for 25 round trips = 4.41 per day)

To/From Bryant Park

- By Car
  - Palisades Interstate Parkway
  - George Washington Bridge (tolls inbound)
  - West Side Highway/Route 9A

- By Transit
  - Rockland Coaches (330 monthly over 25 days, = 13.32 per day)

4A.3-3 Westchester County (Croton-on-Hudson)

To/From World Trade Center

- By Car
  - Route 9/9A
  - Saw Mill Parkway
  - Henry Hudson Bridge (tolls both ways)
  - West Side Highway/Route 9A

- By Transit
  - Metro-North Railroad Hudson Line (322 monthly over 25 days, or 12.88 per day)
  - Nos. 4/5 subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

<u>To/From Bryant Park</u>

- By Car
  - Route 9/9A
  - Saw Mill Parkway
  - Henry Hudson Bridge (tolls both ways)
  - West Side Highway/Route 9A
- By Transit
  - Metro-North Railroad Hudson Line (322 monthly over 25 days, or 12.88 per day)

4A.3-5 NEW JERSEY COUNTIES

4A.3-1 South Jersey (Princeton)

<u>To/From World Trade Center</u>

- By Car
  - Route 1
  - New Jersey Turnpike (toll both directions)
  - I-78
  - Holland Tunnel (inbound tolls)
- By Transit
  - NJ TRANSIT Princeton Junction to Newark Penn (326 monthly over 25 days, or13.04 per day)
  - PATH (110.25 unlimited, used for 25 round trips = 4.41 per day)

<u>To/From Bryant Park</u>

- By Car
  - Route 1
  - New Jersey Turnpike (tolls both directions)
  - I-495
  - Lincoln Tunnel (tolls inbound)
- By Transit
  - NJ TRANSIT Princeton Junction to New York Penn (365 monthly over 25 days, or 13.04 per day)

4A.3-2 Central Jersey (Nutley)

<u>To/From World Trade Center</u>

- By Car
  - Route 3
  - Route 9
  - I-78
  - Holland Tunnel (inbound tolls)

- By Transit
  - NJ TRANSIT (15.20 two-way reduced by 25 percent, or 11.40 per day)
  - A/E subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

To/From Bryant Park

- By Car
  - Route 3
  - I-495
  - Lincoln Tunnel (tolls inbound)
  - West Side Highway/Route 9A at West Street
- By Transit
  - NJ TRANSIT (15.20 two-way reduced by 25 percent, or 11.40 per day)

4A.3-3 Northern Jersey (Ridgewood)

To/From World Trade Center

- By Car
  - Route 17
  - I-95/New Jersey Turnpike (18/17 north of tolls)
  - Route 1/Tonnelle Avenue
  - Holland Tunnel (inbound tolls)
- By Transit
  - NJ TRANSIT train to Hoboken (254 monthly over 25 days, or 10.16 per day)
  - PATH (110.25 unlimited, used for 25 round trips = 4.41 per day)

To/From Bryant Park

- By Car
  - Route 17
  - New Jersey Turnpike (toll both ways)
  - I-495
  - Lincoln Tunnel (tolls inbound)
- By Transit
  - NJ TRANSIT train to Hoboken (254 monthly over 25 days, or 10.16 per day)
  - PATH (110.25 unlimited, used for 20 round trips = 5.51 per day)
  - R subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

4A.3-6 CONNECTICUT COUNTIES

4A.3-1 Fairfield County (Fairfield)

To/From World Trade Center

- By Car
  - I-95
  - I-278
  - RFK Bridge (tolls both ways)
  - FDR Drive
  - West Side Highway/Route 9A at West Street
- By Transit
  - Metro-North Railroad New Haven Line (391 monthly over 25 days, or 15.64 per day)
  - Nos. 4/5 subway (30-day unlimited used for 25 days: 127/25 = 5.08 per day)

To/From Bryant Park

- By Car
  - I-95
  - I-287
  - Hutchinson River Parkway
  - Cross County Parkway
  - Saw Mill Parkway
  - Henry Hudson Bridge (tolls both ways)
  - West Side Highway/Route 9A
- By Transit
  - Metro-North Railroad New Haven Line (391 monthly over 25 days, or 15.64 per day)

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.1, Transportation: Transportation and Traffic Methodology for NEPA Evaluation

August 2022

Contents

Tables

Attachments

Acronyms

BPM .... Best Practice Model
BTA .... Balanced Transportation Analyzer
CBD .... Central Business District
CEQR .... City Environmental Quality Review
CFR .... Code of Federal Regulations
EA .... Environmental Assessment
ETC .... Estimated Time of Completion
FDR Drive .... Franklin D. Roosevelt Drive
FHV .... For-Hire Vehicle
FHWA .... Federal Highway Administration
HCM .... Highway Capacity Manual
HCS .... Highway Capacity Software
HOV .... High-Occupancy Vehicles
LOS .... Level of Service
MPO .... Metropolitan Planning Organization
MTA .... Metropolitan Transportation Authority
NEPA .... National Environmental Policy Act
NYCDOT .... New York City Department of Transportation
NYMTC .... New York Metropolitan Transportation Council
NYSDOT .... New York State Department of Transportation
PATH .... Port Authority Trans-Hudson
RFK Bridge .... Robert F. Kennedy Bridge
TAZ .... Transportation Analysis Zone
TBTA .... Triborough Bridge and Tunnel Authority
VMT .... Vehicle-Miles Traveled
VPPP .... Value Pricing Pilot Program

Appendix 4B.1 Transportation and Traffic Methodology for NEPA Evaluation

4B.1-1 OVERVIEW

FHWA in cooperation with the TBTA—an affiliate of the MTA—the NYSDOT, and the NYCDOT (collectively, the Project Sponsors) have prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and the NEPA implementing regulations promulgated by the Council on Environmental Quality (40 CFR Parts 1500–1508) and FHWA (23 CFR Part 771). FHWA is serving as the lead Federal agency for the NEPA review. The EA will analyze the potential effects of implementing a program to reduce congestion in the Manhattan CBD in New York, New York. The Project purpose is to reduce traffic congestion in the Manhattan CBD in a manner that will generate revenue for future transportation improvements, pursuant to acceptance into FHWA's Value Pricing Pilot Program (VPPP).

Appendix 4B.1 provides a summary of the initial transportation and traffic methodology that was shared with FHWA at the onset of their NEPA lead agency responsibility (and as updated based on their review of the initial submission). As such, the appendix has been used to guide and develop the transportation studies and the impact assessment chapters of the EA. Each impact assessment chapter of the EA has refined impact assessment methodologies and assessment results building from this original methodology framework for transportation modeling and traffic impact assessment.

4B.1-2 MODELING APPROACH

The environmental review will establish the No Action Alternative, which will be compared to the CBD Tolling Alternative, which for the EA review comprises multiple tolling scenarios for future analysis years 2023 (estimated time of completion or ETC) and 2045 (horizon year for conformity and indirect and cumulative project effects[1]). The tolling scenarios will include variations in toll pricing as developed in coordination with variations in potential bridge and tunnel crossing credits. As appropriate, detailed impact assessment will be undertaken based on the determination of a specific tolling scenario.

The No Action Alternative and CBD Tolling Alternative will be analyzed for impacts upon regional travel patterns and local traffic conditions resulting from implementation of the Project. To incorporate all of these aspects into the overall modeling effort, the following model will be utilized:

- Best Practice Model (BPM), the regional travel demand forecasting model, developed by the New York Metropolitan Transportation Council (NYMTC), the region's metropolitan planning organization (MPO).

To evaluate local traffic effects, the environmental review will also include a localized traffic assessment of 15 study areas consisting of approximately 102 intersections, including those immediately adjacent to the

1 The CBD Tolling Alternative is required to demonstrate conformity with The New York Metropolitan Transportation Council (NYMTC)'s latest conformity model (2020U) for all analysis years up to the horizon year of 2045.

area of the Manhattan CBD subject to the toll. The review will evaluate 10 key highway corridors, leading to and from bridges or tunnels that connect to the Manhattan CBD or facilities used to bypass the Manhattan CBD entirely, which could experience an increase in traffic due to diversion of traffic in some toll scenarios.

Chapter 4, "Transportation," and associated appendices of the NEPA document will include detailed outputs from the modeling work discussed in this methodology memo.

Setting Toll Rates and Schedules

The toll rate is a key variable in the modeling to determine shifts in travel patterns and among modes. However, the toll rate also changes depending upon whether crossing credits, exemptions or discounts are given to any facilities as ultimately, by statute, the Project must generate sufficient net revenues to fund $15 billion for the MTA 2020–2024 Capital Program. In other words, the more crossing credits, exemptions or discounts, the higher the toll must be.

TBTA, assisted by MTA Planning, will use the Balanced Transportation Analyzer (BTA) initially to determine the toll rates to be used under different credit/exemption/discount tolling scenarios. The toll rates projected by the BTA for each of these tolling scenarios will then be used to model regional transportation effects using BPM.

The NEPA document will include a toll schedule for each tolling scenario, covering all time periods for the day. These rates will be presented in current 2019 dollars and escalated for the 2023 and 2045 CBD Tolling Alternative analysis years.

Regional Traffic Analysis

This analysis is based on a compilation of existing travel characteristics and forecasts of changes in travel demand using the BPM. It is the primary tool used to evaluate the effects of large-scale regional transportation projects included in the New York Regional Transportation Plan. It is adopted by NYMTC's member agencies for use in regional transportation planning analyses and is the Federally recognized transportation forecasting tool for the region.

With the toll schedule generated by the BTA, the environmental review will use the BPM to model changes in regional travel patterns throughout the 28-county BPM study area. The BPM relies on socioeconomic forecasts developed by NYMTC specifically for long-range transportation forecasting and planning for use in the BPM. This forecast includes changes in population, households by income, as well as changes in employment by occupational class, and are provided at the Transportation Analysis Zone (TAZ) level as inputs to the BPM. Growth rates (or declines) between zones drive the overall growth or decline in trip-making behavior in the model.

The NEPA document will provide summaries of NYMTC forecasts at the district and/or county level for a more complete understanding of the key drivers affecting trip-making growth in the region. Districts, such as the Manhattan CBD, will be aggregations of TAZs to better understand travel pattern changes to, from, and within the Manhattan CBD. The document will also summarize how the BPM utilizes the underlying population and employment data combined with all the regional transportation linkages to model route and mode choice.

For each CBD Tolling Alternative scenario, BPM outputs will be screened to identify any highways and roadways in the region with high volume-to-capacity (v/c) ratios and significant percentage changes in traffic volumes during the four time periods of analysis for the BPM (AM, midday [MD], PM, and Late Night[LN]) as shown in Table 4B.1-1 for each tolling scenario. For the local traffic analysis, because the BPM does not model weekend travel patterns, the environmental review will assume that the traffic changes during the Saturday peak period will be similar to the weekday MD period. This assumption is consistent with data provided by StreetLight Data, Inc. (a third-party traffic data source), which shows similar general traffic conditions for the Saturday peak period and the weekday MD period. Saturday peak-period hours vary by location and will be detailed in the local traffic analysis.

Table 4B.1-1. Best Practice Model Analysis Periods

TIME PERIODS	TIME PERIOD
Weekday Morning Peak (AM)	6 a.m. to 10 a.m.
Weekday Midday (MD)	10 a.m. to 4 p.m.
Weekday Afternoon Peak (PM)	4 p.m. to 8 p.m.
Weekday Late Night (LN)	8 p.m. to 6 a.m.

Source: Best Practice Model, 2022

Specifically, this screening will identify roadway segments with a v/c ratio over 0.90 that experience a 5 percent or more increase in the traffic volume for any period and tolling scenario compared with the No Action Alternative.

Additionally, the screening will also identify changes in roadway volumes along key highways including the Gowanus Expressway, Staten Island Expressway, Brooklyn-Queens Expressway, Long Island Expressway, Trans-Manhattan/Cross Bronx Expressway, Major Deegan Expressway, I-78, NJ-495, Franklin D. Roosevelt Drive (FDR Drive), and West Side Highway/Route 9A.

MEASURES TO ASSESS REGIONAL TRAVEL IMPACT

In addition to identifying significant volume changes on key roadways, the following measures will also be analyzed to assess the effects of the CBD Tolling Alternative scenarios on regional travel patterns.

- **VMT:** The NEPA document will analyze the change in vehicle-miles traveled (VMT) per capita across the tolling scenarios and across time. This analysis will determine whether people would drive less under the tolling scenarios. Less driving could indicate a change to higher capacity modes such as transit, high-occupancy vehicles (HOVs), or trip suppression from people choosing not to travel due to increased costs.

The shift to higher capacity modes could be further analyzed through person-volumes on the region's major corridors indicating a shift toward bus and HOV.

Reductions in VMT and increases in person-volumes on roadways could be leading indicators of improved air quality and greater system efficiency.

Regional Transit Analysis

The BPM is an activity-based model that simulates the number and types of journeys made on an average weekday in the region by each resident. Activity-based models such as the BPM use the concept of journeys. A journey is defined as travel between principal and anchor locations such as home, work, or school but the BPM also predicts related trips linked in with the anchor travel (e.g., intermediate stops such as a day care center or a gym). This makes for a more realistic analysis that is based on the various decisions made by travelers between these locations, such as mode, purpose, destination, frequency, and location of intermediate stops, and time of day. The BPM generates over 28.8 million journeys per average weekday day from the New York City region's 8.2 million households.

The potential for effects from the CBD Tolling Alternative scenarios on the regional transit system will be analyzed using the BPM.

For transit modes, the BPM contains all the routes, stations, service frequencies and fares for transit service throughout the metropolitan region, including the following.

- MTA subway, bus, and commuter rail
- New Jersey Transit Corporation(NJ TRANSIT) commuter rail, light rail, and bus
- Port Authority Trans-Hudson (PATH) trains
- Ferries
- Other public buses such as the Bee-Line in Westchester County and Nassau Inter-County Express (NICE) in Nassau County
- Private transit bus operators

The model generates an estimate of demand by access mode (walk or drive) by two major modes—commuter rail and subway—and all other transit.

Using the BPM, the NEPA document will provide an overarching description of notable transit and travel changes. This will include information on changes in mode share and evaluate factors that inform route choices for trips into and out of the Manhattan CBD, as well as trips within and in the vicinity of the Manhattan CBD. The NEPA document will be written in non-technical language to allow the general public to understand how and why trips change in each tolling scenario.

Local Traffic Analysis

The change in regional travel demand is expected to have localized effects on traffic conditions, particularly in areas where there could be increases in traffic based on diversions or new travel patterns associated with the Project. Therefore, the focus of the traffic analysis will be to analyze the potential traffic effects of the Project by identifying those localized areas most likely to experience meaningful increases in traffic volumes.

IDENTIFICATION OF STUDY AREAS—KEY LOCAL INTERSECTIONS

Localized study areas have been established to evaluate key intersections on either side of bridge and tunnel crossings into Manhattan and other locations where there could be a potential traffic impact. The environmental review will provide a map and detailed inventory of the 102 intersections that comprise the 15 study areas where localized traffic will be evaluated, including:

- East Side around 60th Street, Manhattan
- West Side at 60th Street, Manhattan
- Robert F. Kennedy (RFK) Bridge, the Bronx side
- RFK Bridge, Manhattan side
- Long Island City, Queens including areas around the RFK Bridge and Ed Koch Queensboro Bridge
- Queens-Midtown Tunnel, Queens side
- Queens-Midtown Tunnel, Manhattan side
- Downtown Brooklyn areas around the Brooklyn Bridge and Manhattan Bridge
- Red Hook Brooklyn in the area around the Hugh L. Carey Tunnel
- Downtown Manhattan including the areas around the Hugh L. Carey Tunnel, Brooklyn Bridge, Manhattan Bridge
- West Side Highway/Route 9A (Twelfth Avenue and West 24th Street)
- Midtown Manhattan in the area around the Lincoln Tunnel and Port Authority Bus Terminal
- New Jersey in the area around the Holland Tunnel
- Lower East Side/ China Town/ Two Bridges study area
- Little Dominican Republic study area near George Washington Bridge

Local intersections at the New Jersey approaches to the George Washington Bridge are not included at the intersection level analysis because traffic on the bridge primarily comes from the regional highways instead of the local streets.

IDENTIFICATION OF STUDY AREAS—KEY HIGHWAY SEGMENTS

Based on the initial BPM screening, a traffic count program on key highway segments (e.g., highway crossings into the Manhattan CBD) in both directions will be undertaken, as needed. Current traffic count data from previous studies will be utilized to the maximum extent possible. It is anticipated that the highway segments most likely to be affected would be the approaches to tolled facilities that could experience higher traffic volumes under certain toll credit scenarios. These highway segments are anticipated to include the Gowanus Expressway, Long Island Expressway, the NJ-495 approach to the Lincoln Tunnel, and I-78 approach to the Holland Tunnel. In addition, there may be diversion to the Staten Island Expressway and the Trans-Manhattan/Cross Bronx Expressway because some motorists could take a more circumferential route between Brooklyn/Queens and New Jersey via the Verrazzano-Narrows Bridge or the George Washington Bridge to avoid paying the CBD toll. Following extended examination of the BPM results, additional analyses will be conducted on the FDR Drive, the Bayonne Bridge, the RFK Bridge and a segment of the Eastern Spur in New Jersey, totaling ten highway segments analyzed.

TRAFFIC IMPACT ASSESSMENT

The traffic assessment will be undertaken for the 2023 analysis year to reflect the first year of implementation. For this assessment, existing traffic conditions will first be reviewed and validated reflect existing (2019) conditions. No growth rate will be applied due to the COVID-19 pandemic. Balanced existing traffic flows will be developed where applicable for the weekday AM, MD, PM, and LN peak hours. Synchro networks will be prepared and calibrated to reflect existing (2019) conditions.

To assess the 2023 No Action Alternative and the 2023 CBD Tolling Alternative scenarios, this analysis will first require adjusting BPM results to assign incremental changes in traffic to specific routes and intersections. In lieu of applying a background growth rate to existing volumes to estimate No Action volumes, a No Action increment from the BPM will be added to existing volumes to develop the No Action volumes. For the No Action Alternative and CBD Tolling Alternative scenarios, the BPM results will be adjusted to account for any deviations between calibrated BPM results and hub-bound traffic counts at up to 10 locations (e.g., vicinity of crossings into the Manhattan CBD) during the four time periods of analysis. BPM adjustments include the following:

- Converting peak-period volumes to peak analysis hour volumes
- Applying capacity constraints at the tunnels and bridges crossing into the Manhattan CBD
- Applying a bounce-back adjustment to account for excessive delays due to the diversion of traffic to alternate routes.

A perceived delay adjustment will also be evaluated to reflect a higher cost for time spent in queue conditions. Attachment A summarizes the detailed methodology of applying these adjustment factors to BPM results to determine local traffic volumes.

The future assignments for the CBD Tolling Alternative scenario chosen for analysis will then be added to the existing and No Action volumes and imported into Synchro networks for capacity and delay analysis to determine whether the future CBD Tolling Alternative conditions are likely to cause negative traffic effects. Conceptual traffic mitigation measures will be developed for intersections that may be potentially adversely affected.

A screening assessment will be conducted based on the City Environmental Quality Review (CEQR) screening thresholds for those intersections with a projected net increase of 50 or more vehicles. A secondary screening criterion of an increase of 50 or more vehicles for any movement will also be applied where the net increase in intersection traffic volume is below 50 vehicles.

In addition to the local intersection analysis, the environmental review will also analyze highway corridors most likely to experience the largest increase in traffic volumes under the representative tolling scenario during the four analysis time periods (AM, MD, PM, and LN) described above for the No Action Alternative and CBD Tolling Alternative scenarios. The highway analysis will utilize calibrated Vissim models at the approaches to the Queens-Midtown Tunnel, Hugh L. Carey Tunnel, Holland Tunnel, Lincoln Tunnel, the Verrazzano-Narrows Bridge, and will include merging, diverging, and weaving lane segments as part of the analysis. The FDR Drive and Trans-Manhattan/Cross Bronx Expressway will be analyzed qualitatively due to lack of available data. The Bayonne Bridge, RFK Bridge and New Jersey Turnpike Eastern Spur will be analyzed using Highway Capacity Software (HCS).

MEASURES TO ASSESS TRAFFIC EFFECTS—HIGHWAYS.

Tolling scenarios with the largest increase in local traffic volumes will be analyzed using microsimulation software, the HCS where speeds are 40 mph or greater,[2] or a qualitative and analytic method depending on the availability of micro-simulation models, pre-COVID-19 pandemic traffic data, existing speeds, and the level of congestion. TBTA, in consultation with NYCDOT and NYSDOT, adopted a preliminary evaluation criteria for determining potential adverse traffic effects along highways as follows:

- At speeds below 20 mph, an increase in traffic volumes of up to 5 percent would not be considered significant.
- At speeds of 20 mph or above, an increase in traffic volumes of up to 10 percent would not be considered significant and thus is appropriate for determining the significance of traffic effects along highways potentially affected by the Project.

Where a detailed traffic analysis is performed using the Vissim model or HCS an additional State Environmental Quality Review Act (SEQRA) criterion will be applied to determine adverse highway effects that relies on an increase in delay of 2.5 minutes or greater. This criterion is derived from an examination of average weekday travel times to the Manhattan CBD from the outer boroughs based on for-hire vehicle (FHV) recorded travel time and distance between passenger pickups and drop-offs prior to the COVID-19 pandemic and during spring 2022 when average travel times rebounded to pre-pandemic levels.

Average travel times to the Manhattan CBD from the outer boroughs during the weekday between 6:00 a.m. and 8:00 p.m. vary from about 35 minutes from Brooklyn, 45 minutes from the Bronx, 45 minutes from Queens, and about 58 minutes from Staten Island. A 2.5-minute increase in travel time under the SEQRA threshold would represent about a 5 percent increase in total travel time, depending on the trip origin, with shorter trips experiencing a higher percentage change and longer trips experiencing a smaller percentage change in travel time. See **Appendix 4B.7, "Transportation: Average Weekday Travel Times to the Manhattan CBD**."

Because up to a 2.5-minute increase in travel time would not be noticeable to most drivers over the length of the average trip, it is an appropriate threshold for determining adverse traffic effects. This threshold was applied at all locations where a detailed traffic analysis was performed. Where a detailed traffic analysis will not be performed due to the lack of availability of a calibrated Vissim model, or where reliable pre-COVID-19 traffic data are not available, the following SEQRA criteria will be used to determine adverse effects: an increase in traffic volumes greater than 5 percent at speeds of less than 20 mph, or an increase in traffic volumes greater than 10 percent at speeds of 20 mph or higher.

Measures to Assess Traffic Effects—Intersections. Intersection level of service (LOS) is typically based on the average delay per vehicle, either for the intersection as a whole or for specific lane groups (e.g.,

[2] The Highway Capacity Software (HCS) is a macroscopic traffic simulation software that implements the methodology in the Highway Capacity Manual (HCM) 6th Edition. This tool is useful when speeds are generally 40 mph or higher. It provides level of service (LOS), speed, and density as measures of performance. At LOS F, this software does not provide useful output and, therefore, cannot be used effectively under congested conditions.

westbound left-turn lane). The analysis methodology and impact threshold guidance will be based on the SEQRA standards. In accordance with the SEQRA guidelines adopted by TBTA for the determination of adverse traffic effects at signalized intersections, an increase in delay for any intersection during the peak hour of greater than 5 seconds at LOS E or F is considered an adverse traffic effect requiring mitigation.

These traffic analyses will be conducted using Synchro and all Synchro inputs and outputs will be shared with NYCDOT technical reviewers and will be included in the environmental document. All traffic intersection analyses will be evaluated for the incremental change in volume and LOS between the No Action Alternative and CBD Tolling Alternative conditions consistent with the applicable SEQRA guidance.

PARKING ANALYSES

The enabling legislation requires NYCDOT to prepare a parking study 18 months after implementation of the program.

The BPM has shown an overall reduction in vehicle trips to the Manhattan CBD as a result of the CBD Tolling Alternative in all tolling scenarios. The decrease in vehicle trips would also result in a decrease in parking demand in the Manhattan CBD. Consequently, the CBD Tolling Alternative would not create a parking shortfall in the Manhattan CBD, and a detailed assessment of the effects of the CBD Tolling Alternative on parking supply and demand in the Manhattan CBD is not necessary.

With the CBD Tolling Alternative, the number of commuters and visitors to the Manhattan CBD who would use transit for their trip would increase. Some of these commuters and visitors would drive to commuter rail and subway stations outside the Manhattan CBD to access transit to complete their trip. Consequently, the CBD Tolling Alternative would increase the number of drivers who would seek parking near commuter rail and subway stations outside the Manhattan CBD. These commuters and visitors would create demand for on- and off-street parking near the commuter rail and subway stations they use for their trip to the Manhattan CBD.

The NEPA document will assess the future effects of the Project on parking in the outer boroughs. The proposed methodology will determine baseline supply and utilization in areas up to 1/4-mile from the subway stations or transit hubs where “park & ride” auto to transit demand resulting from toll avoidance is expected to be the greatest. Based upon results from the model, the incremental parking demand will be added to the future baseline (No Action Alternative) levels to determine whether the shift in travel patterns would result in the potential for parking shortfalls within the outer borough study area.

This assessment of parking conditions outside the Manhattan CBD relies upon estimates of transit usage produced by the BPM for the Project.

The parking assessment is being conducted using the methodologies outlined in the City of New York’s 2020 *City Environmental Quality Review (CEQR Technical Manual)*, which recommends a screening procedure to determine whether quantified analyses of transportation conditions are warranted.[3] Using that screening approach, if a project would result in 50 or more peak-hour vehicle trips at an intersection, then further analyses might be warranted to assess the potential for adverse effects on parking. For locations that would experience an increase of fewer than 50 peak-hour vehicle trips due to a project, further analysis of parking is typically not warranted.

The socioeconomic section of the NEPA document will qualitatively examine broader effects of the shifts in parking demand including changes to the demand for off-street parking. It will also look at the potential for new cost differentials to emerge such as increases or decreases in parking costs based on changes to demand.

DATA COLLECTED AS PART OF THE NEPA ANALYSIS

The NEPA transportation and traffic analyses are built on an extensive baseline of data collected in June 2019, with additional data collection that occurred in fall 2019. The combination of assembled existing data obtained from NYCDOT and available public documents with the newly collected data ensures that the analyses are built on a well-supported existing conditions baseline. The data collection, calibration and balancing of intersection traffic and pedestrian volumes was done in coordination with NYCDOT and is consistent with the *CEQR Technical Manual* guidance. For broader calibration of BPM volumes and traffic count data for Manhattan CBD crossings, the collected and modeled data was correlated with the NYMTC *Hub Bound Travel Data Report 2019*. The NEPA document will summarize the data collection effort (location, dates, time periods collected) and the original data collection will be shared with NYCDOT and other agencies as part of the environmental record.

THIRD-PARTY DATA SOURCES

The transportation and traffic analysis will utilize third-party data provided by StreetLight Data, Inc. These data are being used to further define trip origin and destination to inform how to assign traffic on the local road network. The data provided by StreetLight Data, Inc. does not require further calibration with existing traffic counts. The NEPA document will include details about the source material and describe its use as part of the traffic assessment.

[3] While the MTA Reform and Traffic Mobility Act exempts the Project from the environmental review procedures of CEQR, the methodology of the *CEQR Technical Manual* was used for this analysis because it provides a widely accepted methodology for conducting a parking assessment in New York City.

Attachment A. Methodology to Develop Local Traffic Volumes

A.1. HOURLY FACILITY TRAFFIC VOLUMES

This section describes the method used to develop hourly traffic volumes for existing, 2023 No Action Alternative, and 2023 CBD Tolling Alternative conditions.

A.1.1. Existing Traffic Volumes

Existing hourly facility traffic volumes are available for all Manhattan CBD crossings based on transaction data at TBTA tolled facilities for the Hugh L. Carey Tunnel, the Queens–Midtown Tunnel, and the RFK Bridge. Port Authority of New York and New Jersey trans-Hudson transaction data are available for 2018 inbound (to Manhattan) traffic and 2017 outbound (exiting Manhattan) traffic. NYCDOT toll-free bridge counts are available in the *Hub Bound Travel Data Report 2019*. Counts were recently taken in June 2019 at the 60th Street exit from the Manhattan CBD. A 0.5 percent annual background growth rate was applied to the pre-2019 traffic data to estimate the existing 2019 traffic volumes. This growth rate is twice the growth rate suggested in the *CEQR Technical Manual* to account for some additional traffic generated by local development projects.

A.1.2. 2023 No Action Alternative Traffic Volumes

The 2023 No Action Alternative increment traffic volumes were derived by distributing the adjusted peak-period increment traffic volumes from the No Action Alternative BPM facilities to each hour of the day. The No Action Alternative BPM increment is the difference between and the 2023 No Action Alternative BPM and the calibrated existing conditions BPM. The peak-period traffic volumes were distributed to individual hours using the same temporal distribution as the existing facility counts. The No Action Alternative BPM reflects roadway network changes expected to be in place by 2023 including the Brooklyn Bridge bike lanes, Queensboro Bridge bike lanes, and Brooklyn-Queens Expressway lane reduction. No additional background growth rates were applied since the existing volumes and BPM baseline represent pre-pandemic volumes that are not yet fully recovered and are expected to remain flat within the framework of the 2023 No Action Alternative analysis year.[4]

A.1.3. 2023 CBD Tolling Alternative Increment Hourly Traffic Volumes

The 2023 CBD Tolling Alternative increment traffic volumes were derived by distributing the adjusted peak-period increment traffic volumes from the CBD Tolling Alternative BPM facilities to each hour of the day. The 2023 CBD Tolling Alternative increment is the difference between the 2023 CBD Tolling Alternative BPM and the 2023 No Action Alternative BPM. The peak-period traffic volumes were distributed to individual hours using the same temporal distribution as the existing facility counts.

[4] Traffic counts on local streets and NYCDOT bridges in the Manhattan CBD in May 2021 and May 2022 indicate that traffic volumes are at 85 percent to 90 percent of pre-COVID-19 pandemic traffic levels, although traffic volumes on TBTA and PANYNJ facilities have nearly recovered to pre-pandemic levels.

A.1.4. 2023 CBD Tolling Alternative Total Hourly Traffic Volumes

Both the 2023 No Action Alternative and CBD Tolling Alternative hourly traffic volumes were derived by adding the appropriate hourly increment to the preceding analysis (No Action Alternative is added to existing conditions, CBD Tolling Alternative is added to the No Action Alternative) hourly volumes and then subtracting or adding the hourly "bounce-back" traffic volumes. A facility that is projected to have a large incremental increase could see the increment decrease slightly due to volume (traffic) diverting to a facility with more available capacity, which would result in a smaller positive increment. A facility that is projected to have a large incremental decrease could see the increment increase slightly due to volume diverting from a facility with less available capacity, resulting in a smaller negative increment. The bounce-back methodology is further detailed in the section below.

A.2. ADJUSTMENT OF PROJECTED CHANGES IN BPM PERIOD FACILITY VOLUMES

Figure A-1 presents a flow chart describing the adjustment of projected changes in peak-period facility volumes as projected by the BPM. These steps are summarized below. This process is followed when establishing both the No Action Alternative and CBD Tolling Alternative increments, with the only differences between the following:

- The No Action Alternative calibration factor is based on the difference between the *Hub Bound Travel Data Report 2019* and the existing BPM, while the CBD Tolling Alternative calibration factor is based on the difference between the *Hub Bound Travel Data Report 2019* and the No Action Alternative BPM.
- The No Action Alternative increment is based on the initial difference between the existing and No Action Alternative BPM results, while the CBD Tolling Alternative increment is based on the initial difference between the No Action Alternative and CBD Tolling Alternative BPM results.

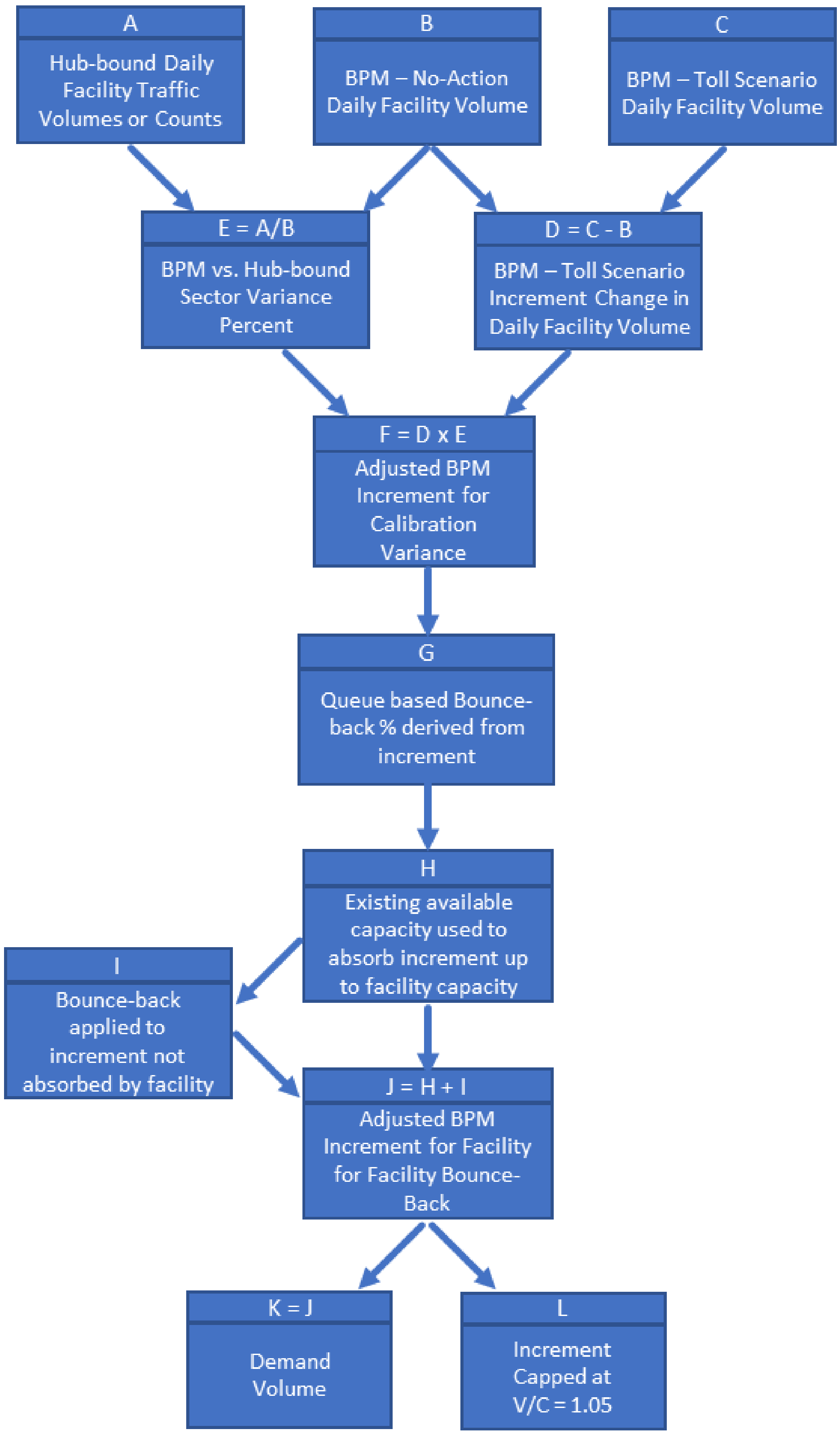
A.2.1. Adjustment for Calibration Variance at Each Facility

The period increment between the modeled BPM facility volume and the hub-bound[5] or count volume represents an under or over assignment of facility traffic. This over-under assignment of facility volumes needs to be accounted for and an adjustment needs to be made to the initial changes in facility volumes projected by the BPM. The proposed increment, whether positive or negative has an impact on the necessary adjustment. There are four possible scenarios based on these relationships of the BPM assignment and the proposed BPM increment. The table below breaks down each possible scenario.

Scenarios	A BPM Percent Difference (Over/Under Assigned)	B BPM Increment (Positive/Negative)	C Adjusted BPM Increment	Reason
Scenario 1	Over Assigned (+)	Positive (+)	**Positive (+) [Absolute Increase]**	The real facility has less traffic (**more available capacity**) than it does in the BPM, so it **could attract more** trips.
Scenario 2	Over Assigned (+)	Negative (-)	**Negative (-) [Absolute Decrease]**	The real facility **has less traffic** than it does in the BPM. There is less traffic to lose so it **could lose fewer** trips.
Scenario 3	Under Assigned (-)	Positive (+)	**Positive (+) [Absolute Decrease]**	The real facility has more traffic (**less available capacity**) than it does in the BPM, so it could **attract fewer** trips.
Scenario 4	Under Assigned (-)	Negative (-)	**Negative (-) [Absolute Increase]**	The real facility **has more traffic** than it does in the BPM. There is more traffic to lose so it could **lose more** trips.

5 Hub-bound refers to travel to the Manhattan CBD tolling area and is a term used by NYMTC. The geographic coverage of the Hub and the Manhattan CBD tolling area are the same.

Figure A-1 Adjustment of Period Best Practice Model Changes in Facility Volumes[6]



A.2.2. Adjustment for Sector Calibration Variance

The period BPM sector volumes are generally consistent with the hub-bound sector volumes; however, there is a need to adjust for some over or under assignment of traffic. Sectors are defined regions within BPM, generally broken down by New York City borough. For instance, if the BPM period sector traffic volume is over-assigned by 5 percent, then it is assumed that the diverted traffic would also be about 5 percent too high. Therefore, in Step 2, a 5 percent reduction is applied to the Step 1 adjusted increase in BPM facility volume to account for the over assignment in period BPM sector volumes. Similarly, if the assigned sector volumes are 5 percent too low, then the Step 1 adjusted BPM change in facility volumes must be increased to account for the under assignment of sector traffic volumes.

A.2.3. Bounce-back Hourly Facility Traffic Volumes

Unlike a network simulation model, the BPM as a travel demand model relies on a conventional static assignment method in TransCAD for the loading of origin-destination demand to the links of the highway network. While it does consider capacity constraints at the Manhattan CBD crossings and all links in the network, over congestion is expressed as simple link-level v/c ratios, which are used to calculate travel time delays on each link. Therefore, post assignment analysis of the hourly traffic volumes can yield more realistic estimates of traffic flow characteristics particularly on the arterial system and at intersections. For specific segments and links utilized in the traffic study the distribution of adjusted period BPM flow increments may result in traffic volumes that cannot be accommodated resulting in excessive delays which may result in a bounce-back of traffic from the alternate facility to the original facility. The premise of this portion of the methodology is to determine how a system equilibrium would look following the implementation of any of the CBD Tolling Alternative scenarios.

The No Action Alternative delay and the CBD Tolling Alternative delay are calculated based on estimated queue length. Estimated queue length is determined by converting the additional volume from the No Action Alternative to CBD Tolling Alternative scenarios into a queue length by assuming 20 feet per vehicle. The additional queue is only considered if the v/c ratio is greater than 1.0. Based on the estimated increase in queue, a delay function, using a congested speed of about 6.5 mph, calculates a projected delay for each vehicle. This delay value is then multiplied by a perceived delay factor of 1.5 which is used to reflect a higher perceived cost for time spent in queue conditions. This factor is supported via several studies that detail how a traveler perceives delay as taking longer than it may take realistically. A delay cost is calculated by multiplying the new delay factor by a $35 per hour value of time. Based on the delay cost, using the bounce-back curve shown in **Figure A-2**, the percent bounce-back is determined for the hourly increment. Any additional increment over the capacity of the facility is subject to this bounce-back percentage. The volume that is "bounced" returns to the facility it was likely to have originally used under existing conditions. **Table A-1** and **Table A-2** show the method of calculating the hourly bounce-back traffic volumes.

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[6] Variance adjustments are based on the ratio of Hub-bound volumes vs. BPM assigned volumes and were applied by four sectors as described below: New Jersey sector for the George Washington Bridge, Lincoln Tunnel, and Holland Tunnel; Brooklyn sector for Hugh L. Carey T, Brooklyn Bridge, and Manhattan Bridge; Queens sector for Williamsburg Bridge, Queens Midtown Tunnel, Queensboro Bridge, and RFK Bridge; 60th Street Sector for Route 9A, west side avenues, east side avenues, and the FDR Drive

Table A-1. Hourly Existing, No Action Alternative and CBD Tolling Alternative Facility Volumes (Hugh L. Carey Tunnel Manhattan-bound Example)

Hour Starting	Existing Inbound - May 2019					No Action Inbound - May 2023					2023 Base Action Increment				
	Cars		Trucks		Total	Cars		Trucks		Total	Cars		Trucks		Total
	TBM	E-ZPass	TBM	E-ZPass		TBM	E-ZPass	TBM	E-ZPass		TBM	E-ZPass	TBM	E-ZPass	
12:00 AM	6	108	0	15	129	6	113	0	16	135	7	120	0	17	144
1:00 AM	3	55	0	7	65	3	58	0	7	68	3	61	0	8	72
2:00 AM	2	33	0	6	41	2	35	0	6	43	2	37	0	7	46
3:00 AM	1	38	0	6	45	1	40	0	6	47	1	42	0	7	50
4:00 AM	3	116	0	18	137	3	121	0	19	143	3	129	0	20	152
5:00 AM	17	785	2	97	901	18	821	2	101	942	19	874	2	108	1,003
6:00 AM	40	1,722	4	191	1,957	46	1,960	5	217	2,228	13	575	1	64	653
7:00 AM	37	1,919	2	235	2,193	40	2,117	2	256	2,416	12	621	1	75	708
8:00 AM	37	1,735	2	201	1,975	42	1,983	2	229	2,256	12	582	1	67	662
9:00 AM	35	1,612	2	142	1,791	40	1,835	2	162	2,039	12	538	1	47	598
10:00 AM	48	1,812	4	126	1,990	56	2,115	5	147	2,322	18	684	2	48	751
11:00 AM	46	1,538	3	104	1,691	56	1,861	4	126	2,046	18	602	1	41	662
12:00 PM	43	1,431	2	93	1,569	52	1,731	2	113	1,898	17	560	1	36	614
1:00 PM	45	1,351	2	108	1,506	54	1,634	2	131	1,822	18	528	1	42	589
2:00 PM	49	1,388	2	121	1,560	59	1,679	2	146	1,887	19	543	1	47	610
3:00 PM	53	1,408	2	132	1,595	64	1,703	2	160	1,930	21	551	1	52	624
4:00 PM	40	1,137	1	152	1,330	42	1,201	1	161	1,405	43	1,217	1	163	1,424
5:00 PM	32	1,023	1	144	1,200	35	1,104	1	155	1,295	35	1,118	1	157	1,312
6:00 PM	30	1,043	1	134	1,208	32	1,126	1	145	1,304	33	1,141	1	147	1,321
7:00 PM	40	1,112	1	76	1,229	43	1,208	1	83	1,335	44	1,224	1	84	1,353
8:00 PM	30	783	0	40	853	31	819	0	42	892	33	871	0	45	949
9:00 PM	32	702	0	36	770	34	734	0	38	805	36	781	0	40	857
10:00 PM	26	626	0	31	683	27	655	0	32	714	29	697	0	35	760
11:00 PM	16	348	0	21	385	17	364	0	22	403	18	387	0	23	429
AM Peak TOTAL	**149**	**6,989**	**10**	**769**	**7,916**	**168**	**7,895**	**11**	**864**	**8,938**	**49**	**2,315**	**3**	**253**	**2,621**
PM Peak TOTAL	**142**	**4,315**	**4**	**506**	**4,967**	**153**	**4,639**	**4**	**543**	**5,339**	**155**	**4,700**	**4**	**550**	**5,409**
Off-Peak TOTAL	**420**	**12,522**	**17**	**961**	**13,920**	**484**	**14,482**	**20**	**1,112**	**16,097**	**262**	**7,467**	**8**	**574**	**8,311**
Daily TOTAL	**711**	**23,826**	**31**	**2,236**	**26,803**	**804**	**27,015**	**36**	**2,519**	**30,374**	**465**	**14,482**	**16**	**1,378**	**16,341**
Vehicle TOTAL	**24,537**		**2,266**		**26,803**	**27,819**		**2,554**		**30,374**	**14,948**		**1,394**		**16,341**
Facility TOTAL	**26,803**					**30,374**					**16,341**				

Hour Starting	Bounceback					Adjusted Increment w/Bounceback					TOTAL 2023 Action Inbound Traffic Volume				
	Cars		Trucks		Total	Cars		Trucks		Total	Cars		Trucks		Total
	TBM	E-ZPass	TBM	E-ZPass		TBM	E-ZPass	TBM	E-ZPass		TBM	E-ZPass	TBM	E-ZPass	
12:00 AM	0	0	0	0	0	7	120	0	17	144	13	233	0	32	279
1:00 AM	0	0	0	0	0	3	61	0	8	72	6	119	0	15	140
2:00 AM	0	0	0	0	0	2	37	0	7	46	4	71	0	13	89
3:00 AM	0	0	0	0	0	1	42	0	7	50	2	82	0	13	97
4:00 AM	0	0	0	0	0	3	129	0	20	152	6	250	0	39	296
5:00 AM	0	0	0	0	0	19	874	2	108	1,003	37	1,695	4	209	1,945
6:00 AM	-11	-488	-1	-54	-555	2	87	0	10	99	48	2,047	5	227	2,326
7:00 AM	-11	-596	-1	-72	-680	0	25	0	3	28	41	2,142	2	259	2,444
8:00 AM	-11	-519	-1	-60	-591	1	62	0	7	71	43	2,045	2	236	2,327
9:00 AM	-6	-291	0	-26	-324	5	247	0	22	274	45	2,081	3	183	2,313
10:00 AM	-17	-657	-1	-46	-721	1	27	0	2	30	57	2,142	5	149	2,352
11:00 AM	-11	-357	-1	-24	-393	7	245	0	17	269	63	2,105	4	142	2,315
12:00 PM	-6	-186	0	-12	-204	11	374	1	24	410	63	2,105	3	137	2,308
1:00 PM	-3	-96	0	-8	-107	14	432	1	35	482	69	2,067	3	165	2,304
2:00 PM	-6	-169	0	-15	-190	13	374	1	33	420	73	2,053	3	179	2,307
3:00 PM	-8	-216	0	-20	-244	13	335	0	31	379	77	2,038	3	191	2,309
4:00 PM	-41	-1,173	-1	-157	-1,372	2	44	0	6	51	44	1,245	1	166	1,456
5:00 PM	-34	-1,078	-1	-152	-1,265	1	40	0	6	47	36	1,144	1	161	1,342
6:00 PM	-32	-1,100	-1	-141	-1,274	1	41	0	5	47	34	1,167	1	150	1,351
7:00 PM	-42	-1,180	-1	-81	-1,304	2	44	0	3	49	45	1,252	1	86	1,384
8:00 PM	0	0	0	0	0	33	871	0	45	949	65	1,690	0	86	1,841
9:00 PM	0	0	0	0	0	36	781	0	40	857	69	1,515	0	78	1,662
10:00 PM	0	0	0	0	0	29	697	0	35	760	56	1,352	0	67	1,475
11:00 PM	0	0	0	0	0	18	387	0	23	429	35	751	0	45	831
AM Peak TOTAL	**-40**	**-1,895**	**-3**	**-212**	**-2,149**	**9**	**421**	**1**	**42**	**472**	**177**	**8,315**	**12**	**905**	**9,410**
PM Peak TOTAL	**-149**	**-4,531**	**-4**	**-530**	**-5,215**	**6**	**169**	**0**	**20**	**195**	**158**	**4,808**	**4**	**563**	**5,533**
Off-Peak TOTAL	**-51**	**-1,681**	**-3**	**-125**	**-1,859**	**211**	**5,786**	**5**	**449**	**6,451**	**694**	**20,268**	**25**	**1,561**	**22,549**
Daily TOTAL	**-240**	**-8,106**	**-10**	**-867**	**-9,223**	**225**	**6,376**	**6**	**511**	**7,118**	**1,030**	**33,391**	**41**	**3,030**	**37,492**
Vehicle TOTAL	**-8,346**		**-877**		**-9,223**	**6,601**		**517**		**7,118**	**34,421**		**3,071**		**37,492**
Facility TOTAL	**-9,223**					**7,118**					**37,492**				

Table A-2. Percentage Bounce-Back by Hour—(Hugh L. Carey Tunnel Manhattan-bound Example)

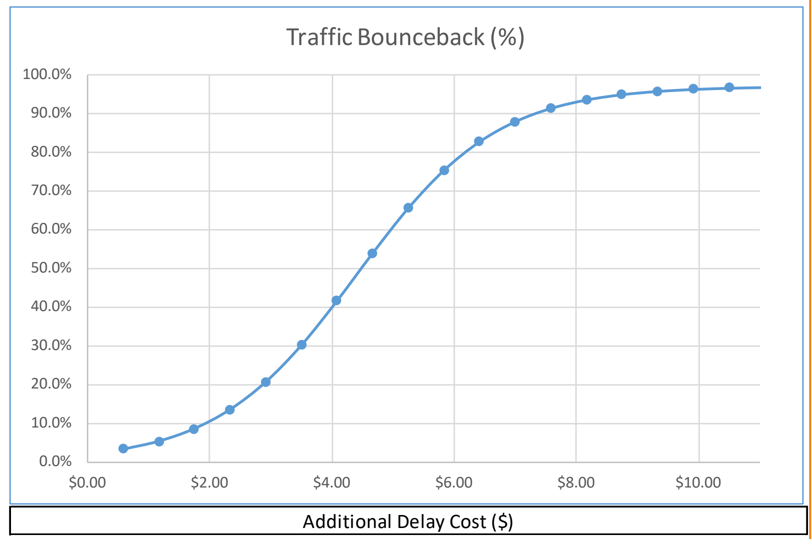
													Approach Lanes	Congested Speed	Uncongested Speed	VOT/Min	Excessive Delay Multiplier	
														8.82	51.45			
		1,150											2	9.4		$ 0.58	1.50	
Hour Starting	Number of GP Lanes	Capacity Per GP Lane	HOV Volume Removed	Total Vehicular Capacity in GP	Existing Volume (PCE)	No Action Volume (PCE)	Action Volume (PCE)	Delta Volume	No Action V/C	Action V/C w/o Bounce-Back	No Action Queue	Action Queue w/o Bounce-Back	Net Queue w/o Bounce-Back (ft)	Estimated Delay (min)	Perceived Delay	Delay Cost	Bounce-Back (percent)*	Capped Bounce Back (percent)*
12:00 AM	2	1,150		2,300	144	151	311	160	0.065	0.135	0	0	0	0	0.0	$ -	2.54%	0.0%
1:00 AM	2	1,150		2,300	72	75	155	80	0.033	0.068	0	0	0	0	0.0	$ -	2.54%	0.0%
2:00 AM	2	1,150		2,300	47	49	102	52	0.021	0.044	0	0	0	0	0.0	$ -	2.54%	0.0%
3:00 AM	2	1,150		2,300	51	53	110	57	0.023	0.048	0	0	0	0	0.0	$ -	2.54%	0.0%
4:00 AM	2	1,150		2,300	155	162	334	172	0.070	0.145	0	0	0	0	0.0	$ -	2.54%	0.0%
5:00 AM	2	1,150		2,300	1,000	1046	2159	1113	0.455	0.938	0	0	0	0	0.0	$ -	2.54%	0.0%
6:00 AM	2	1,150	751	2,300	2,151	2450	3168	718	1.065	1.377	2981	10164	7183	11	16.9	$ 9.84	95.51%	95.5%
7:00 AM	2	1,150	913	2,300	2,430	2674	3458	784	1.163	1.503	2436	10277	7841	12	18.4	$ 10.74	95.98%	96.0%
8:00 AM	2	1,150	985	2,300	2,178	2487	3217	729	1.081	1.399	3095	10389	7294	11	17.1	$ 9.99	95.62%	95.6%
9:00 AM	2	1,150	859	2,300	1,935	2202	2848	646	0.958	1.238	0	9134	9134	14	21.5	$ 12.51	96.30%	96.3%
10:00 AM	2	1,150		2,300	2,120	2474	3274	800	1.076	1.423	3540	11538	7998	13	18.8	$ 10.96	96.05%	96.0%
11:00 AM	2	1,150		2,300	1,798	2175	2879	703	0.946	1.252	0	10806	10806	17	25.4	$ 14.80	96.38%	96.4%
12:00 PM	2	1,150		2,300	1,664	2013	2664	651	0.875	1.158	0	9999	9999	16	23.5	$ 13.70	96.36%	96.4%
1:00 PM	2	1,150		2,300	1,616	1955	2587	632	0.850	1.125	0	9712	9712	15	22.8	$ 13.31	96.35%	96.3%
2:00 PM	2	1,150		2,300	1,683	2036	2694	658	0.885	1.171	0	10114	10114	16	23.8	$ 13.86	96.37%	96.4%
3:00 PM	2	1,150		2,300	1,729	2092	2768	676	0.909	1.203	0	10389	10389	16	24.4	$ 14.23	96.38%	96.4%
4:00 PM	1	1,150		1,150	1,483	1566	3154	1587	1.362	2.742	835	16708	15873	25	37.3	$ 21.75	96.40%	96.4%
5:00 PM	1	1,150		1,150	1,345	1451	2921	1470	1.262	2.540	1061	15764	14703	23	34.5	$ 20.14	96.40%	96.4%
6:00 PM	1	1,150		1,150	1,343	1449	2918	1469	1.260	2.537	1065	15751	14686	23	34.5	$ 20.12	96.40%	96.4%
7:00 PM	1	1,150		1,150	1,306	1419	2857	1438	1.234	2.484	1130	15508	14378	23	33.8	$ 19.70	96.40%	96.4%
8:00 PM	2	1,150		2,300	893	934	1928	994	0.406	0.838	0	0	0	0	0.0	$ -	2.54%	0.0%
9:00 PM	2	1,150		2,300	806	843	1740	897	0.366	0.756	0	0	0	0	0.0	$ -	2.54%	0.0%
10:00 PM	2	1,150		2,300	714	747	1541	795	0.325	0.670	0	0	0	0	0.0	$ -	2.54%	0.0%
11:00 PM	2	1,150		2,300	406	425	877	452	0.185	0.381	0	0	0	0	0.0	$ -	2.54%	0.0%
Facility TOTAL				PCE	29,069	32,928	50,663							*Bounce-back is only applied after a facility is over capacity				

Figure A-2 Bounce-Back Curve (Percentage Bounce-Back versus Anticipated Cost of Delay)

		Xo	Midpoint	4.412203965
VOT/Hour	$35.00	L	Max Value	0.971291382
VOT/Min	$0.58	K	Growth Rate	0.875596649
		e	Exponential value	2.718281828

Perceived Delay Factor: 1

Delay (min)	Perceived Delay (min)	Delay Cost	Target Bounceback	Bounceback Curve	Variance
1	1.00	$0.58	3.0%	3.3%	0.28%
2	2.00	$1.17	5.0%	5.4%	0.35%
3	3.00	$1.75	8.0%	8.6%	0.60%
4	4.00	$2.33	10.0%	13.5%	3.54%
5	5.00	$2.92	20.0%	20.6%	0.65%
6	6.00	$3.50	30.0%	30.1%	0.14%
7	7.00	$4.08	40.0%	41.6%	1.62%
8	8.00	$4.67	50.0%	54.0%	3.95%
9	9.00	$5.25	70.0%	65.6%	-4.38%
10	10.00	$5.83	75.0%	75.4%	0.40%
11	11.00	$6.42	85.0%	82.8%	-2.19%
12	12.00	$7.00	88.0%	88.0%	0.00%
13	13.00	$7.58	90.0%	91.4%	1.44%
14	14.00	$8.17	94.0%	93.6%	-0.37%
15	15.00	$8.75	95.0%	95.0%	0.00%
16	16.00	$9.33	96.0%	95.8%	-0.16%
17	17.00	$9.92	97.0%	96.4%	-0.65%
18	18.00	$10.50	97.0%	96.7%	-0.34%
19	19.00	$11.08	97.0%	96.8%	-0.15%
20	20.00	$11.67	98.0%	97.0%	-1.04%
21	21.00	$12.25	98.0%	97.0%	-0.97%
22	22.00	$12.83	98.0%	97.1%	-0.93%
23	23.00	$13.42	98.0%	97.1%	-0.91%
24	24.00	$14.00	98.0%	97.1%	-0.89%



A.2.4. Capping Processed Traffic Volumes

The final step of the adjustment process deals with capping the processed increment based upon the capacity of the facility. The final incremental demand is split into two categories: demand volume and processed (capped) volume. The demand volume is the total number of vehicles that are committed to using a facility. Based on the magnitude of this volume, it is possible that the entire demand cannot be processed by the facility. As a result, a lower processed volume will emerge downstream of the facility. The processing ability of a facility is set to 105 percent of the facility capacity, a standard value used in traffic analysis. This demand volume is used in analysis of locations upstream of, or before entering, a facility. The processed volume is used in analysis of locations downstream of, or after exiting, a facility. **Table A-3** details the entire adjustment process that the period increment undergoes, prior to any capping.

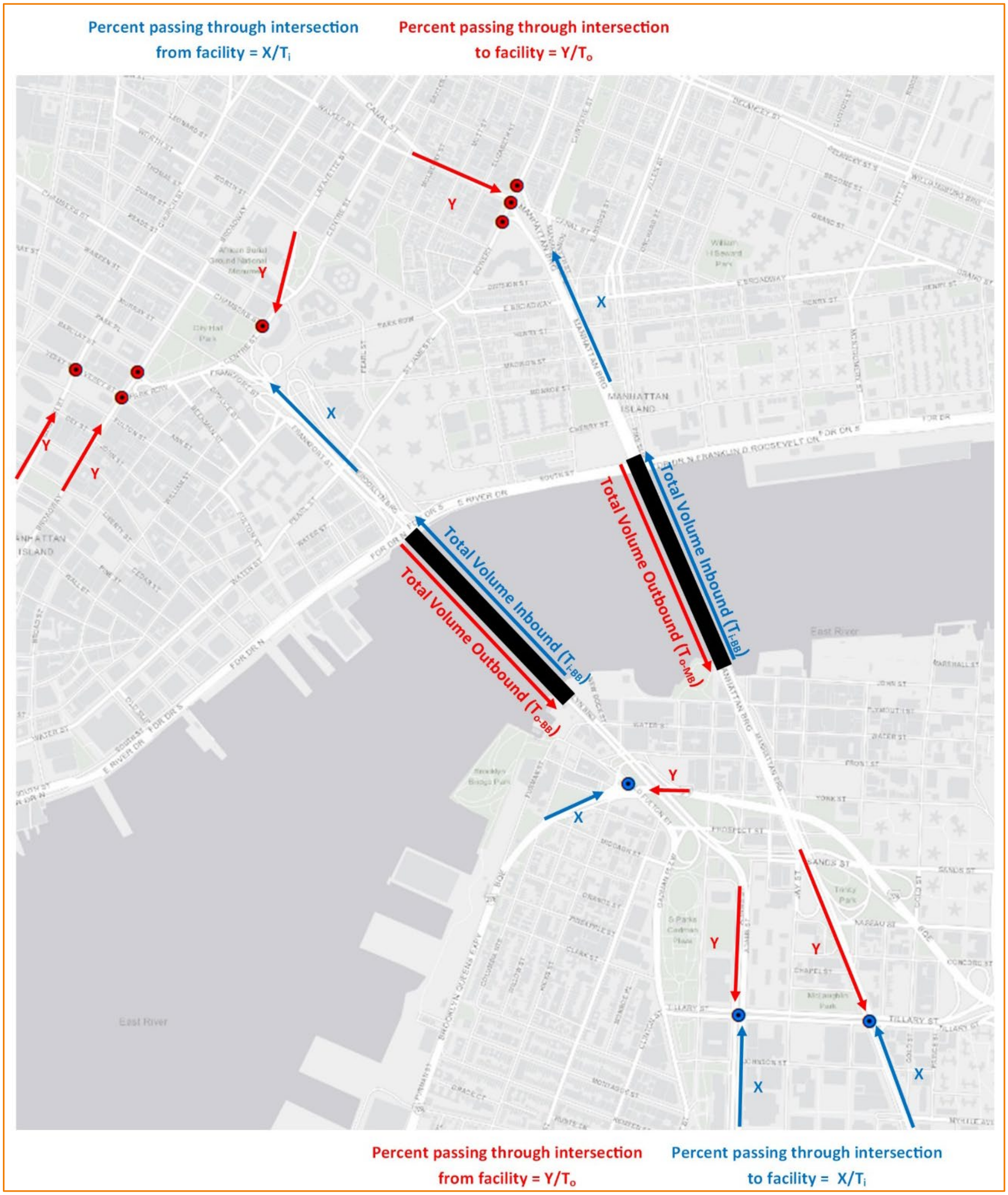
Table A-3 Inbound Adjustment of Projected Best Practice Model AM Period Changes in Facility Volumes

FACILITY	Δ	A	B	C=B*(1-A) or C=B*(1+A)	D	E	F = C x D x E	G	H		I = F + G + H
	BPM Nobuild - Existing Counts	Percent Difference	BPM Scenario Increment	Adjusted BPM Increment	Sector Adjustment	Value of Time Adjustment	Adjusted 6AM - 10AM	Bounceback Loss	Bounceback Gain	Bounce-Back To	**Total Facility Increment**
Queensboro Bridge (Lower)	4,584	75%	(3,922)	(985)	0.826	1.000	(814)	0	1,115	50% QMT and 50% RFK	**301**
Queensboro Bridge (Upper NR)	1,082	16%	(2,562)	(2,140)	0.826	1.000	(1,767)	0	0	100% RFKM	**(1,767)**
Queensboro Bridge (Upper SR)	797	(2%)	(2,058)	(2,101)	0.826	1.000	(1,735)	0	710	100% RFKM	**(1,025)**
Queens-Midtown Tunnel	337	3%	4,146	4,253	0.826	1.000	3,512	(2,787)	0	QBB LL, 15% WBB, 10% BB, 10% MB, 25% Q	**725**
Hugh L. Carey Tunnel	1,484	13%	2,598	2,944	0.890	1.000	2,621	(2,149)	0	20% WBB, 60% MB, and 20% BB	**472**
Holland Tunnel	606	6%	(356)	(336)	0.960	1.000	(323)	0	0	50% VNB and 50% GWB	**(322)**
Lincoln Tunnel	521	3%	(383)	(371)	0.960	1.000	(356)	0	0	100% LT	**(356)**
RFK Bridge - Manhattan	(2,184)	(19%)	961	777	0.642	1.000	499	(21)	0	60% QBB UL, 40% RFKM	**477**
Williamsburg Bridge	280	3%	(1,597)	(1,552)	0.890	1.000	(1,382)	0	848	35% QMT, 50% BB and 15% MB	**(534)**
Manhattan Bridge	6,311	59%	(10,331)	(4,281)	0.890	1.000	(3,812)	0	1,568	20% HCT, 40% WBB and 40% BB	**(2,244)**
Brooklyn Bridge	(2,320)	(16%)	(1,294)	(1,496)	0.890	1.000	(1,332)	0	709	20% HCT, 40% MB and 40% WB	**(624)**
George Washington Bridge	7,865	21%	(665)	(526)	0.960	1.000	(505)	0	0	50% HT and 50% LT	**(505)**
Henry Hudson Bridge	5,184	118%	(448)	81	0.458	1.000	37	0	0	100% RFKM	**37**
Verrazzano-Narrows Bridge	20,993	135%	(224)	80	0.425	1.000	34	(0)	0	50% HT and 50% LT	**33**
60th St Crossings	5,579	9%	(13,532)	(12,358)	0.920	1.000	(11,371)	0	9	-	**(11,363)**

A.3. INTERSECTION ASSIGNMENT

After the BPM results are normalized at each crossing facility, the hourly increment between the No Action Alternative and CBD Tolling Alternative facility volumes were distributed to the study locations for each analysis hour based on StreetLight Data, Inc. GPS travel data. The distribution was performed separately for inbound traffic (entering Manhattan), outbound traffic (exiting Manhattan), non-Manhattan locations, and Manhattan locations. These distributions were then combined to calculate the total traffic increment at each study location. The process is described below and illustrated in **Figure A-3**.

Figure A-3 Traffic Assignment to Specific Intersections



A.3.1. Inbound Assignment

NON-MANHATTAN

The percentage of facility trips that pass through each non-Manhattan intersection destined to a facility crossing during each peak period is calculated from data provided by StreetLight Data, Inc.. This percentage is applied to the facility Action increment to calculate the inbound increment by facility for each intersection. After the facility increments are calculated they were added together to derive the total inbound increment for each non-Manhattan intersection location.

MANHATTAN CBD

The percentage of facility trips that pass through each Manhattan intersection originating at a facility crossing during each peak period was calculated from data provided by StreetLight Data, Inc.. This percentage was applied to the facility Action increment to calculate the inbound increment by facility for each location. After the facility increments were calculated they were added together to derive the total inbound increment for each Manhattan intersection location.

A.3.2. Outbound Assignment

MANHATTAN CBD

The percentage of facility trips that pass through each Manhattan intersection destined to a facility crossing during each peak period was calculated from data provided by StreetLight Data, Inc.. This percentage was applied to the facility Action increment to calculate the outbound increment by facility for each intersection. After the facility increments were calculated they were added together to derive the total outbound increment for each Manhattan location.

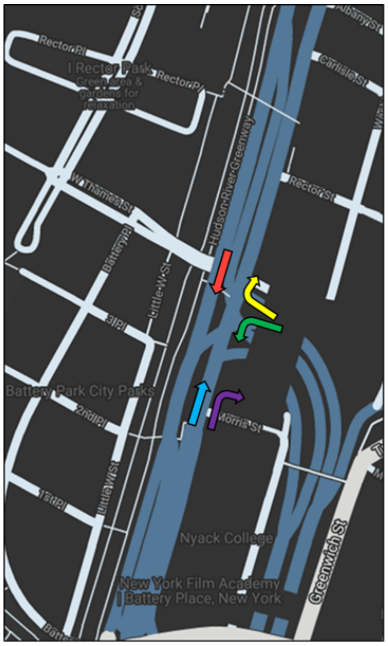
NON-MANHATTAN

The percentage of facility trips that pass through each non-Manhattan intersection originating at a facility crossing during each peak period was calculated from data provided by StreetLight Data, Inc.. This percentage was applied to the facility Action increment to calculate the outbound increment by facility for each location. After the facility increments were calculated they were added together to derive the total outbound increment for each non-Manhattan intersection location.

A.3.3. Northern Manhattan (Non-Manhattan CBD) Assignment

The normalized volume entering the Manhattan CBD at 60th Street was assigned as southbound traffic at Manhattan intersection locations in the Upper East and Upper West study areas while the normalized volume exiting the Manhattan CBD at 60th Street were assigned as northbound traffic at Manhattan intersection locations in the Upper East and Upper West study areas.

Figure A-4 Example of Traffic Assignment Methodology



Facility Source	Outbound (Away from CBD)			Assigned to?					Inbound (Towards CBD)			Assigned to?				
	% of Increment	Total Increment	Assigned Increment	NBT	NBR	SBT	WBL	WBR	% of Increment	Total Increment	Assigned Increment	NBT	NBR	SBT	WBL	WBR
George Washington Bridge	0.1%	342	1						1.9%	-115	(2)					
Holland Tunnel	7.5%	-294	(22)						12.1%	-85	(10)					
Lincoln Tunnel	0.8%	-171	(1)						3.3%	-120	(4)					
Verrazzano-Narrows Bridge	54.3%	5	2						-	-	0					
Brooklyn Bridge	8.8%	196	17						1.5%	-356	(5)					
Hugh L. Carey Tunnel	97.6%	187	182						87.4%	324	283					
Manhattan Bridge	0.9%	-201	(2)						0.4%	-897	(3)					
Queensboro (59th Street) Bridge - Upper Level	0.0%	0	0						1.1%	4	0					
Queensboro (59th Street) Bridge - Lower Level	0.1%	-499	(0)						1.1%	50	1					
Queens Midtown Tunnel	0.5%	3	0						2.8%	106	3					
Robert F. Kennedy (Triborough) Bridge	0.5%	474	2						2.0%	0	0					
Williamsburg Bridge	1.0%	-172	(2)						0.7%	12	0					
11th Ave	7.9%	-70	(6)						7.9%	-120	(9)					
10th Ave	2.6%	-200	(5)						-	-	0					
9th Ave	-	-	0						5.1%	-208	(11)					
Broadway	1.1%	0	0						1.1%	-157	(2)					
Queensboro Bridge Exit	3.1%	-161	(5)						-	-	0					
3rd Ave	0.4%	-252	(1)						-	-	0					
York Ave	5.9%	0	0						5.9%	-98	(6)					
2nd Ave	-	-	0						0.5%	-218	(1)					
1st Ave	3.3%	-283	(9)						-	-	0					
Lexington Ave	-	-	0						0.7%	-208	(1)					
Park Ave	0.4%	-161	(1)						0.4%	0	0					
Madison Ave	0.9%	-159	(1)						-	-	0					
5th Ave	-	-	0						0.5%	-174	(1)					
West Side Highway	0.1%	-503	(1)						1.9%	-836	(16)					
FDR Drive	0.5%	-770	(4)						2.0%	-972	(19)					
Sum (If Assigned)			152								195					

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.2, Transportation:

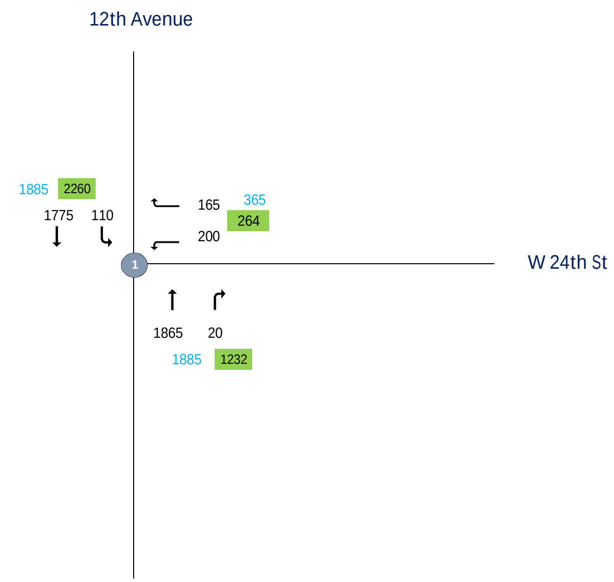
Traffic Flow Maps

August 2022

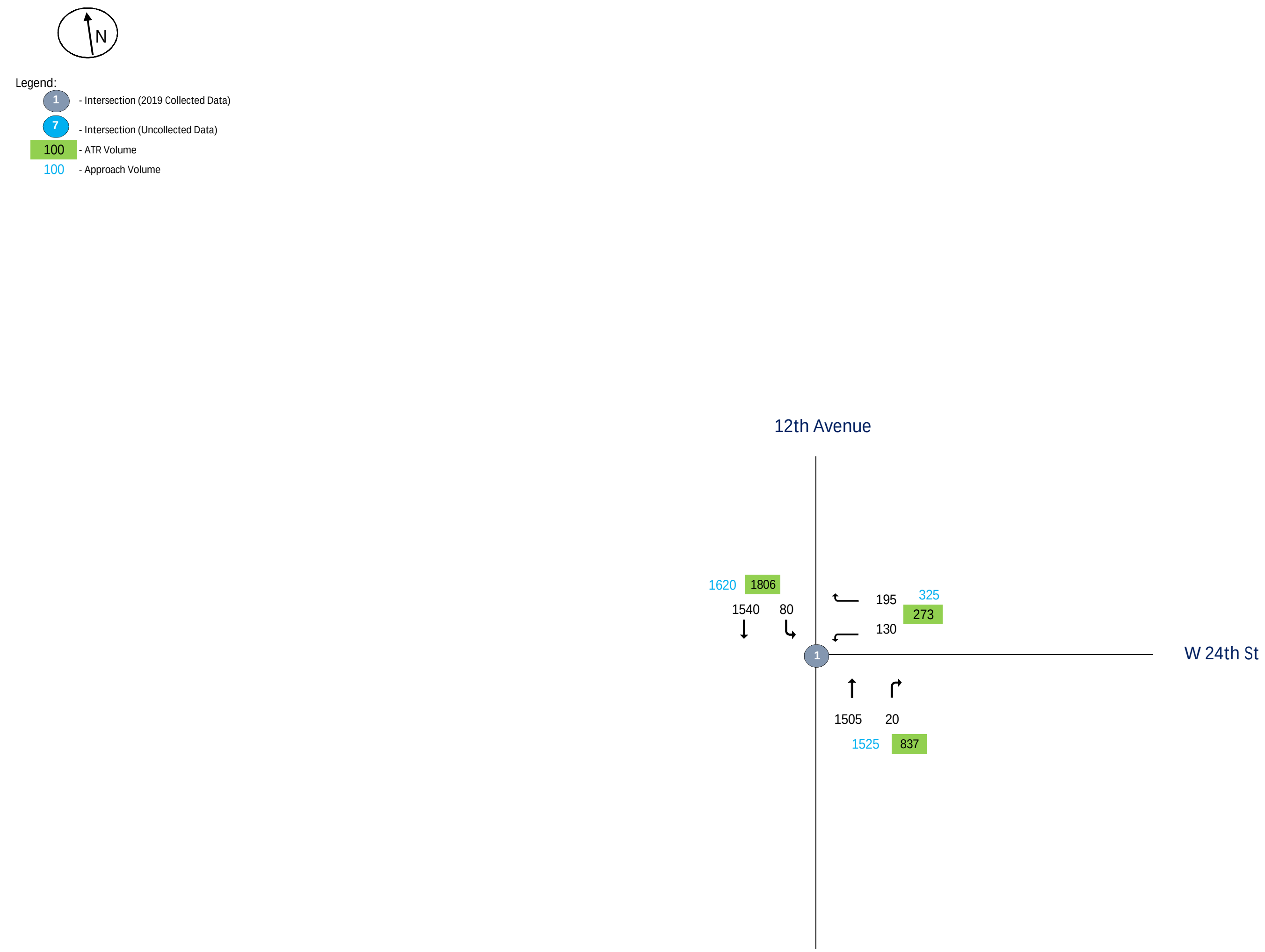
CBD Tolling
9A - Traffic Flowmap
AM Existing

N

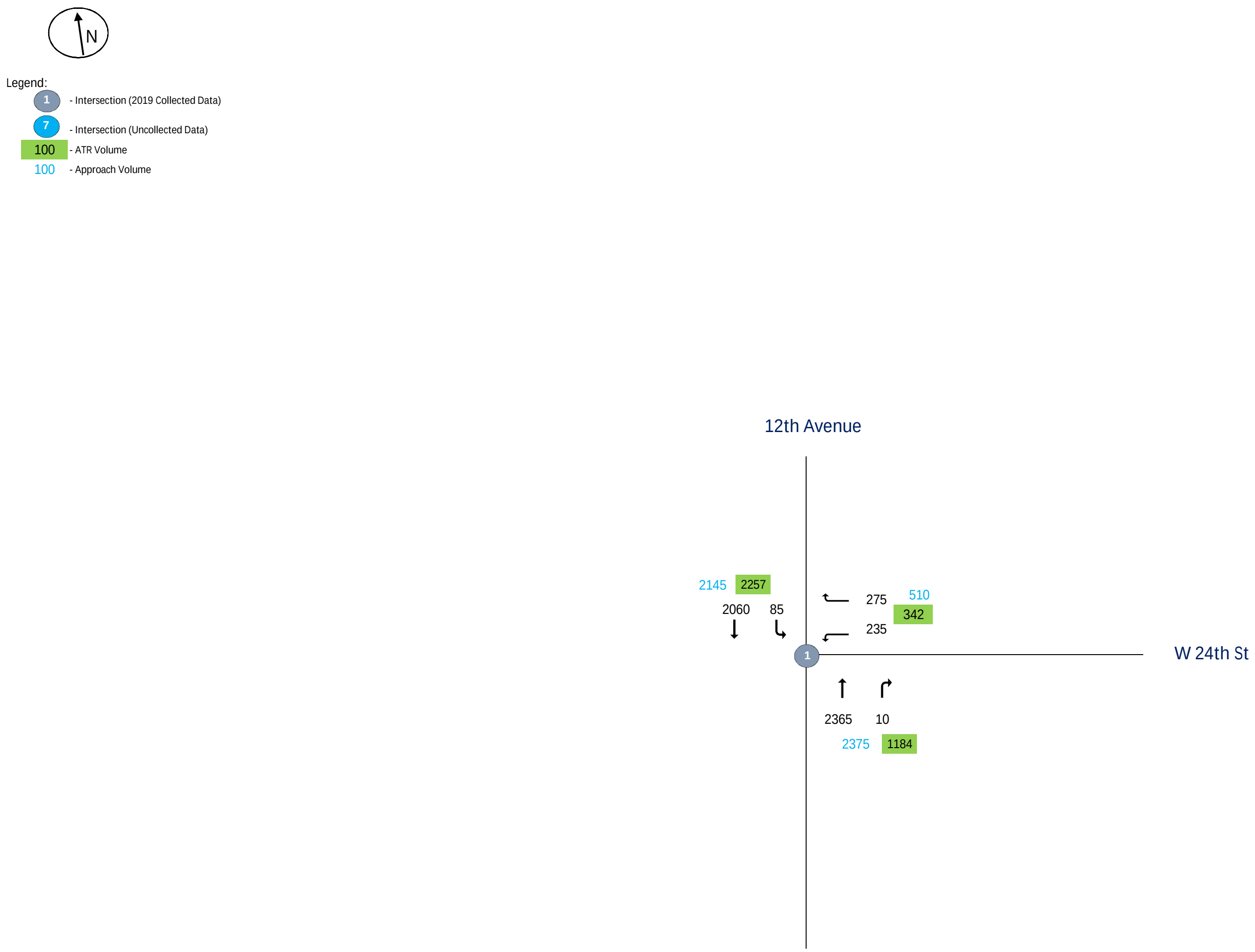
Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



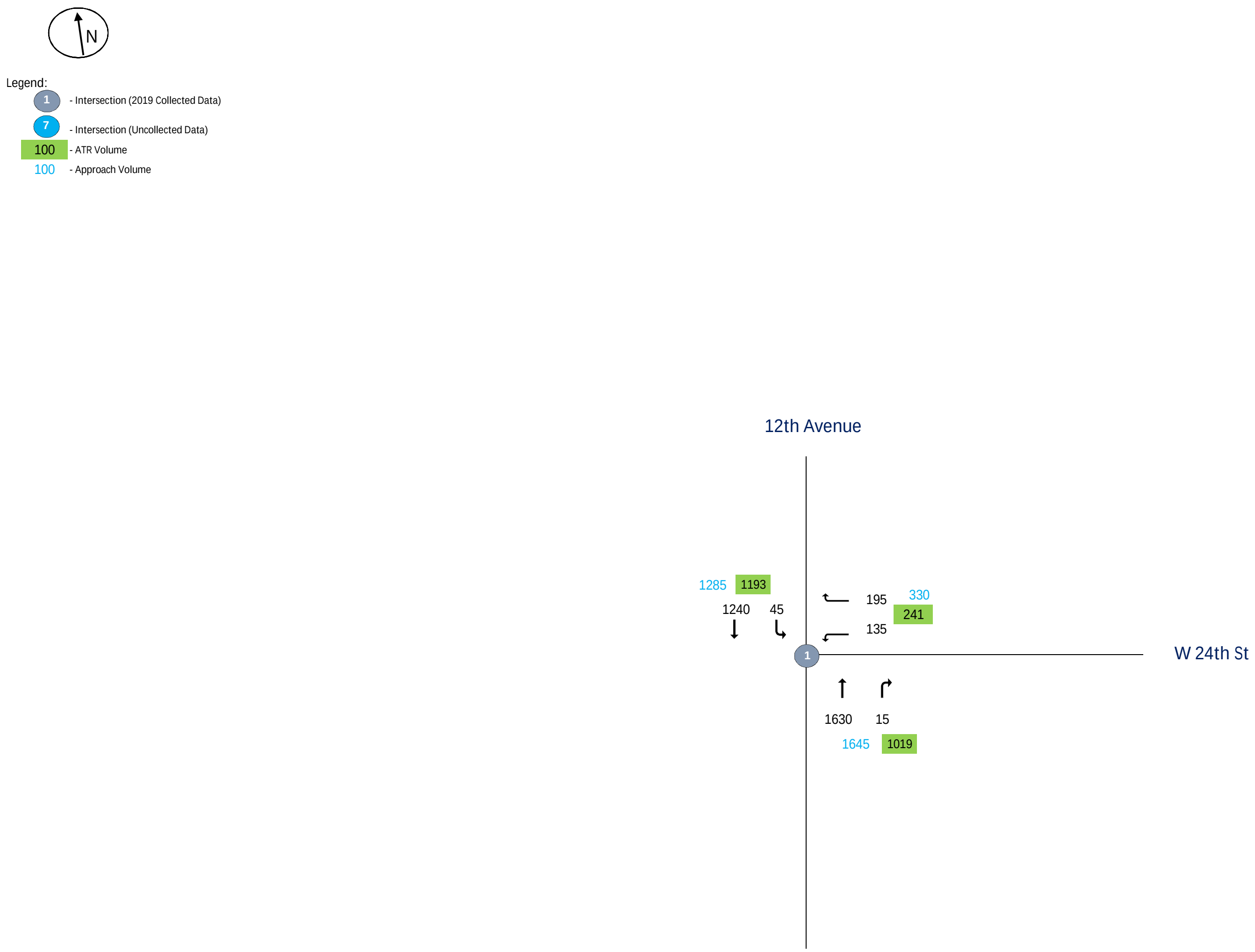
CBD Tolling
9A - Traffic Flowmap
MD Existing



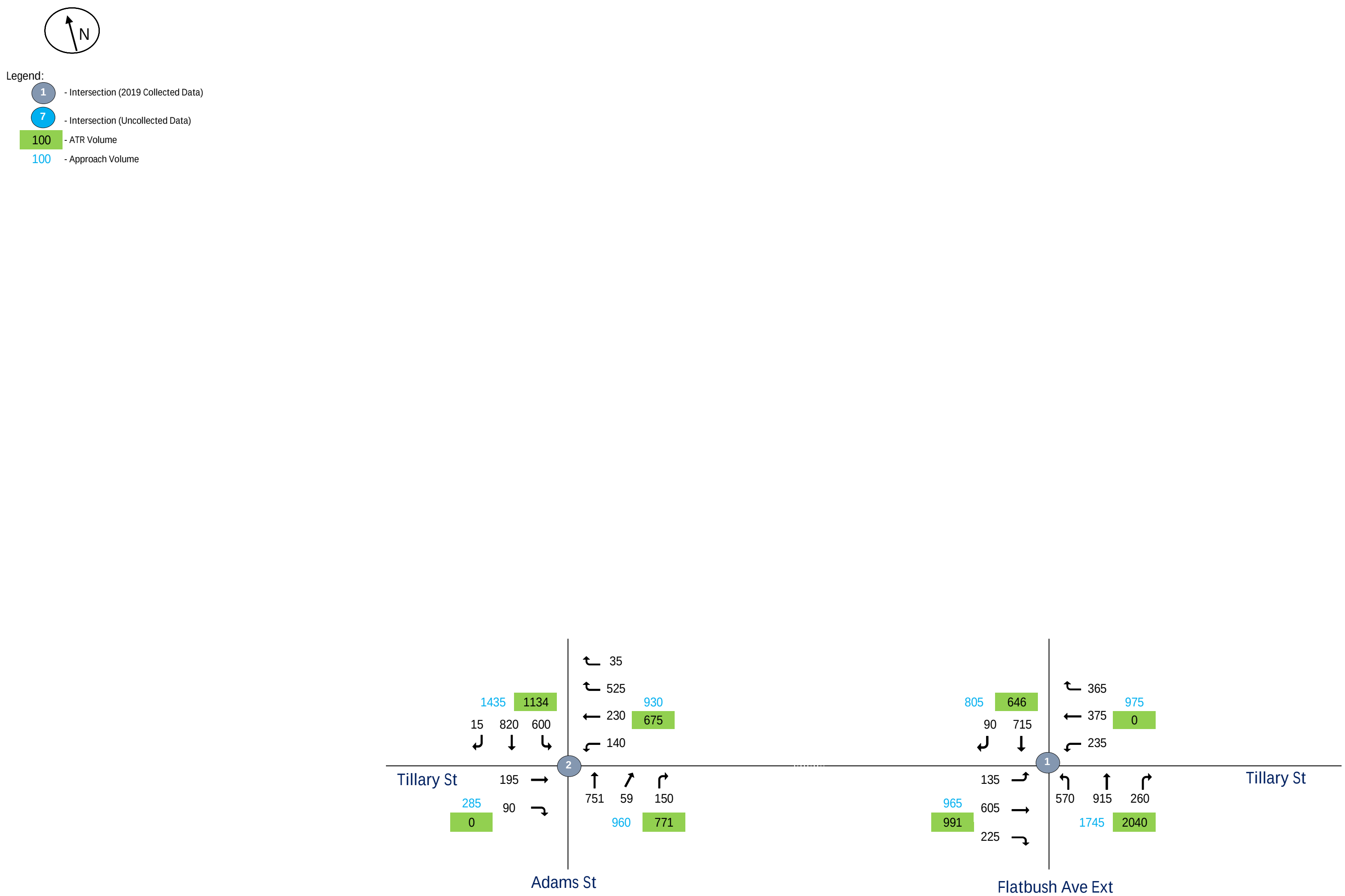
CBD Tolling
9A - Traffic Flowmap
PM Existing

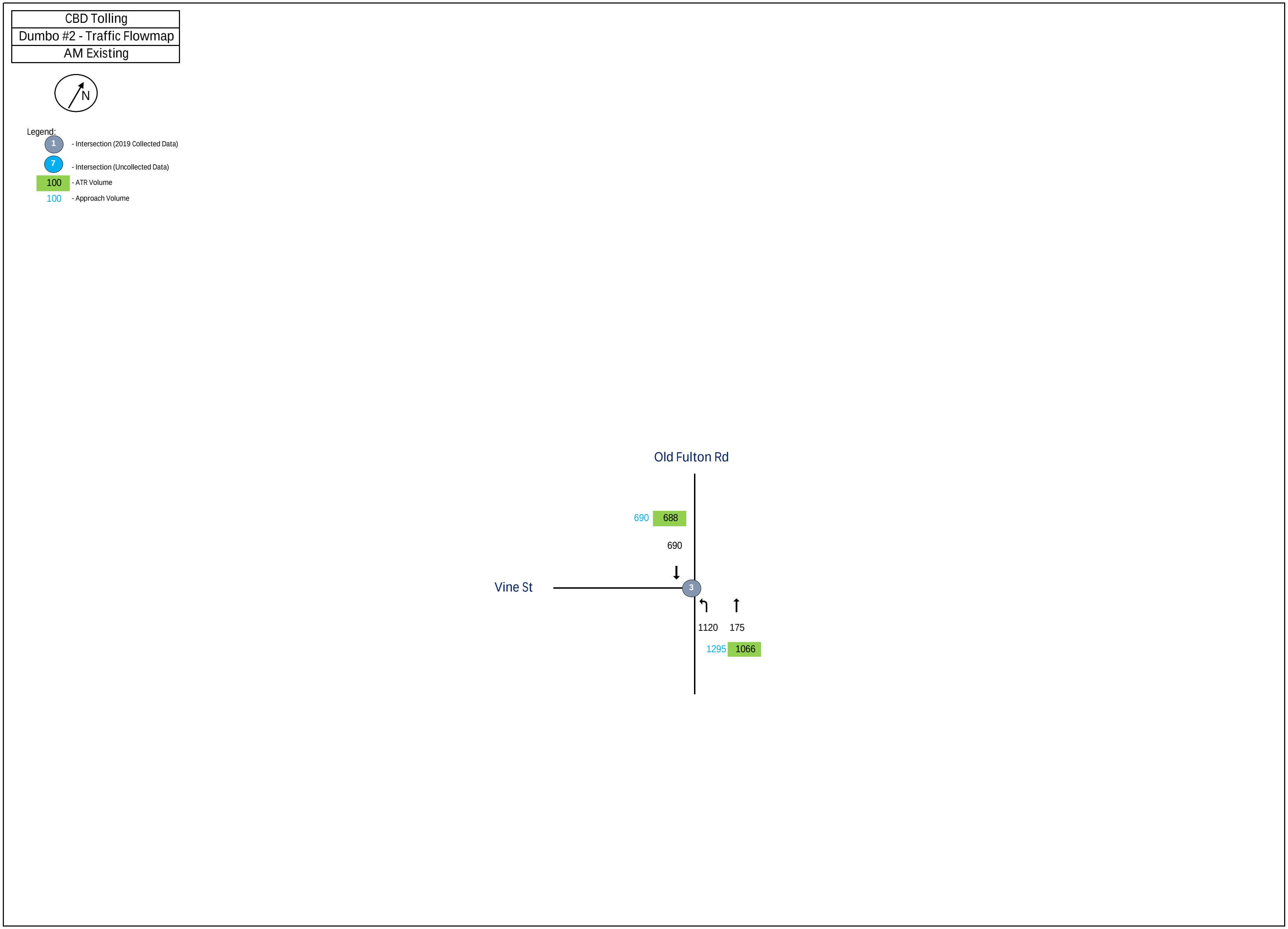


CBD Tolling
9A - Traffic Flowmap
LN Existing



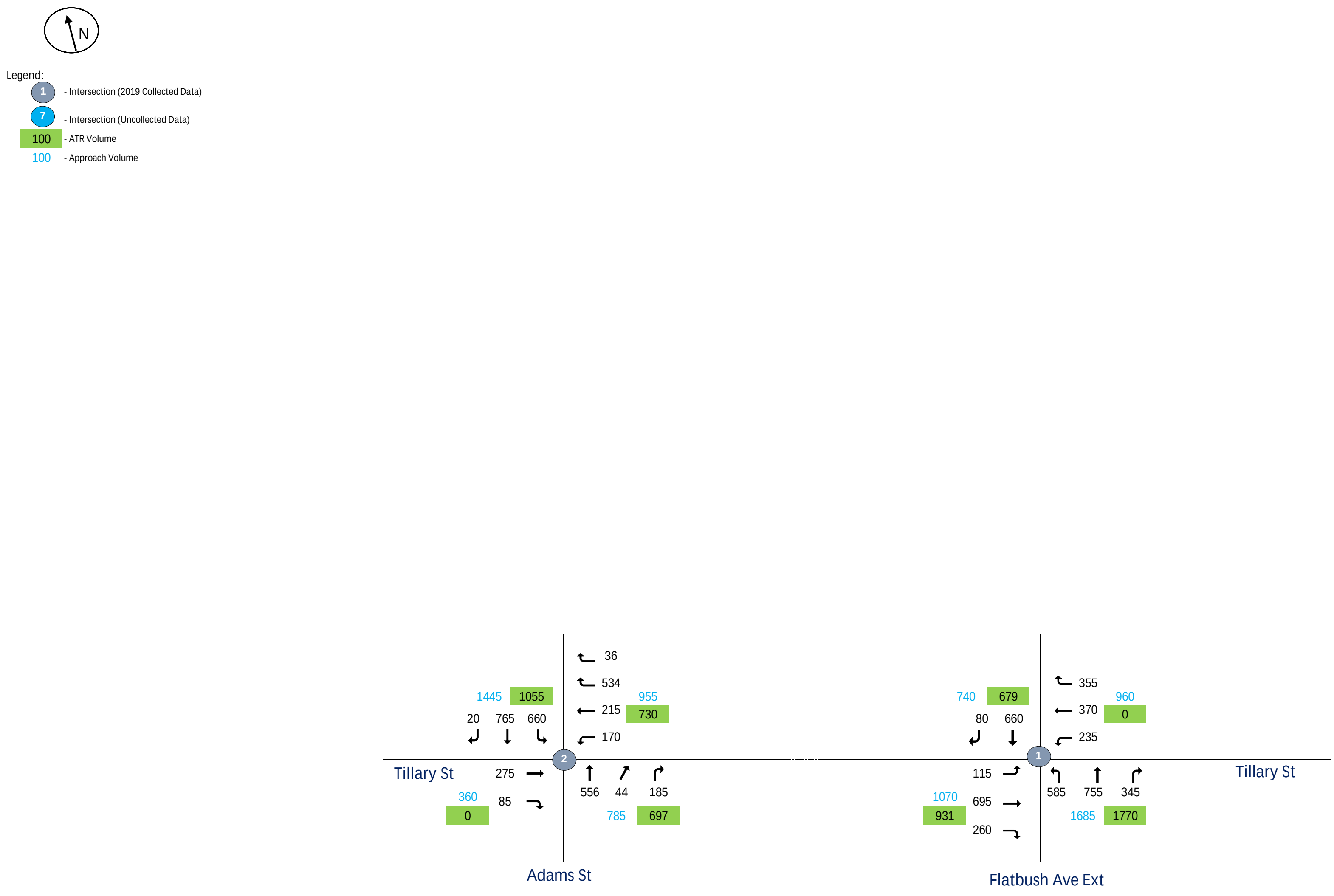
CBD Tolling
Dumbo - Traffic Flowmap
AM Existing



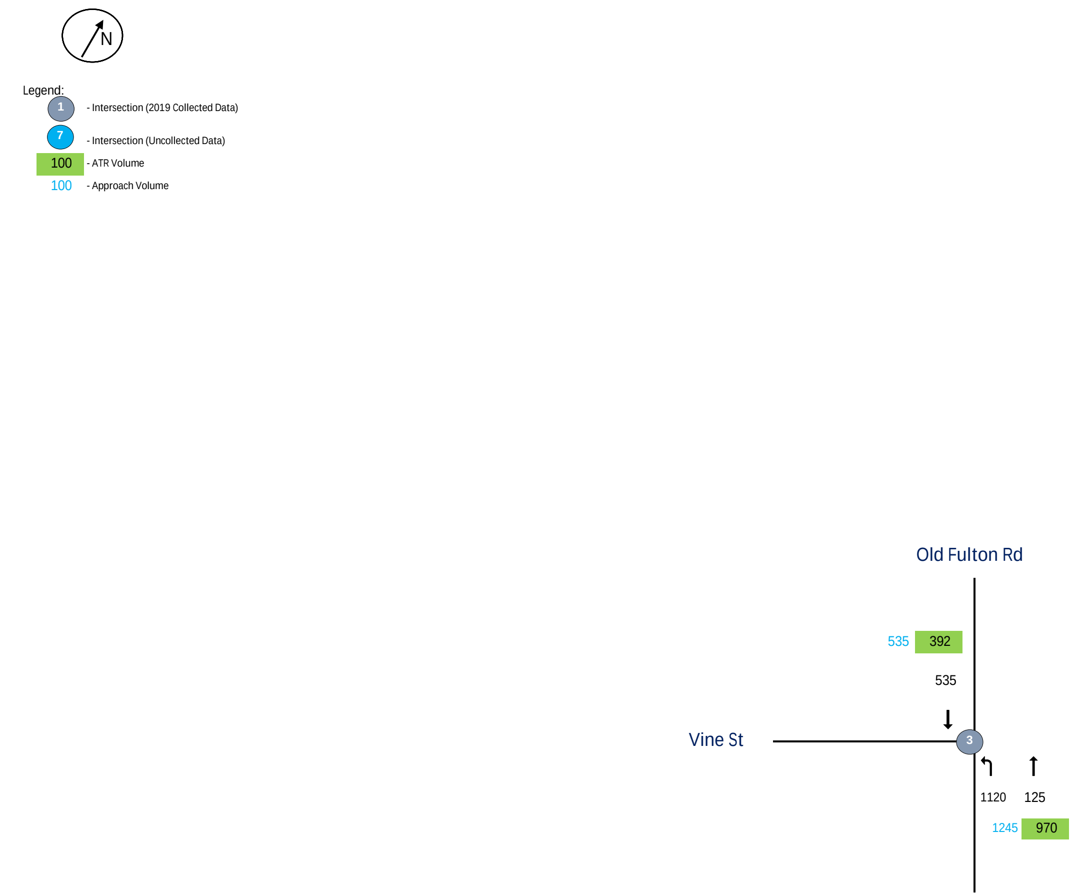


CBD Tolling
Dumbo #2 - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Old Fulton Rd
690
688
690
Vine St
3
1120
175
1295
1066

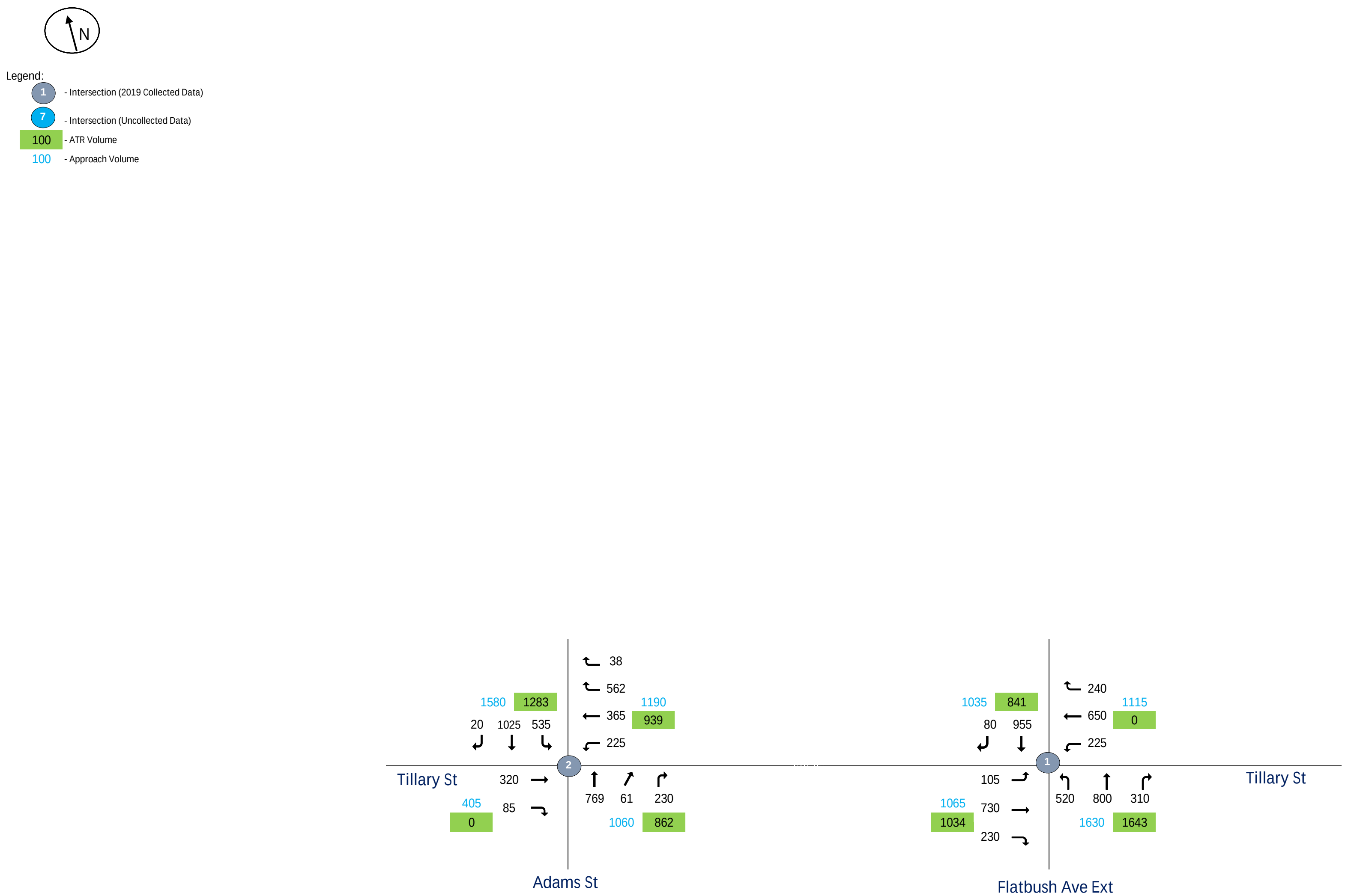
CBD Tolling
Dumbo - Traffic Flowmap
MD Existing



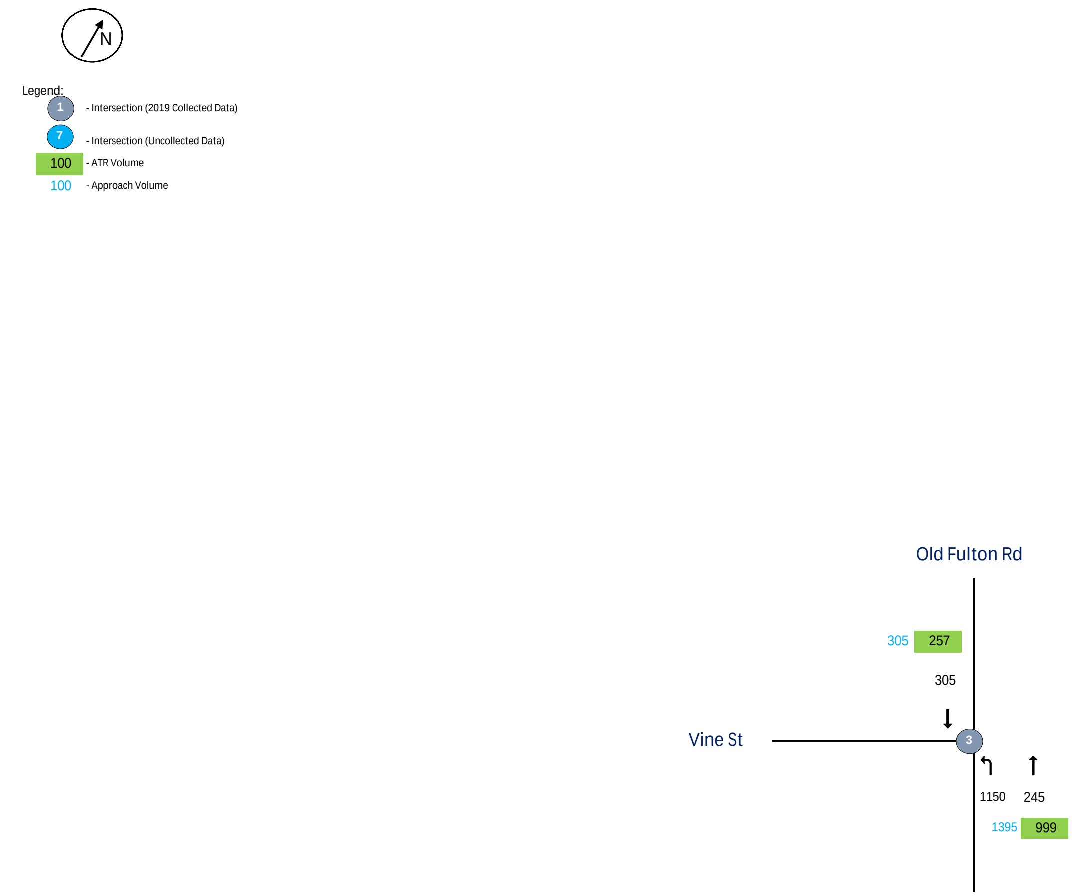
CBD Tolling
Dumbo #2 - Traffic Flowmap
MD Existing



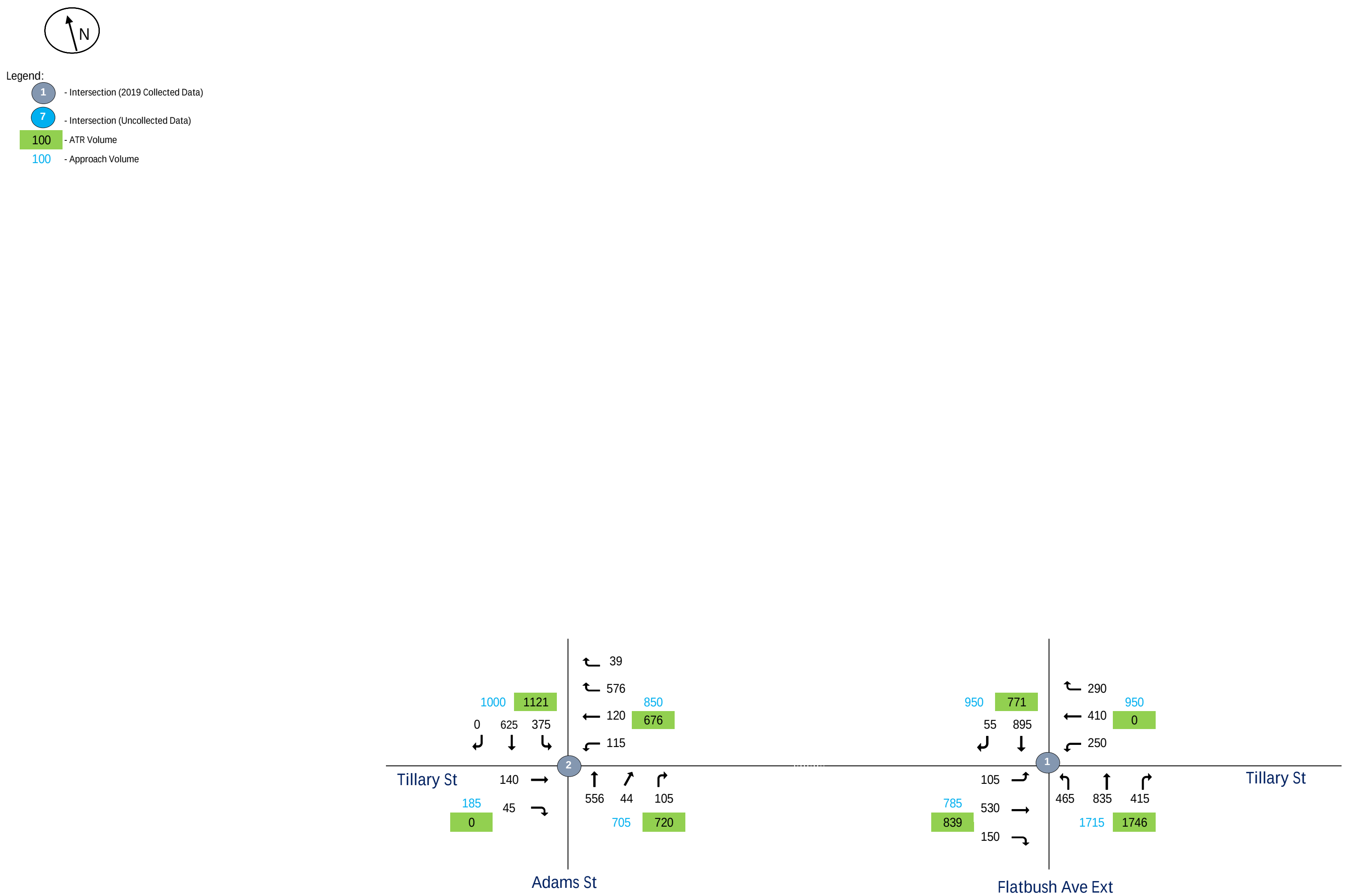
CBD Tolling
Dumbo - Traffic Flowmap
PM Existing



CBD Tolling
Dumbo #2 - Traffic Flowmap
PM Existing



CBD Tolling
Dumbo - Traffic Flowmap
LN Existing



CBD Tolling

Dumbo #2 - Traffic Flowmap

LN Existing

N

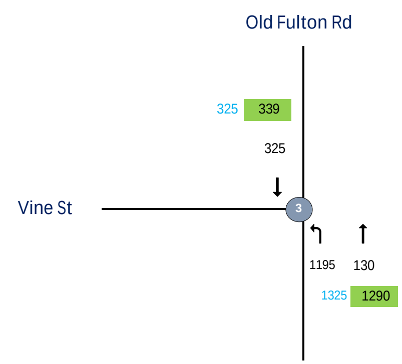
Legend:

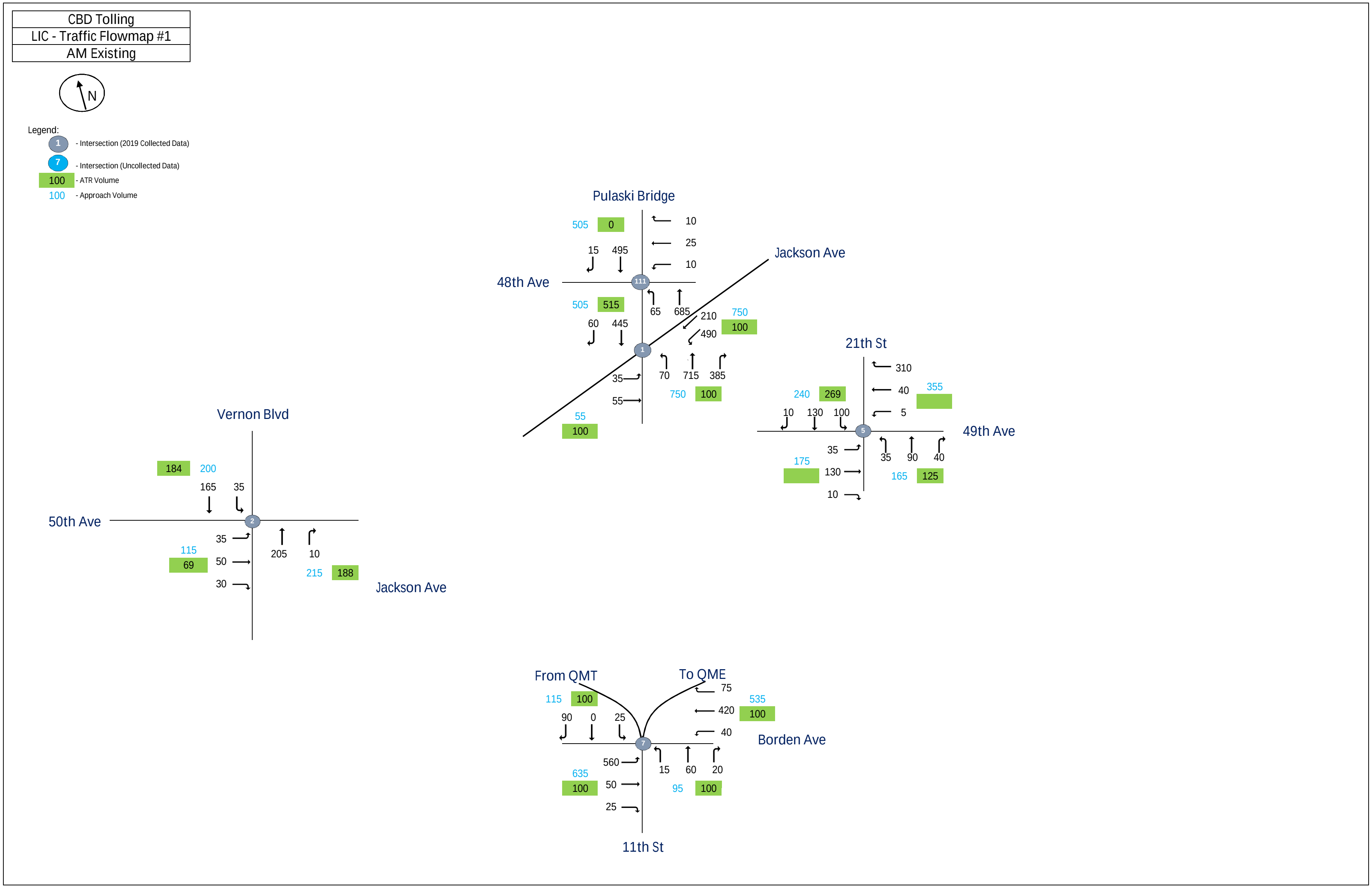
1 - Intersection (2019 Collected Data)

7 - Intersection (Uncollected Data)

100 - ATR Volume

100 - Approach Volume




CBD Tolling
LIC - Traffic Flowmap #1
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
48th Ave
Jackson Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St
505
0
15
495
10
25
10
65
685
505
515
60
445
210
490
750
100
70
715
385
35
55
750
100
55
100
310
40
5
240
269
355
10
130
100
35
90
40
35
175
130
10
165
125
184
200
165
35
35
205
10
115
69
50
30
215
188
115
100
90
0
25
75
420
40
535
100
560
15
60
20
635
100
50
95
100
25

CBD Tolling

LIC - Traffic Flowmap #2

AM Existing

N

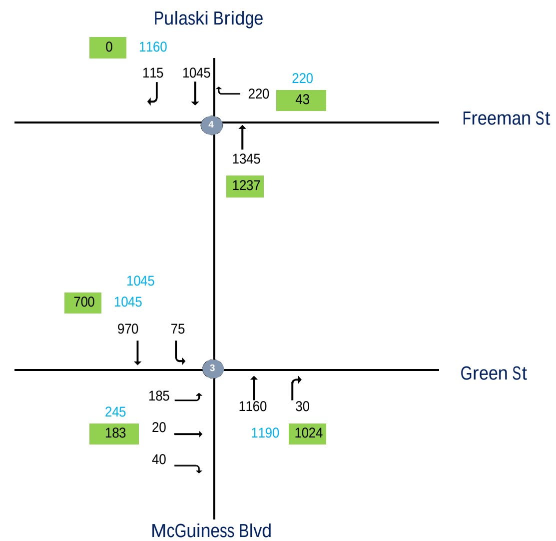
Legend:

1 - Intersection (2019 Collected Data)

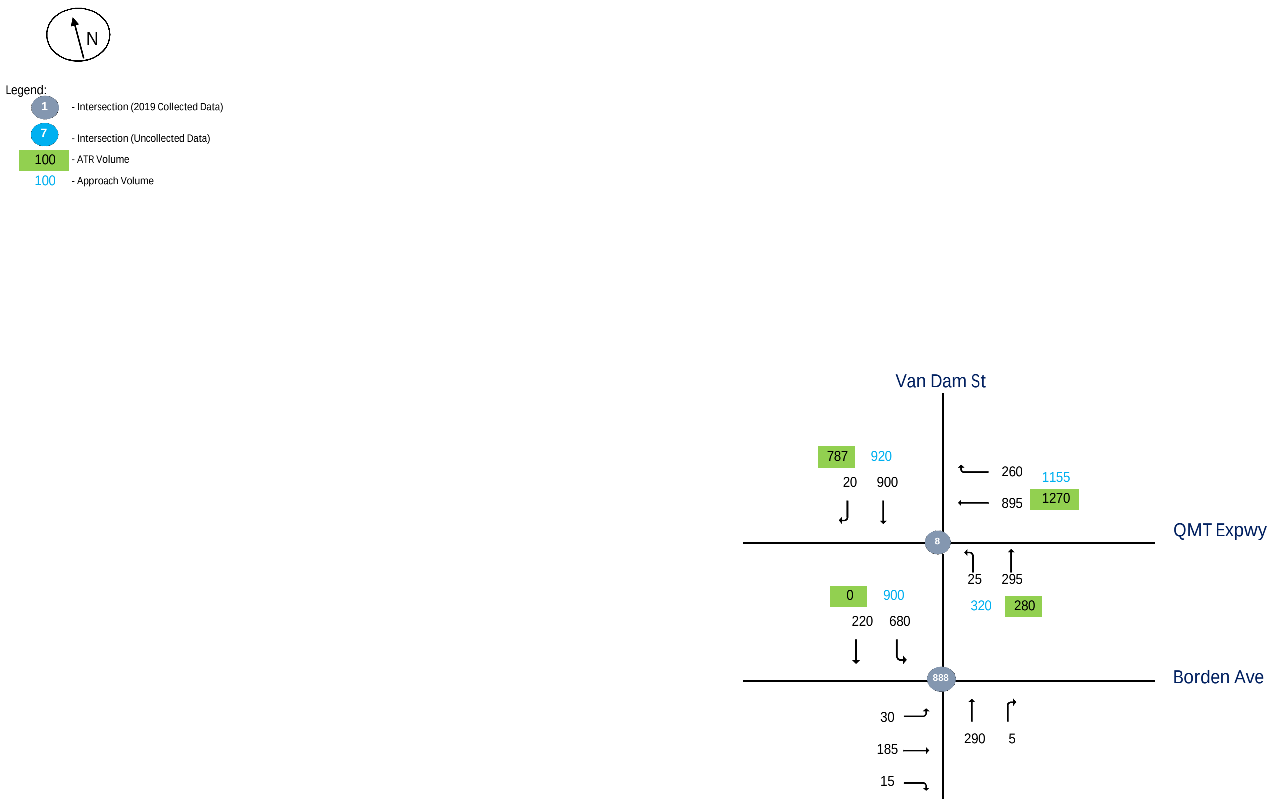
7 - Intersection (Uncollected Data)

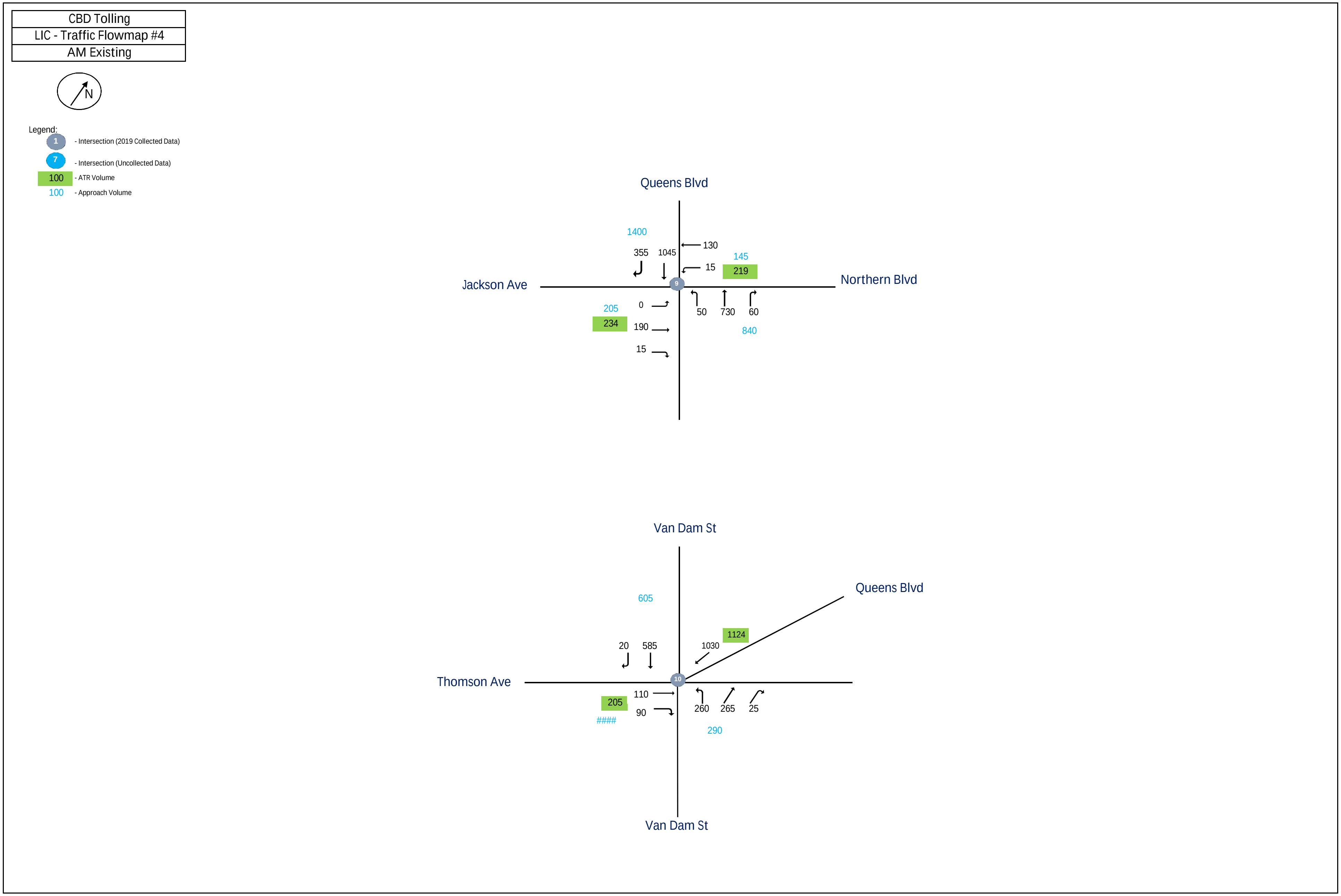
100 - ATR Volume

100 - Approach Volume



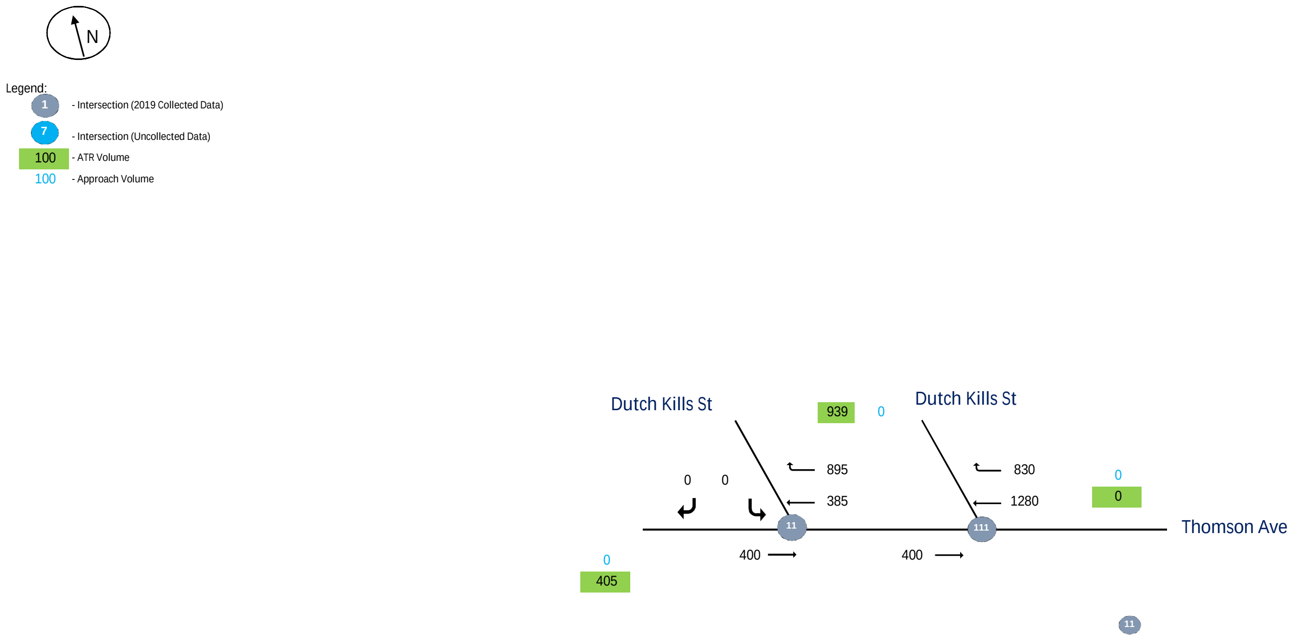
CBD Tolling
LIC - Traffic Flowmap #3
AM Existing



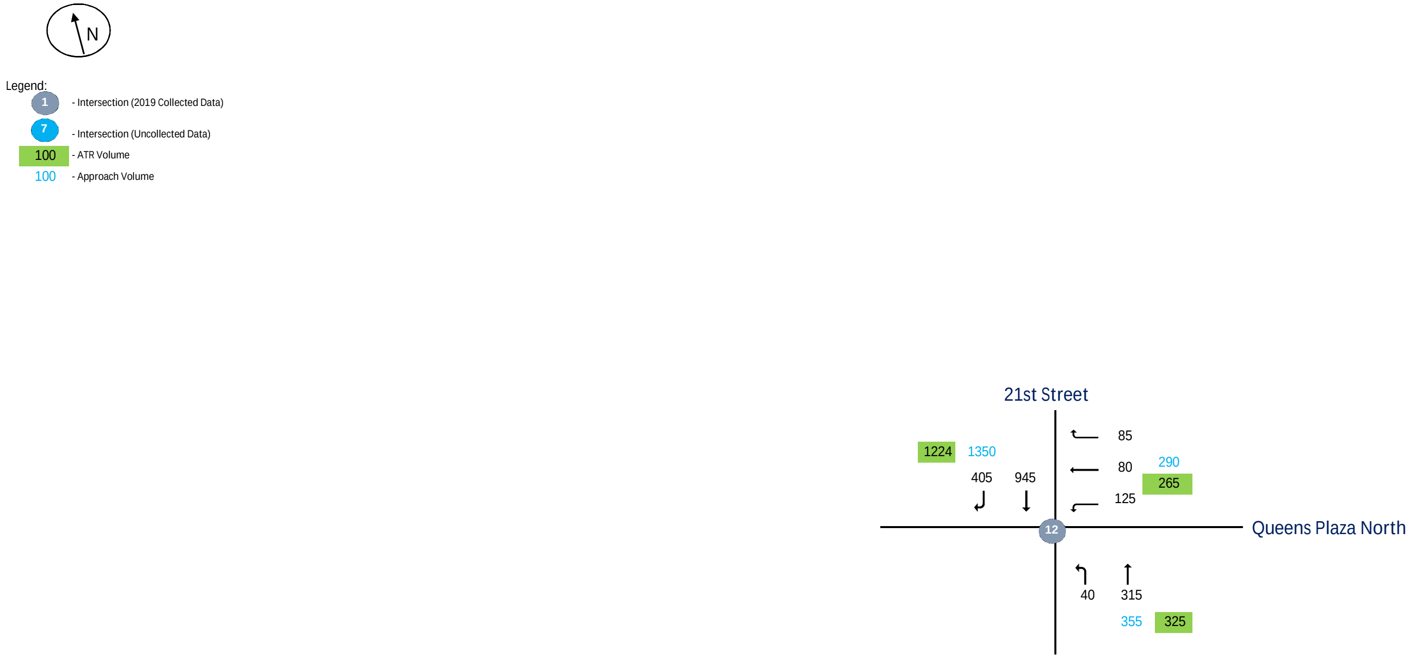


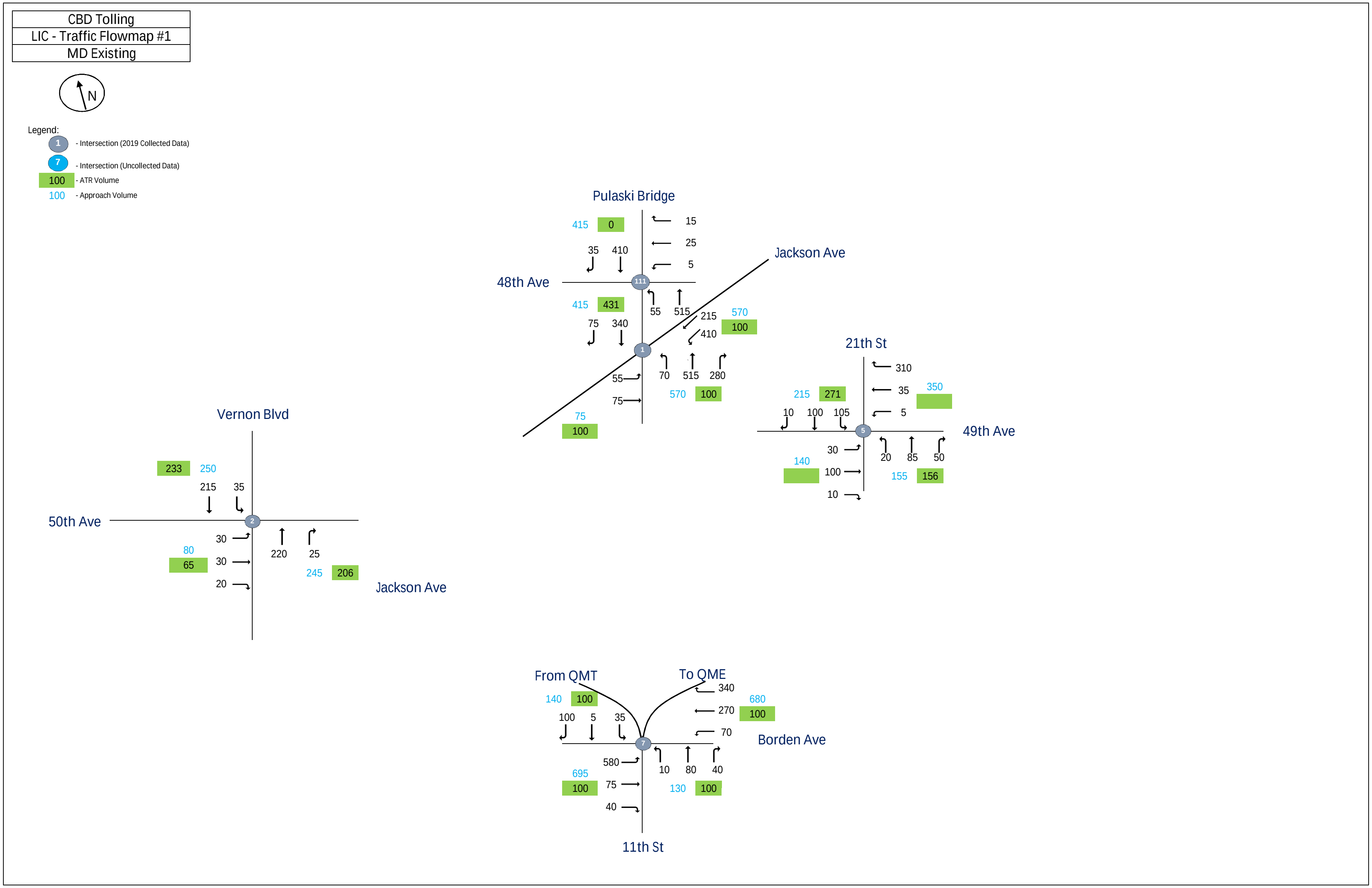
CBD Tolling
LIC - Traffic Flowmap #4
AM Existing
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Queens Blvd
1400
355
1045
130
15
145
219
Jackson Ave
9
Northern Blvd
205
0
234
190
15
50
730
60
840
Van Dam St
Queens Blvd
605
1124
20
585
1030
Thomson Ave
10
110
205
90
####
260
265
25
290
Van Dam St

CBD Tolling
LIC - Traffic Flowmap #5
AM Existing



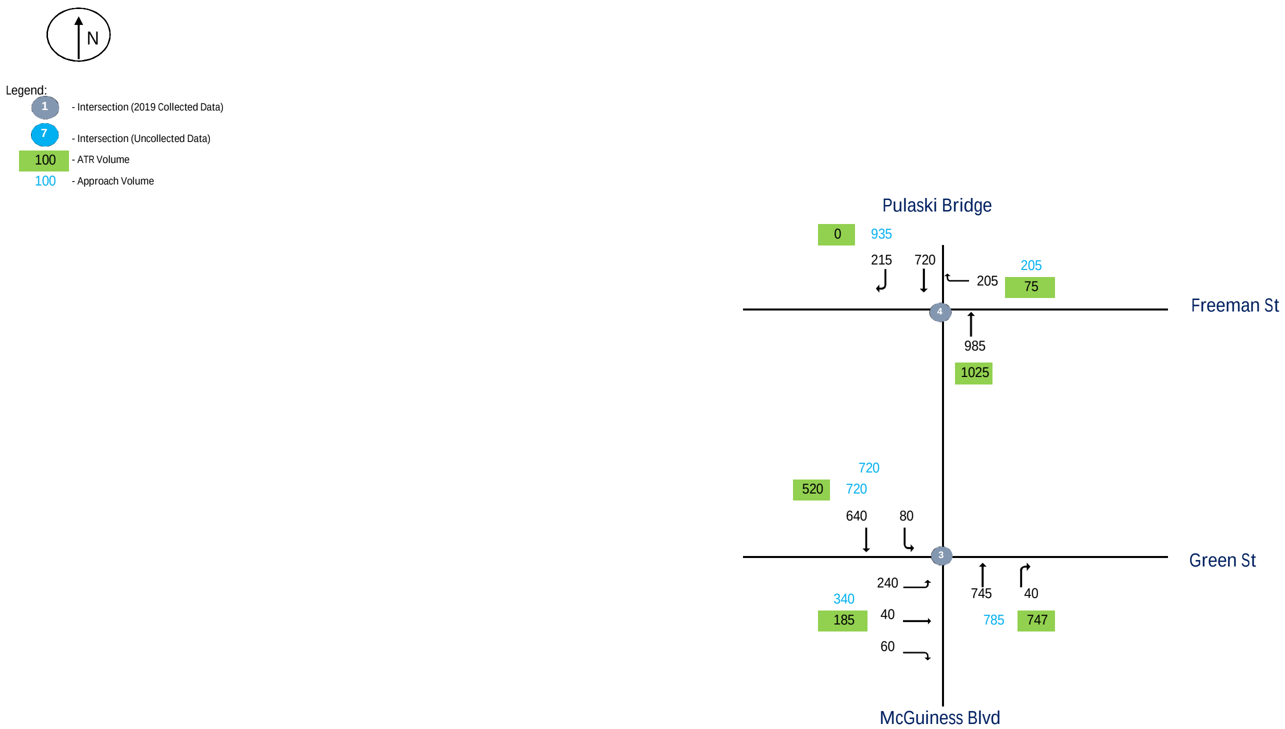
CBD Tolling
LIC - Traffic Flowmap #6
AM Existing





CBD Tolling
LIC - Traffic Flowmap #1
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
48th Ave
Jackson Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St

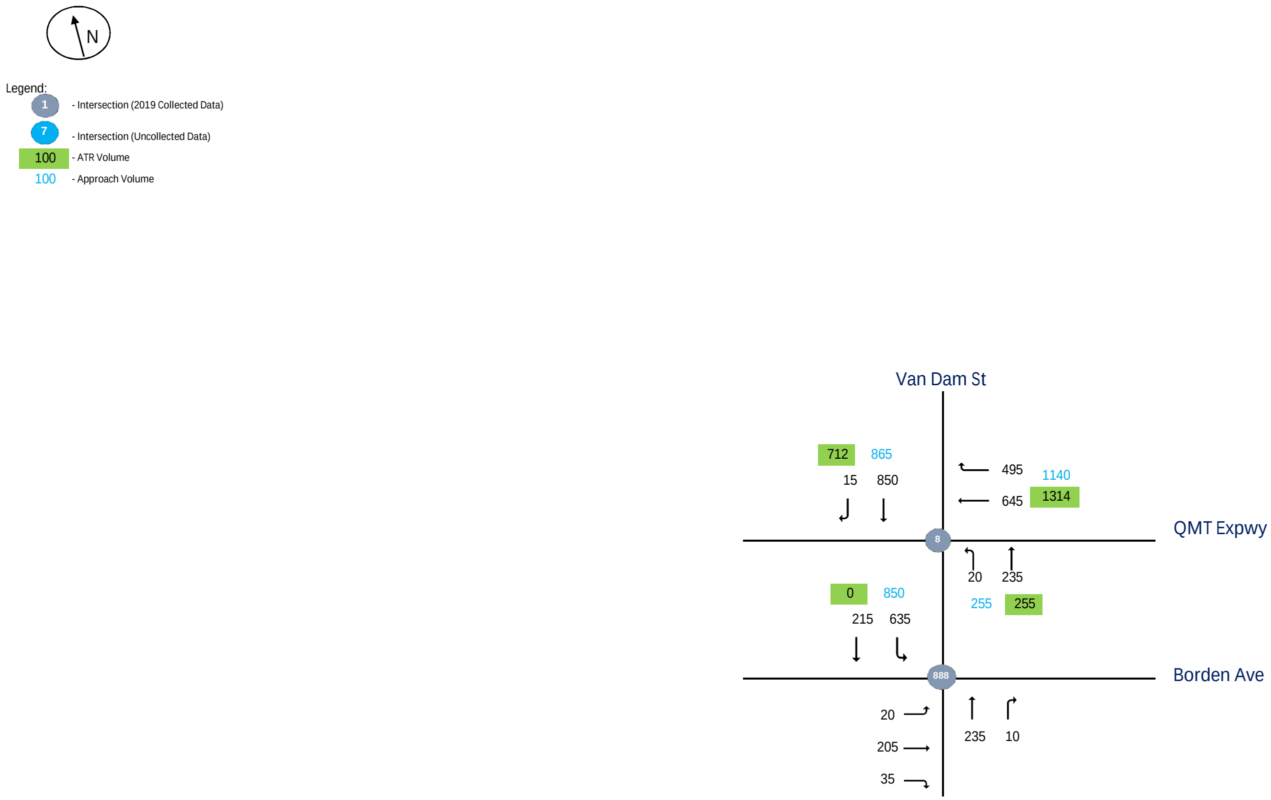
CBD Tolling
LIC - Traffic Flowmap #2
MD Existing



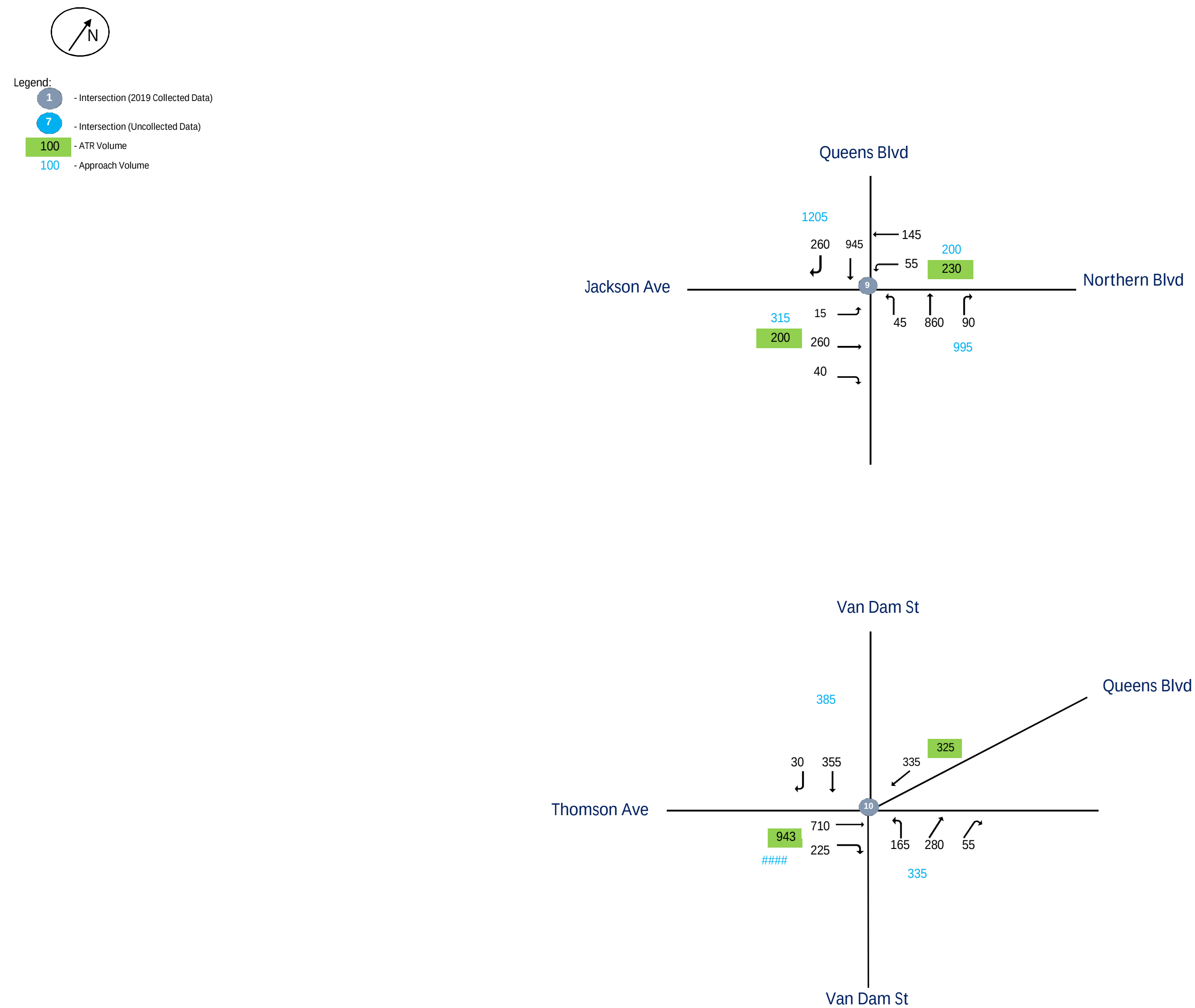
CBD Tolling

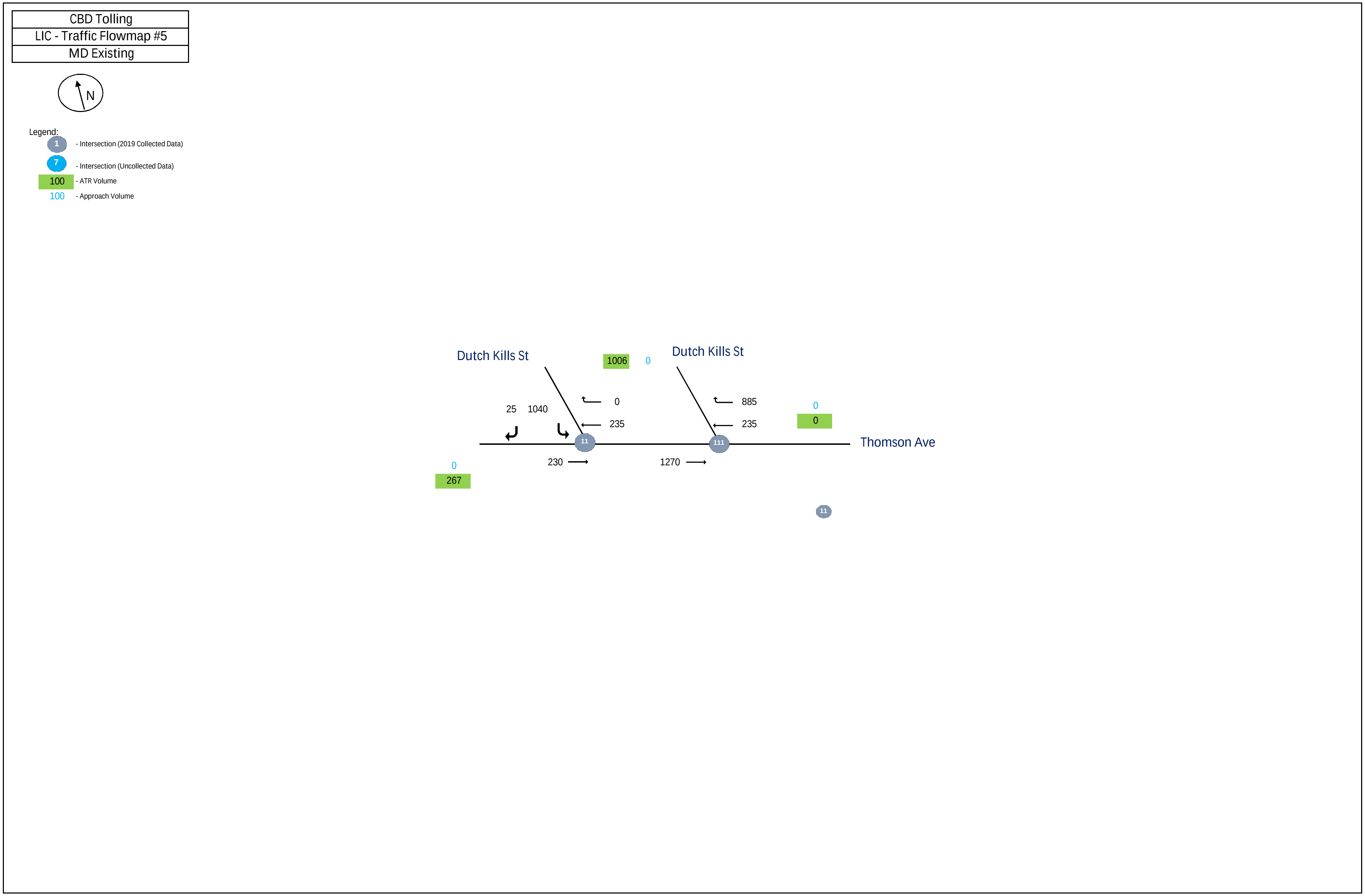
LIC - Traffic Flowmap #3

MD Existing



CBD Tolling
LIC - Traffic Flowmap #4
MD Existing

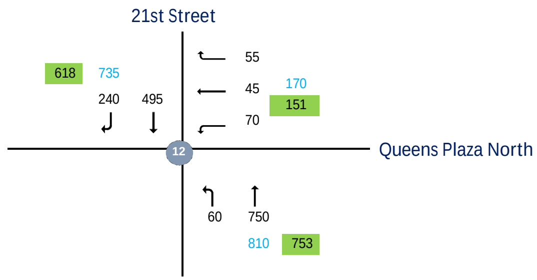


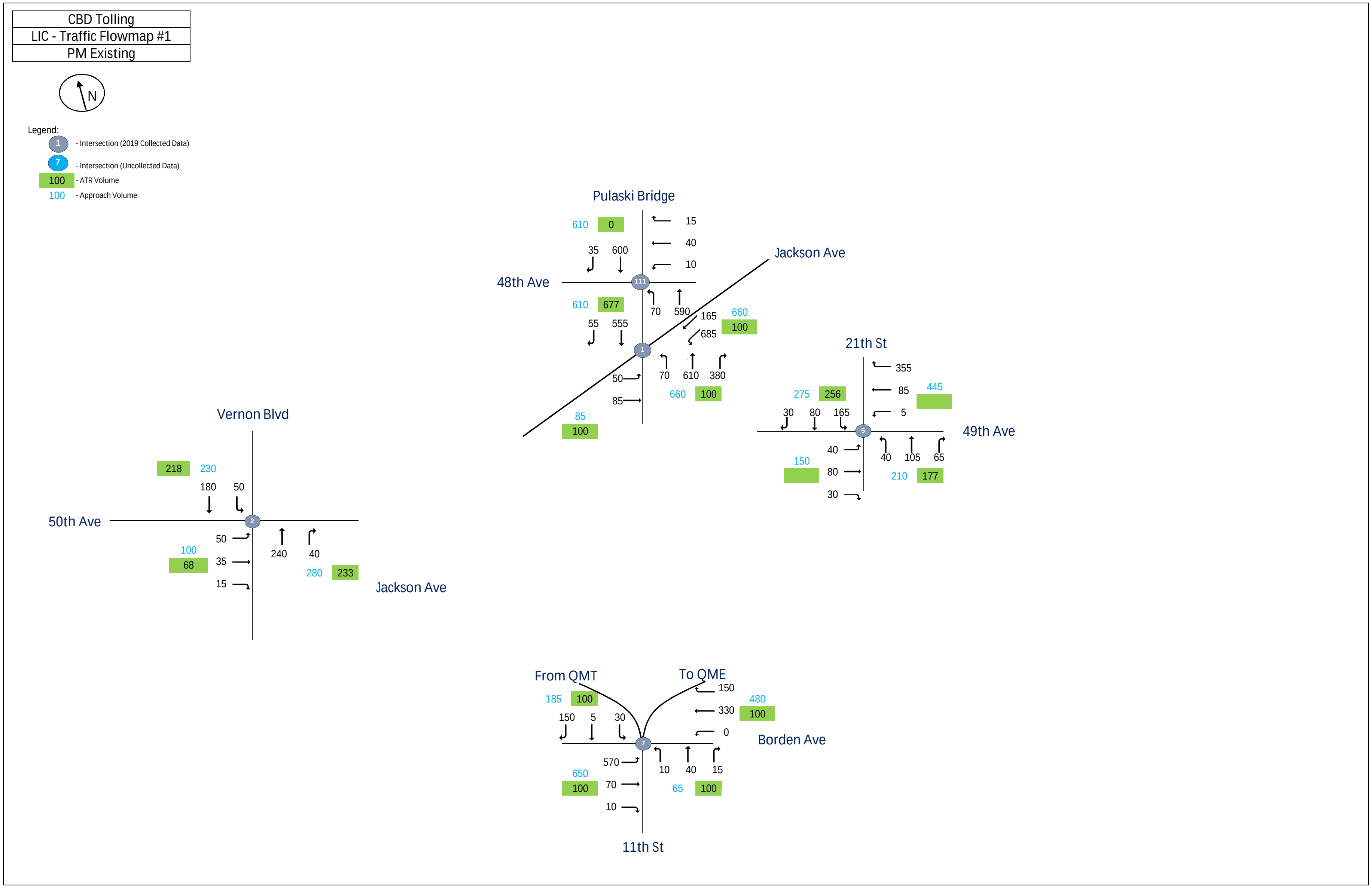


CBD Tolling
LIC - Traffic Flowmap #5
MD Existing
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Dutch Kills St
1006
0
Dutch Kills St
0
885
25
1040
235
235
0
0
11
111
Thomson Ave
230
1270
0
267
11

CBD Tolling
LIC - Traffic Flowmap #6
MD Existing

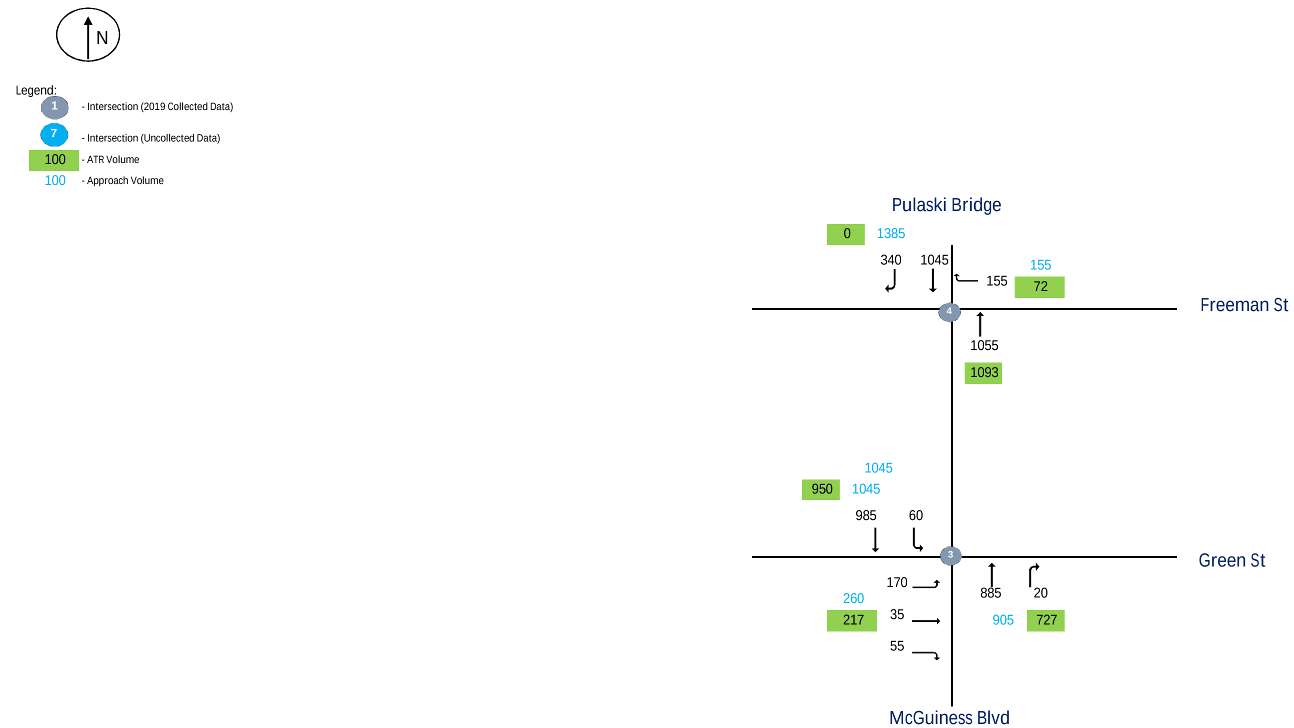
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume





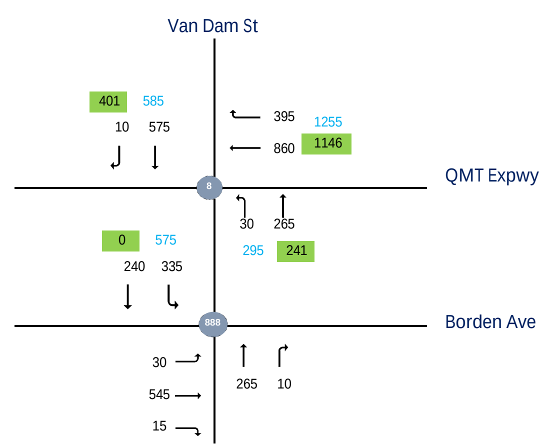
CBD Tolling
LIC - Traffic Flowmap #1
PM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
610 0
35 600
15
40
10
48th Ave
111
70 590
Jackson Ave
610 677
55 555
165
685
660 100
1
70 610 380
50
85
660 100
85 100
21th St
355
85
5
445
275 256
30 80 165
5
49th Ave
40
80
30
150
40 105 65
210 177
Vernon Blvd
218 230
180 50
50th Ave
2
50
35
15
100 68
240 40
280 233
Jackson Ave
From QMT
To QME
185 100
150 5 30
150
330
0
480 100
Borden Ave
7
570
70
10
650 100
10 40 15
65 100
11th St

CBD Tolling
LIC - Traffic Flowmap #2
PM Existing

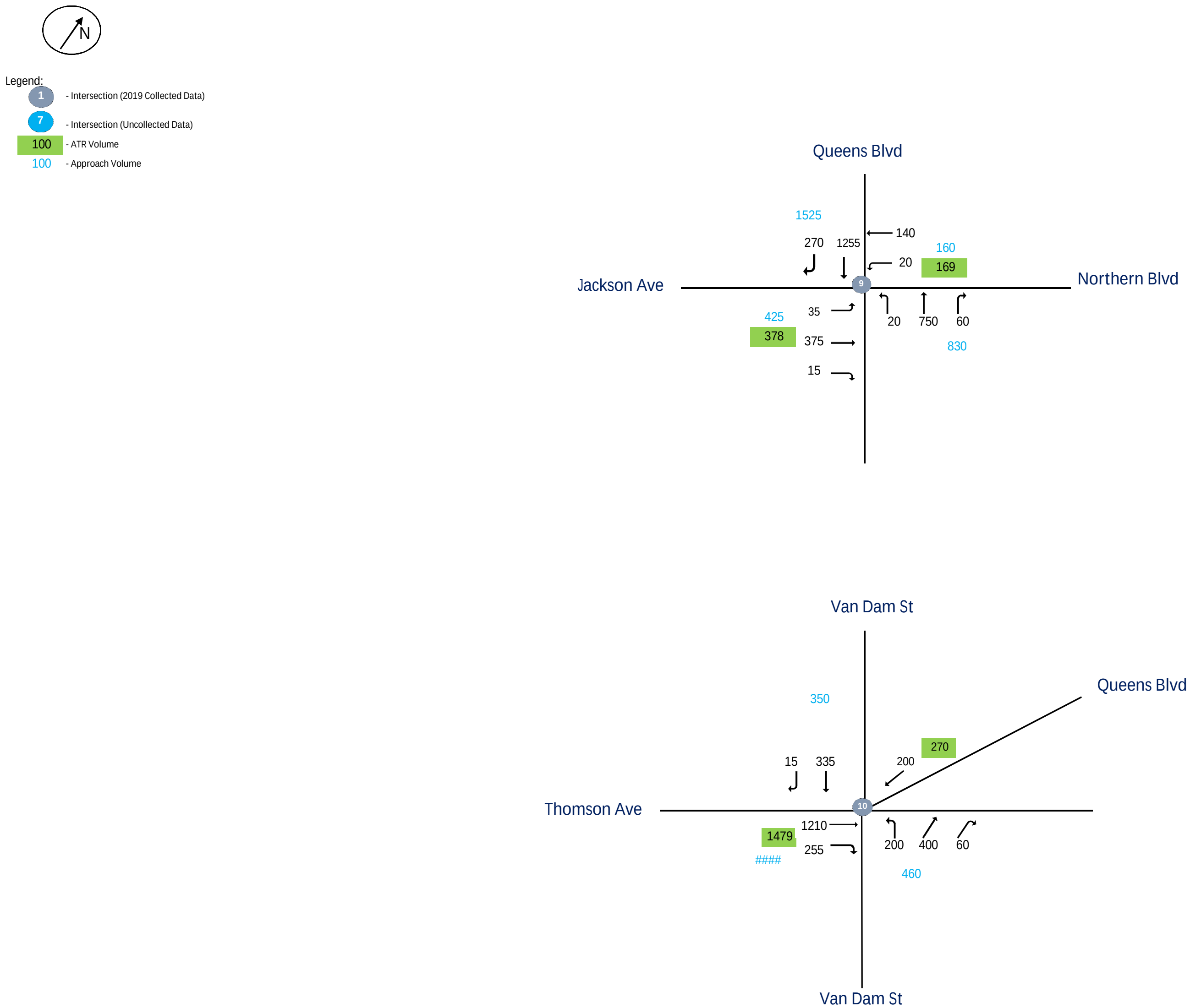


CBD Tolling
LIC - Traffic Flowmap #3
PM Existing

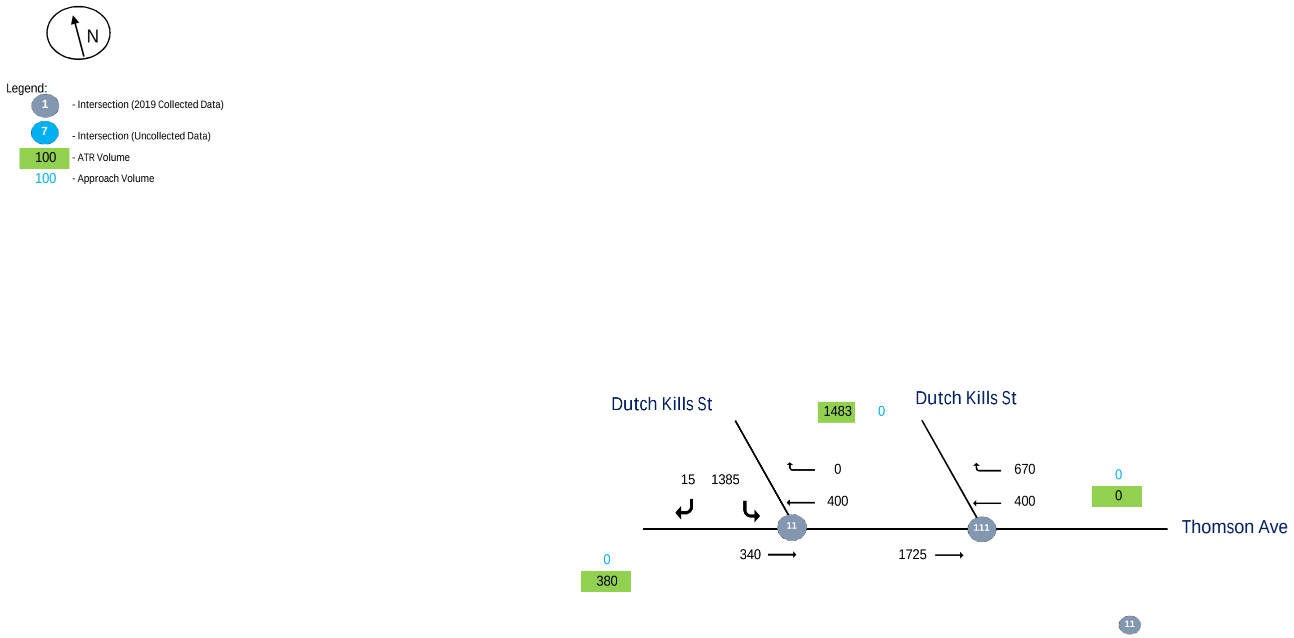
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume



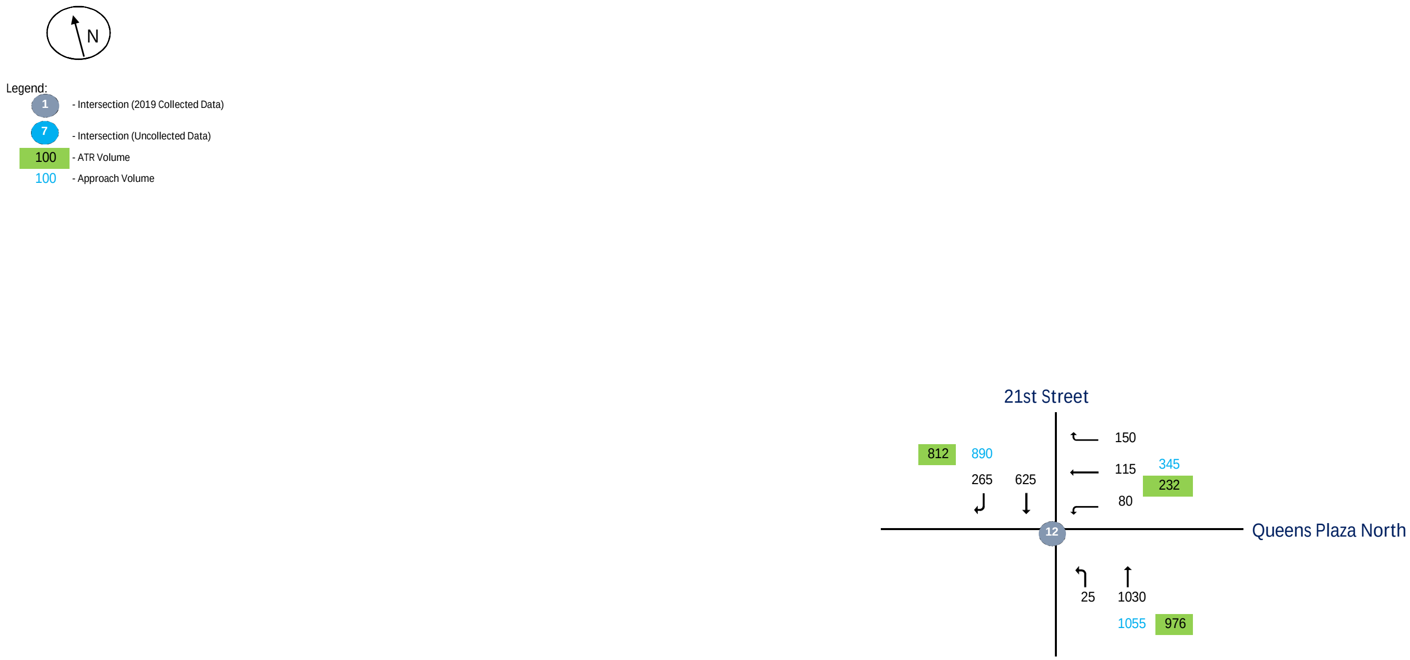
CBD Tolling
LIC - Traffic Flowmap #4
PM Existing

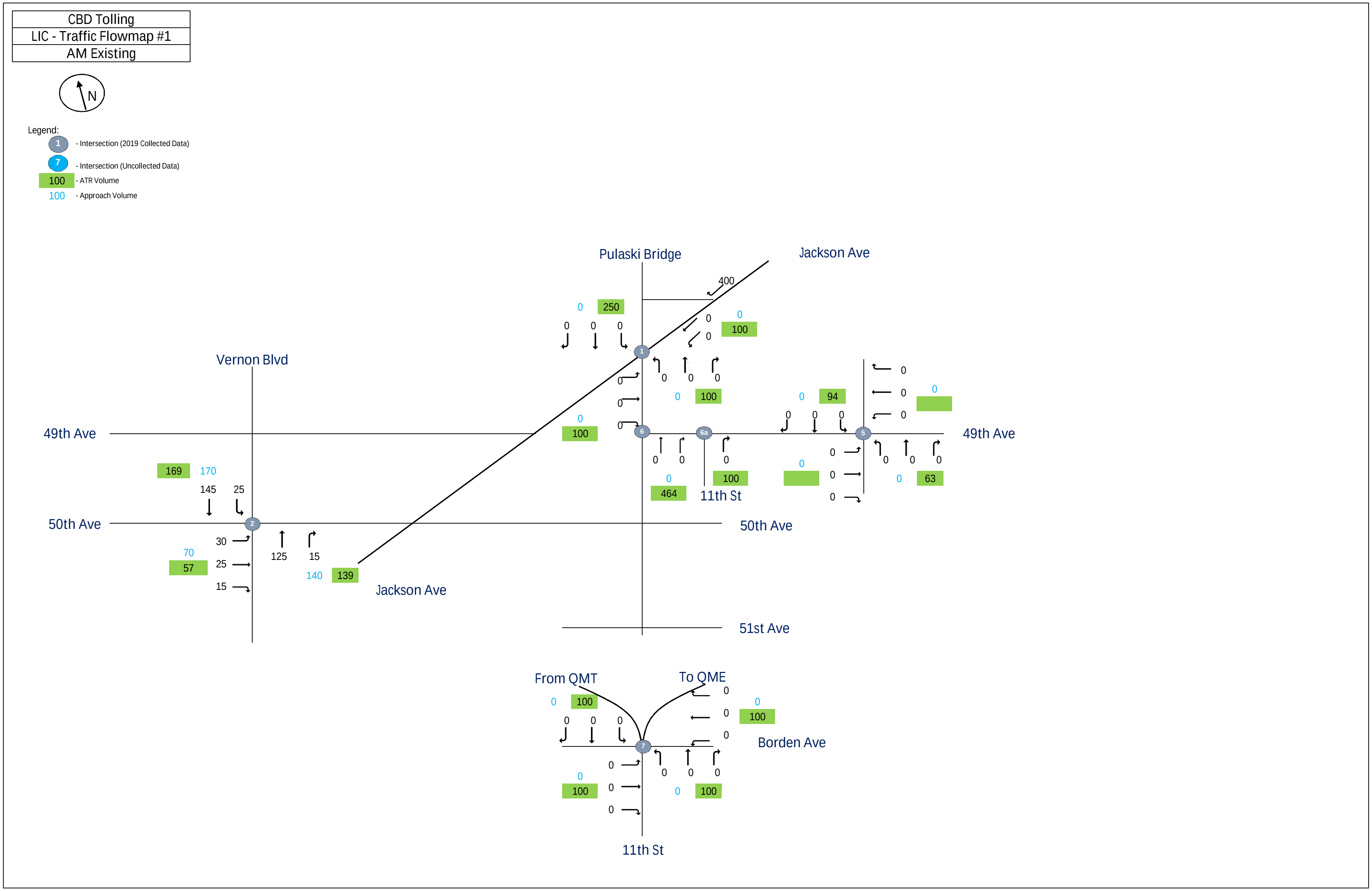


CBD Tolling
LIC - Traffic Flowmap #5
PM Existing



CBD Tolling
LIC - Traffic Flowmap #6
PM Existing



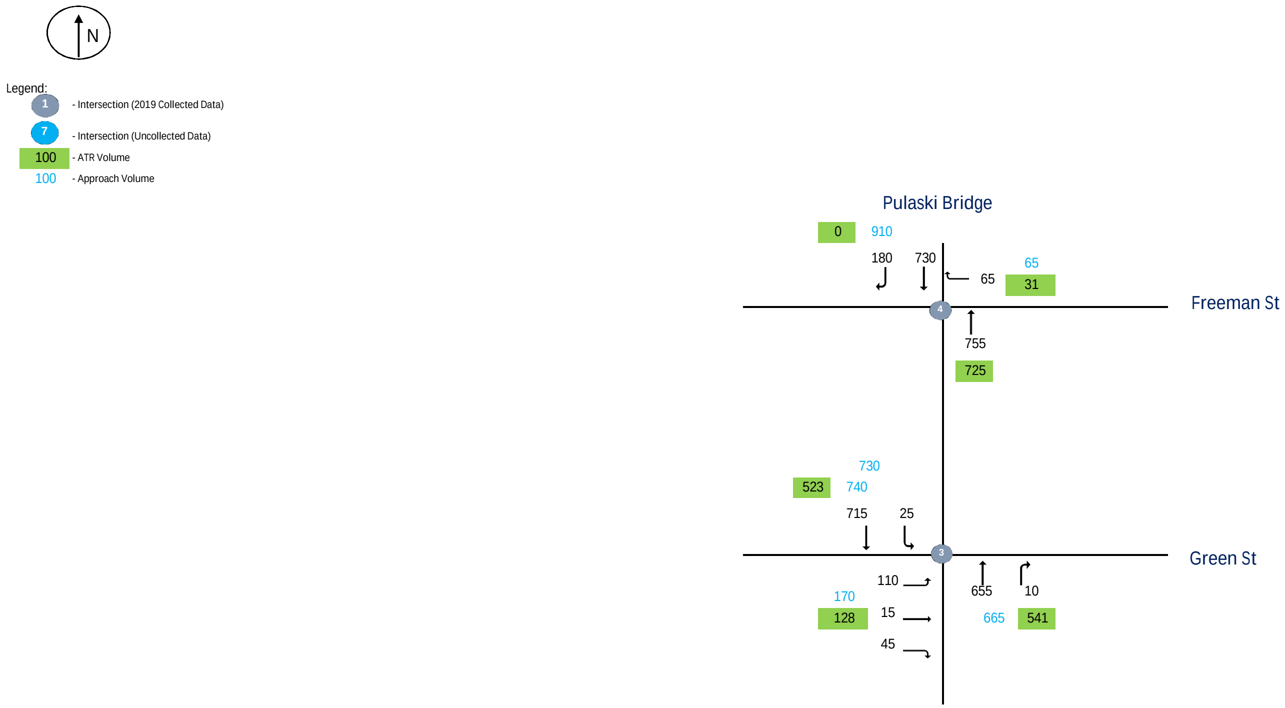


CBD Tolling
LIC - Traffic Flowmap #1
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
Jackson Ave
400
0
250
0
100
0 0 0
0
0
0 0 0
0
100
0
0
0
0
100
Vernon Blvd
49th Ave
0
94
0
0 0 0
0 0 0
0
0
0
0 0 0
49th Ave
169
170
145 25
0
464
0
100
11th St
0
0
63
50th Ave
30
125 15
70
57
25
15
140
139
Jackson Ave
50th Ave
51st Ave
From QMT
To QME
0
100
0 0 0
0
0
100
0
0
Borden Ave
0
0
0 0 0
0
100
0
0
100
11th St

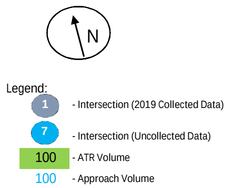
CBD Tolling

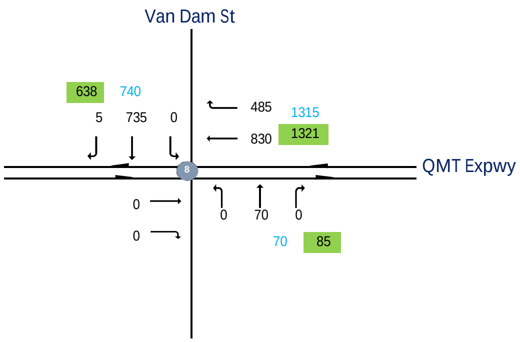
LIC - Traffic Flowmap #2

AM Existing

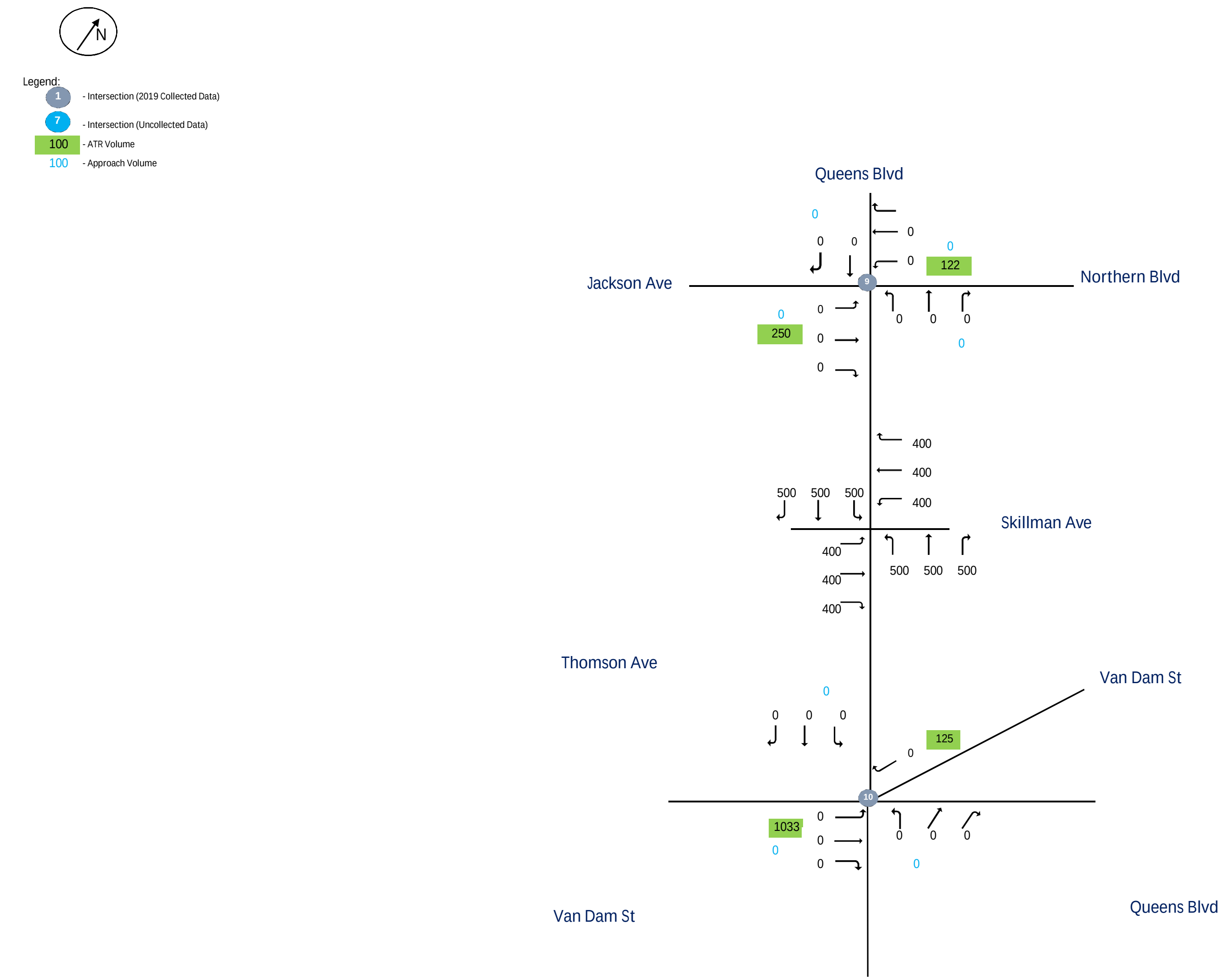


CBD Tolling
LIC - Traffic Flowmap #3
AM Existing





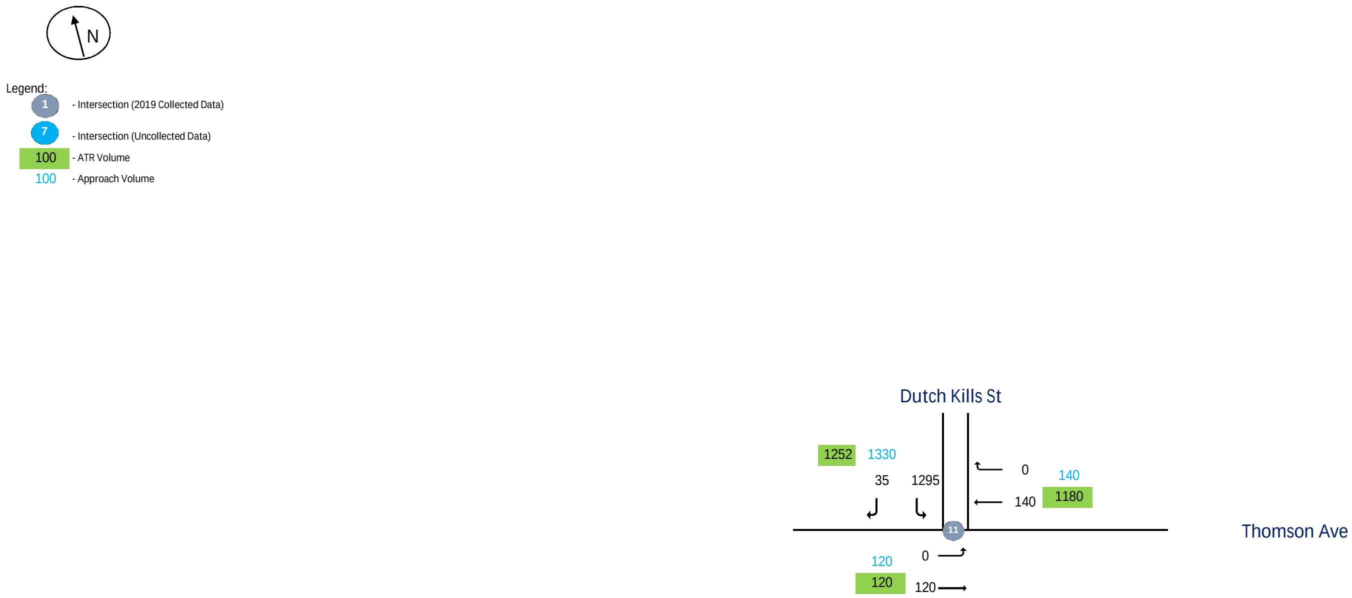
CBD Tolling
LIC - Traffic Flowmap #4
AM Existing



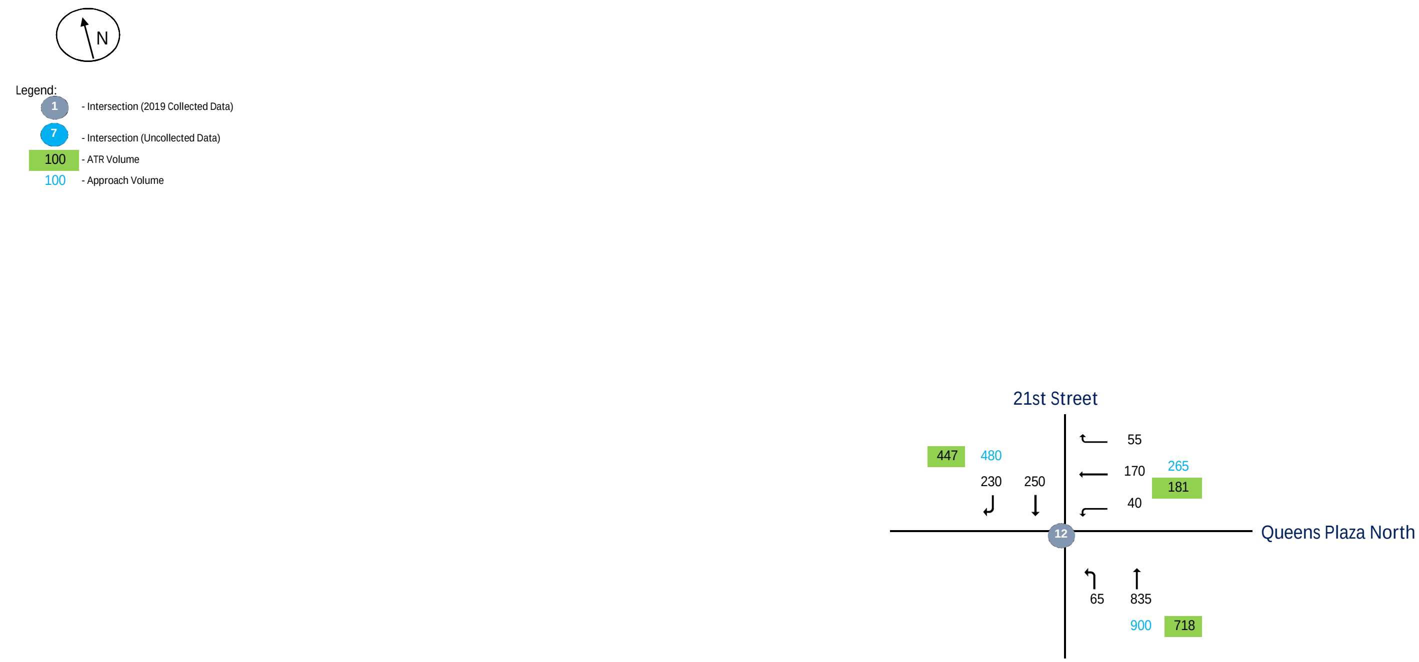
CBD Tolling

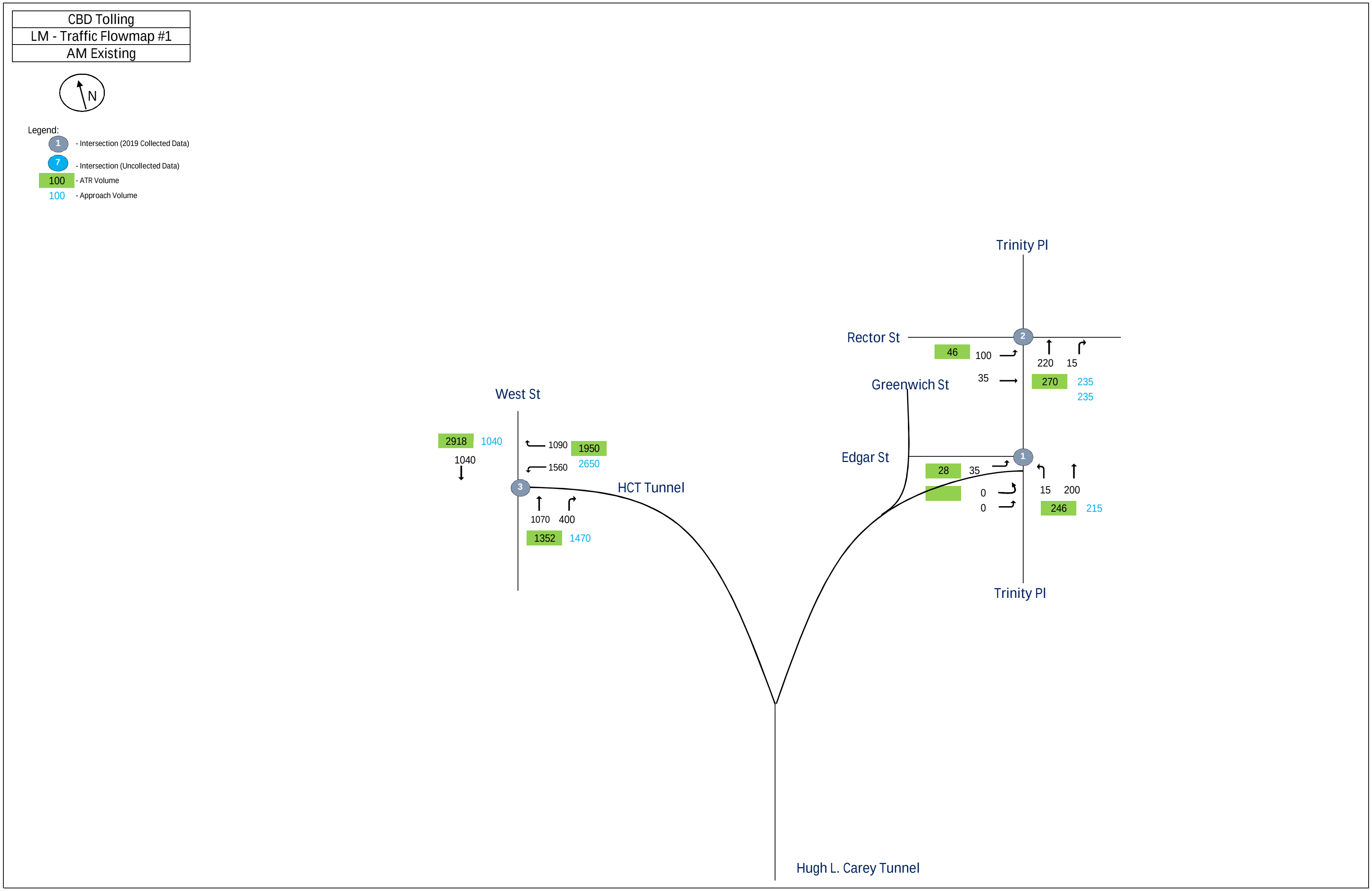
LIC - Traffic Flowmap #5

AM Existing



CBD Tolling
LIC - Traffic Flowmap #6
AM Existing



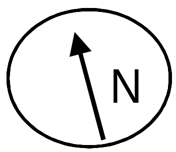


CBD Tolling
LM - Traffic Flowmap #1
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Trinity Pl
Rector St
46
100
220
15
35
270
235
235
Greenwich St
West St
2918
1040
1090
1950
1040
1560
2650
HCT Tunnel
1070
400
1352
1470
Edgar St
28
35
0
0
15
200
246
215
Trinity Pl
Hugh L. Carey Tunnel

CBD Tolling

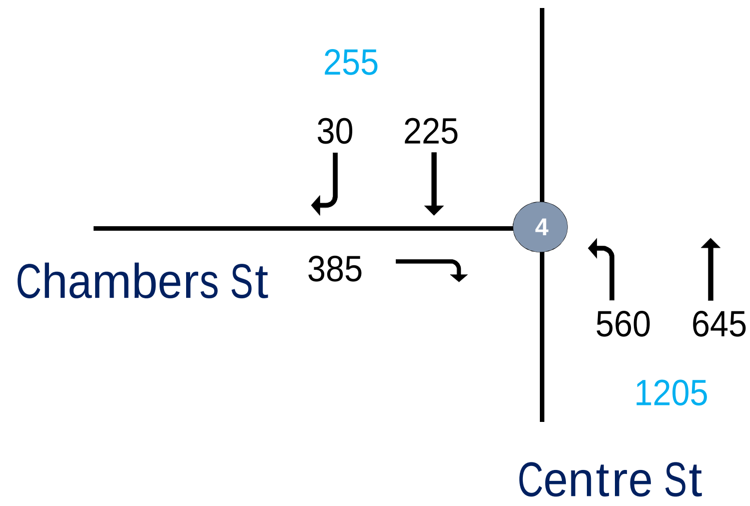
LM - Traffic Flowmap #2

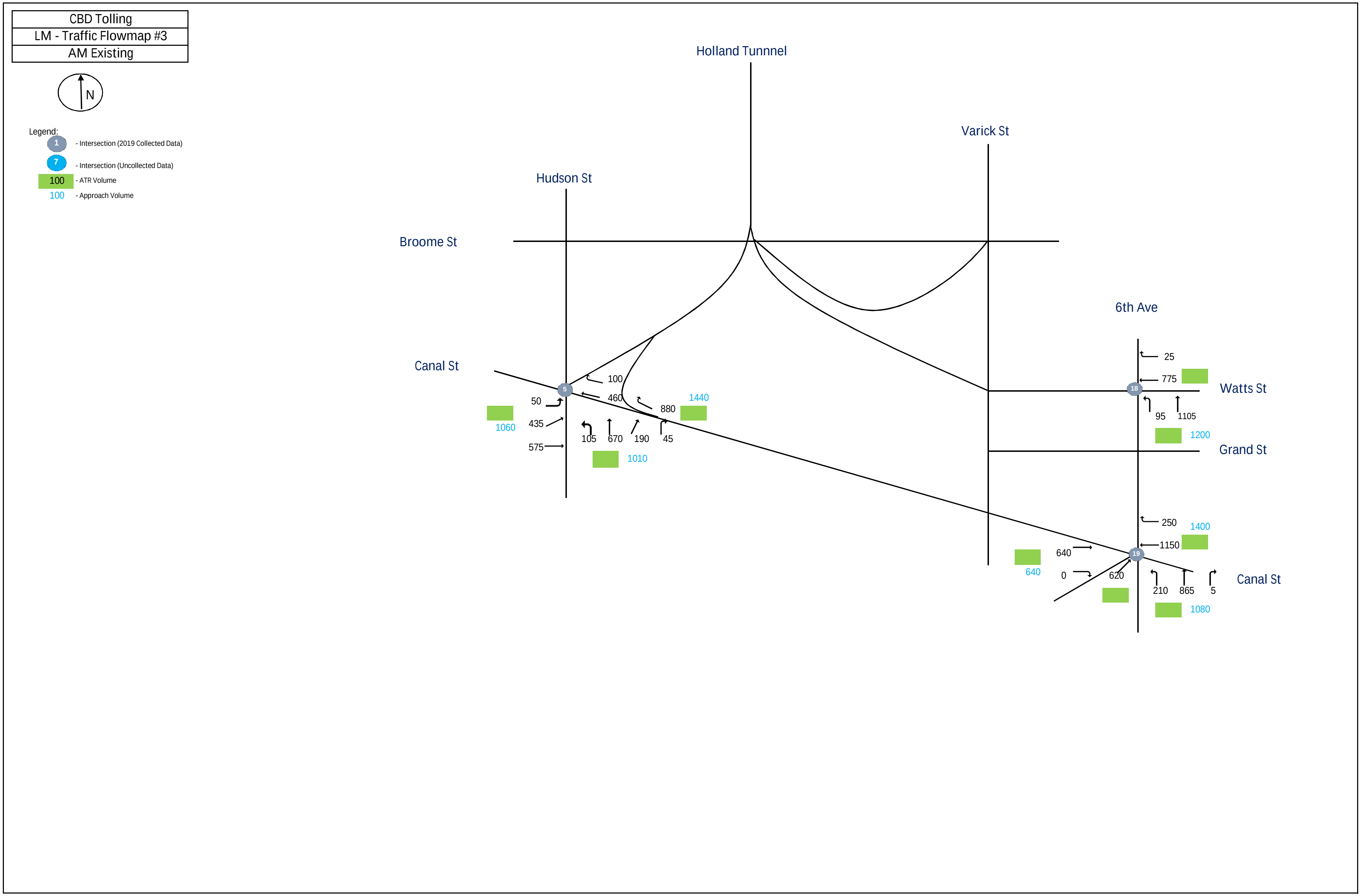
AM Existing



Legend:

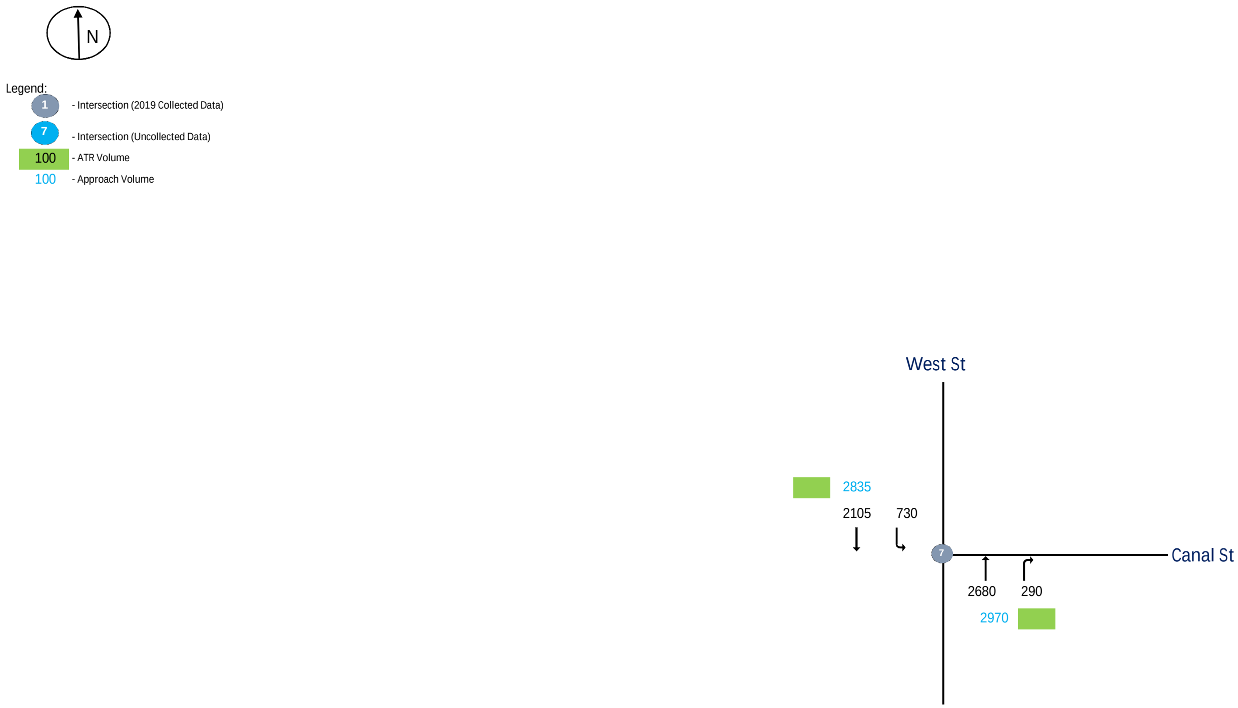
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



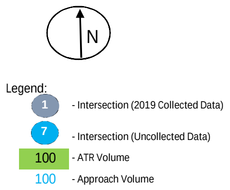


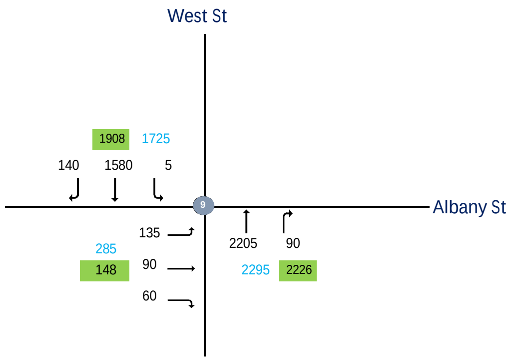
CBD Tolling
LM - Traffic Flowmap #3
AM Existing
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Holland Tunnel
Varick St
Hudson St
Broome St
6th Ave
Canal St
Watts St
Grand St
Canal St
100
460
880
1440
50
435
575
1060
105
670
190
45
1010
25
775
95
1105
1200
250
1400
1150
640
640
0
620
210
865
5
1080

CBD Tolling
LM - Traffic Flowmap #4
AM Existing

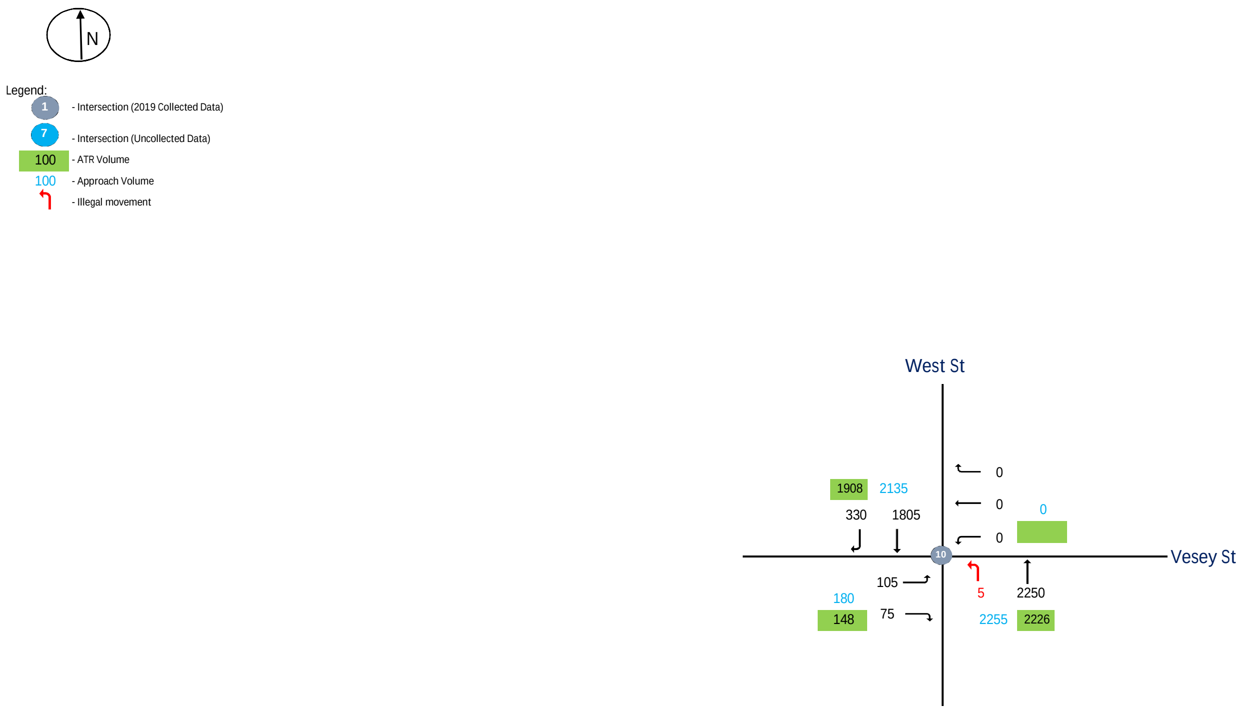


CBD Tolling
LM - Traffic Flowmap #5
AM Existing



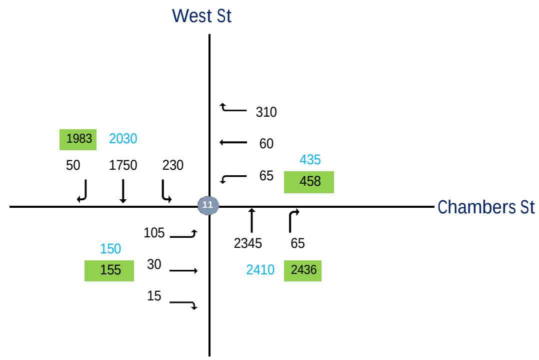


CBD Tolling
LM - Traffic Flowmap #6
AM Existing

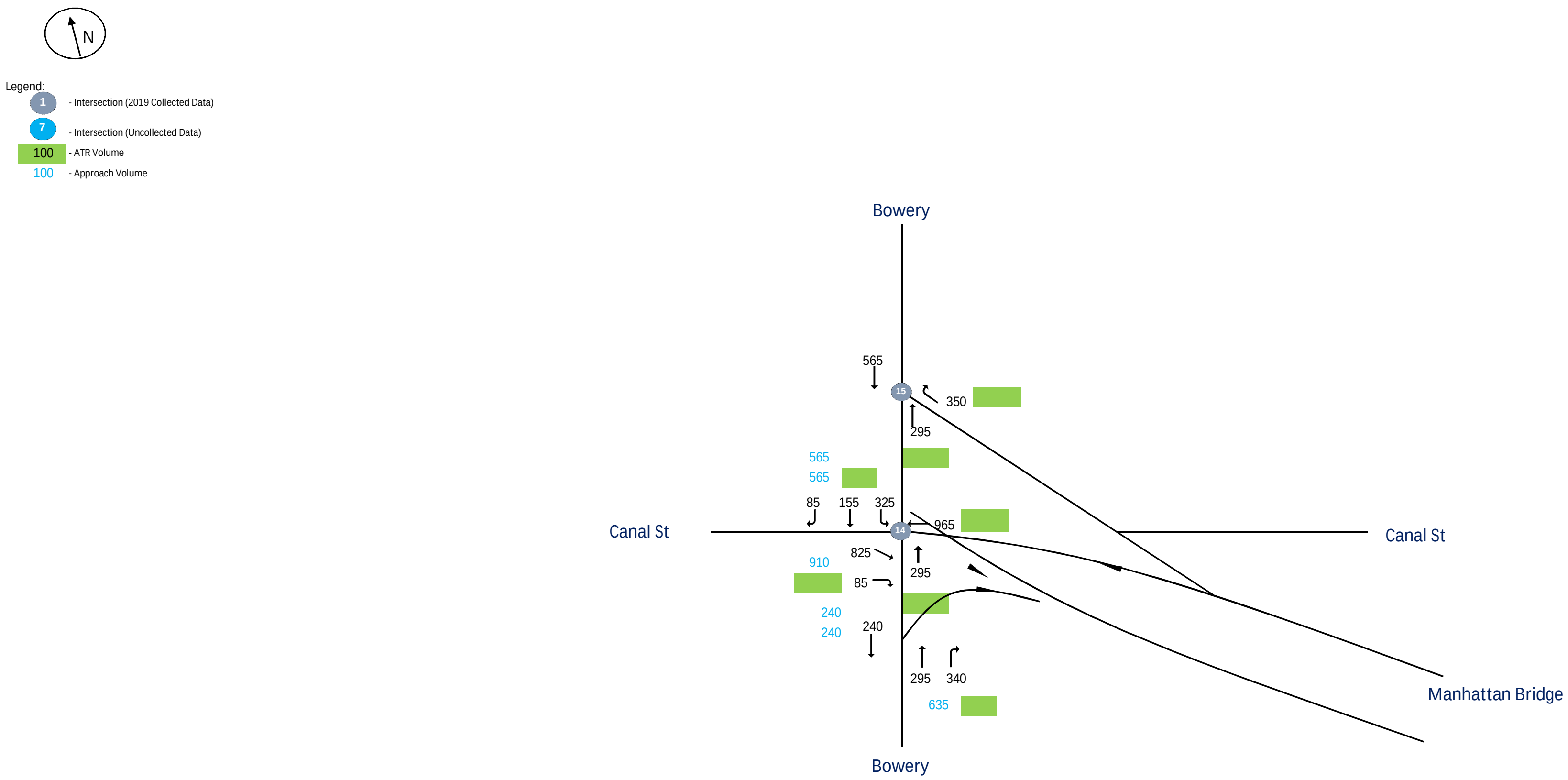


CBD Tolling
LM - Traffic Flowmap #7
AM Existing

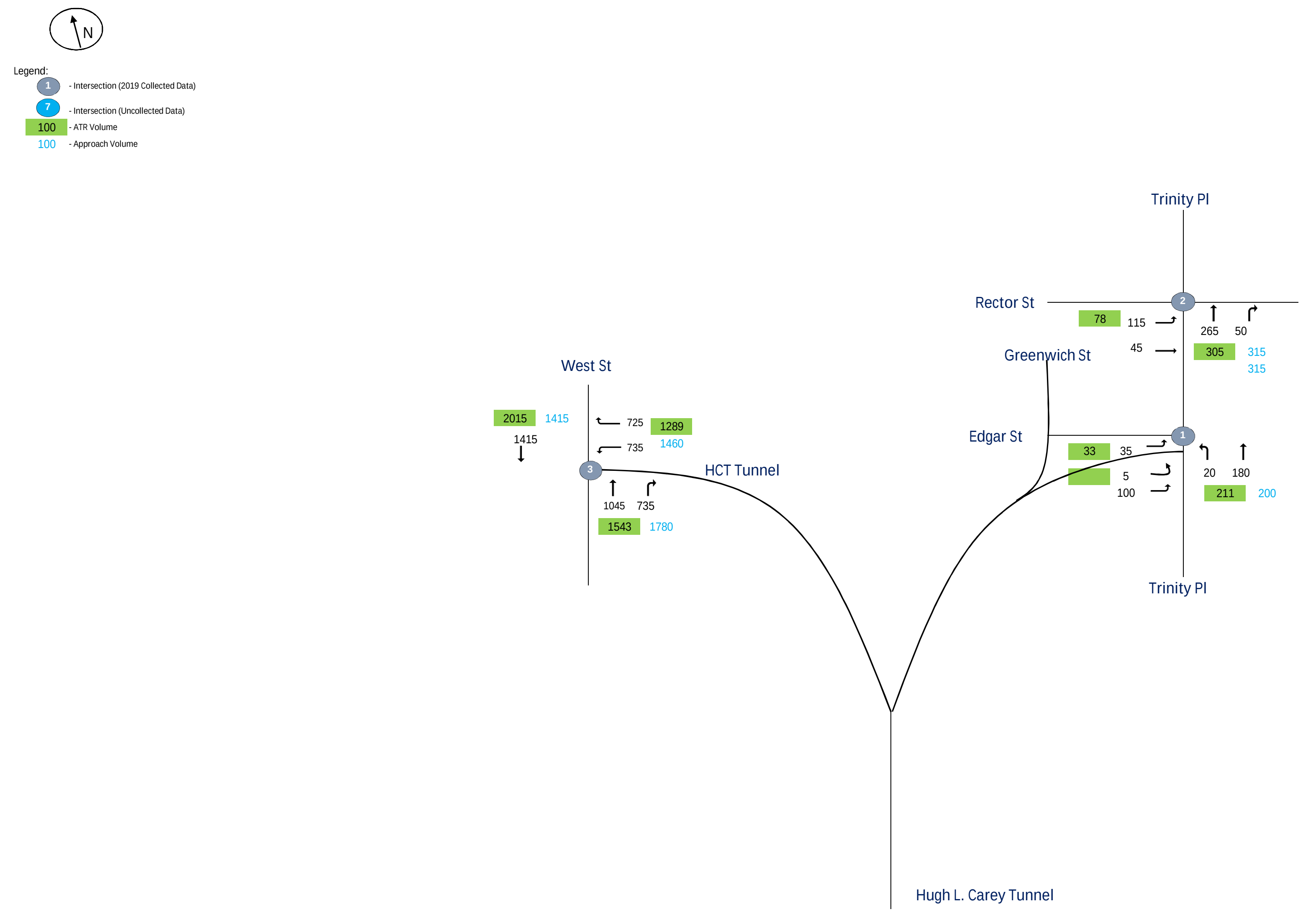
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume



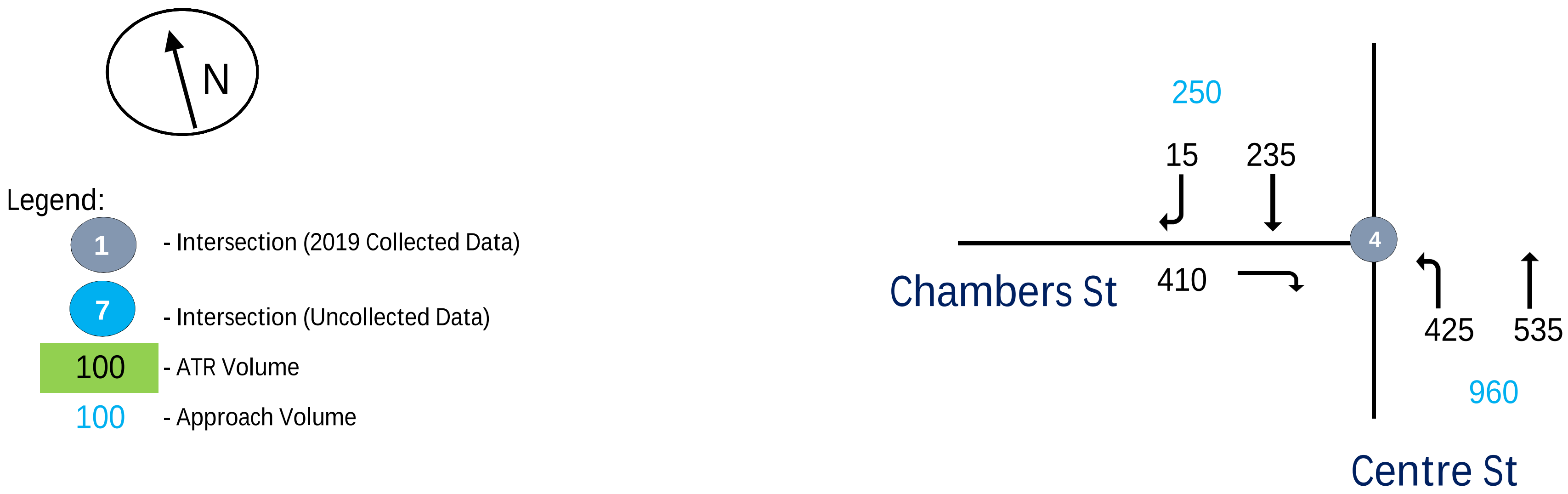
CBD Tolling
LM - Traffic Flowmap #8
AM Existing

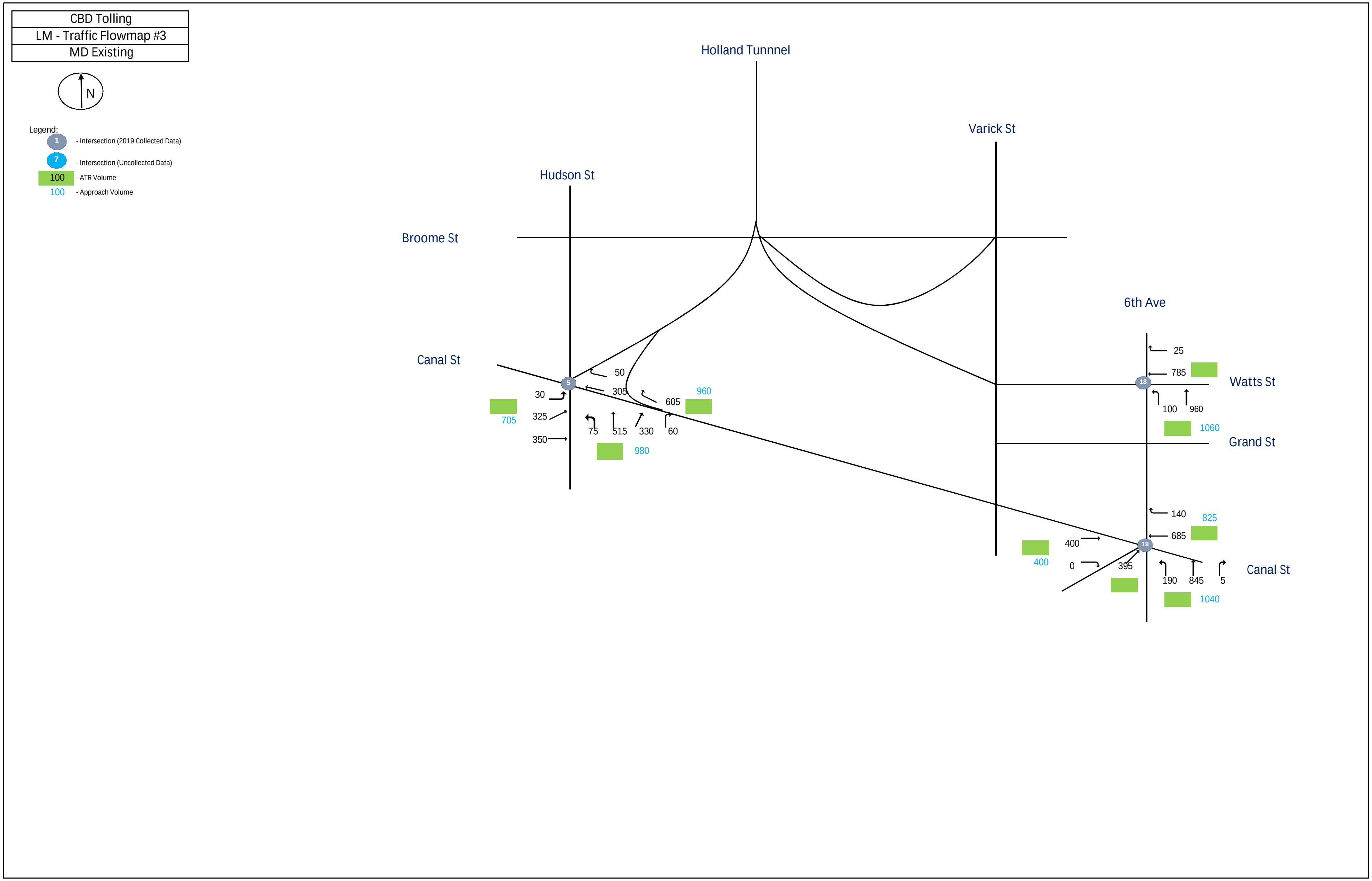


CBD Tolling
LM - Traffic Flowmap #1
MD Existing



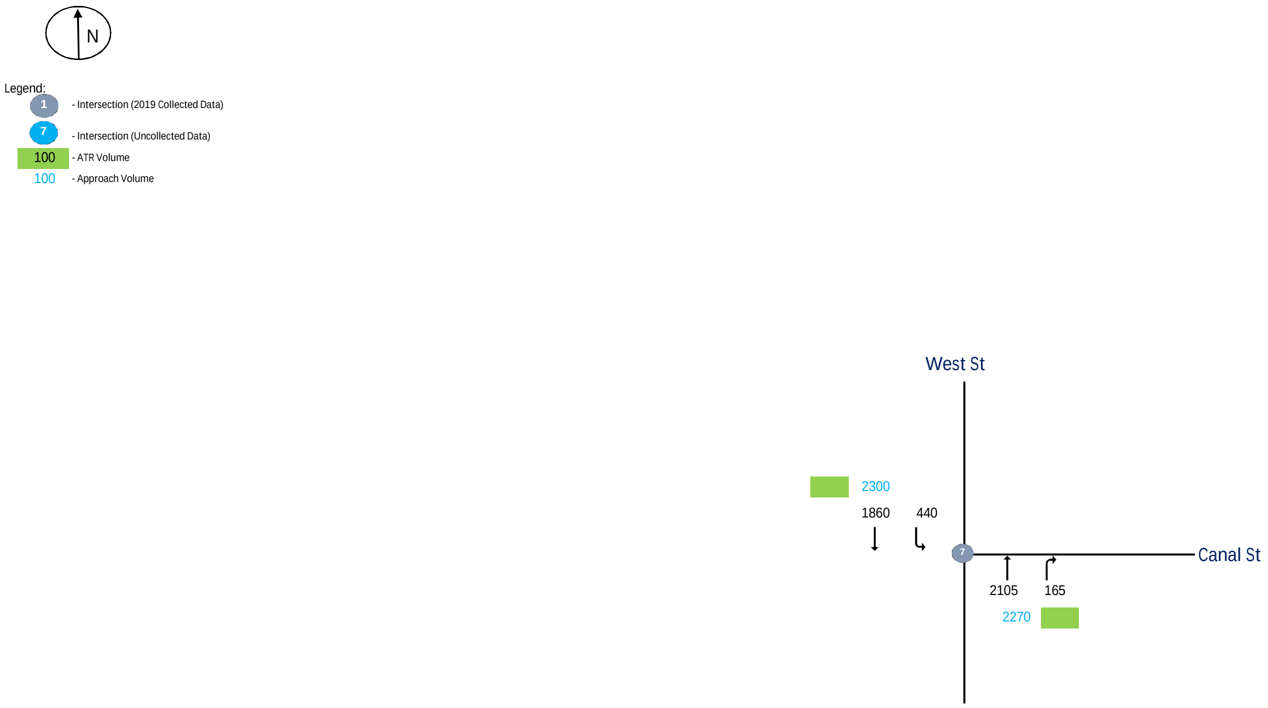
CBD Tolling
LM - Traffic Flowmap #2
MD Existing



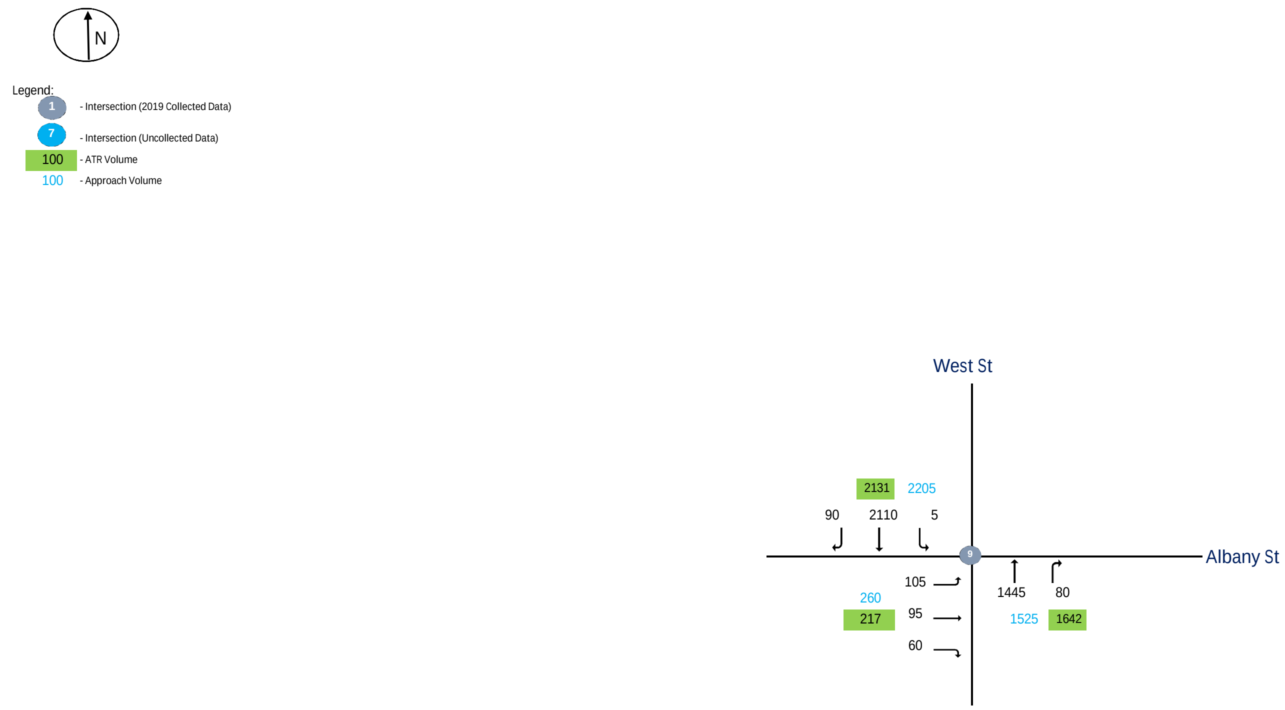


CBD Tolling
LM - Traffic Flowmap #3
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Holland Tunnnel
Varick St
Hudson St
Broome St
6th Ave
Canal St
Watts St
Grand St
Canal St
5
50
305
605
960
30
325
350
705
75
515
330
60
980
18
25
785
100
960
1060
19
140
825
685
400
400
0
395
190
845
5
1040

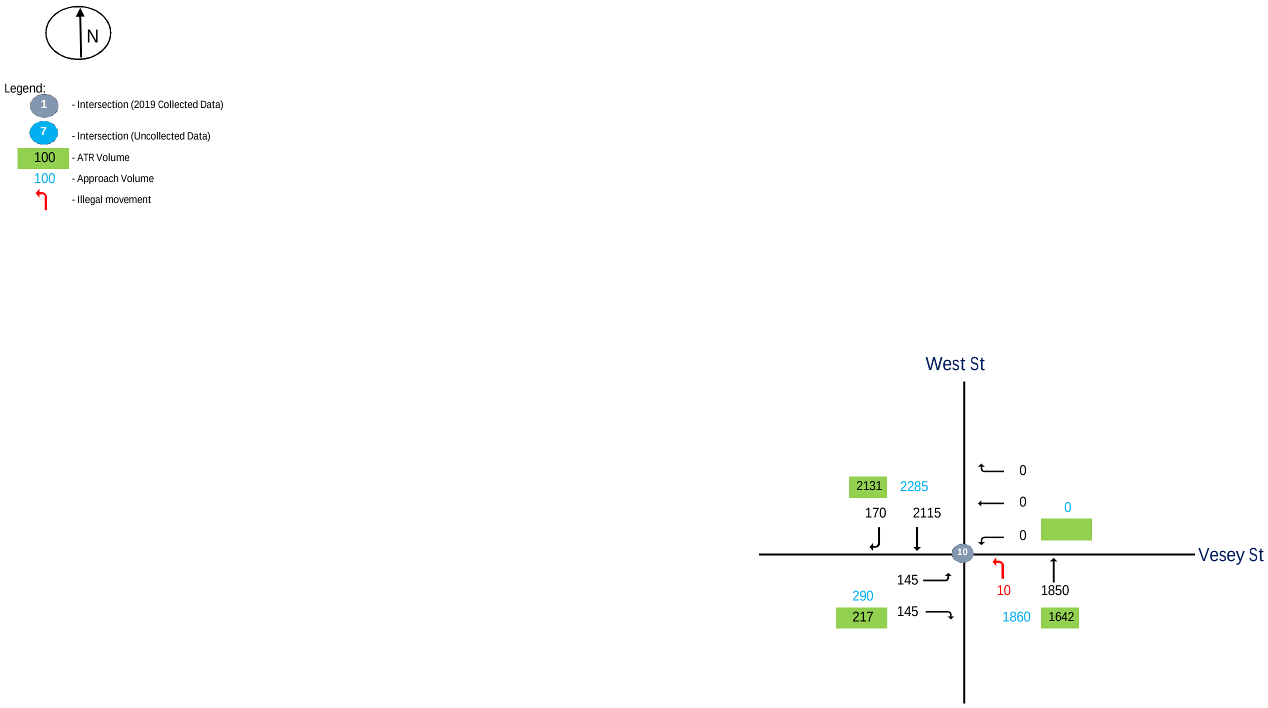
CBD Tolling
LM - Traffic Flowmap #4
MD Existing



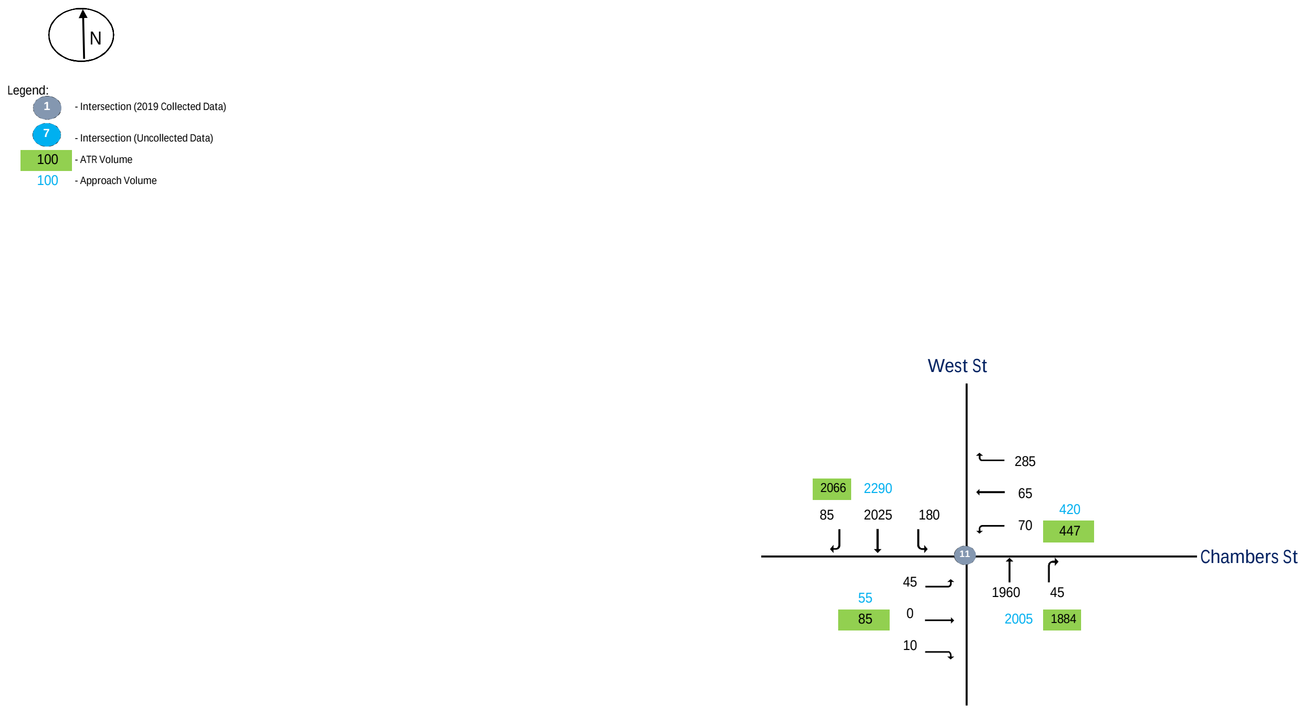
CBD Tolling
LM - Traffic Flowmap #5
MD Existing



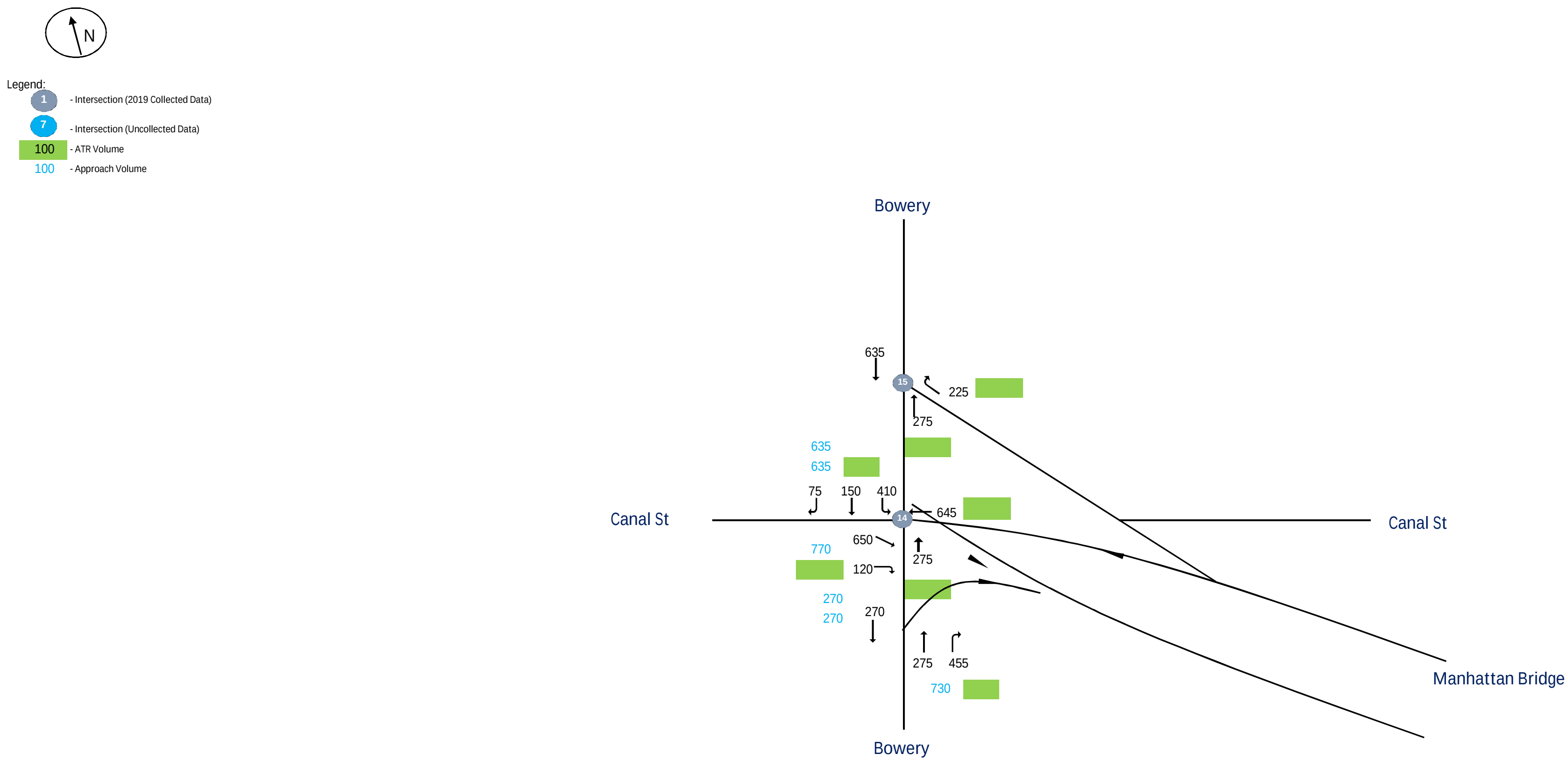
CBD Tolling
LM - Traffic Flowmap #6
MD Existing



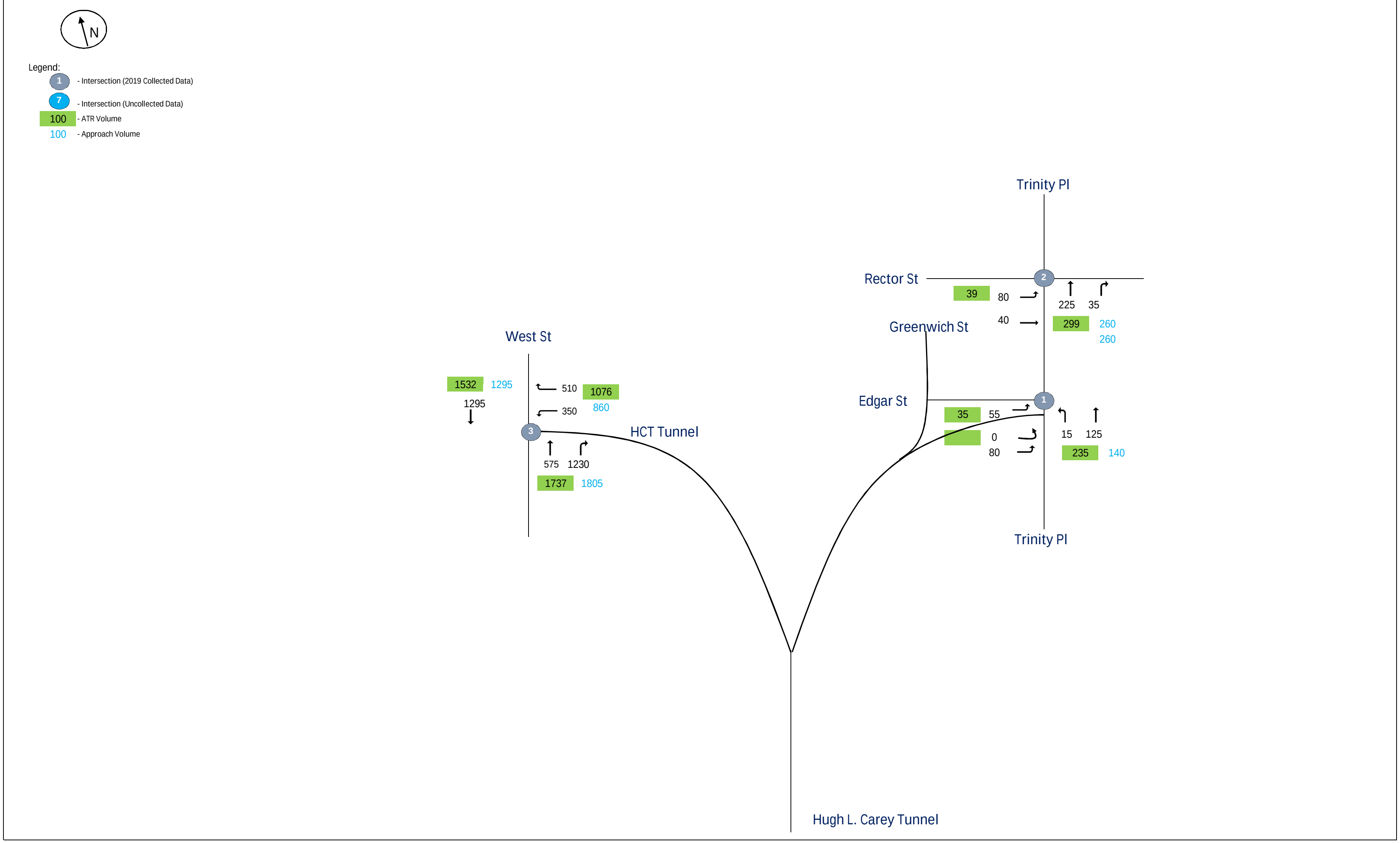
CBD Tolling
LM - Traffic Flowmap #7
MD Existing



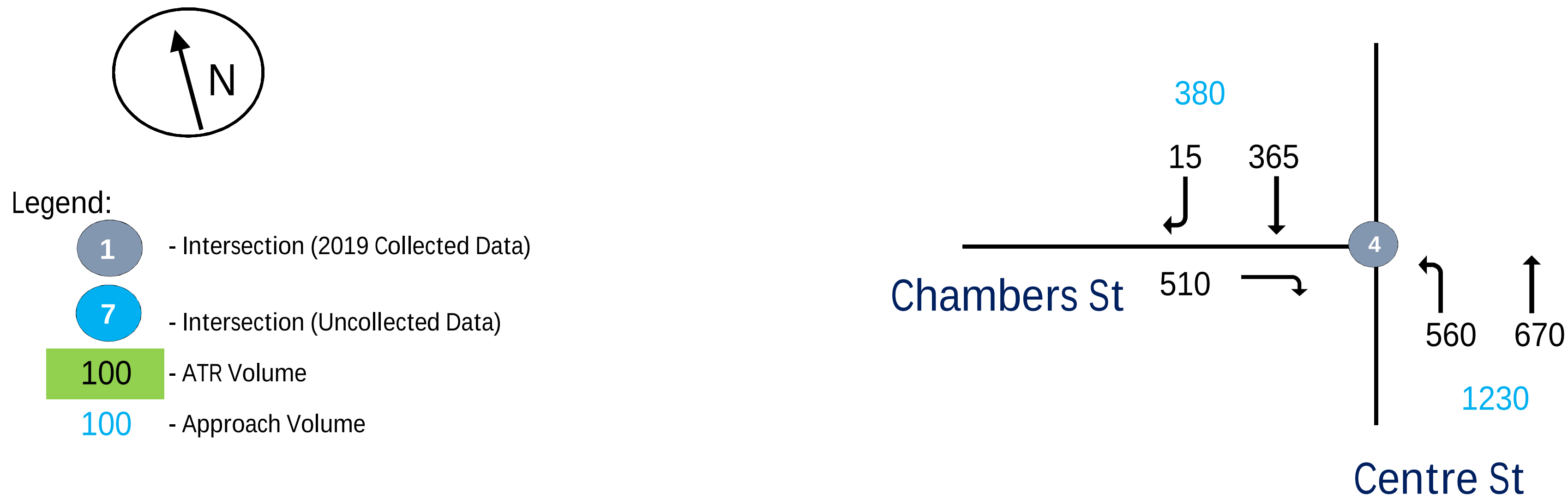
CBD Tolling
LM - Traffic Flowmap #8
MD Existing

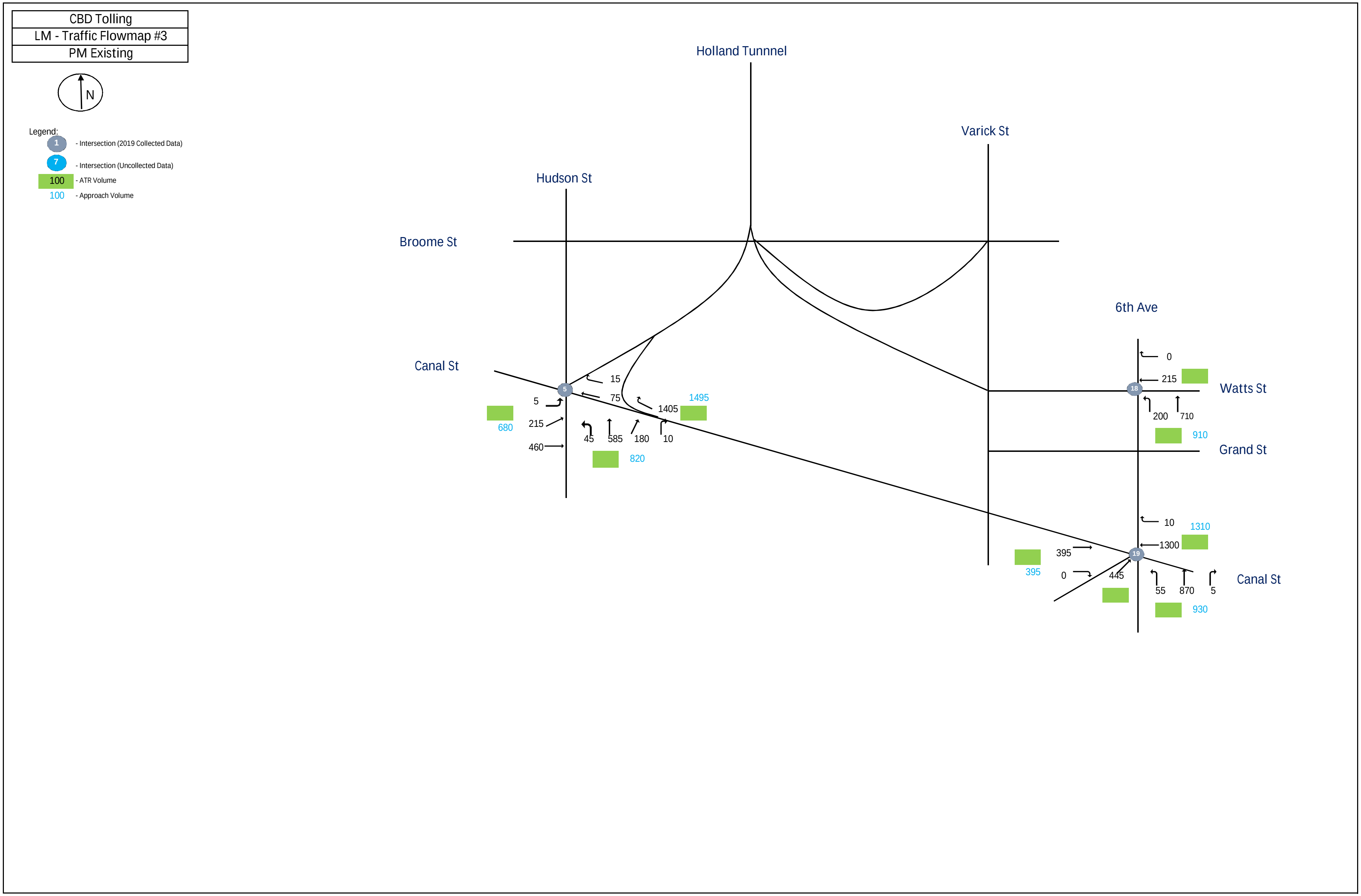


CBD Tolling
LM - Traffic Flowmap #1
PM Existing

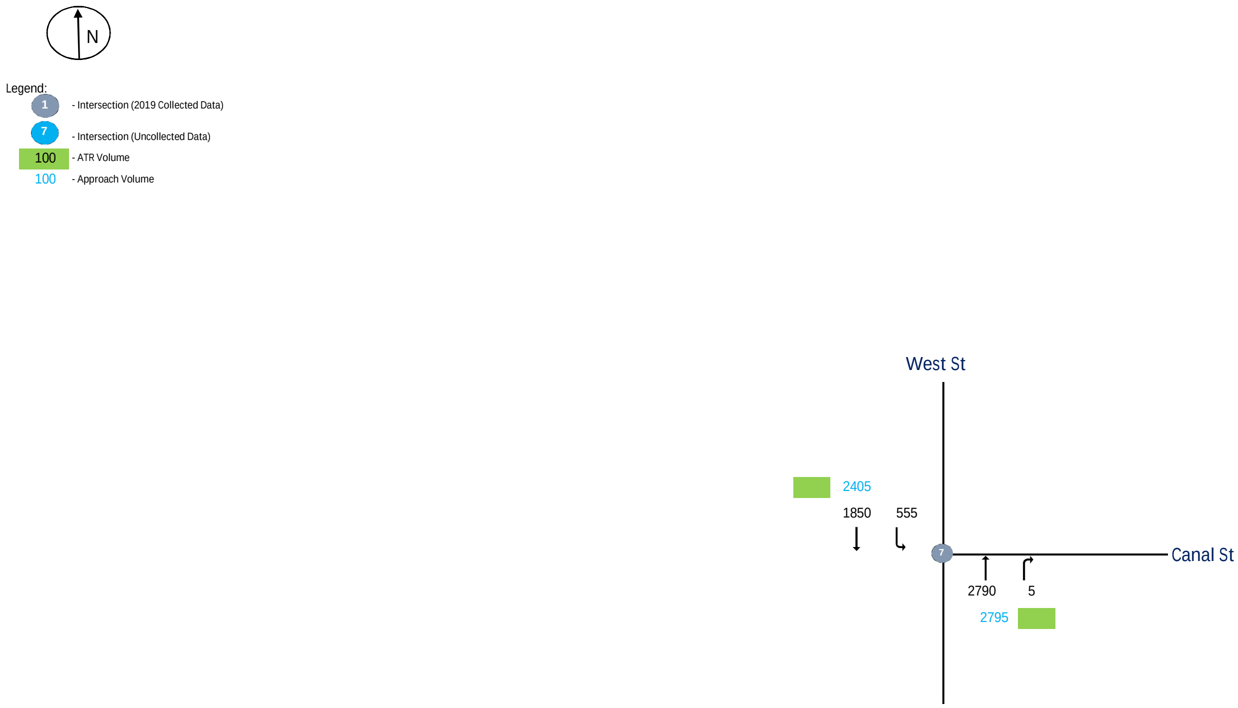


CBD Tolling
LM - Traffic Flowmap #2
PM Existing

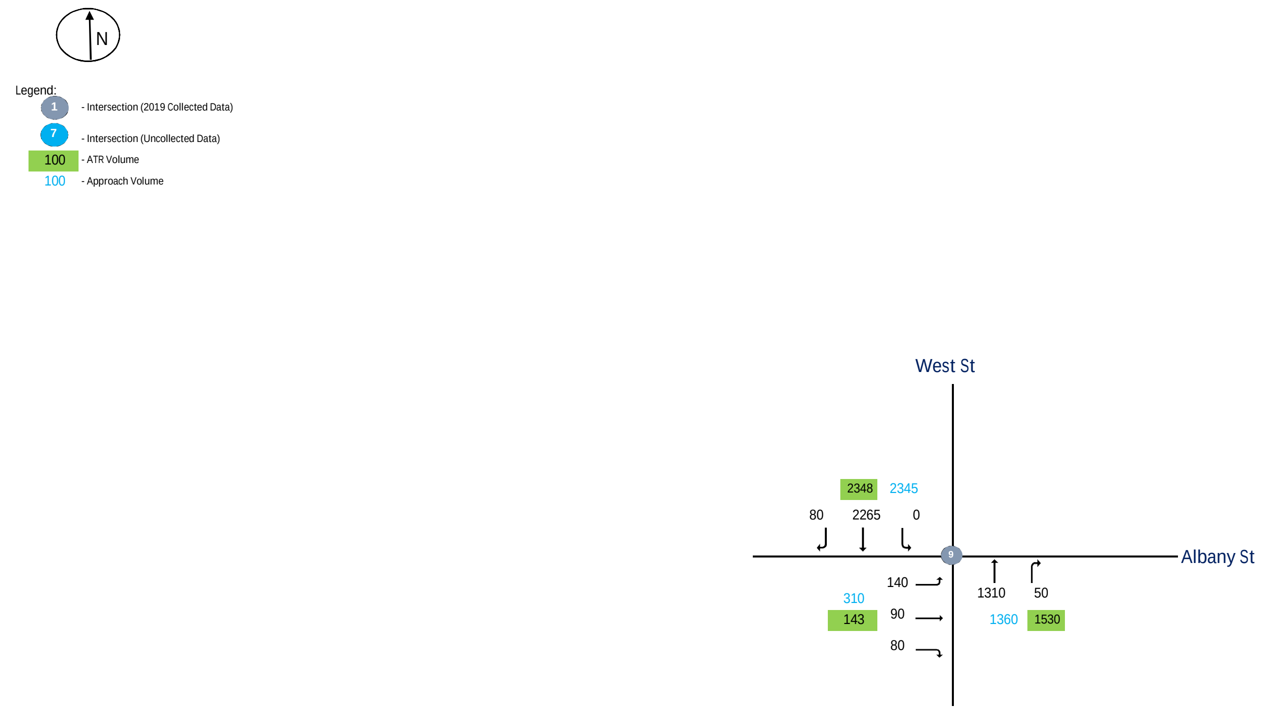



CBD Tolling
LM - Traffic Flowmap #3
PM Existing
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Holland Tunnel
Varick St
Hudson St
Broome St
6th Ave
Canal St
0
215
Watts St
15
75
1495
1405
5
215
680
45
585
180
10
460
820
200
710
910
Grand St
10
1310
1300
395
395
0
445
55
870
5
Canal St
930

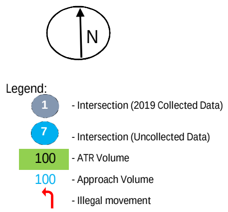
CBD Tolling
LM - Traffic Flowmap #4
PM Existing

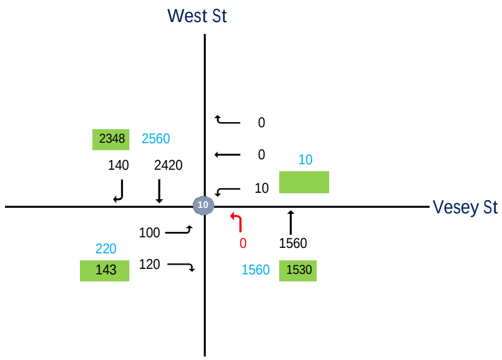


CBD Tolling
LM - Traffic Flowmap #5
PM Existing

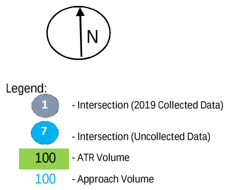


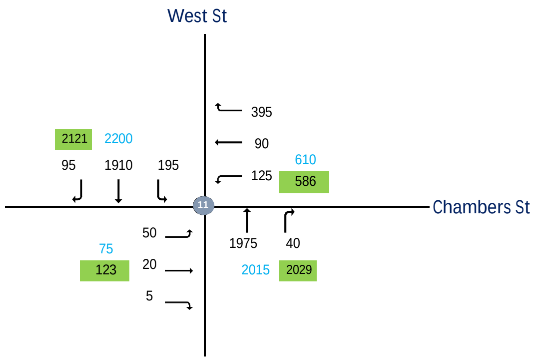
CBD Tolling
LM - Traffic Flowmap #6
PM Existing



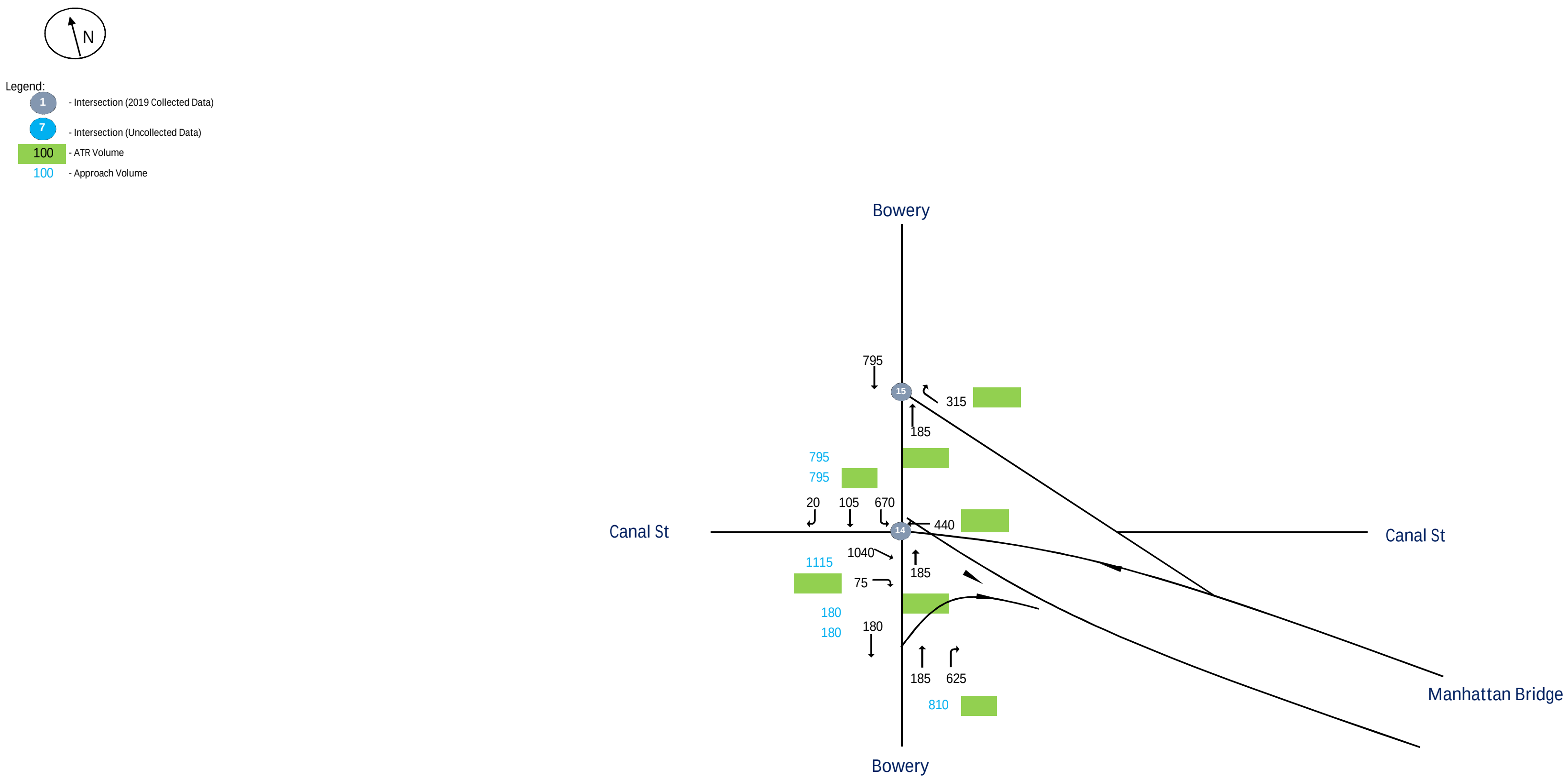


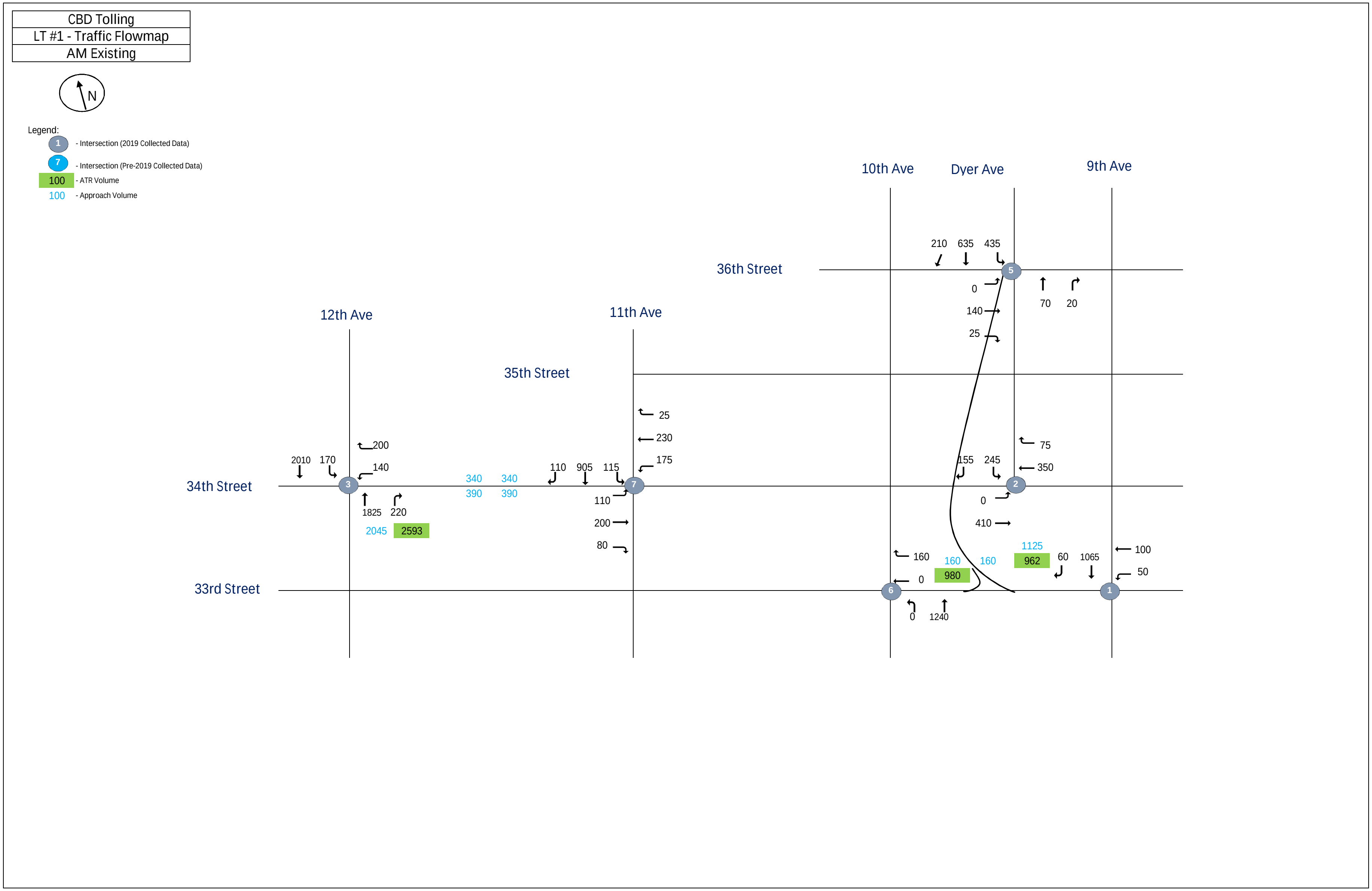
CBD Tolling
LM - Traffic Flowmap #7
PM Existing



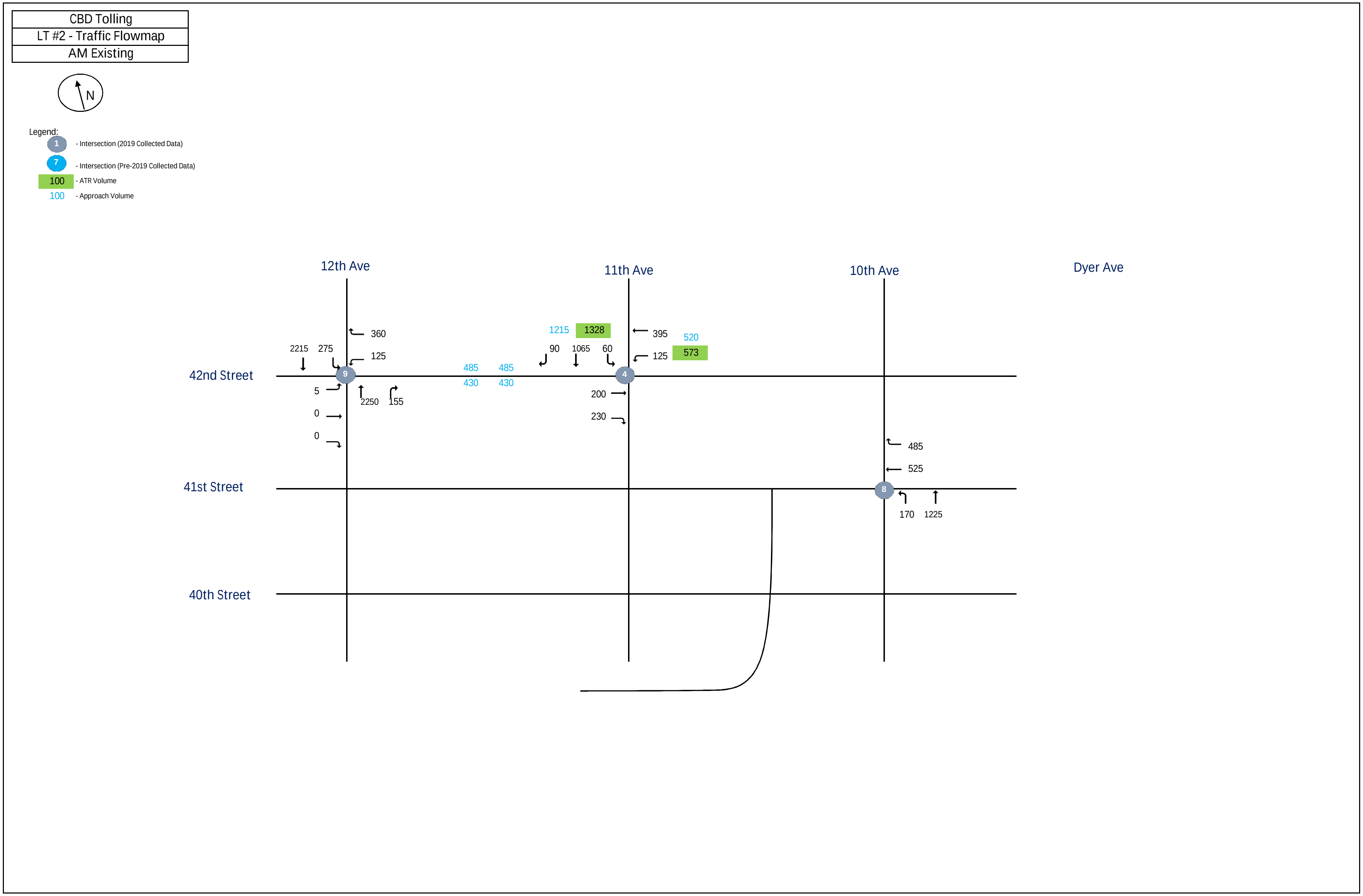


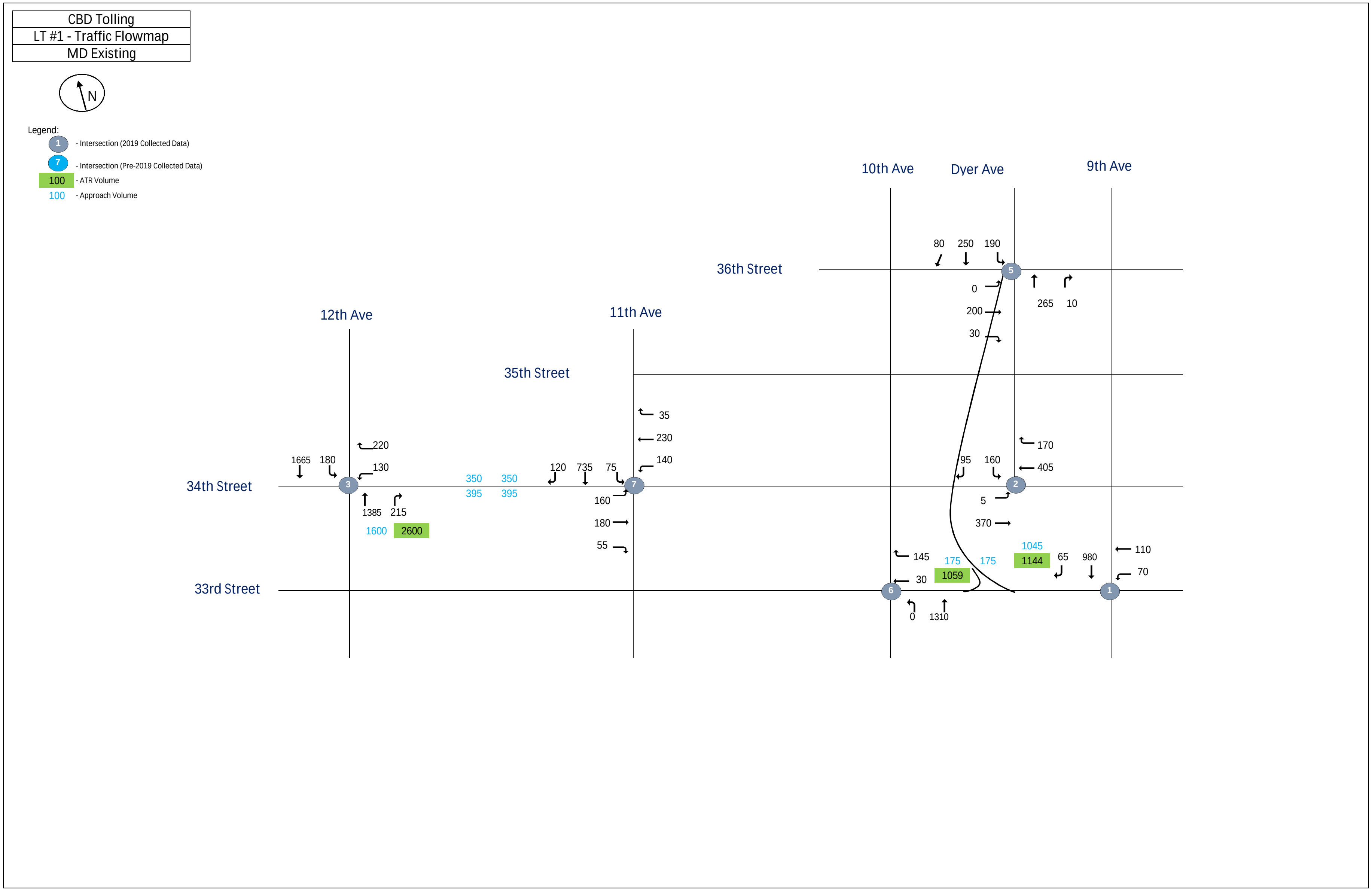
CBD Tolling
LM - Traffic Flowmap #8
PM Existing



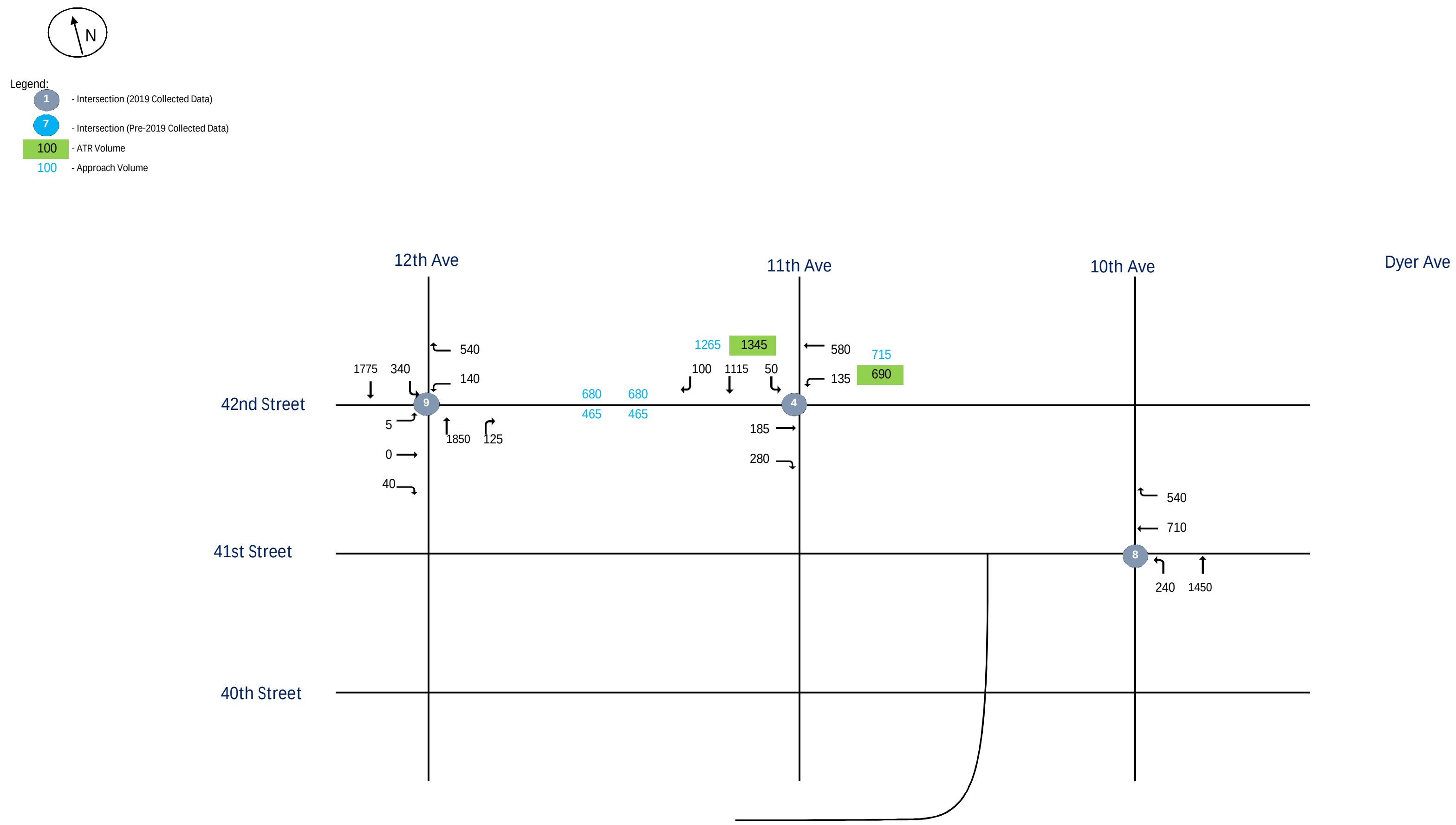


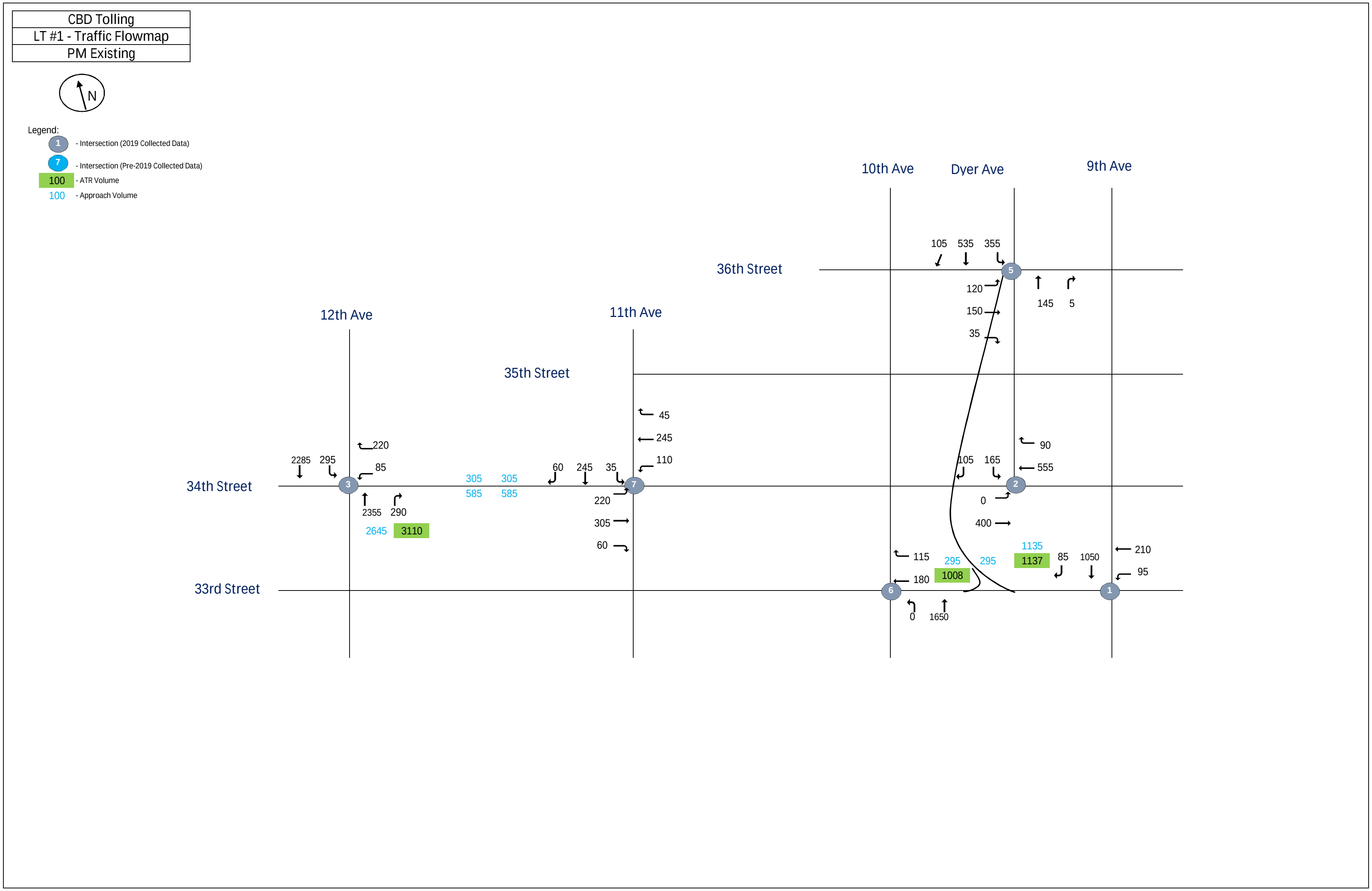
CBD Tolling
LT #1 - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
36th Street
12th Ave
11th Ave
35th Street
34th Street
33rd Street
210
635
435
0
140
25
70
20
25
230
175
200
140
2010
170
110
905
115
340
340
390
390
1825
220
2045
2593
110
200
80
75
350
155
245
0
410
1125
962
60
1065
100
50
160
160
160
980
0
0
1240


CBD Tolling
LT #2 - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
12th Ave
11th Ave
10th Ave
Dyer Ave
42nd Street
41st Street
40th Street
360
2215
275
125
5
0
0
2250
155
9
485
485
430
430
1215
1328
90
1065
60
395
520
125
573
4
200
230
485
525
8
170
1225


CBD Tolling
LT #1 - Traffic Flowmap
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
12th Ave
11th Ave
36th Street
35th Street
34th Street
33rd Street
80
250
190
0
200
30
265
10
35
230
140
220
130
1665
180
1385
215
1600
2600
350
350
395
395
120
735
75
160
180
55
170
405
95
160
5
370
145
175
1059
175
30
0
1310
1045
1144
65
980
110
70

CBD Tolling
LT #2 - Traffic Flowmap
MD Existing

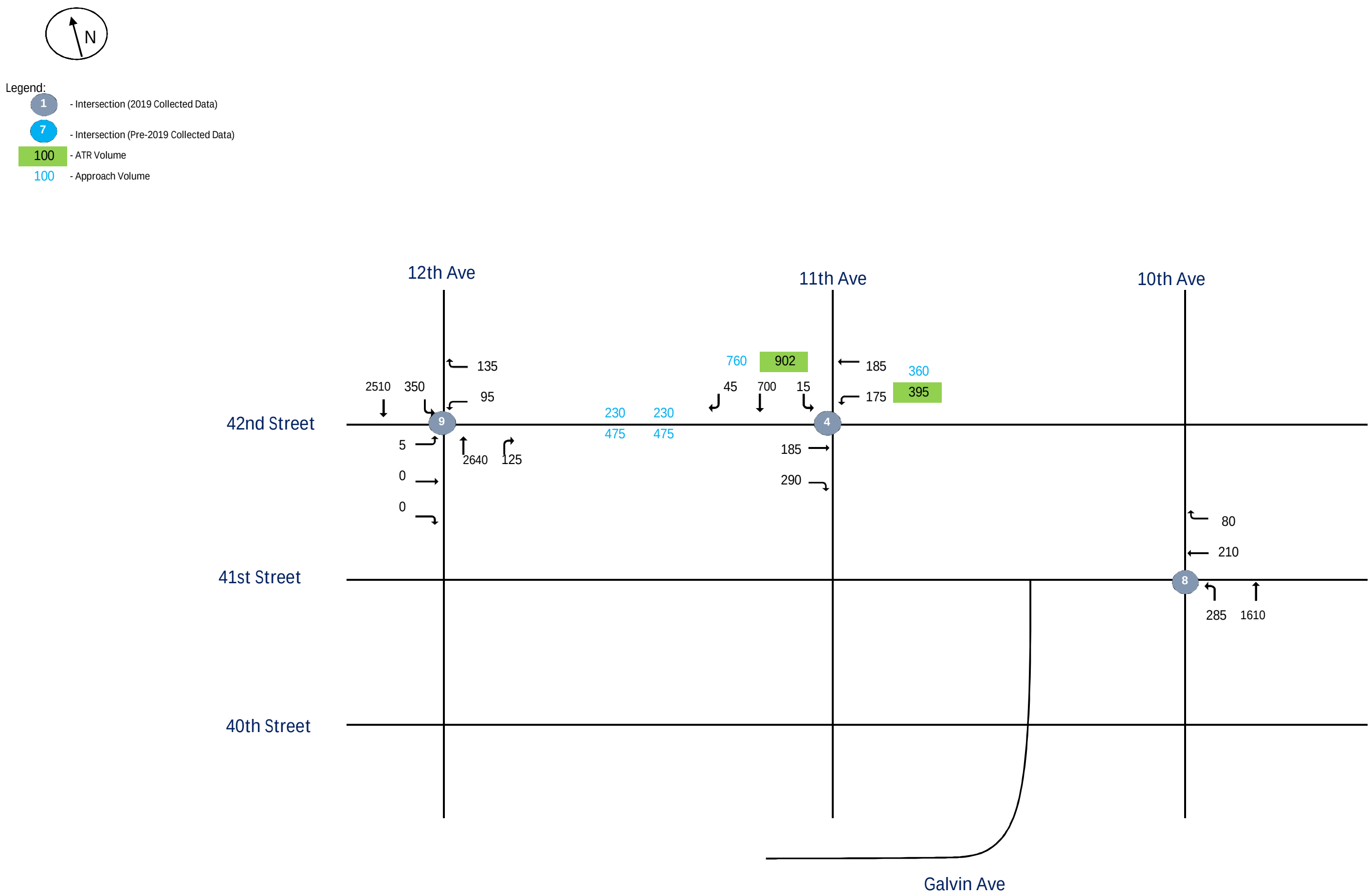



CBD Tolling
LT #1 - Traffic Flowmap
PM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
12th Ave
11th Ave
36th Street
35th Street
34th Street
33rd Street
105
535
355
120
150
35
145
5
45
245
110
220
85
2285
295
2355
290
2645
3110
305
305
585
585
60
245
35
220
305
60
90
555
105
165
0
400
115
295
295
1135
1137
1008
180
85
1050
210
95
0
1650

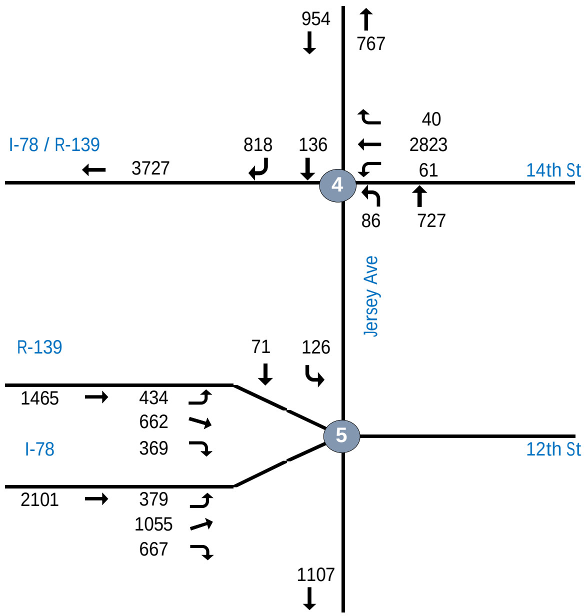
CBD Tolling

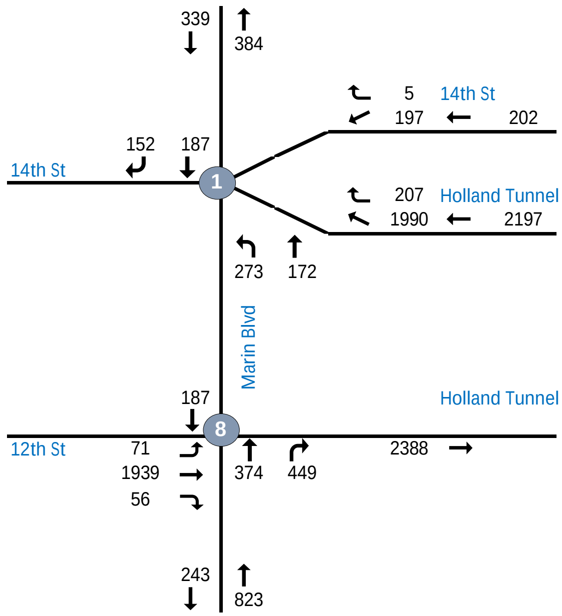
LT #2 - Traffic Flowmap

PM Existing

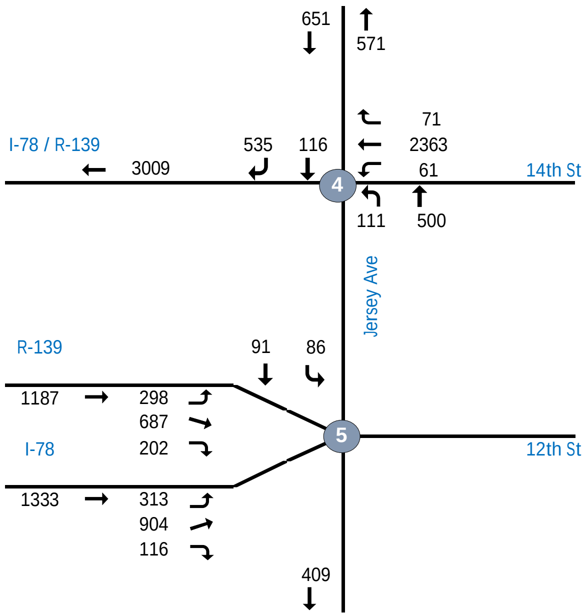


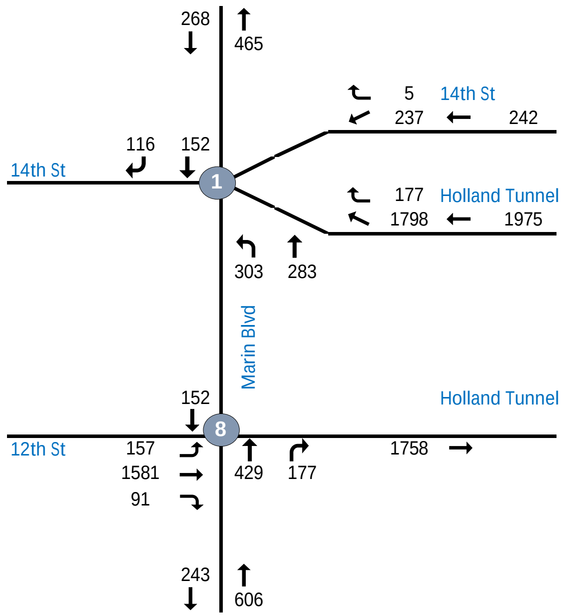
New Jersey
2019 Existing Conditions
AM Peak Hour



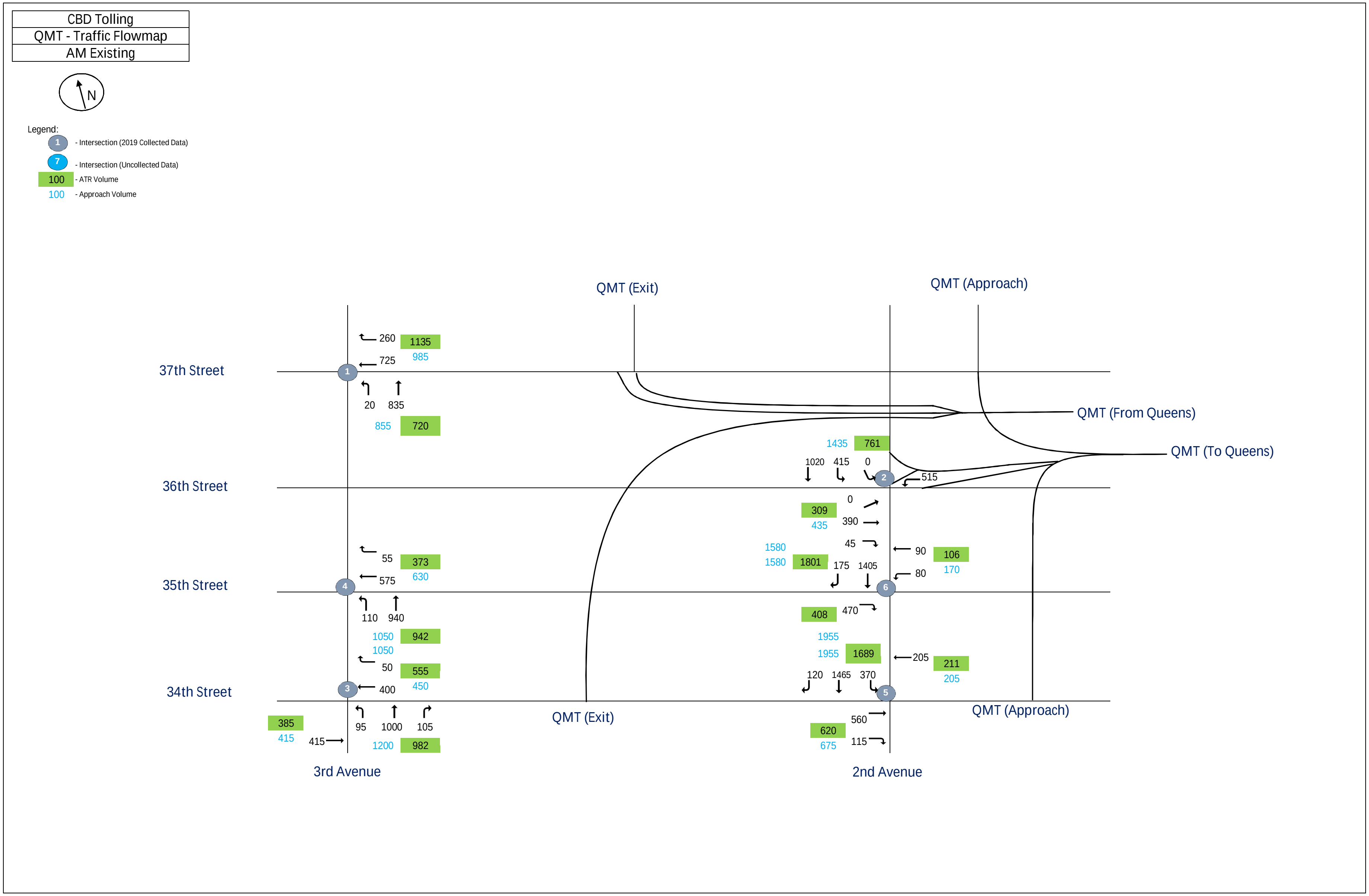


New Jersey
2019 Existing Conditions
MD Peak Hour

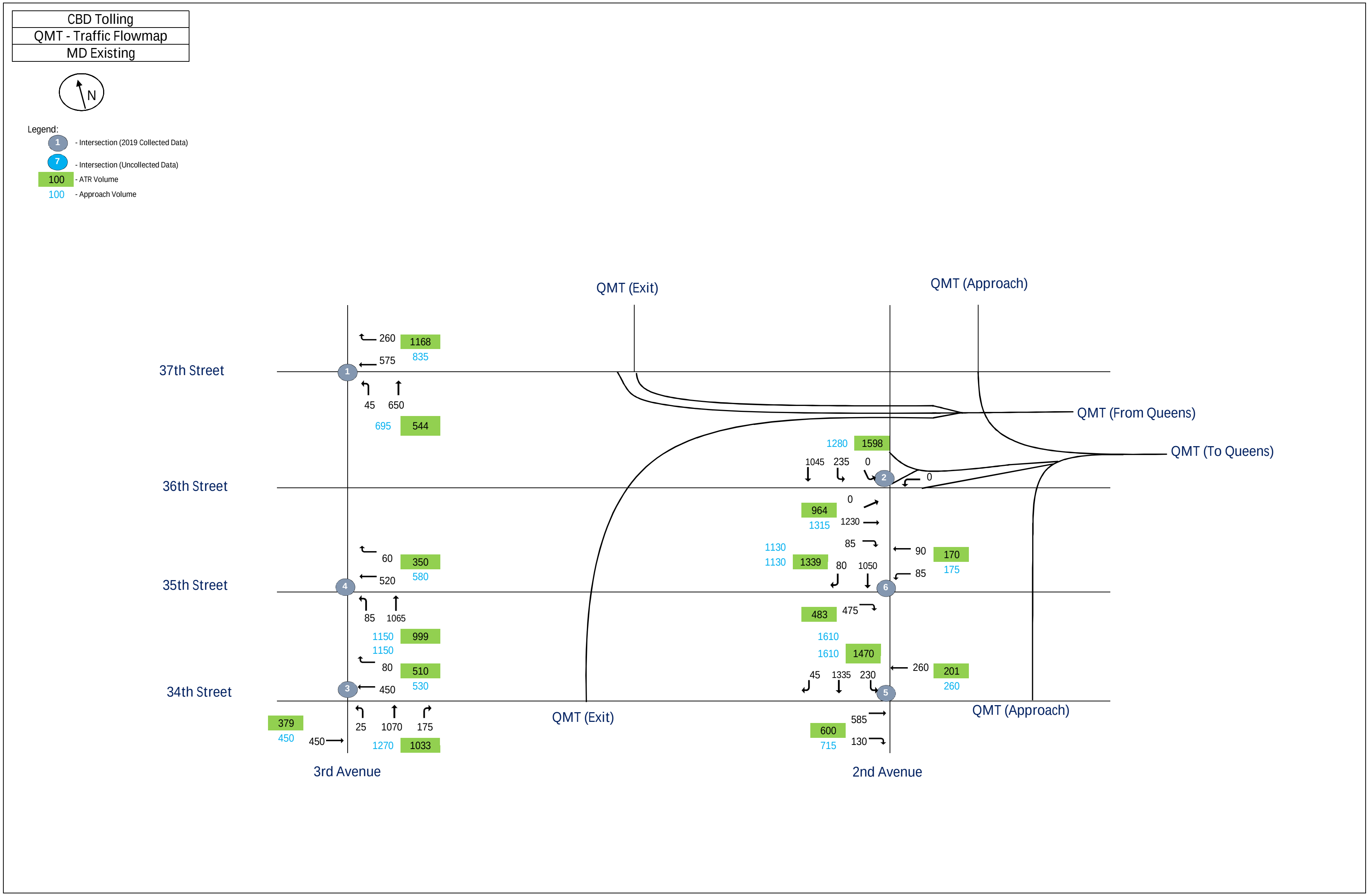




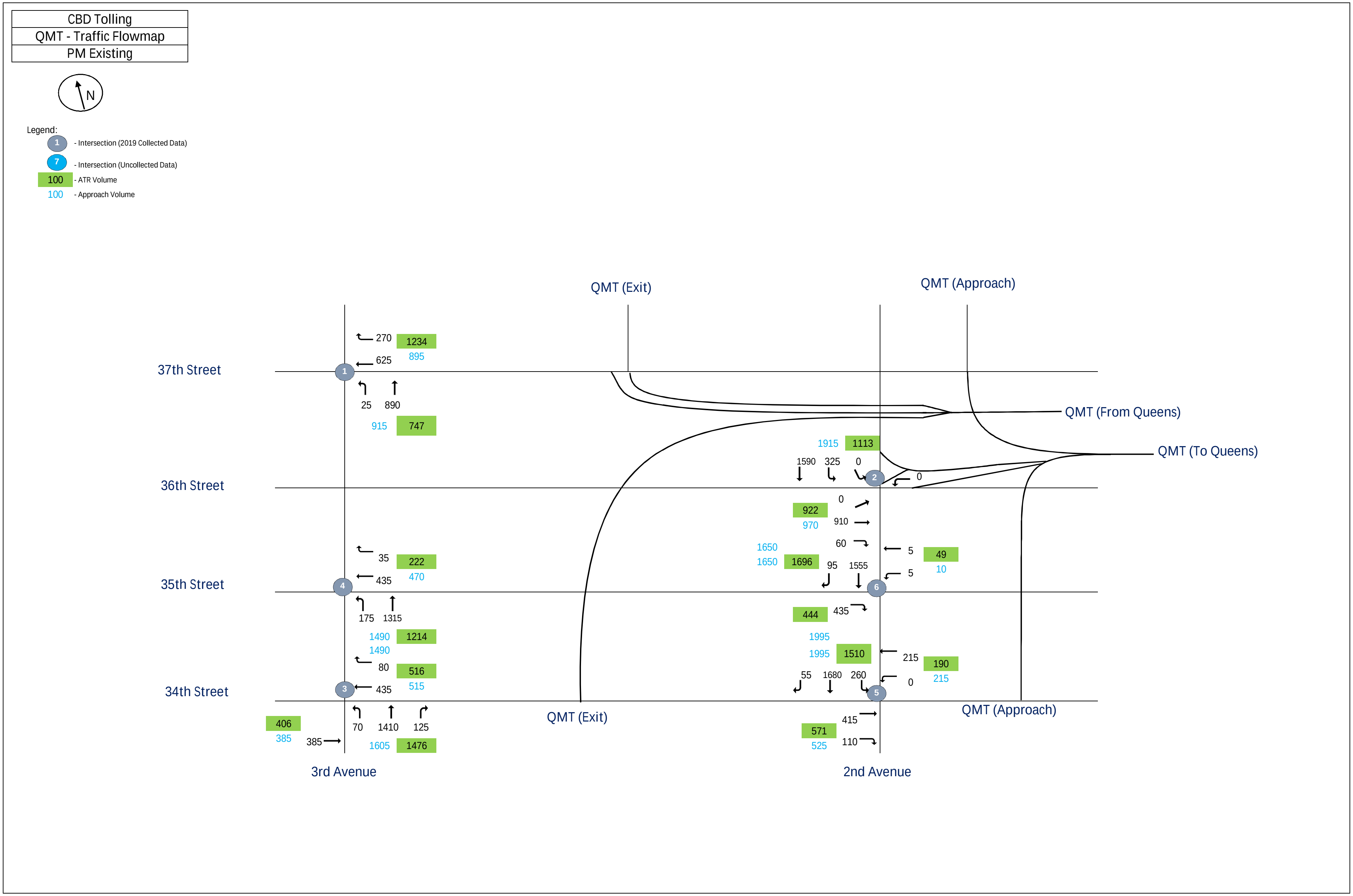
New Jersey
2019 Existing Conditions
PM Peak Hour



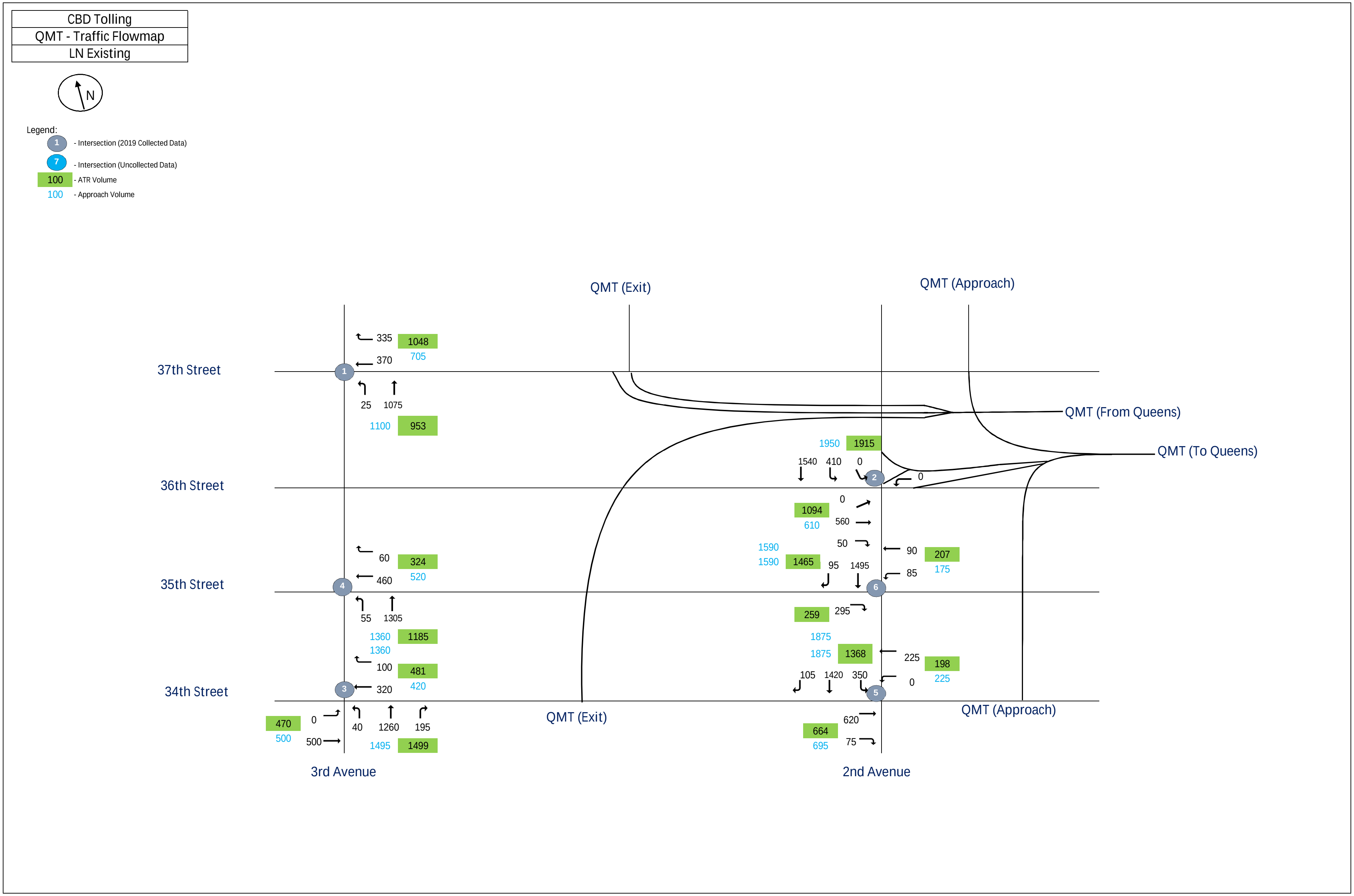
CBD Tolling
QMT - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
QMT (From Queens)
QMT (To Queens)
37th Street
36th Street
35th Street
34th Street
3rd Avenue
2nd Avenue
260
1135
725
985
20
835
855
720
55
373
575
630
110
940
1050
942
1050
50
555
400
450
95
1000
105
385
415
415
1200
982
1435
761
1020
415
0
515
0
309
390
435
45
1580
1580
1801
175
1405
90
106
80
170
408
470
1955
1955
1689
205
211
120
1465
370
205
560
620
115
675

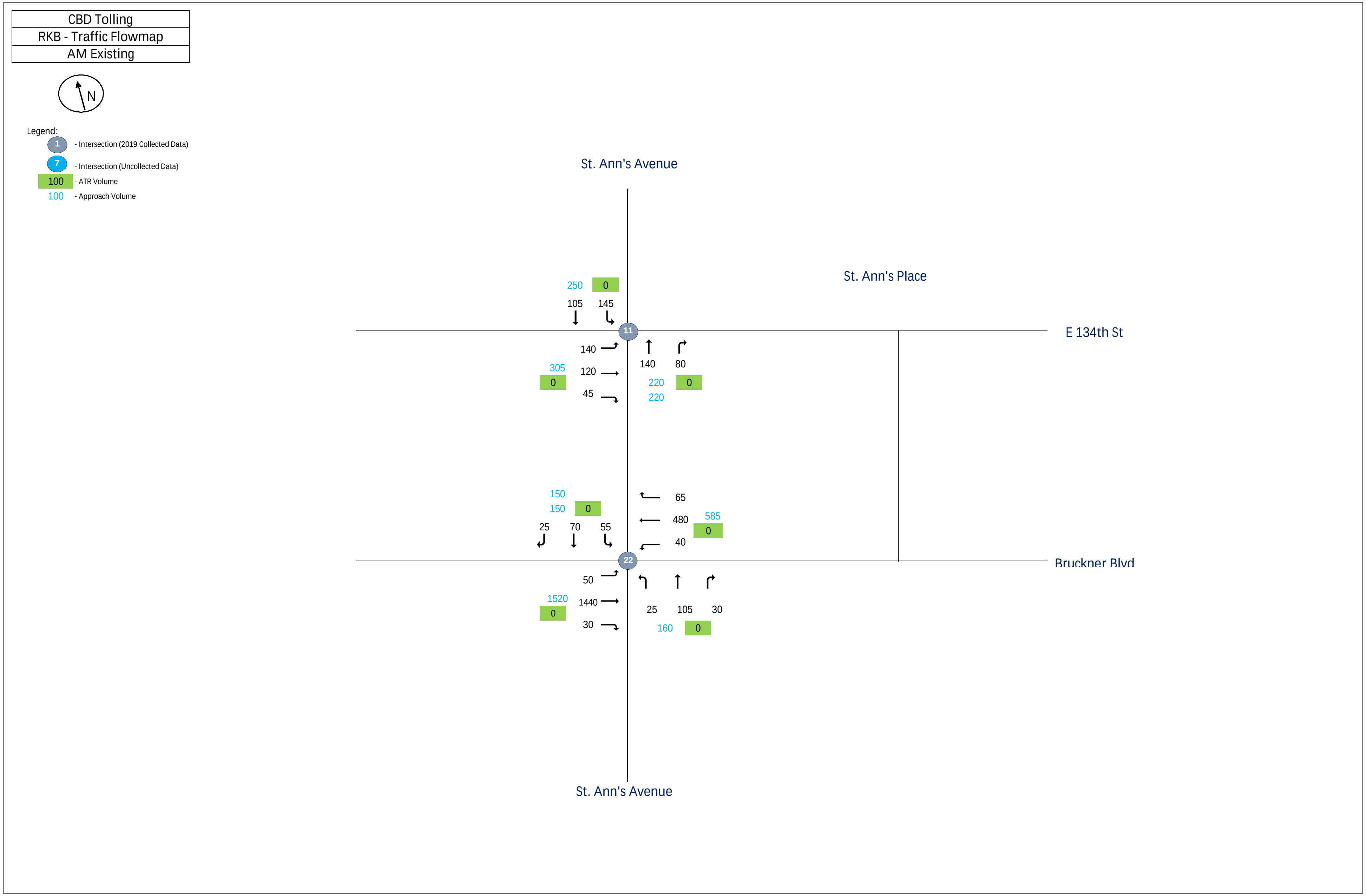


CBD Tolling
QMT - Traffic Flowmap
MD Existing
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
QMT (From Queens)
QMT (To Queens)
37th Street
36th Street
35th Street
34th Street
3rd Avenue
2nd Avenue
260
1168
575
835
45
650
695
544
1280
1598
1045
235
0
0
964
1315
1230
1130
85
90
170
1130
1339
80
1050
85
175
60
350
520
580
85
1065
483
475
1150
999
1610
1150
1610
1470
80
510
450
530
45
1335
230
260
201
260
379
450
25
1070
175
450
1270
1033
585
600
715
130

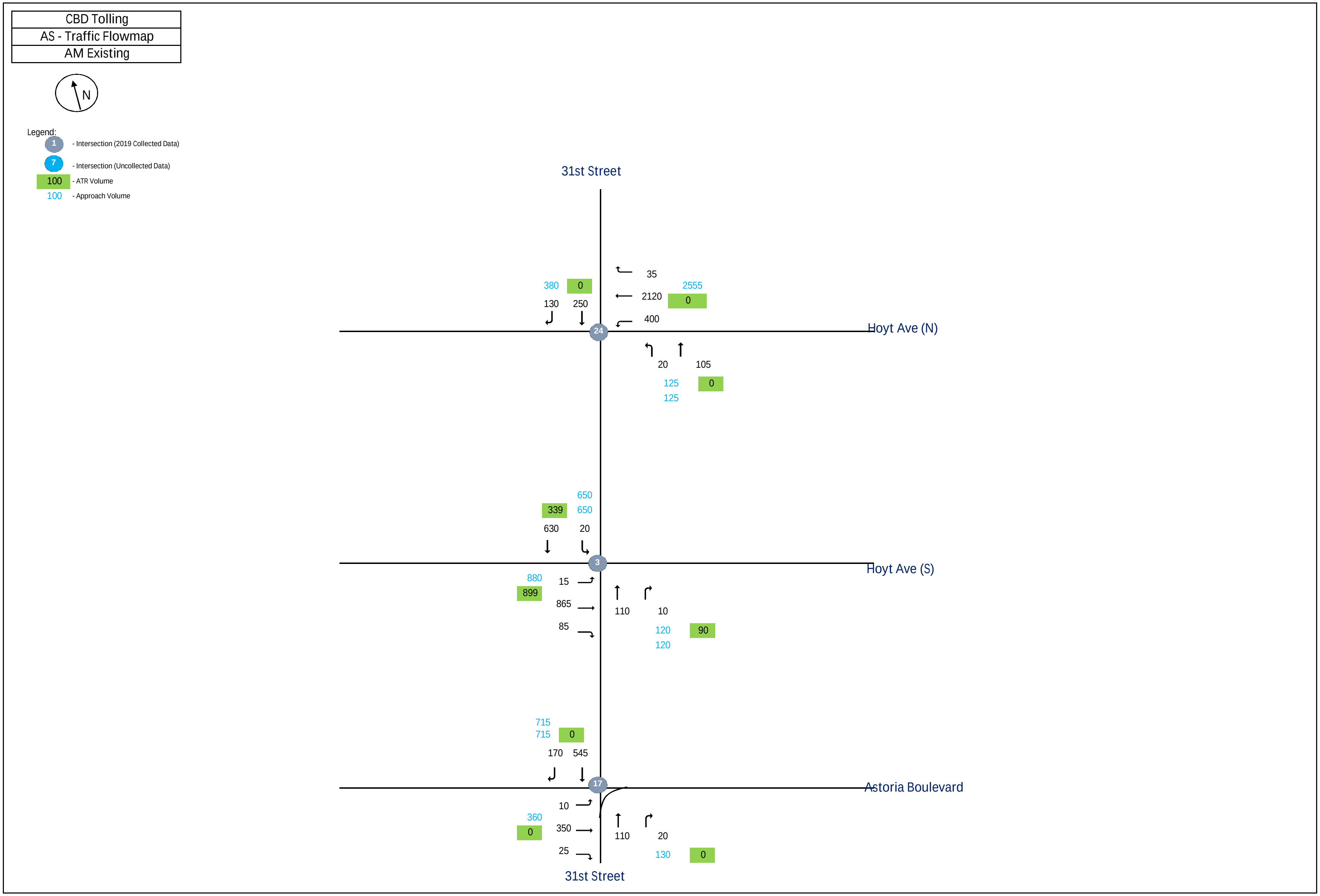


CBD Tolling
QMT - Traffic Flowmap
PM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
37th Street
36th Street
35th Street
34th Street
QMT (From Queens)
QMT (To Queens)
270
1234
625
895
25
890
915
747
1915
1113
1590
325
0
0
0
922
970
910
60
1650
1650
1696
95
1555
5
49
5
10
35
222
435
470
175
1315
444
435
1490
1214
1490
1995
1995
1510
215
190
80
516
435
515
55
1680
260
0
215
406
385
385
70
1410
125
1605
1476
QMT (Exit)
415
571
525
110
QMT (Approach)
3rd Avenue
2nd Avenue


CBD Tolling
QMT - Traffic Flowmap
LN Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
37th Street
36th Street
35th Street
34th Street
QMT (From Queens)
QMT (To Queens)
QMT (Exit)
QMT (Approach)
3rd Avenue
2nd Avenue
1
2
3
4
5
6
335
1048
370
705
25
1075
1100
953
1950
1915
1540
410
0
0
0
1094
610
560
50
1590
1590
1465
95
1495
90
207
85
175
60
324
460
520
55
1305
1360
1185
1360
100
481
320
420
259
295
1875
1875
1368
225
198
105
1420
350
0
225
470
500
0
500
40
1260
195
1495
1499
620
664
695
75

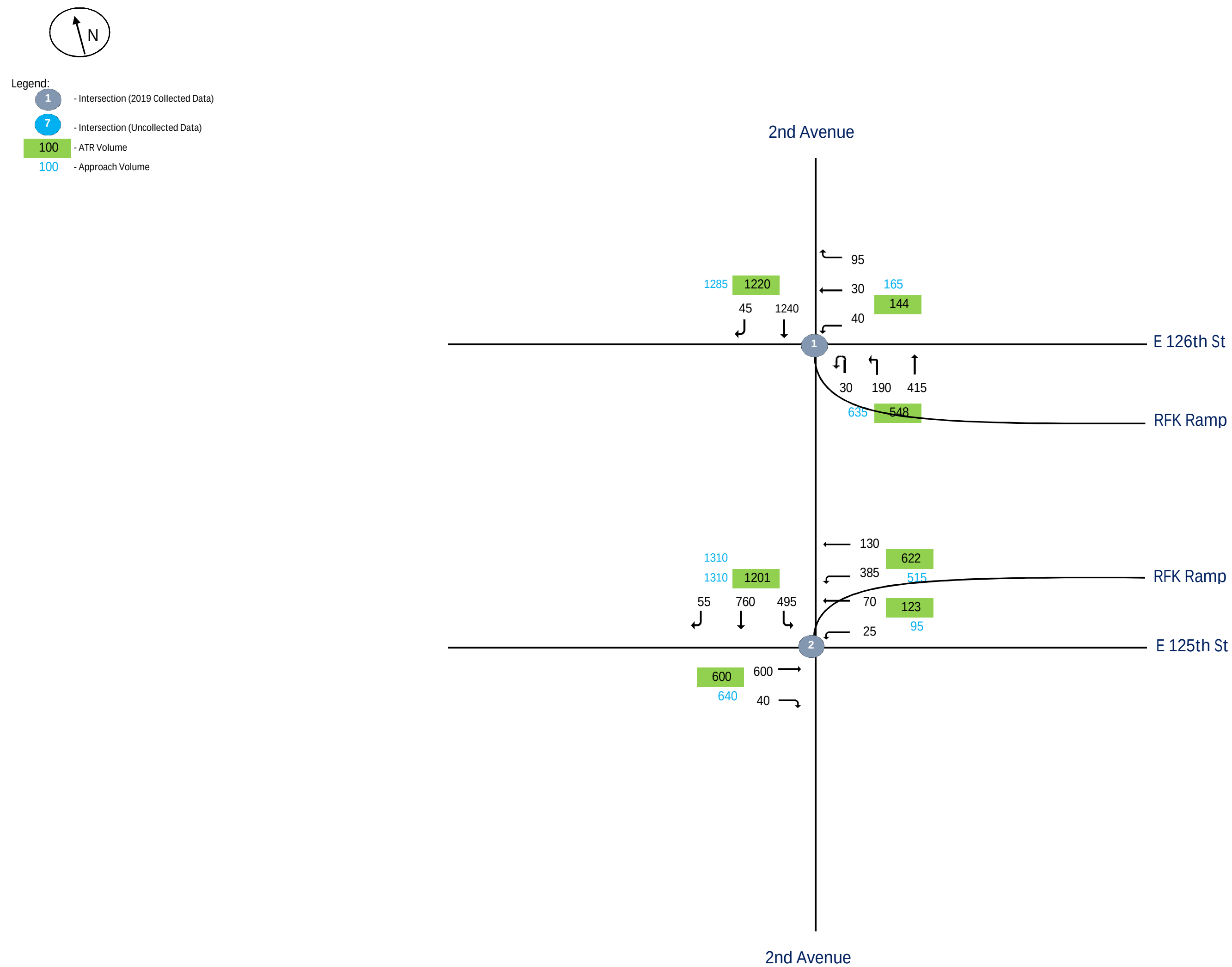


CBD Tolling
RKB - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
St. Ann's Avenue
St. Ann's Place
E 134th St
Bruckner Blvd
St. Ann's Avenue
11
22
250
0
105
145
140
305
0
120
45
140
80
220
0
220
150
150
0
25
70
55
65
480
585
0
40
50
1520
0
1440
30
25
105
30
160
0

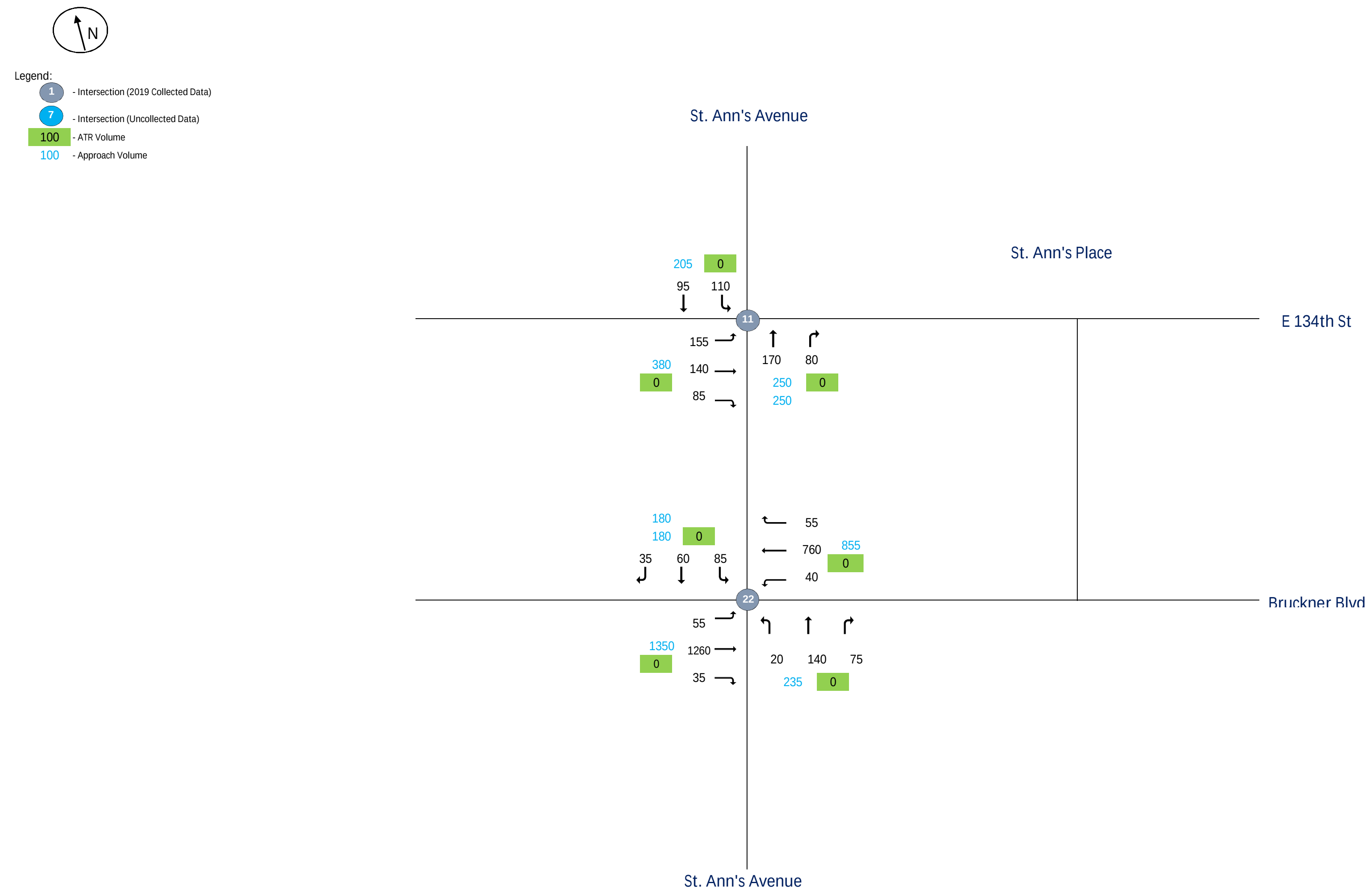


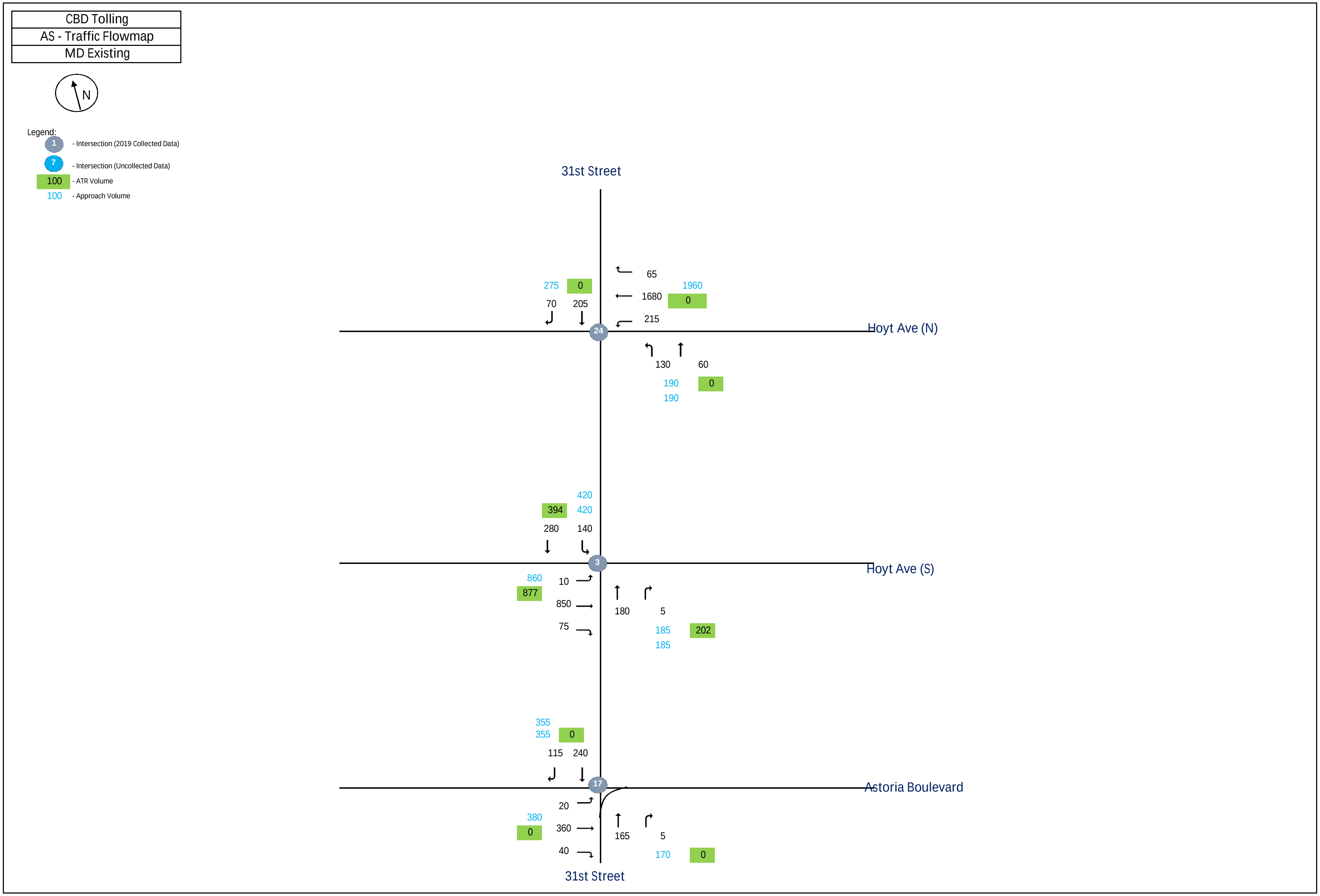
CBD Tolling
AS - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
Hoyt Ave (N)
380
0
130
250
35
2120
400
2555
0
24
20
105
125
0
125
650
650
339
630
20
3
Hoyt Ave (S)
880
899
15
865
85
110
10
120
90
120
715
715
0
170
545
17
Astoria Boulevard
10
360
350
0
25
110
20
130
0
31st Street

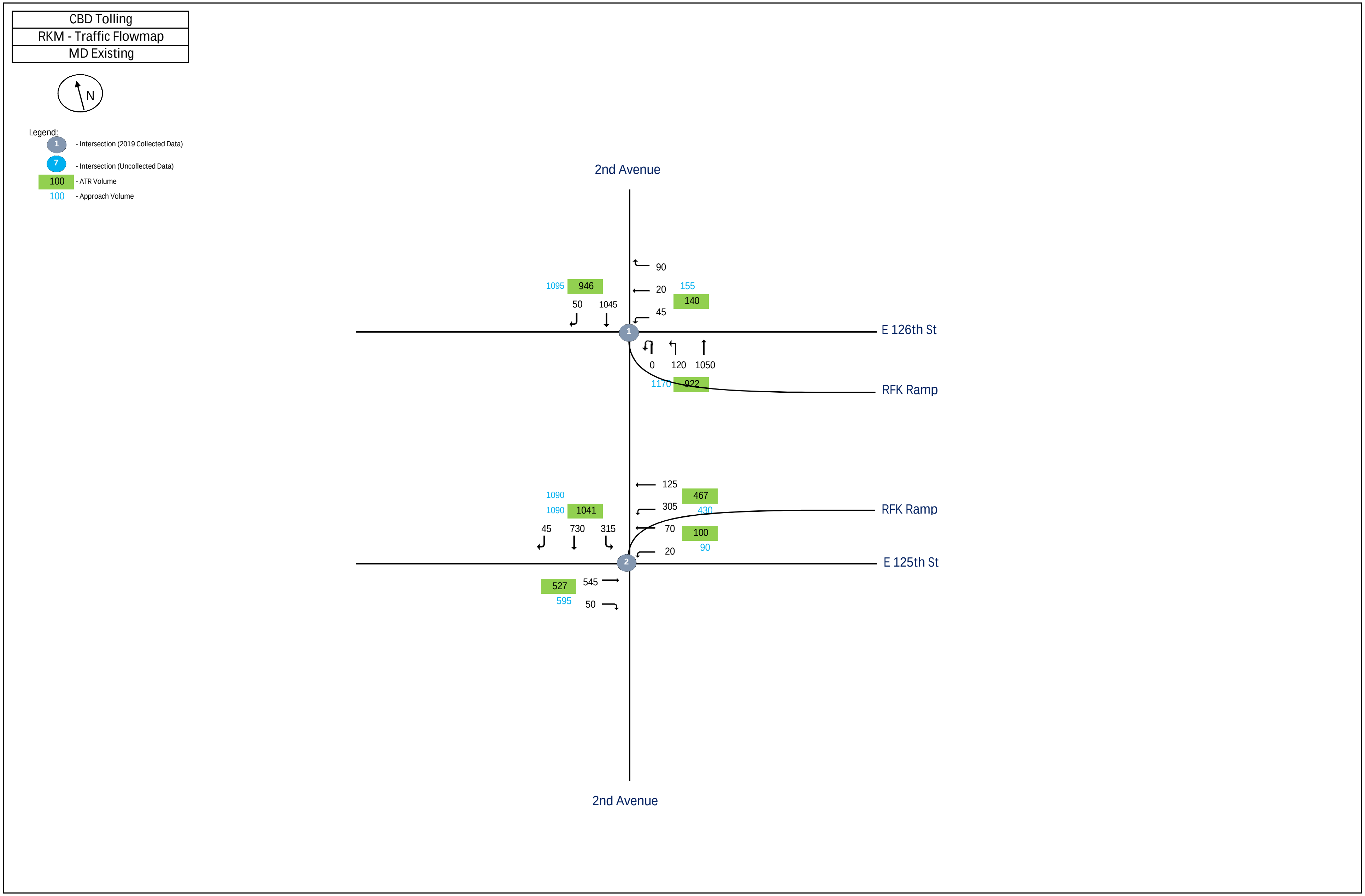
CBD Tolling
RKM - Traffic Flowmap
AM Existing



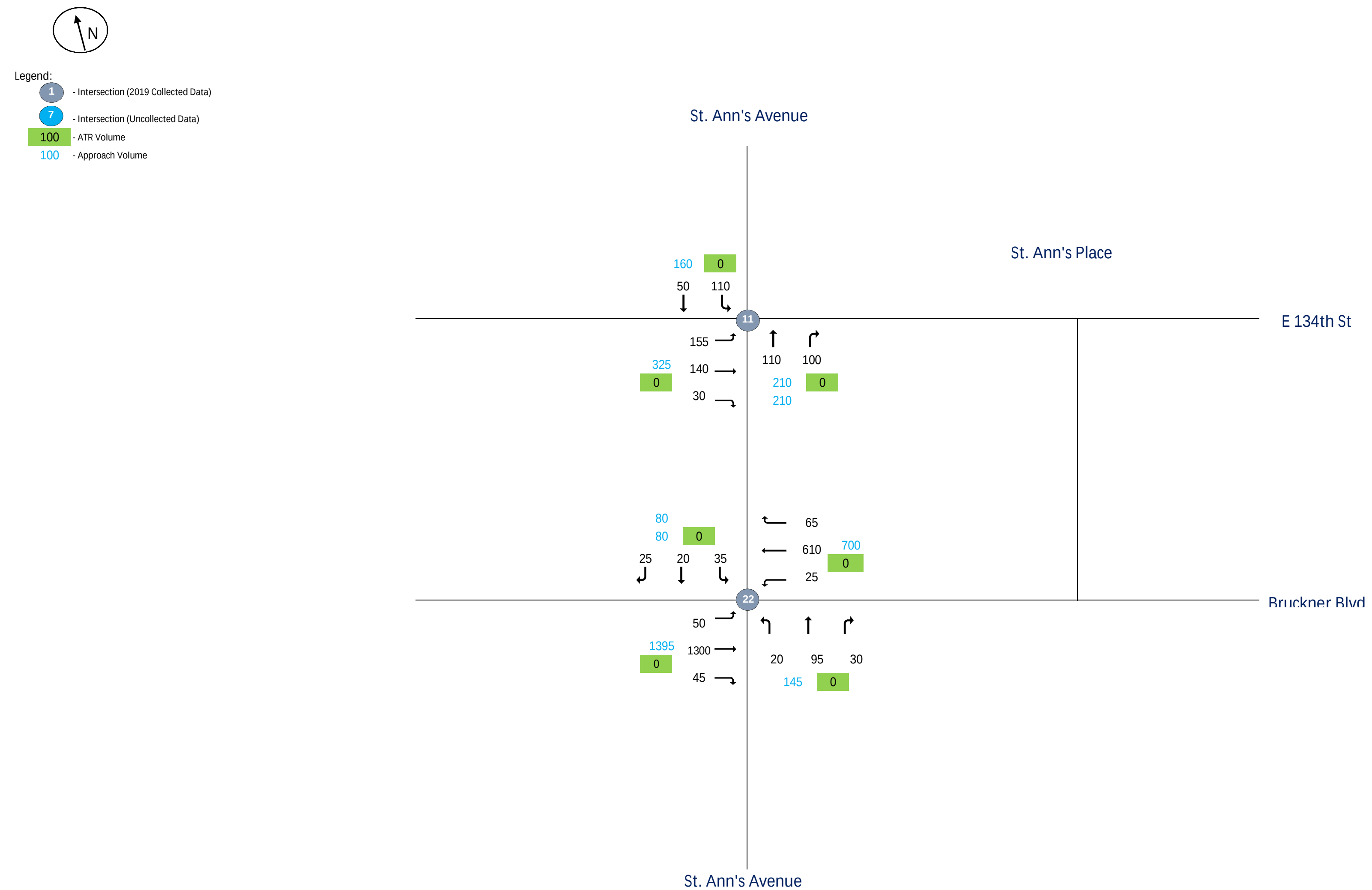
CBD Tolling
RKB - Traffic Flowmap
MD Existing

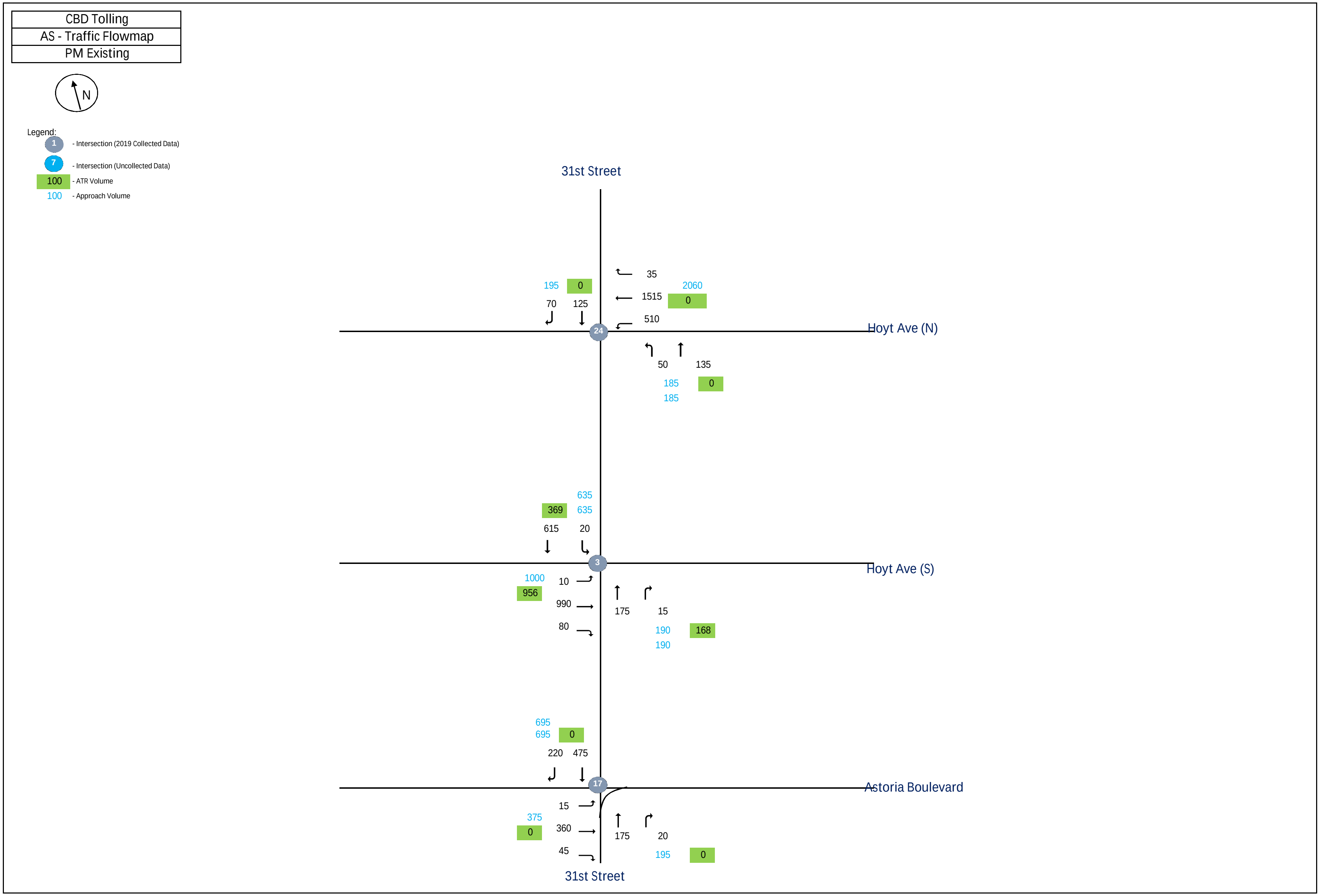


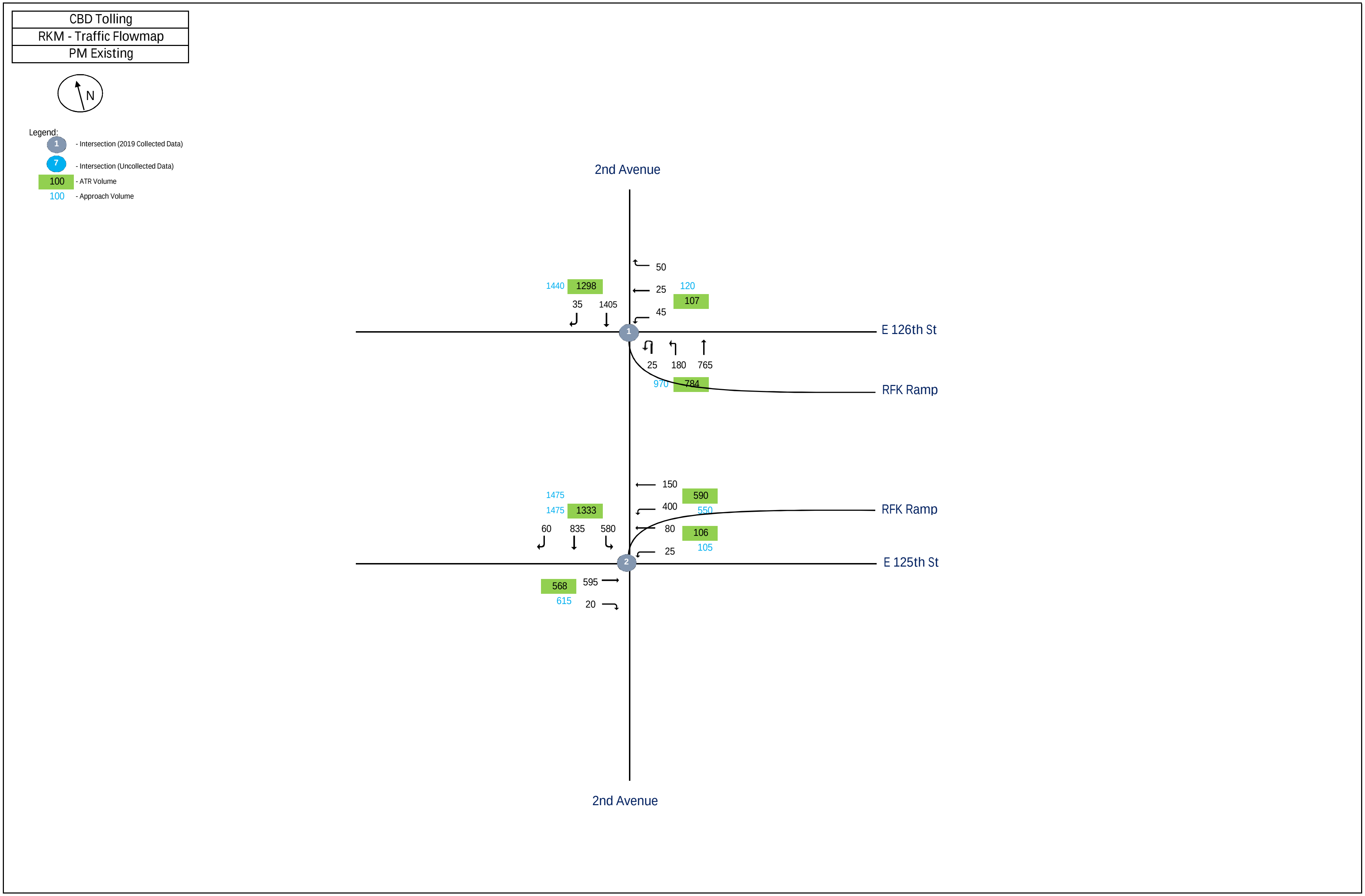

CBD Tolling
AS - Traffic Flowmap
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
275
0
70
205
65
1680
215
1960
0
24
Hoyt Ave (N)
130
60
190
0
190
420
394
420
280
140
3
Hoyt Ave (S)
860
877
10
850
75
180
5
185
202
185
355
355
0
115
240
17
Astoria Boulevard
20
380
0
360
40
165
5
170
0
31st Street


CBD Tolling
RKM - Traffic Flowmap
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
2nd Avenue
90
20
155
140
1095
946
50
1045
45
E 126th St
0
120
1050
1170
922
RFK Ramp
125
467
1090
305
1090
1041
430
RFK Ramp
45
730
315
70
100
90
20
E 125th St
545
527
595
50
2nd Avenue

CBD Tolling
RKB - Traffic Flowmap
PM Existing

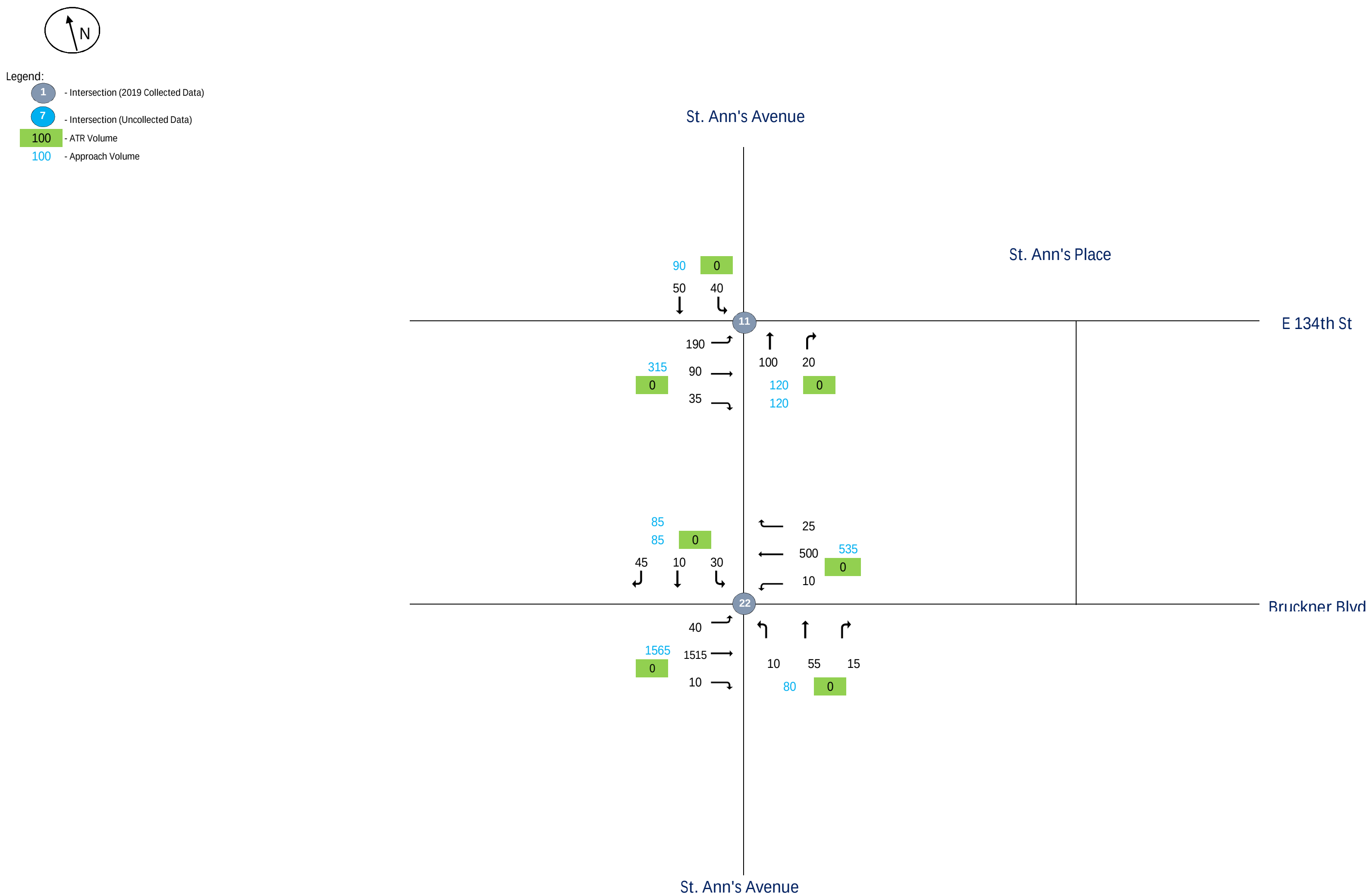


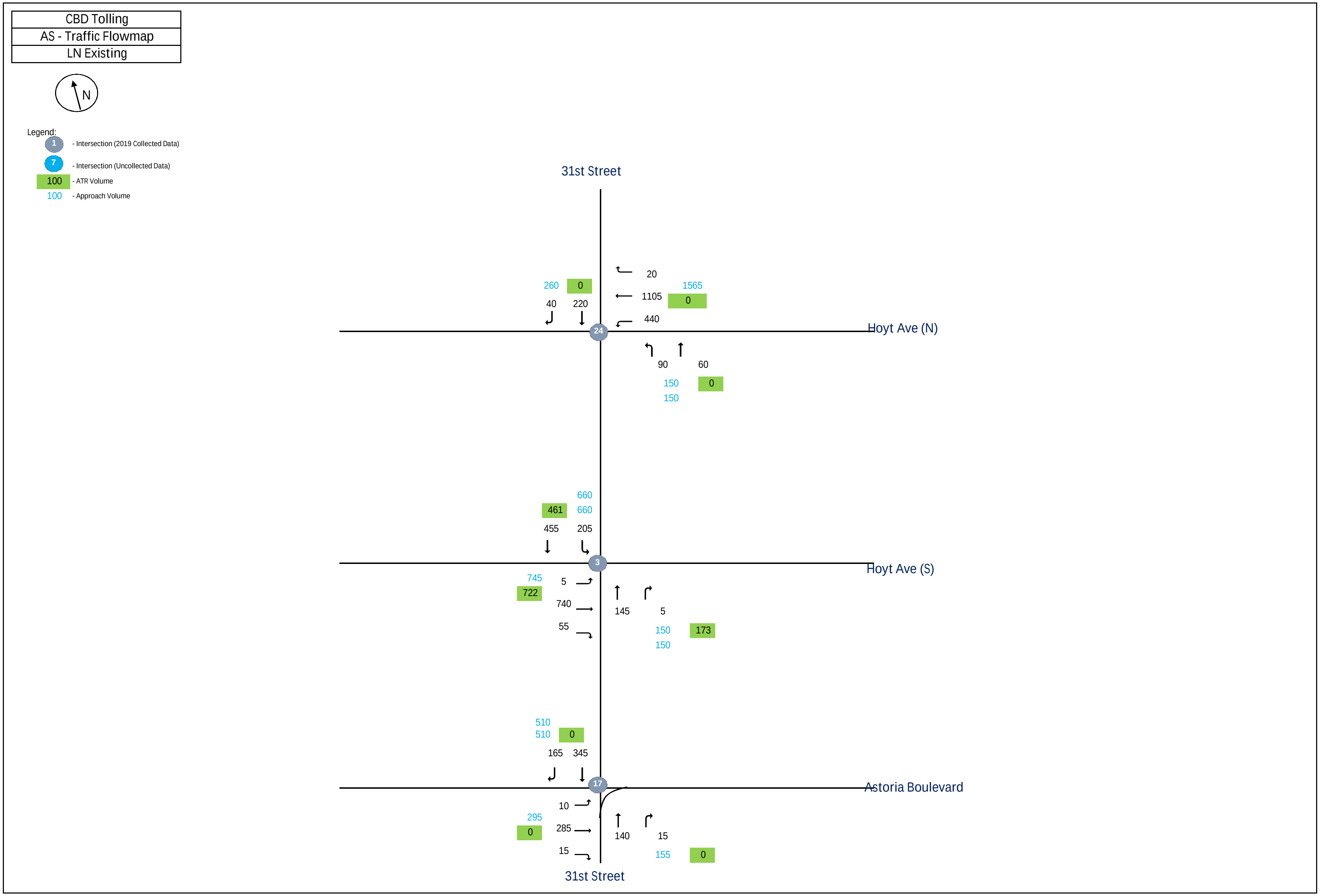

CBD Tolling
AS - Traffic Flowmap
PM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
195
0
70
125
35
2060
1515
0
510
24
Hoyt Ave (N)
50
135
185
0
185
635
369
635
615
20
3
Hoyt Ave (S)
1000
10
956
990
175
15
80
190
168
190
695
695
0
220
475
17
Astoria Boulevard
15
375
360
175
20
0
45
195
0
31st Street



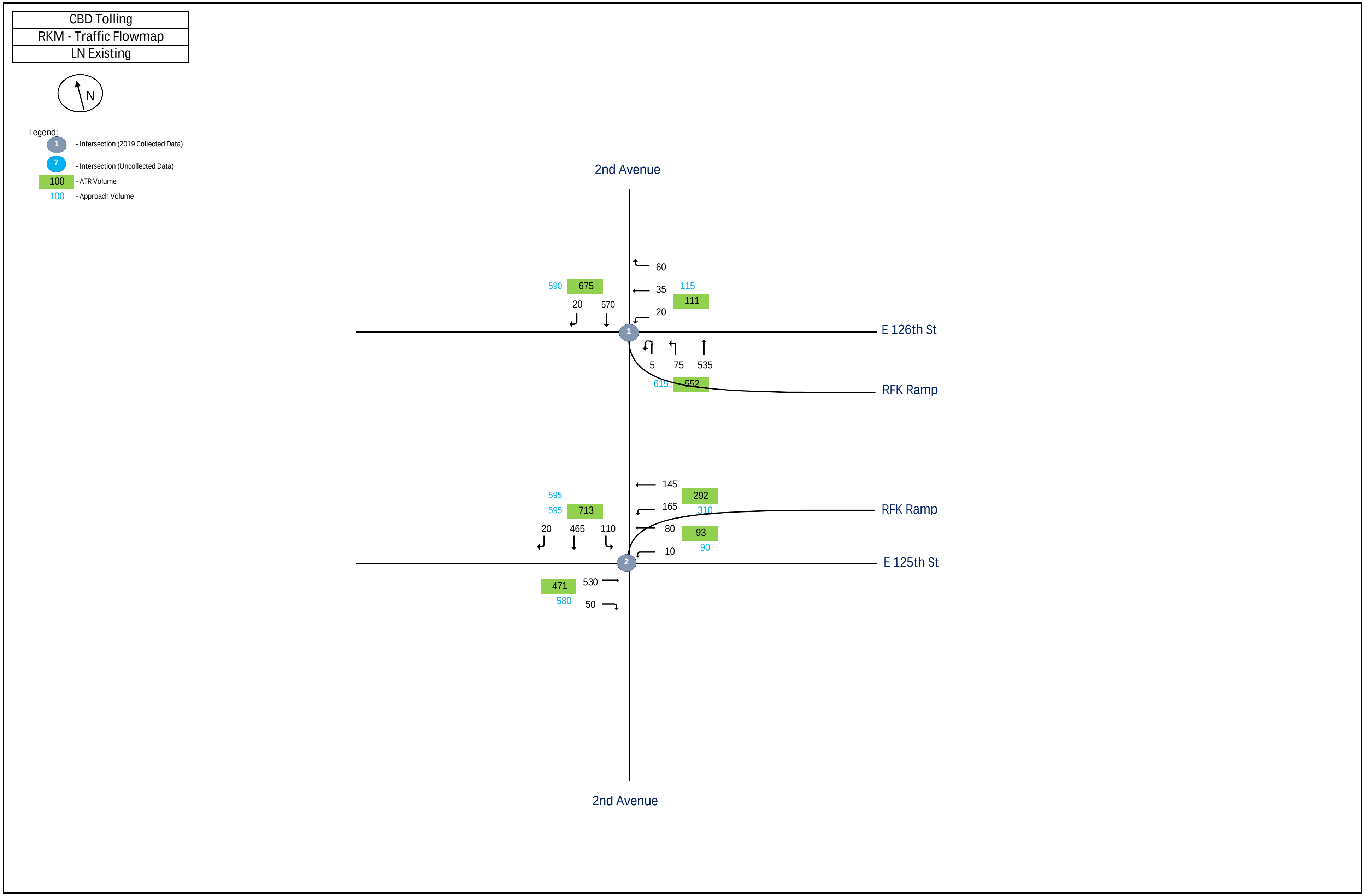
CBD Tolling
RKM - Traffic Flowmap
PM Existing
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
2nd Avenue
50
1440
1298
25
120
35
1405
107
45
1
E 126th St
25
180
765
970
784
RFK Ramp
150
1475
590
400
1475
1333
550
RFK Ramp
60
835
580
80
106
25
105
2
E 125th St
568
595
615
20
2nd Avenue

CBD Tolling
RKB - Traffic Flowmap
LN Existing



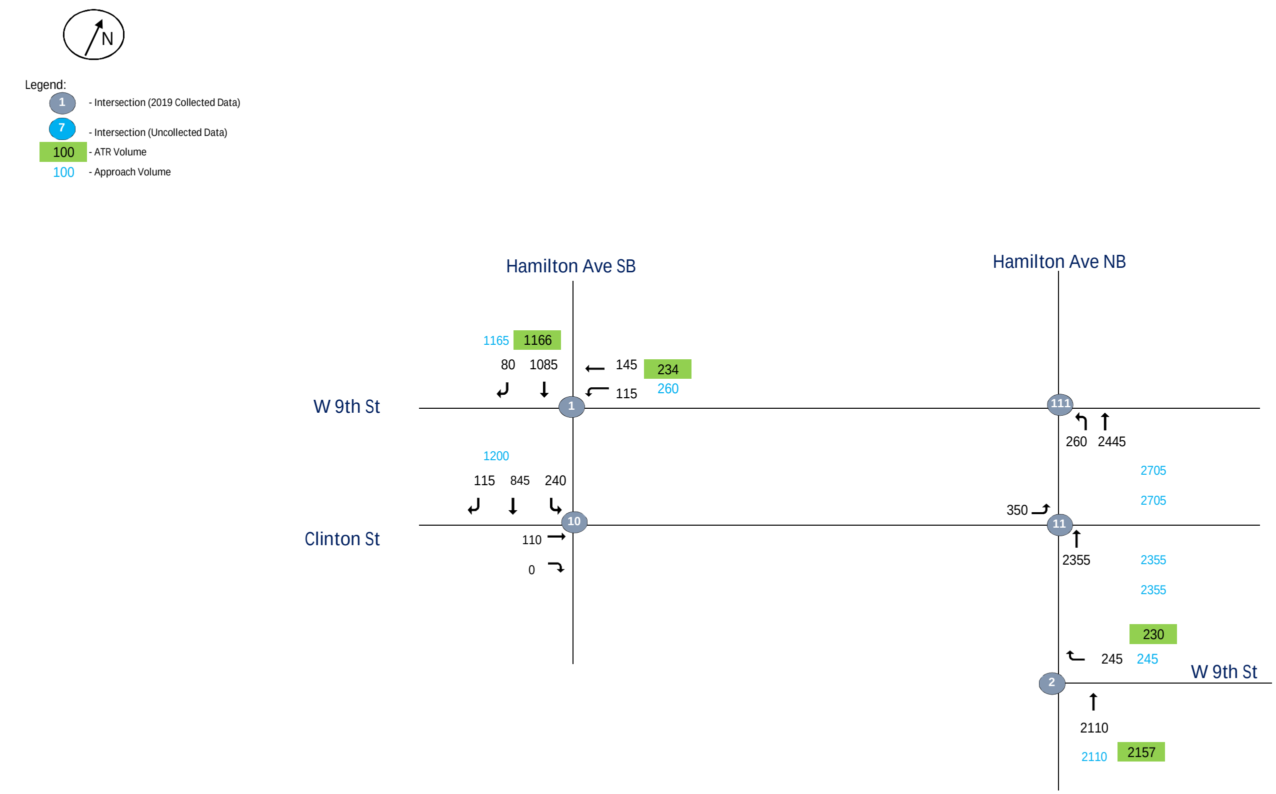


CBD Tolling
AS - Traffic Flowmap
LN Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
Hoyt Ave (N)
Hoyt Ave (S)
Astoria Boulevard
31st Street
24
3
17
260
0
40
220
20
1105
440
1565
0
90
60
150
0
150
660
660
461
455
205
745
722
5
740
55
145
5
150
173
150
510
510
0
165
345
10
285
15
295
0
140
15
155
0

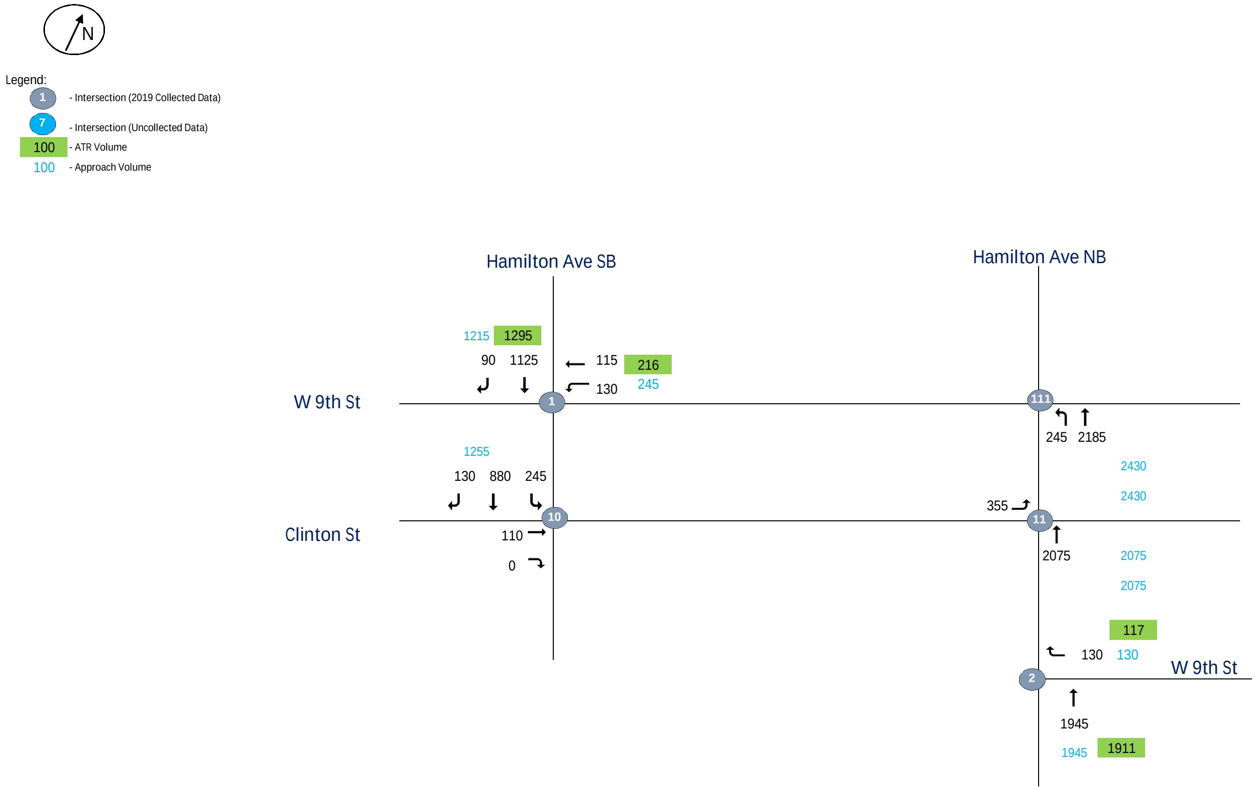


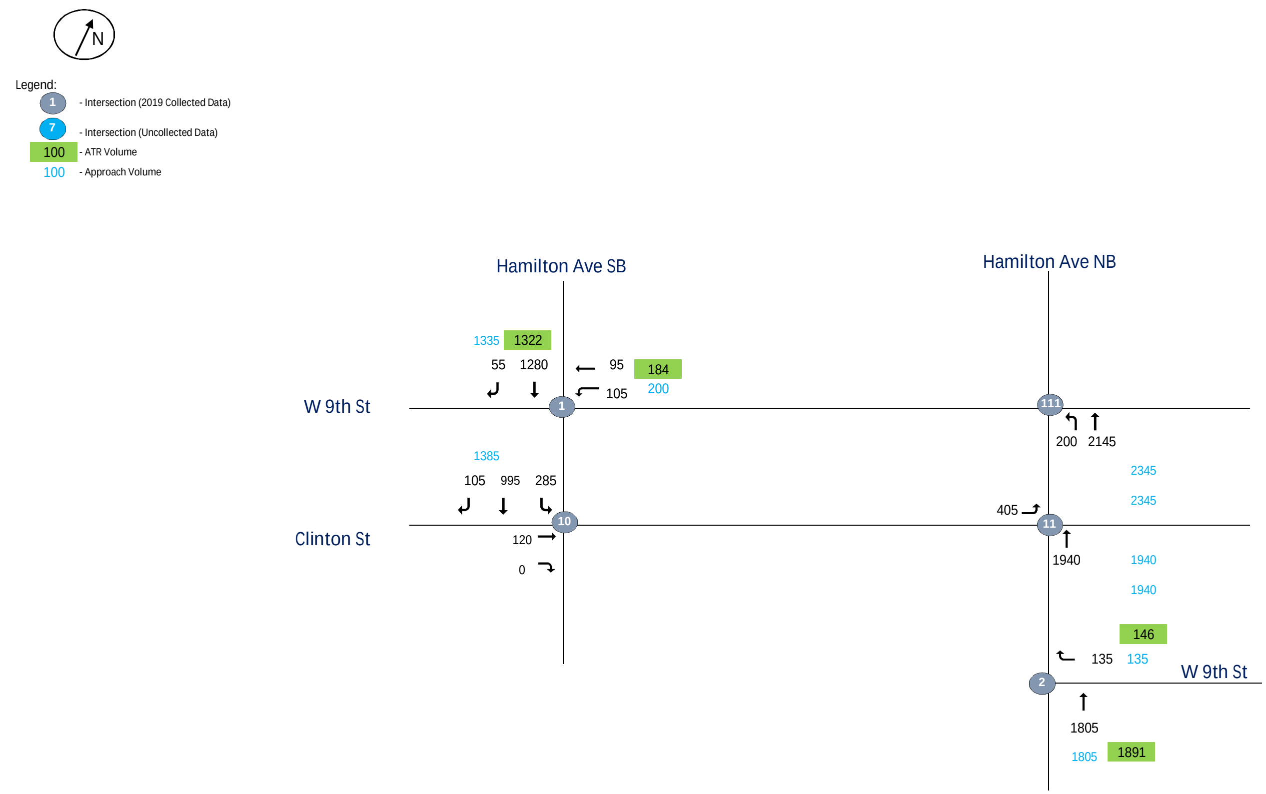
CBD Tolling
RKM - Traffic Flowmap
LN Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
2nd Avenue
E 126th St
RFK Ramp
RFK Ramp
E 125th St
2nd Avenue
60
35
20
115
111
590
675
20
570
5
75
535
615
552
145
292
165
310
80
93
10
90
595
595
713
20
465
110
471
530
580
50

CBD Tolling
Red Hook- Traffic Flowmap
AM Existing

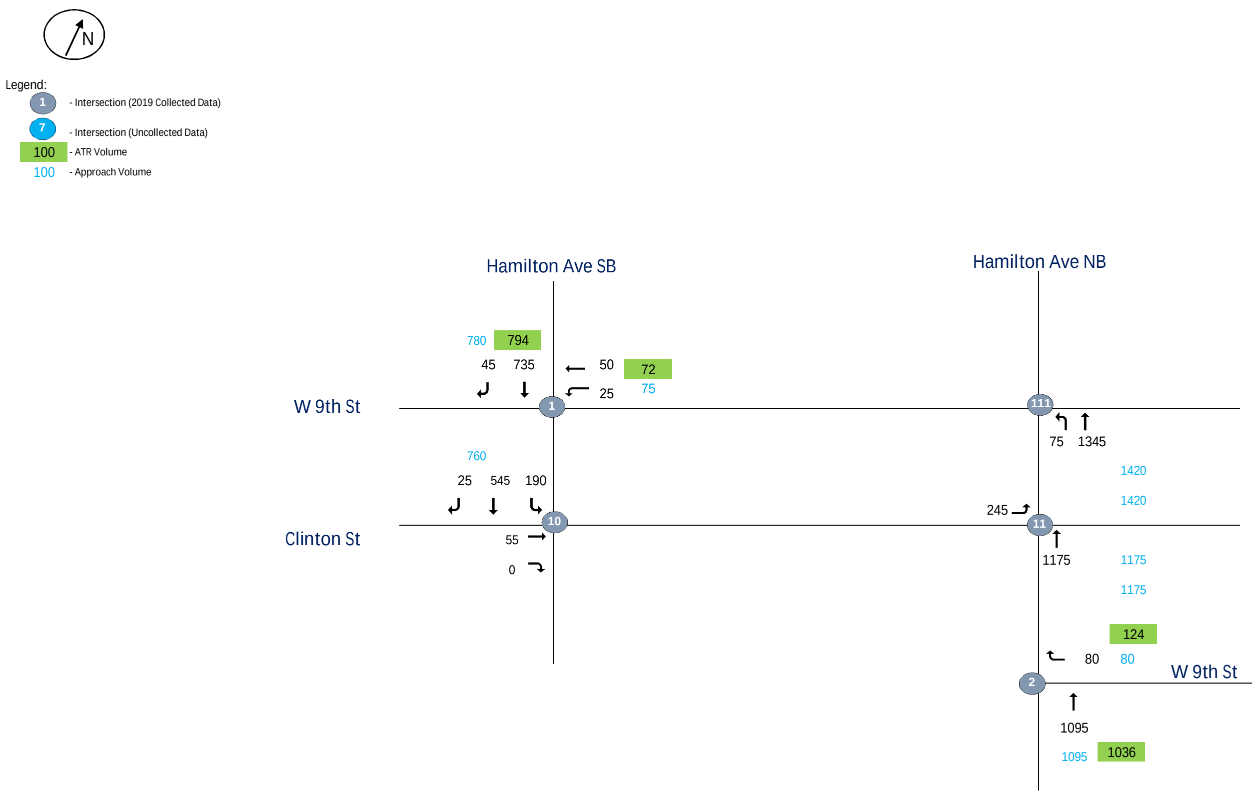


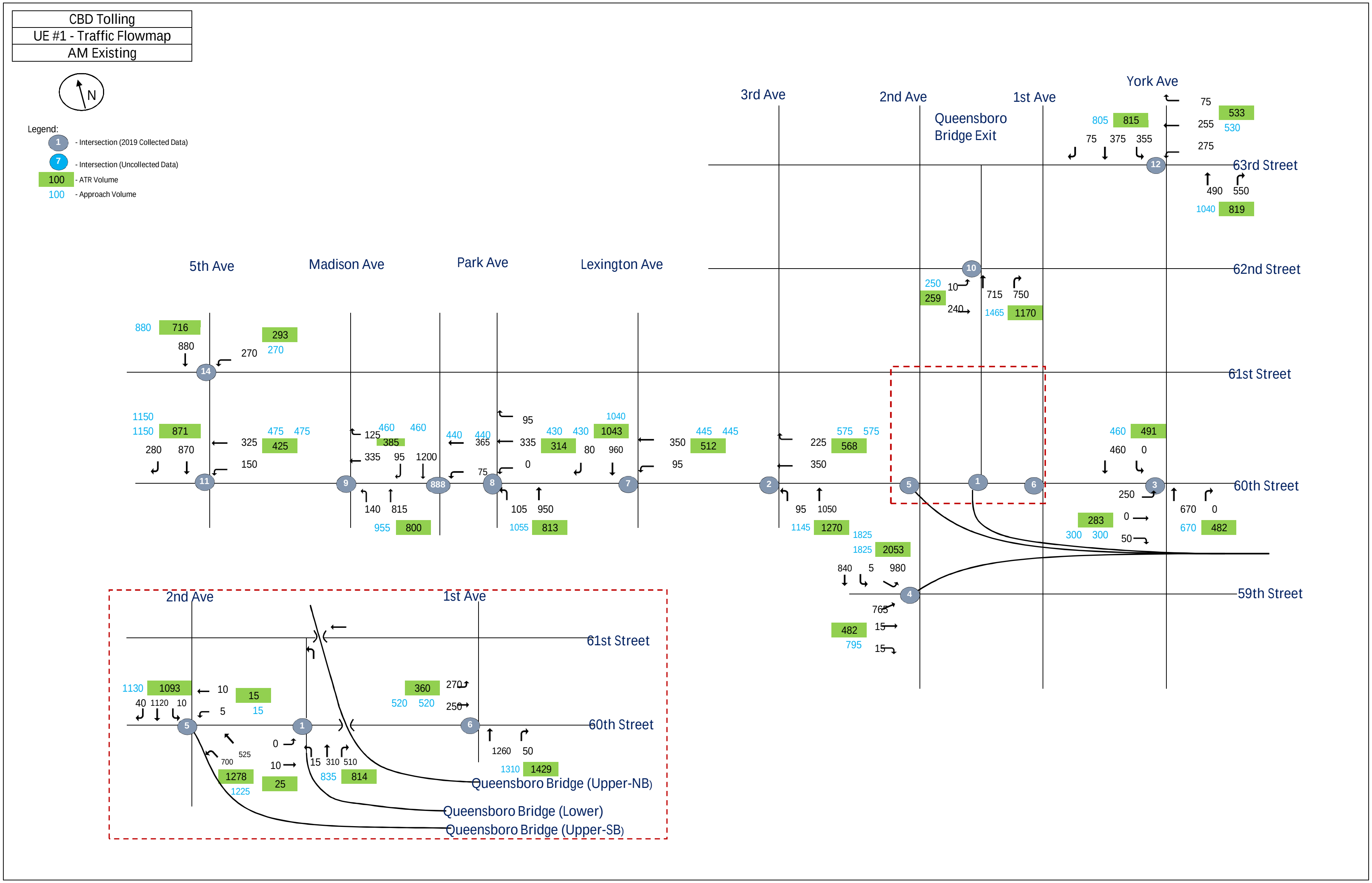
CBD Tolling
Red Hook- Traffic Flowmap
MD Existing




N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Hamilton Ave SB
Hamilton Ave NB
W 9th St
Clinton St
W 9th St
1335
1322
55
1280
95
184
105
200
1
111
200
2145
2345
2345
1385
105
995
285
405
10
11
120
0
1940
1940
1940
146
135
135
2
1805
1805
1891

CBD Tolling
Red Hook- Traffic Flowmap
LN Existing





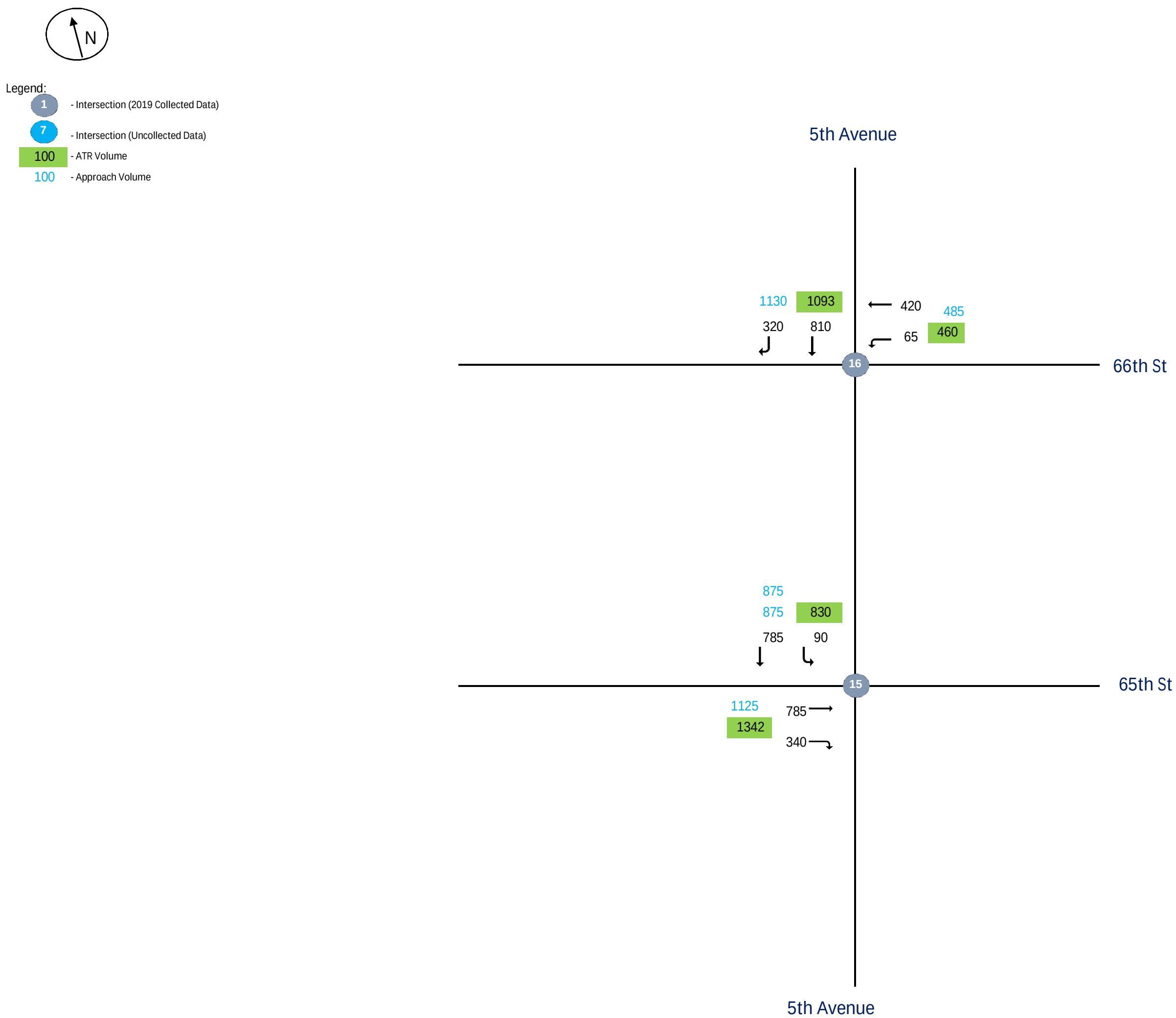
CBD Tolling
UE #1 - Traffic Flowmap
AM Existing
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
- ATR Volume
- Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling

UE #2 - Traffic Flowmap

AM Existing

CBD Tolling
UE #3 - Traffic Flowmap
AM Existing



CBD Tolling

UE #3 - Traffic Flowmap

AM Existing

N

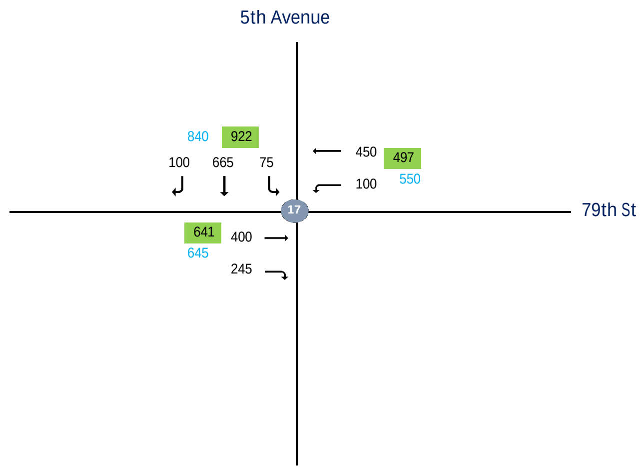
Legend:

1 - Intersection (2019 Collected Data)

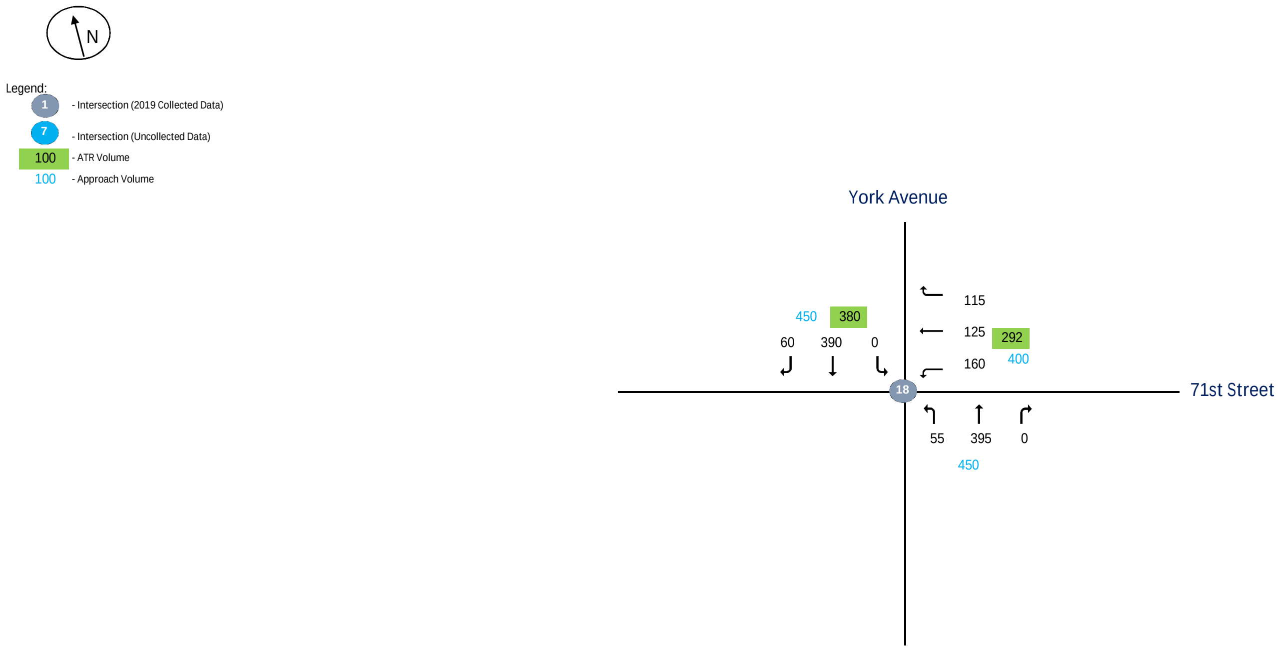
7 - Intersection (Uncollected Data)

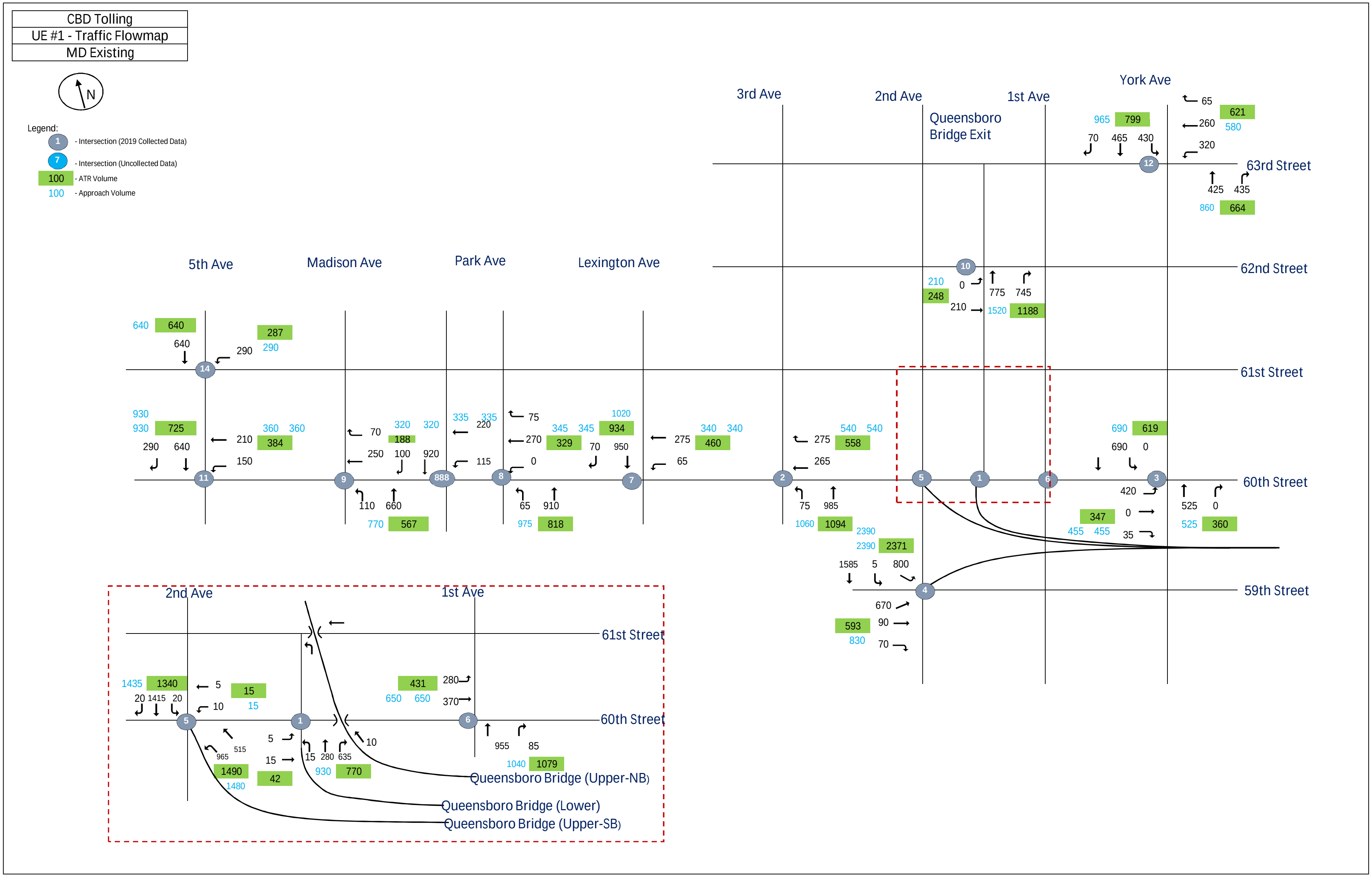
100 - ATR Volume

100 - Approach Volume

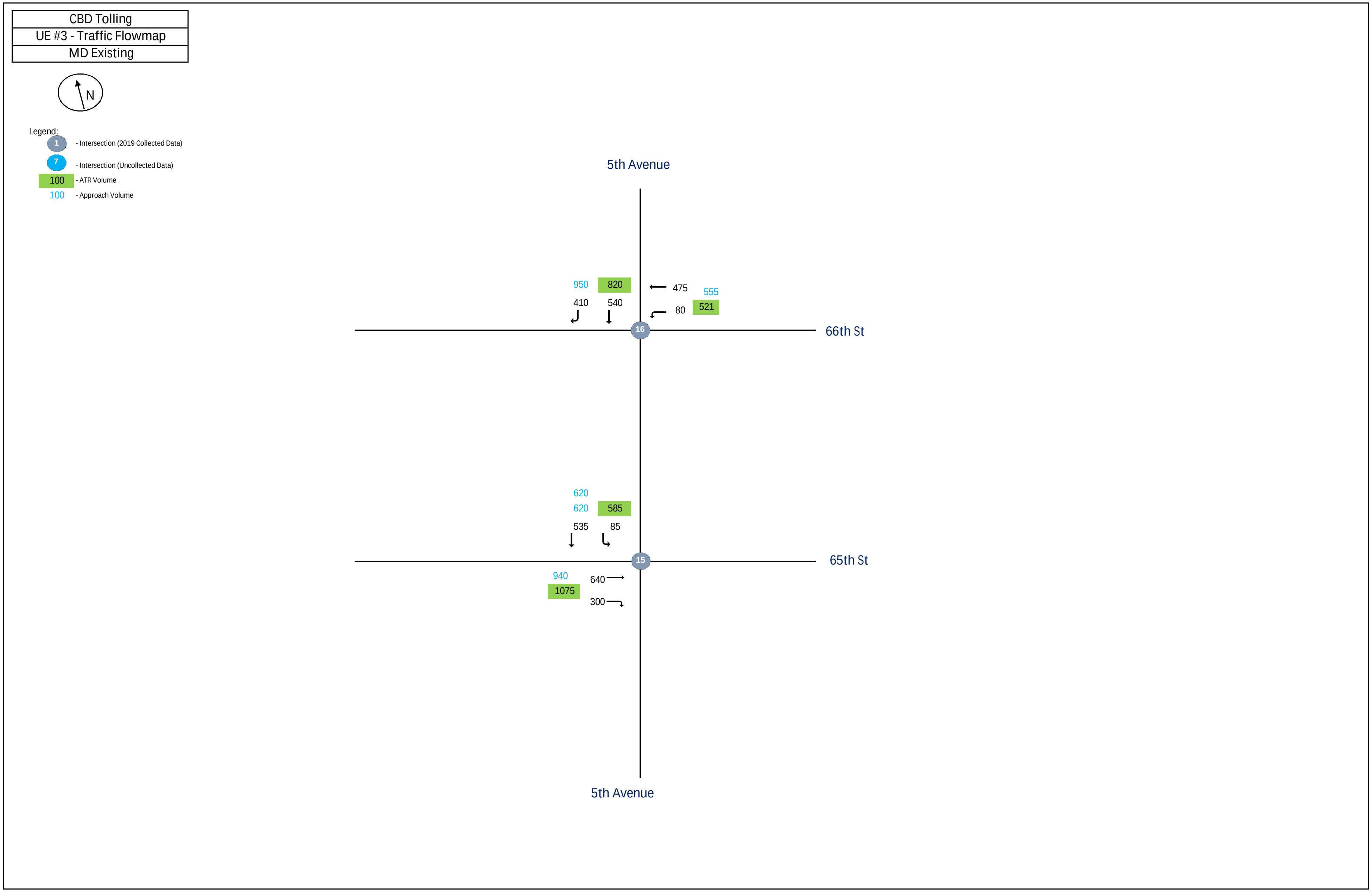


CBD Tolling
UE #4 - Traffic Flowmap
AM Existing

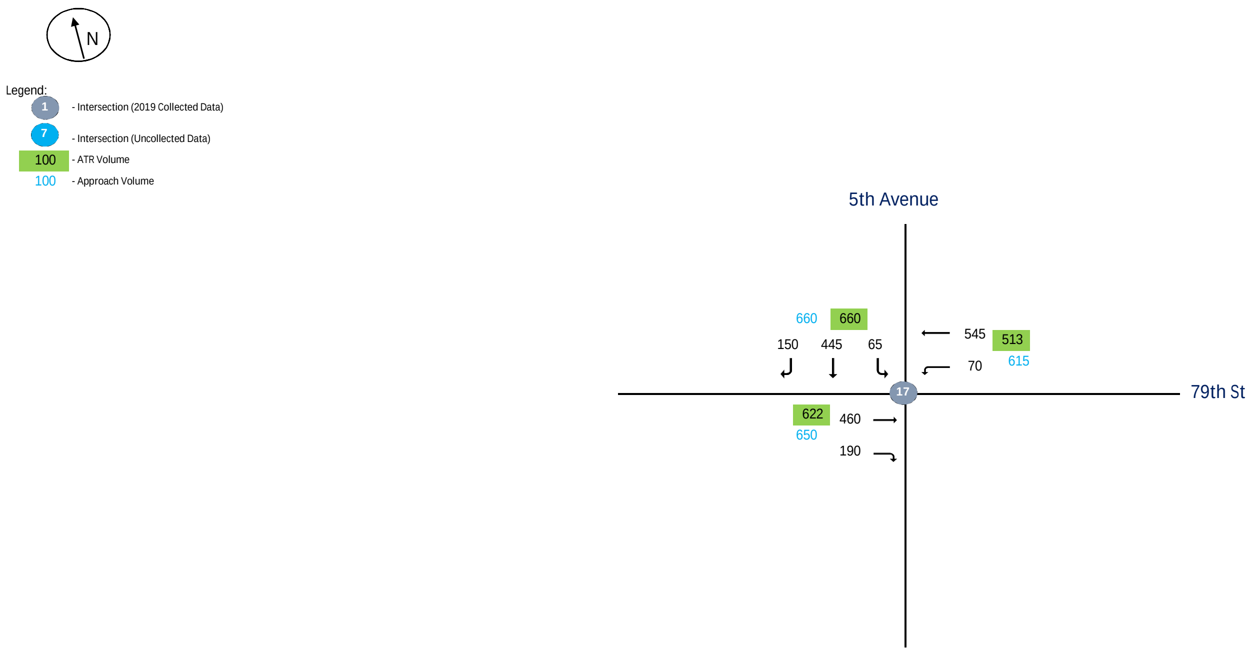



CBD Tolling
UE #1 - Traffic Flowmap
MD Existing
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
61st Street
60th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

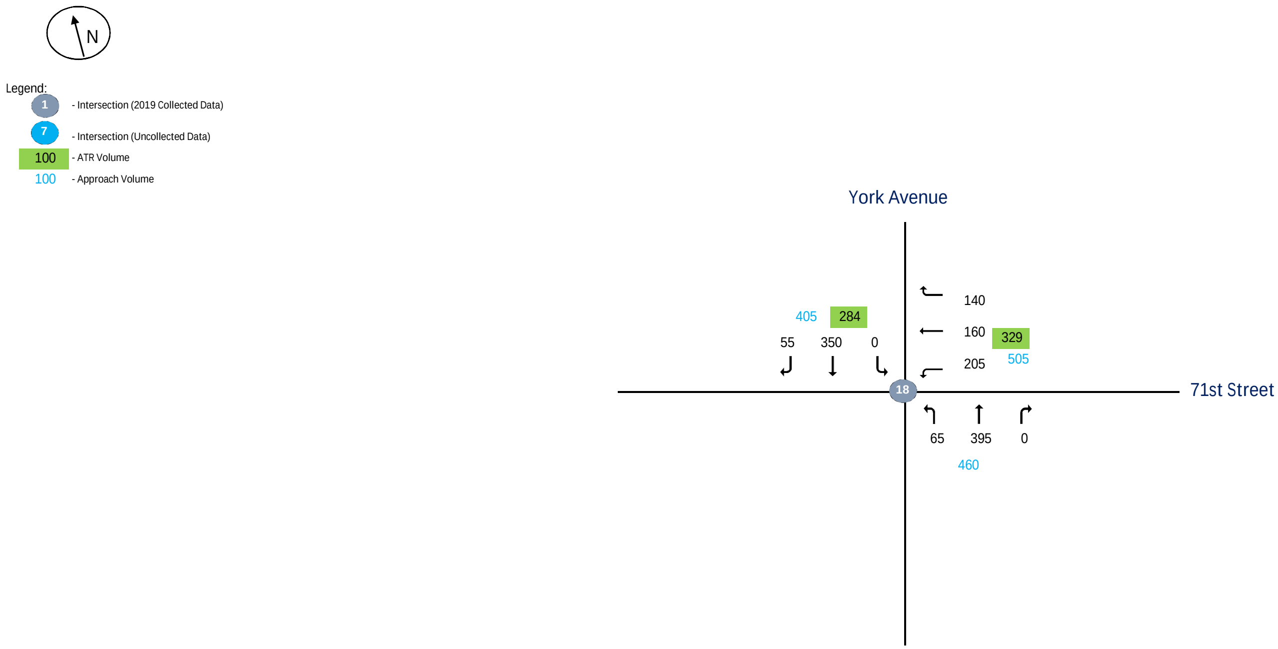
CBD Tolling
UE #2 - Traffic Flowmap
MD Existing

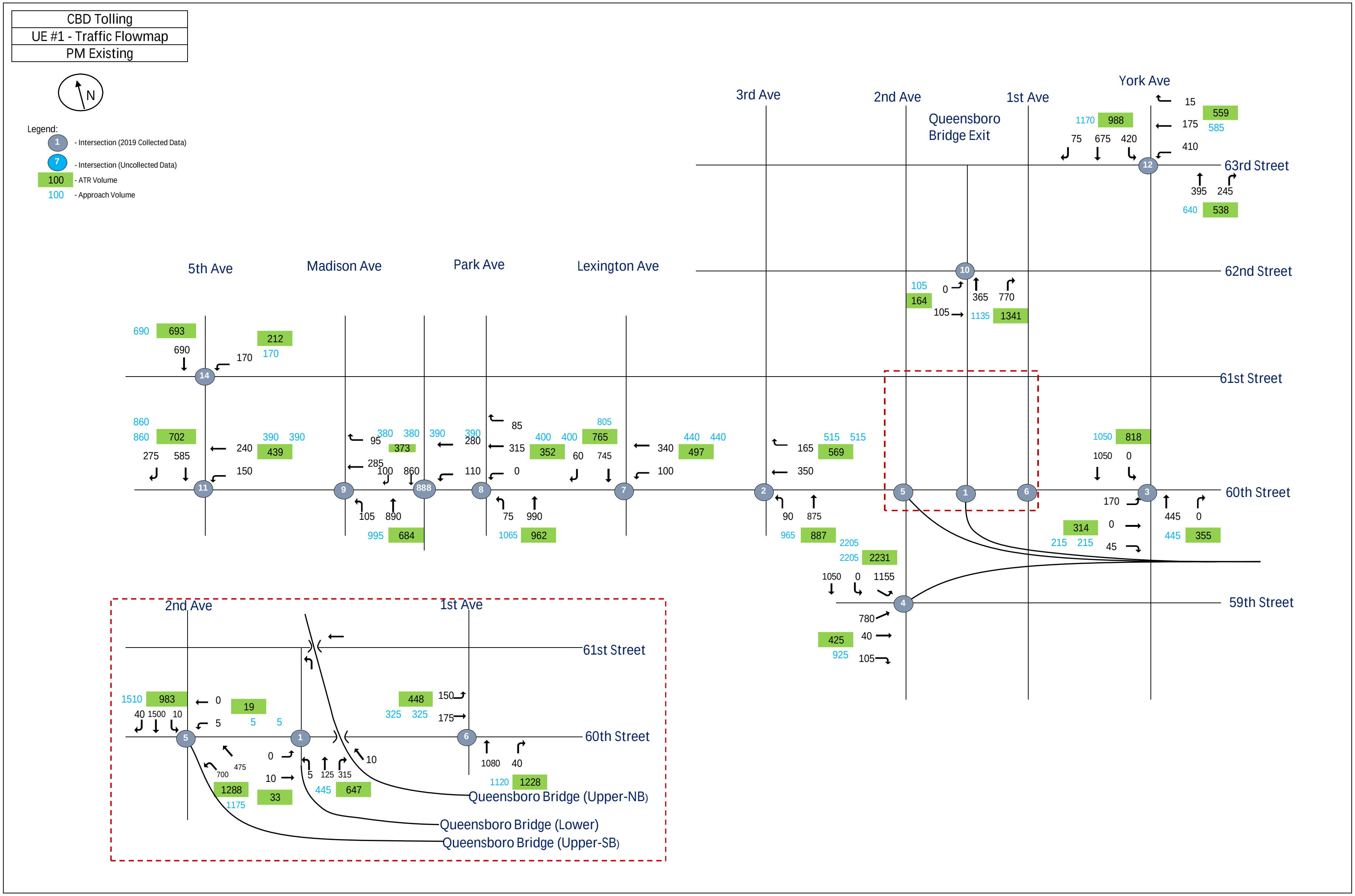

CBD Tolling
UE #3 - Traffic Flowmap
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Avenue
950
820
410
540
475
555
80
521
16
66th St
620
620
585
535
85
15
65th St
940
1075
640
300
5th Avenue

CBD Tolling
UE #3 - Traffic Flowmap
MD Existing



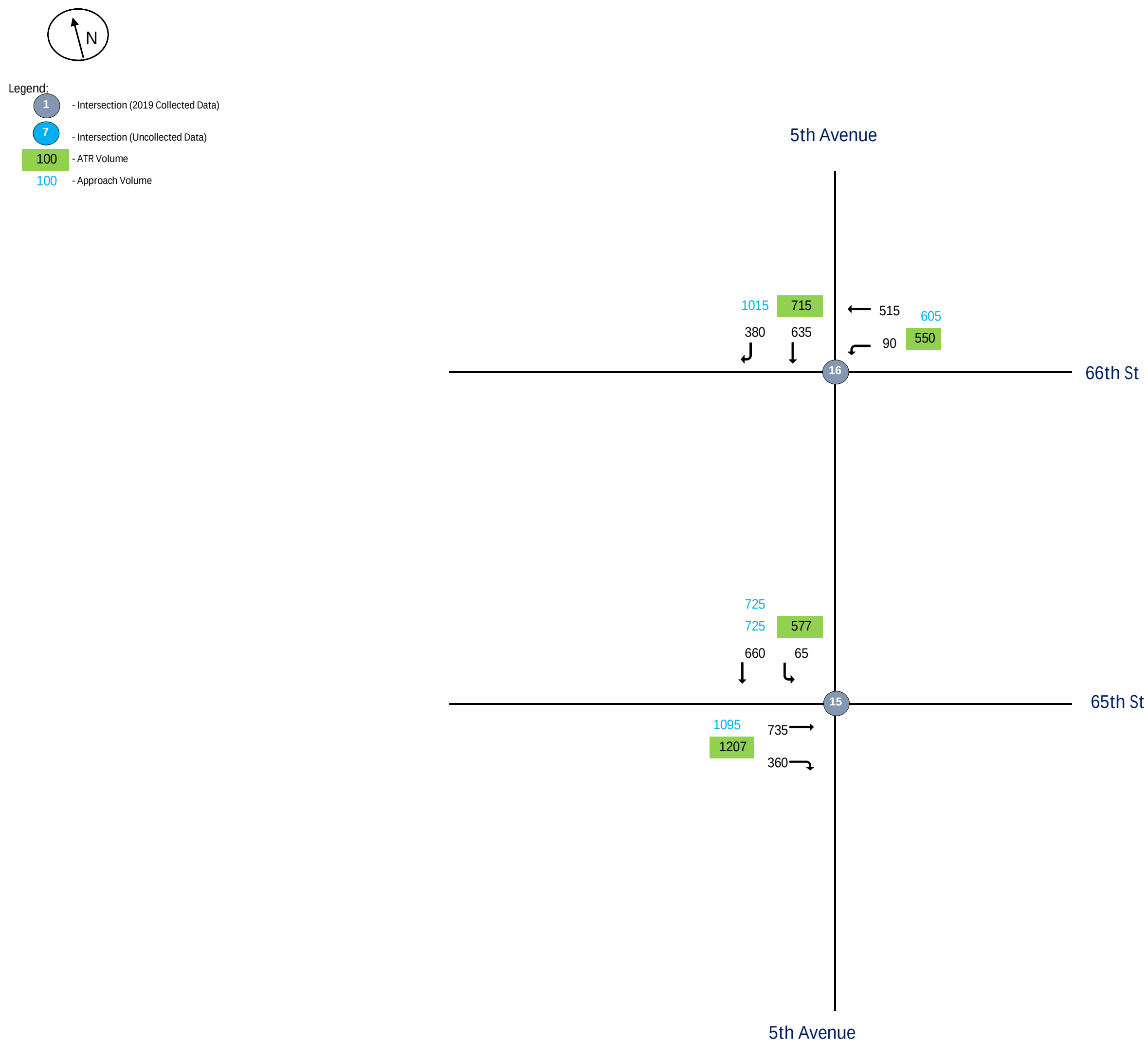
CBD Tolling
UE #4 - Traffic Flowmap
MD Existing



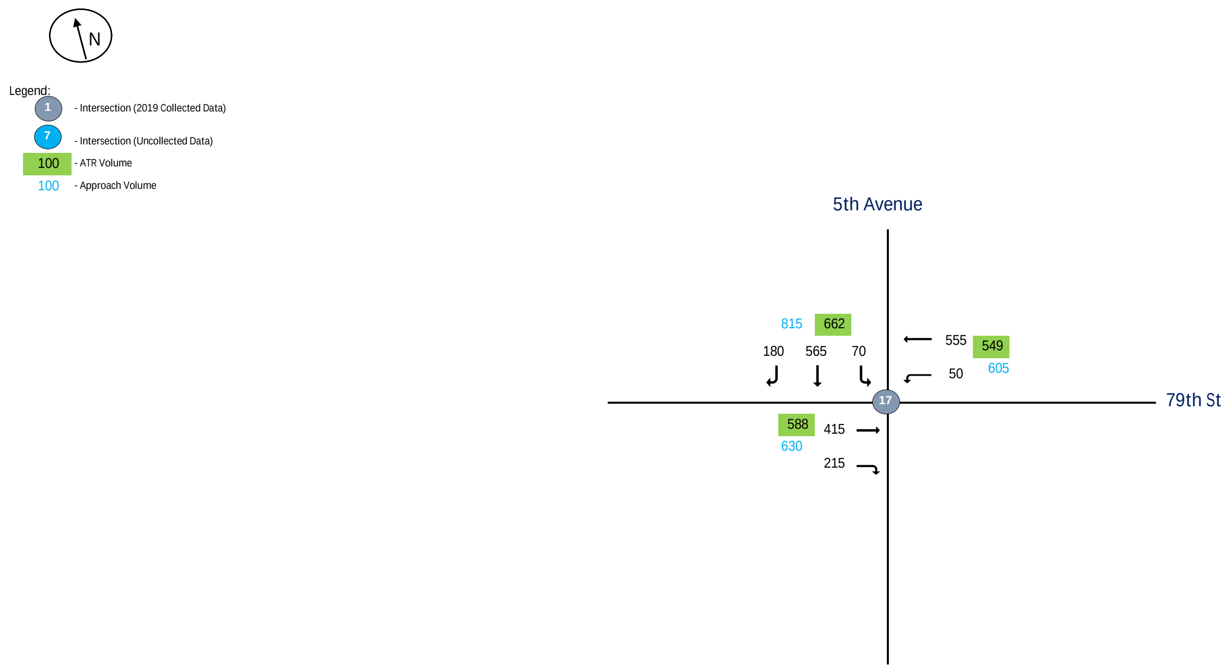

CBD Tolling
UE #1 - Traffic Flowmap
PM Existing
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
PM Existing

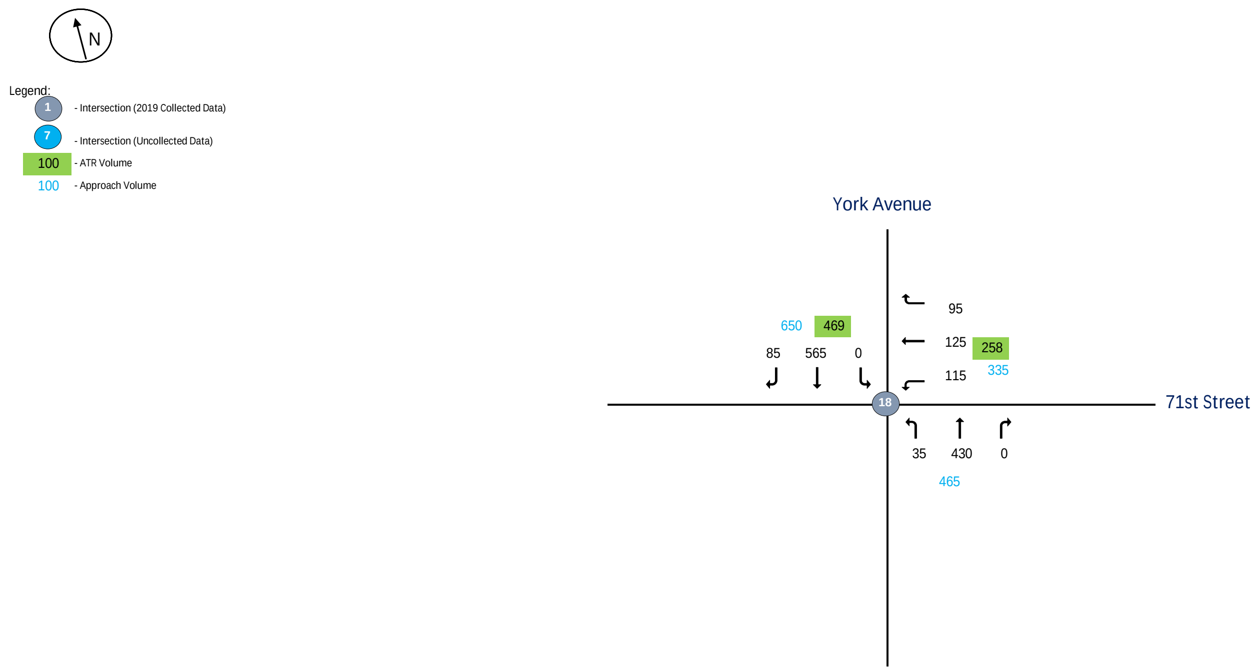
CBD Tolling
UE #3 - Traffic Flowmap
PM Existing

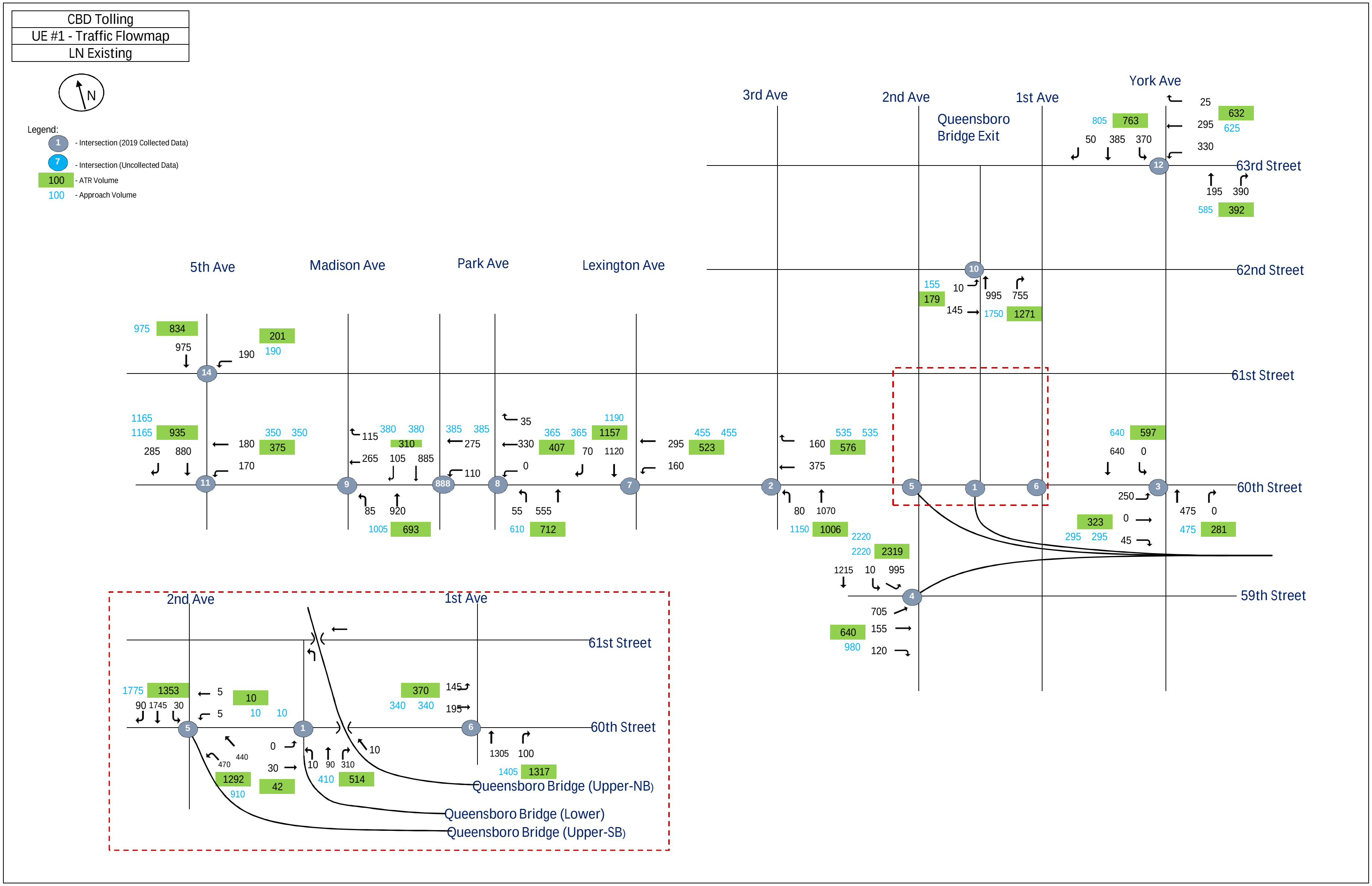


CBD Tolling
UE #3 - Traffic Flowmap
PM Existing



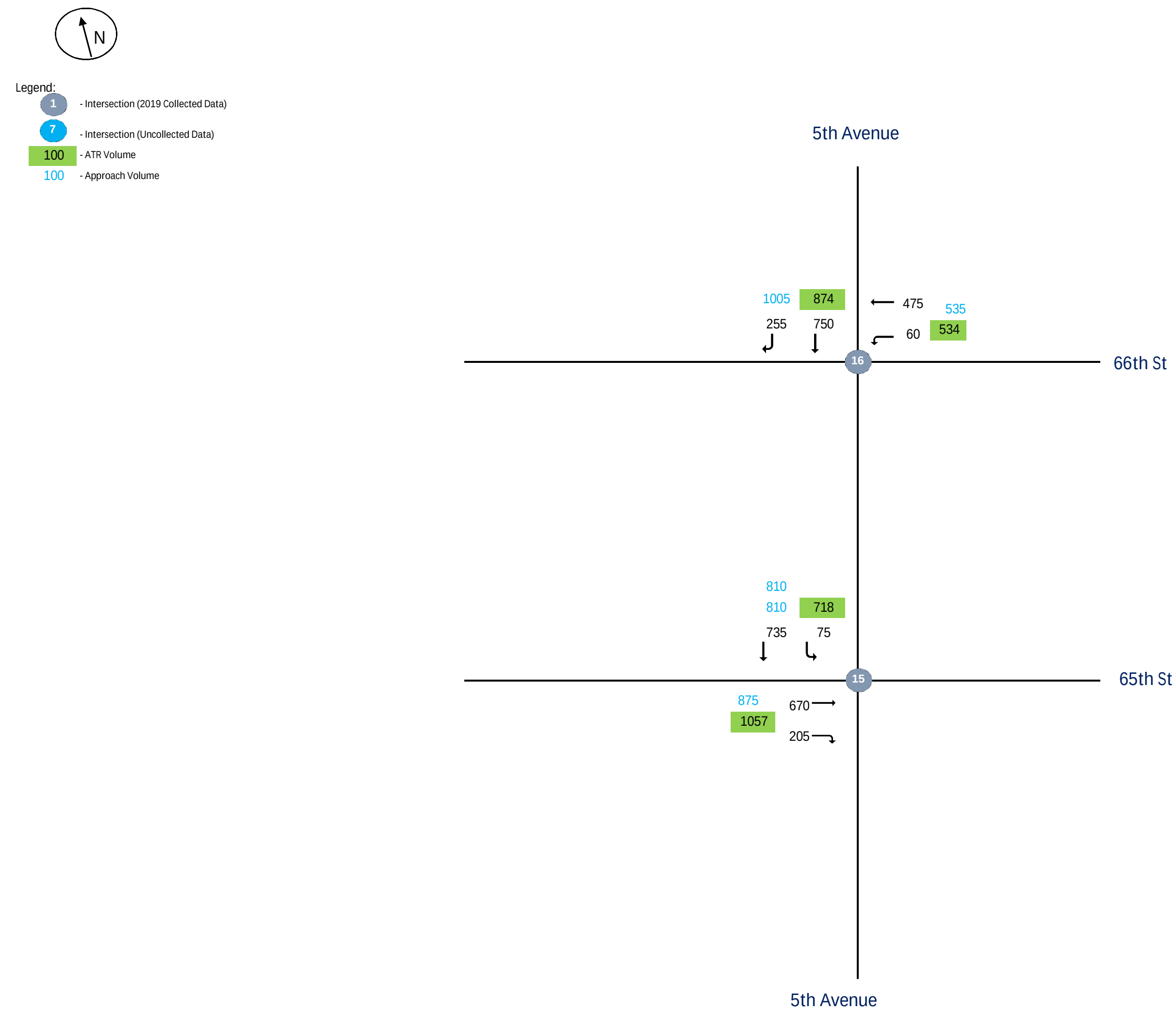
CBD Tolling
UE #4 - Traffic Flowmap
PM Existing



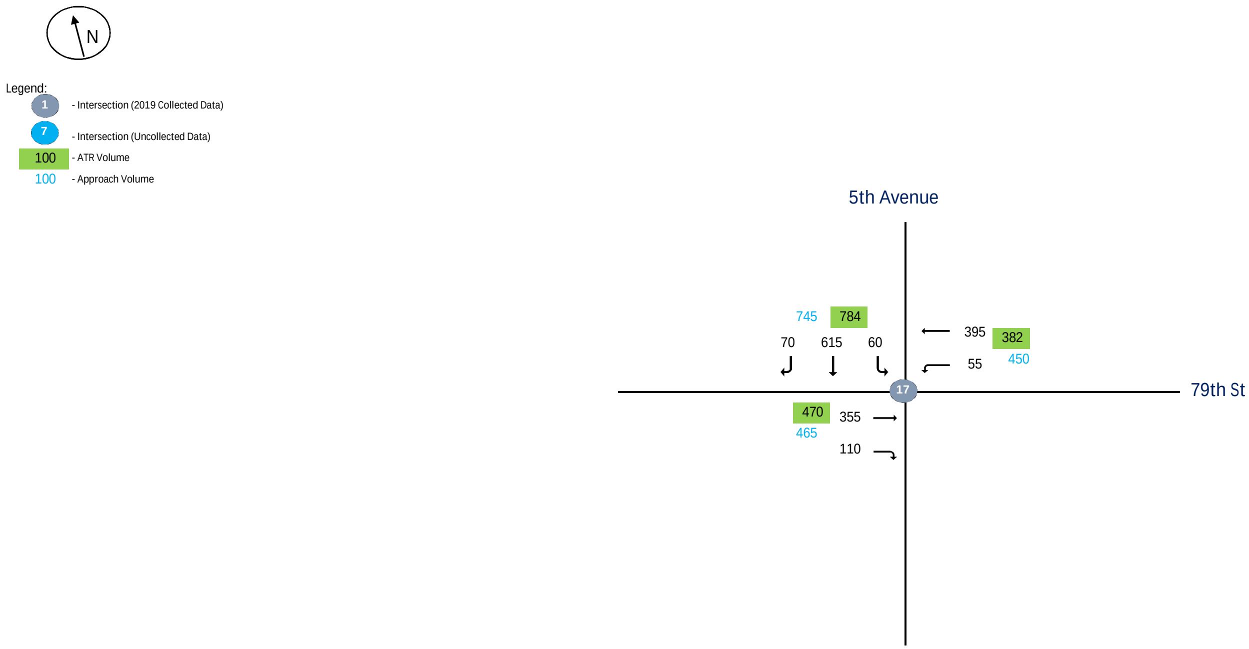

CBD Tolling
UE #1 - Traffic Flowmap
LN Existing
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
LN Existing

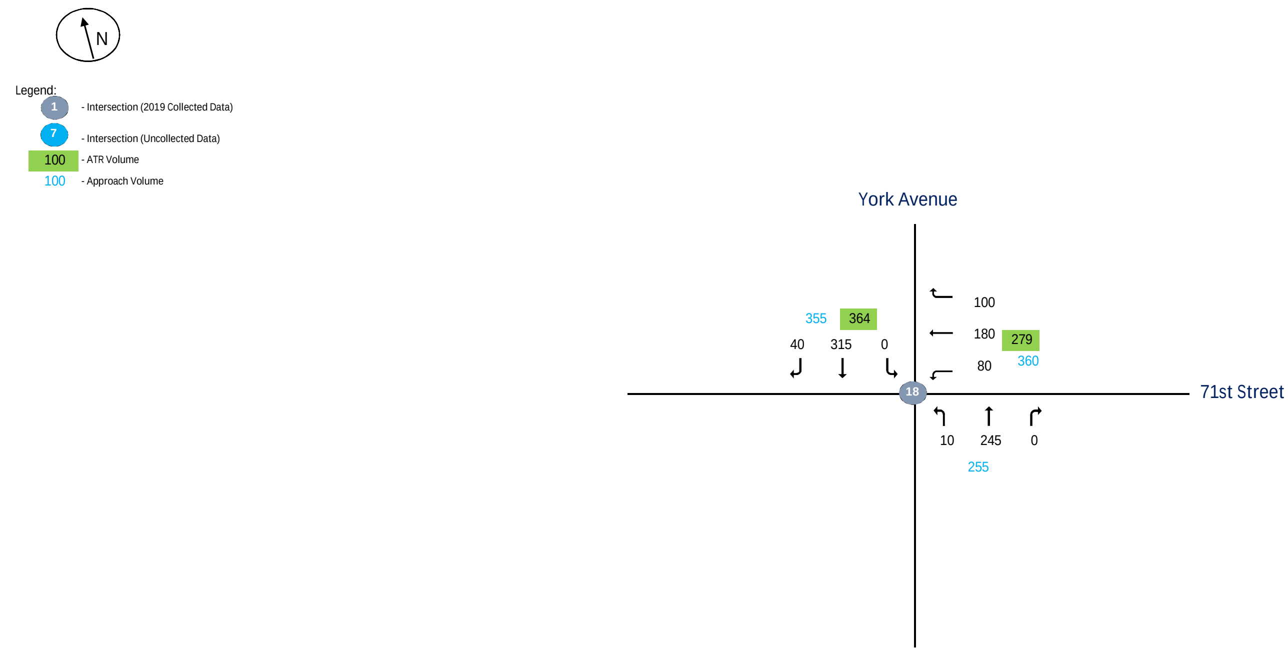
CBD Tolling
UE #3 - Traffic Flowmap
LN Existing



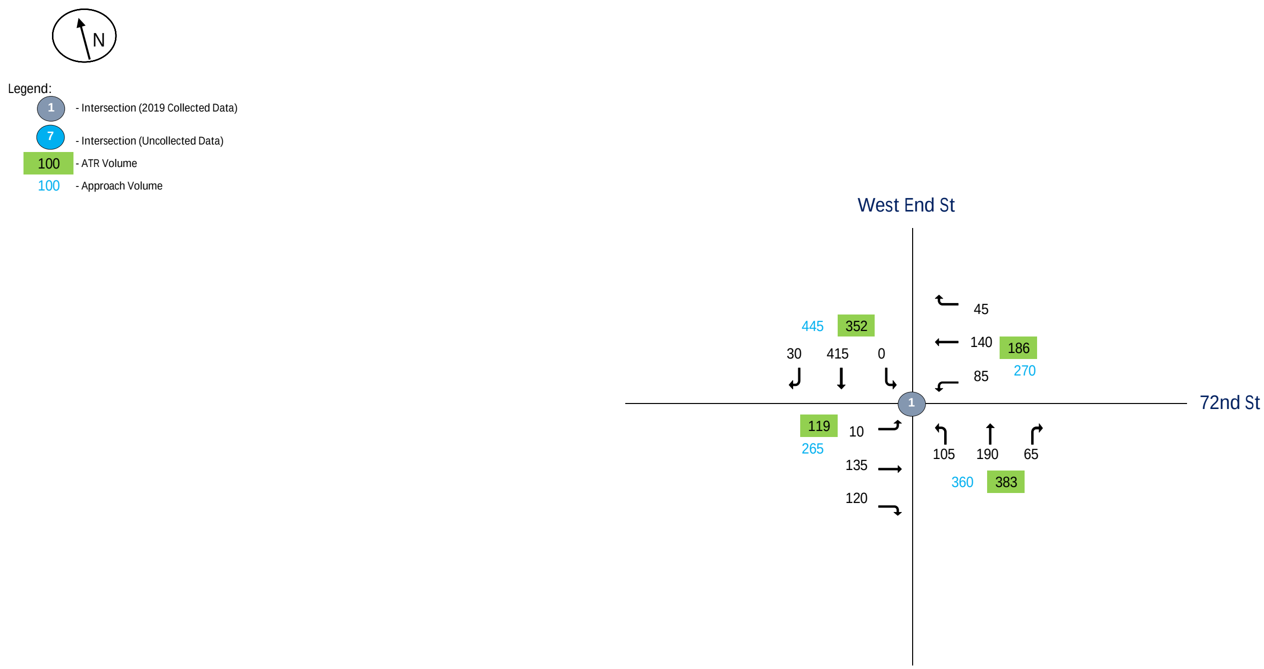
CBD Tolling
UE #3 - Traffic Flowmap
LN Existing



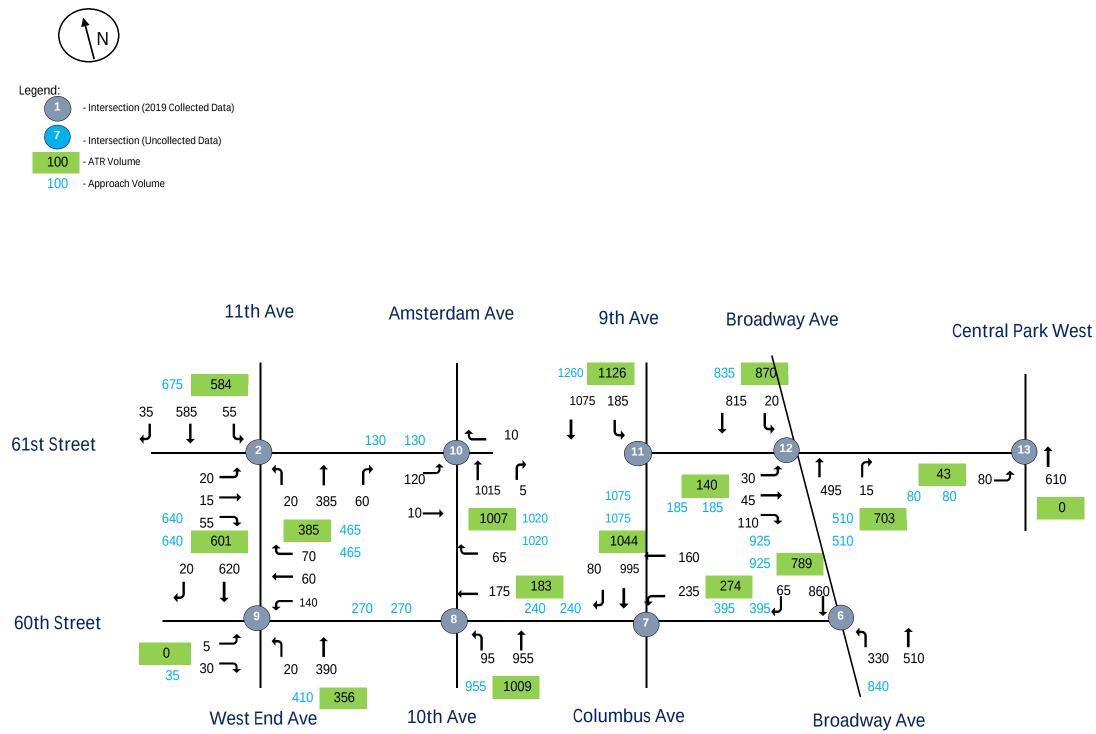
CBD Tolling
UE #4 - Traffic Flowmap
LN Existing



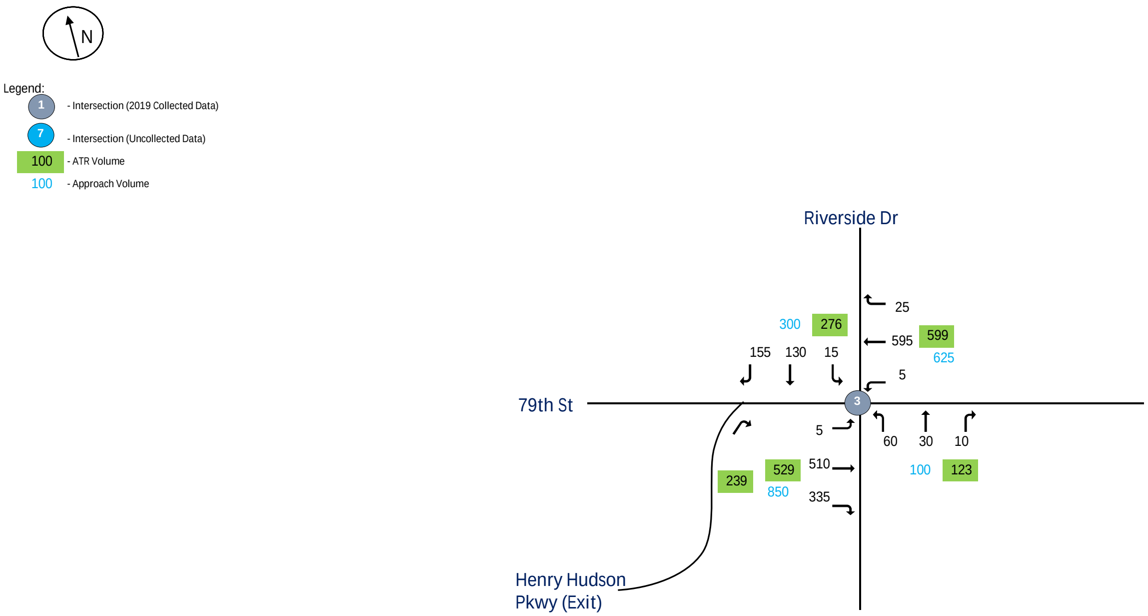
CBD Tolling
UW #1 - Traffic Flowmap
AM Existing

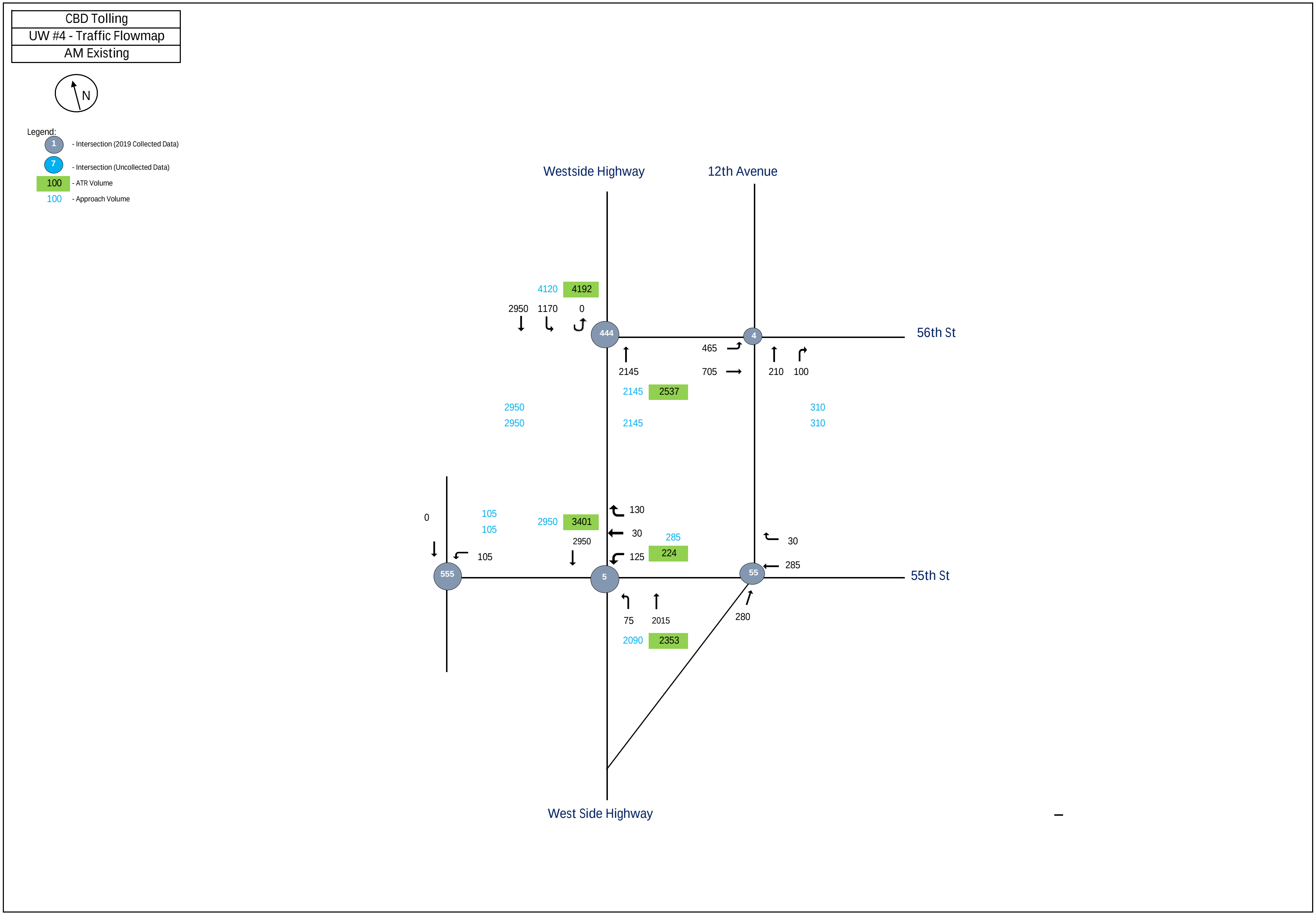


CBD Tolling
UW #2 - Traffic Flowmap
AM Existing

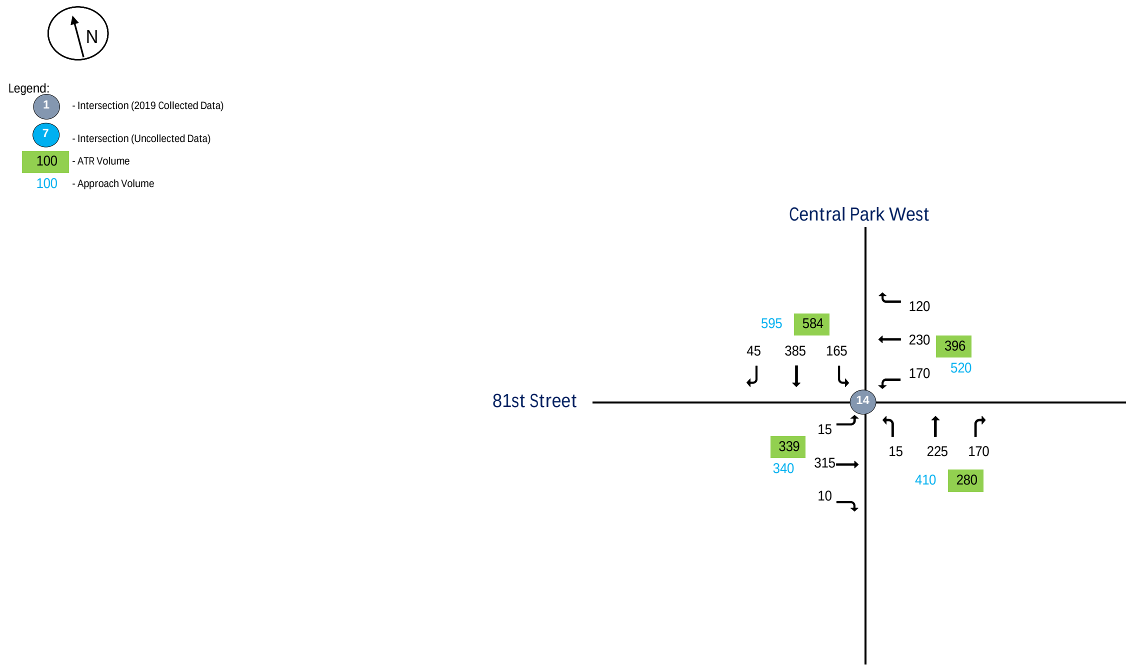


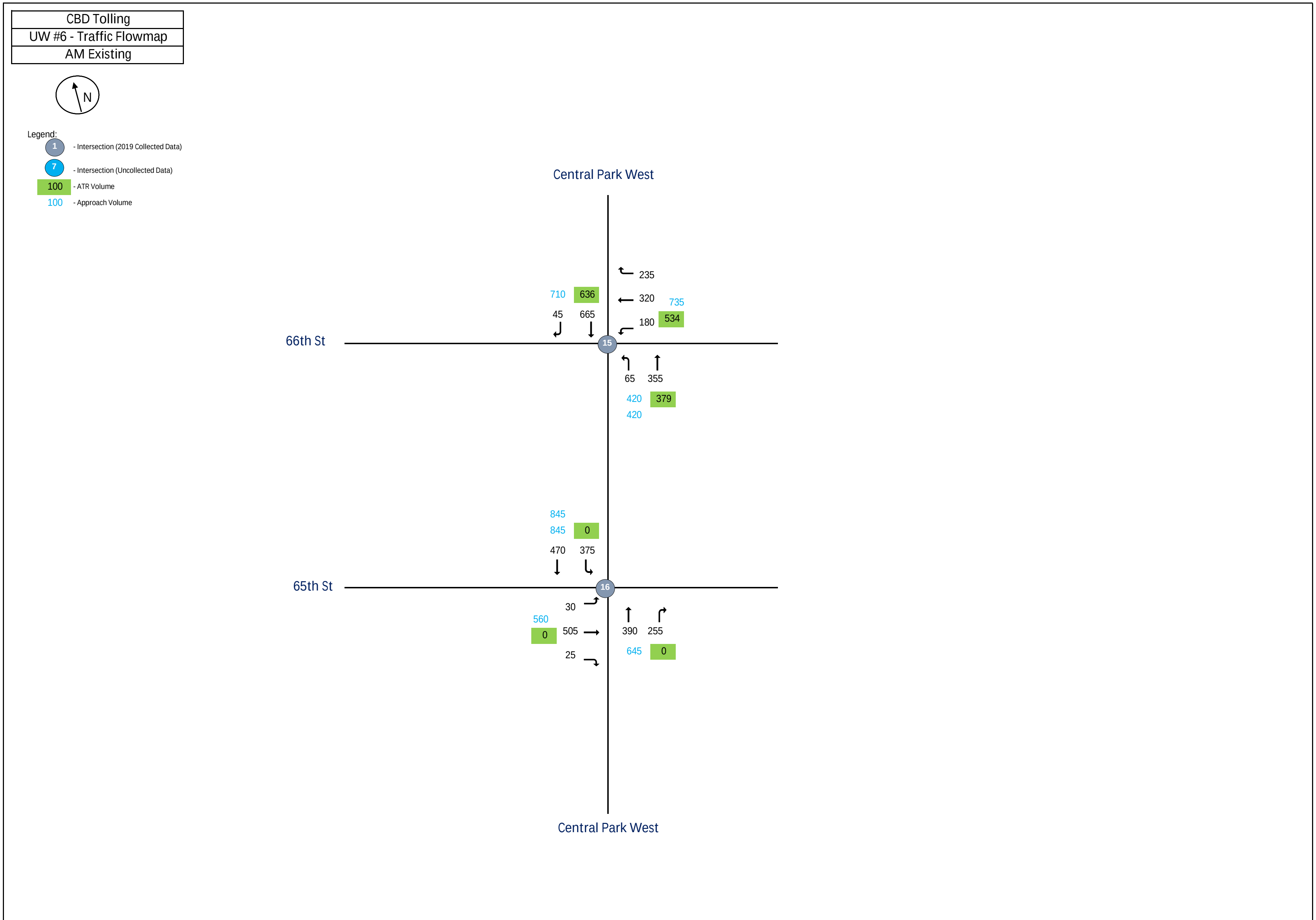
CBD Tolling
UW #3 - Traffic Flowmap
AM Existing



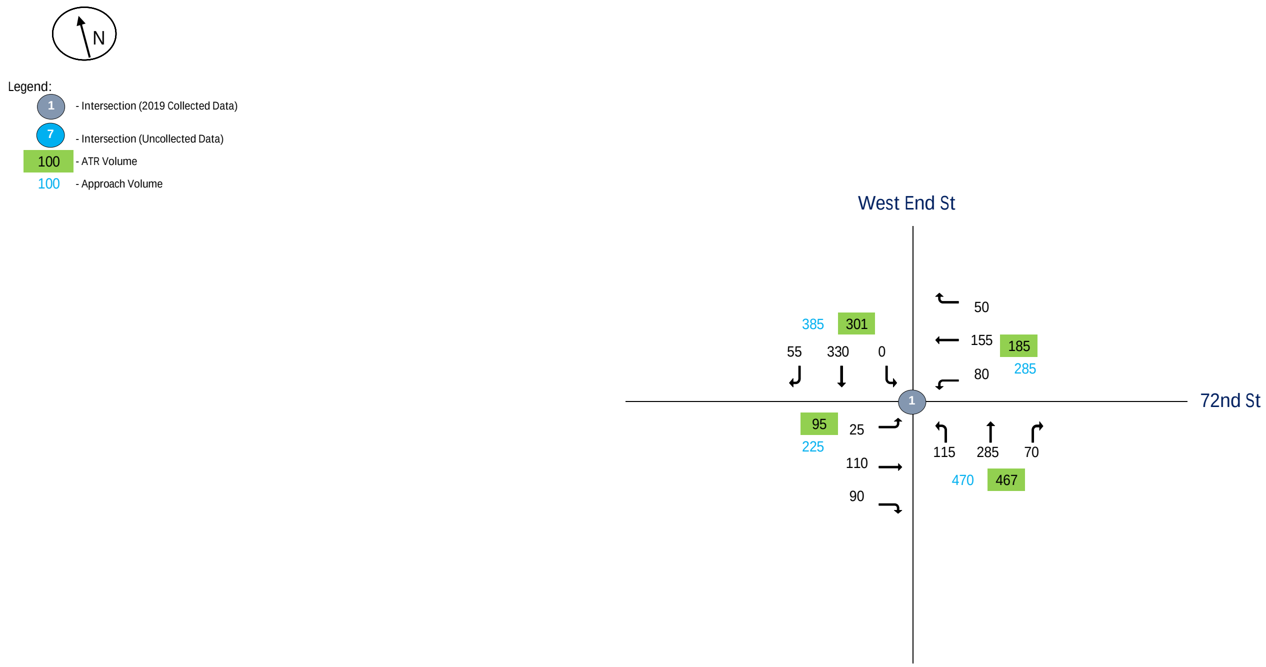

CBD Tolling
UW #4 - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
4120
4192
2950
1170
0
444
4
465
705
2145
210
100
2145
2537
2950
2950
2145
310
310
0
105
105
2950
3401
130
30
285
30
2950
125
224
285
105
555
5
55
75
2015
280
2090
2353

CBD Tolling
UW #5 - Traffic Flowmap
AM Existing



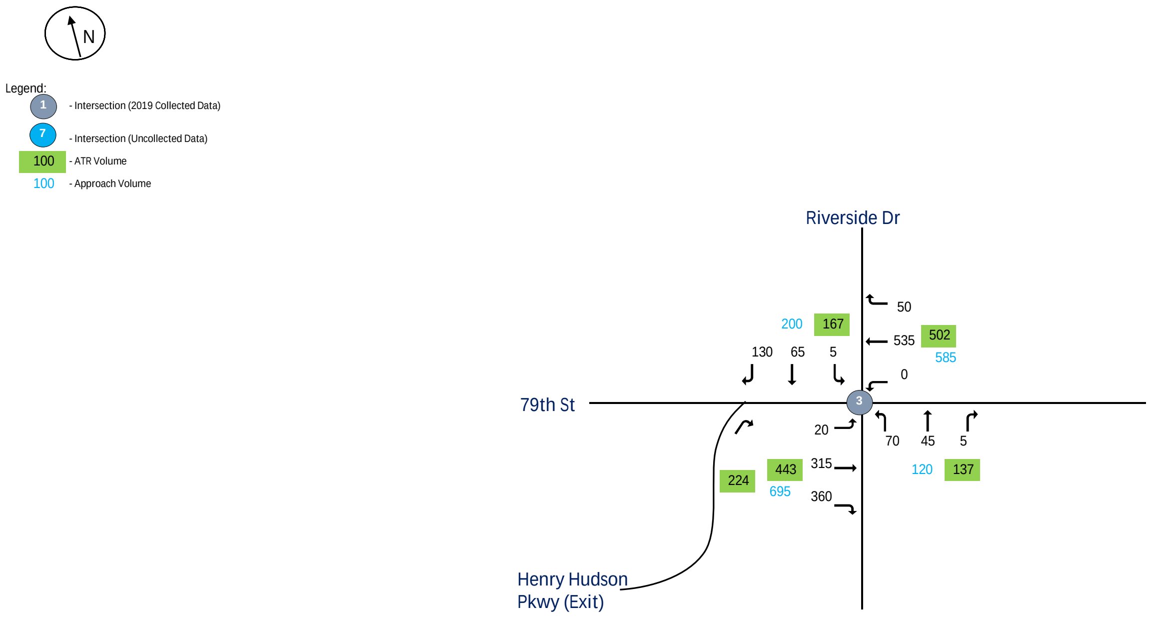

CBD Tolling
UW #6 - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Central Park West
66th St
15
710
636
45
665
235
320
735
180
534
65
355
420
379
420
845
845
0
470
375
65th St
16
30
560
0
505
25
390
255
645
0
Central Park West

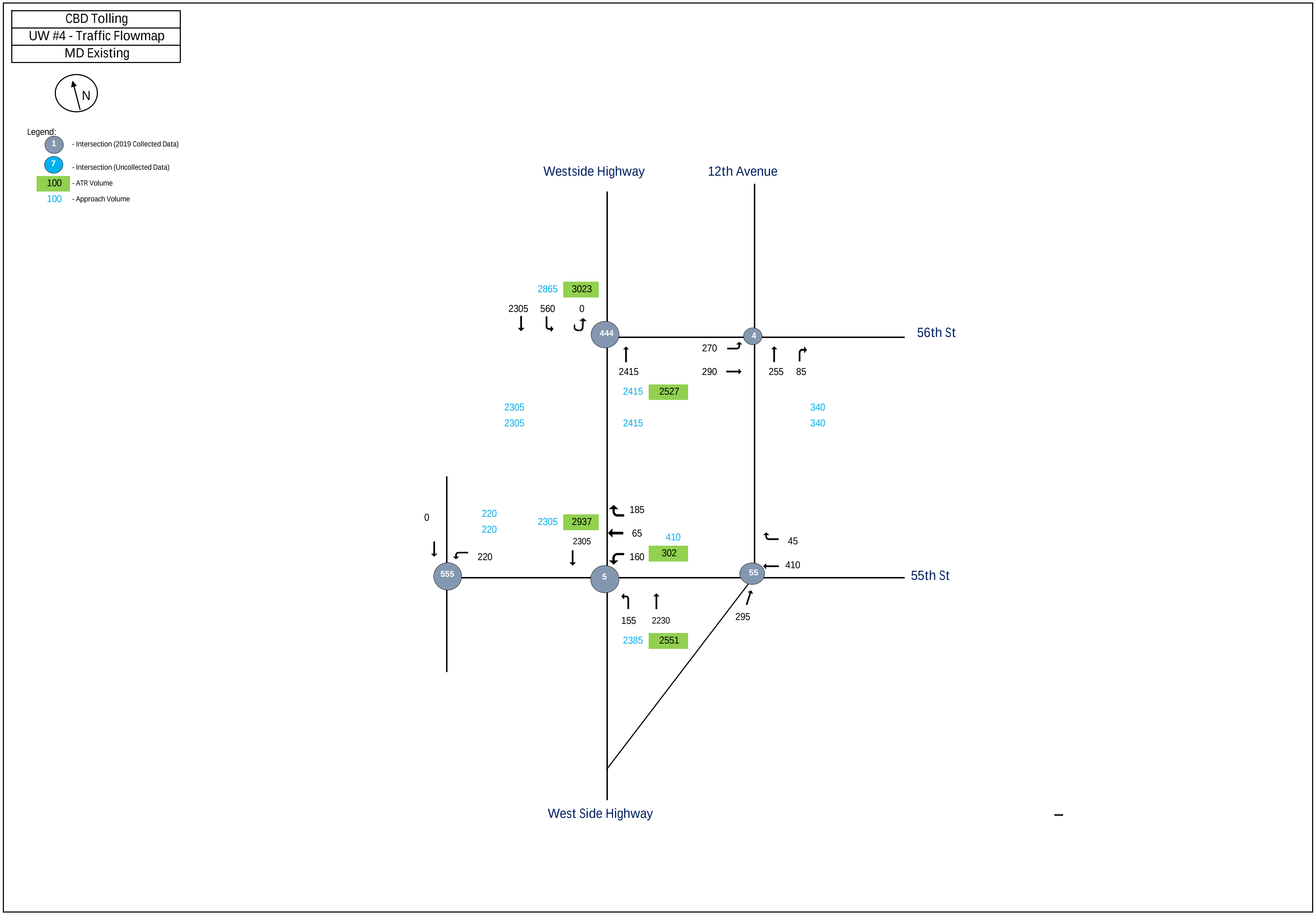
CBD Tolling
UW #1 - Traffic Flowmap
MD Existing



CBD Tolling
UW #2 - Traffic Flowmap
MD Existing

CBD Tolling
UW #3 - Traffic Flowmap
MD Existing



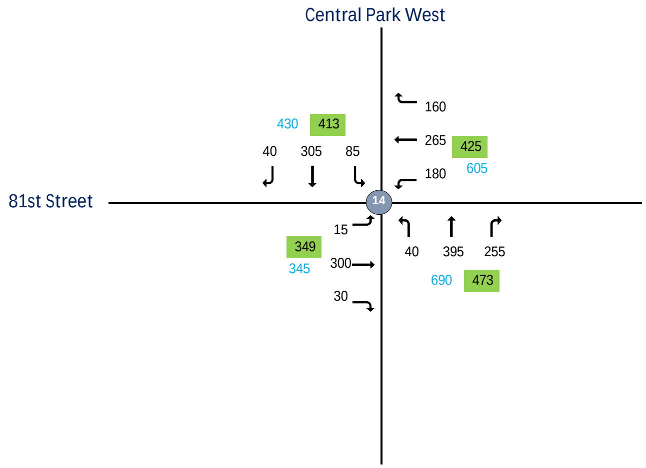


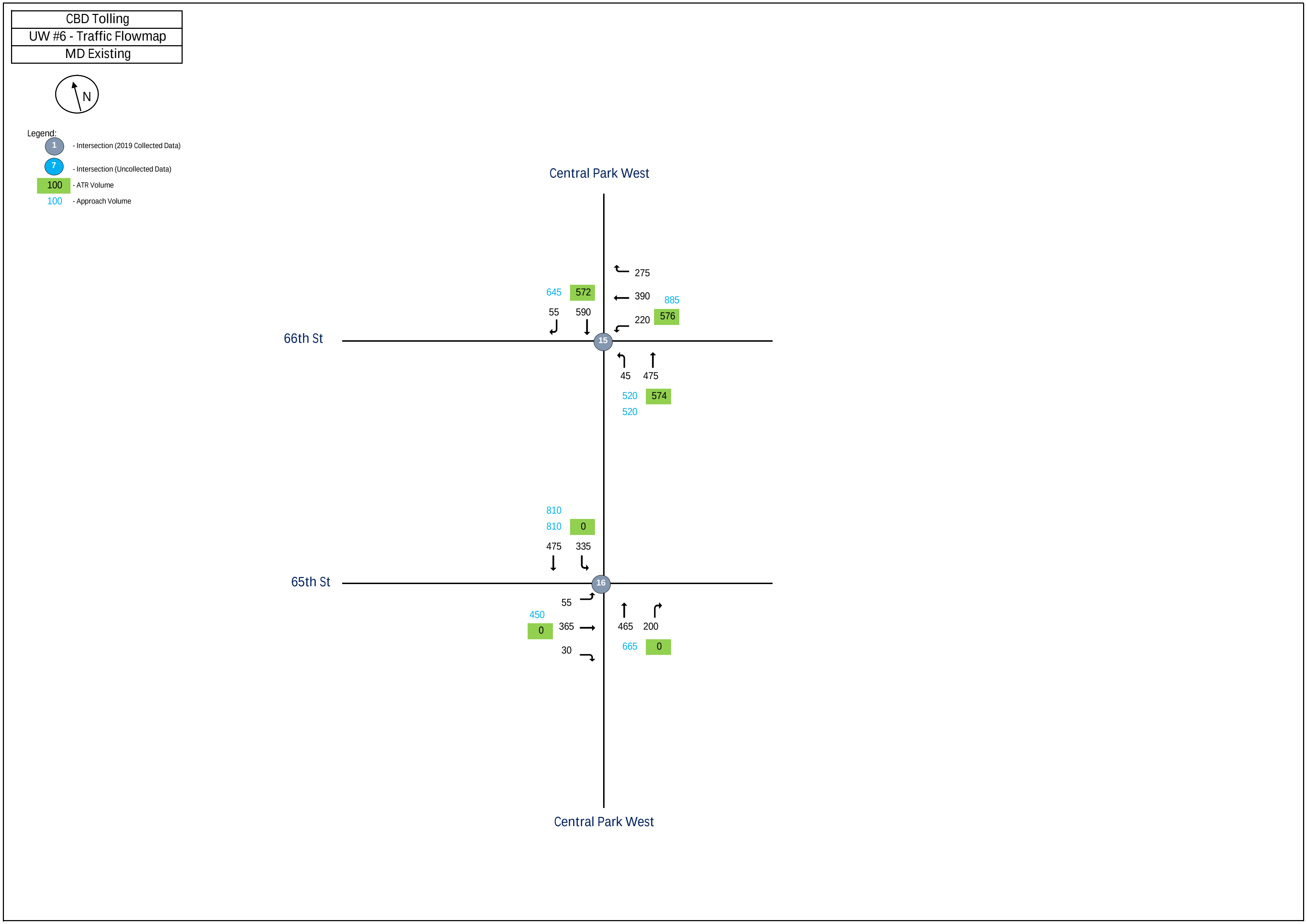
CBD Tolling
UW #4 - Traffic Flowmap
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
2865
3023
2305
560
0
444
4
270
290
2415
255
85
2415
2527
2305
2305
2415
340
340
0
220
220
2305
2937
185
65
410
45
2305
220
160
302
410
555
5
55
155
2230
295
2385
2551

CBD Tolling
UW #5 - Traffic Flowmap
MD Existing

N

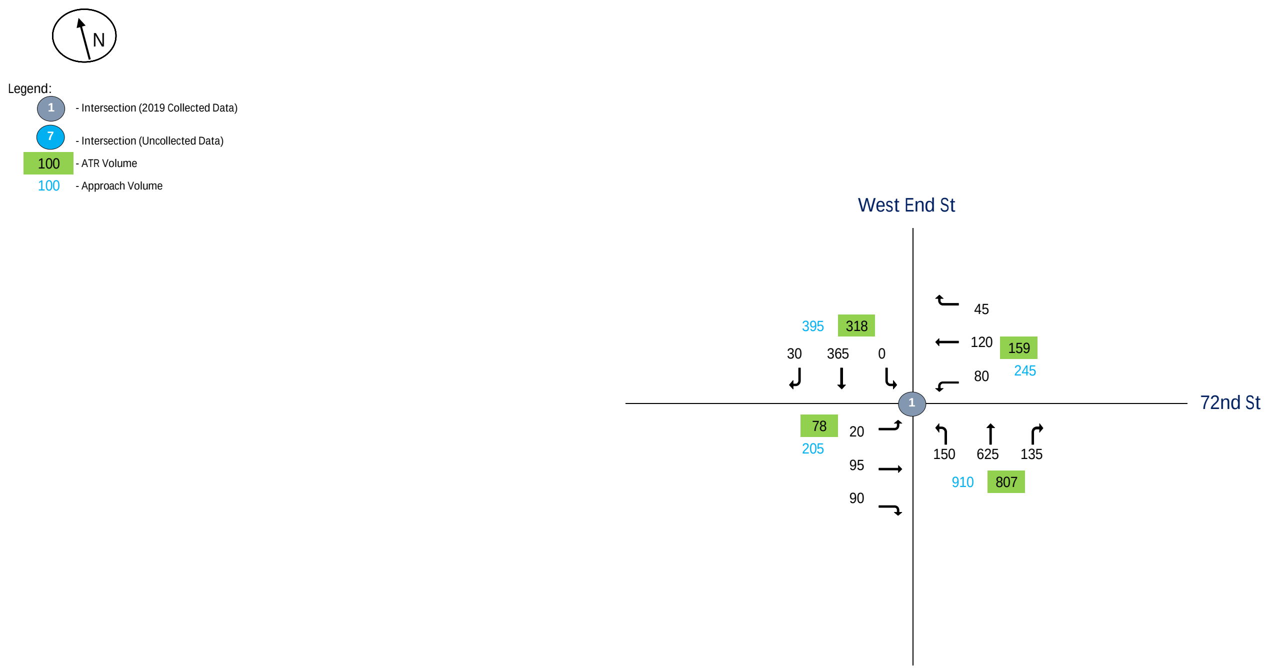
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume





CBD Tolling
UW #6 - Traffic Flowmap
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Central Park West
66th St
15
275
390
220
885
576
645
572
55
590
45
475
520
574
520
810
810
0
475
335
65th St
16
55
450
0
365
30
465
200
665
0
Central Park West

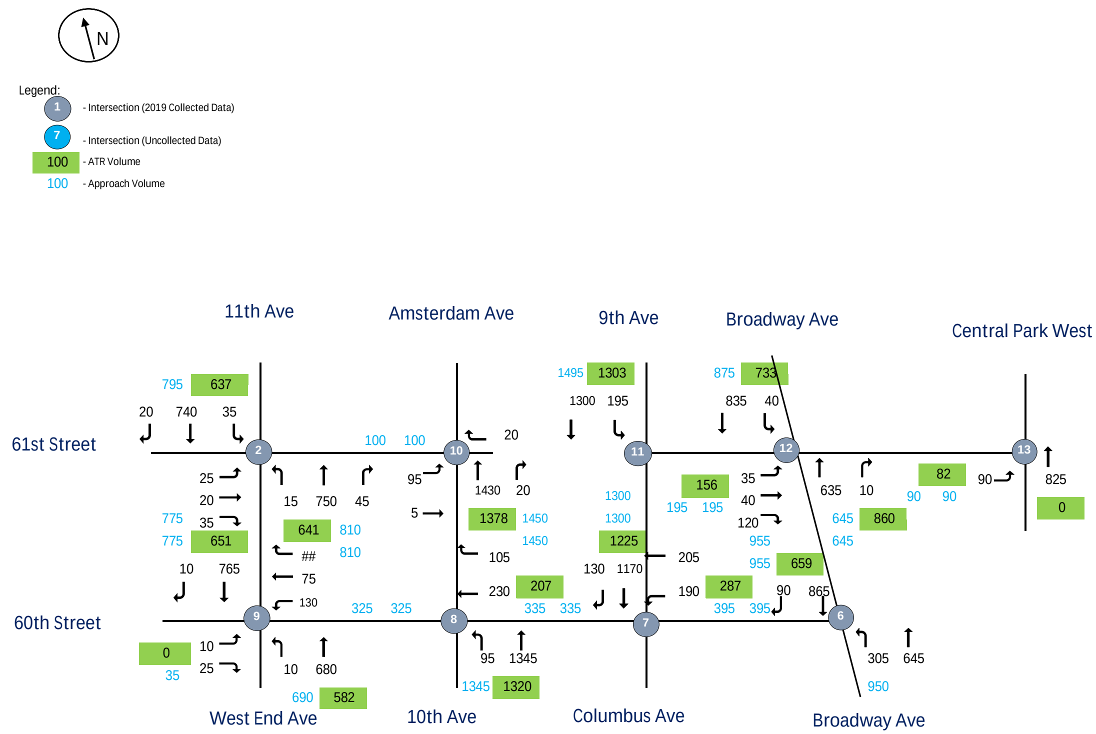
CBD Tolling
UW #1 - Traffic Flowmap
PM Existing



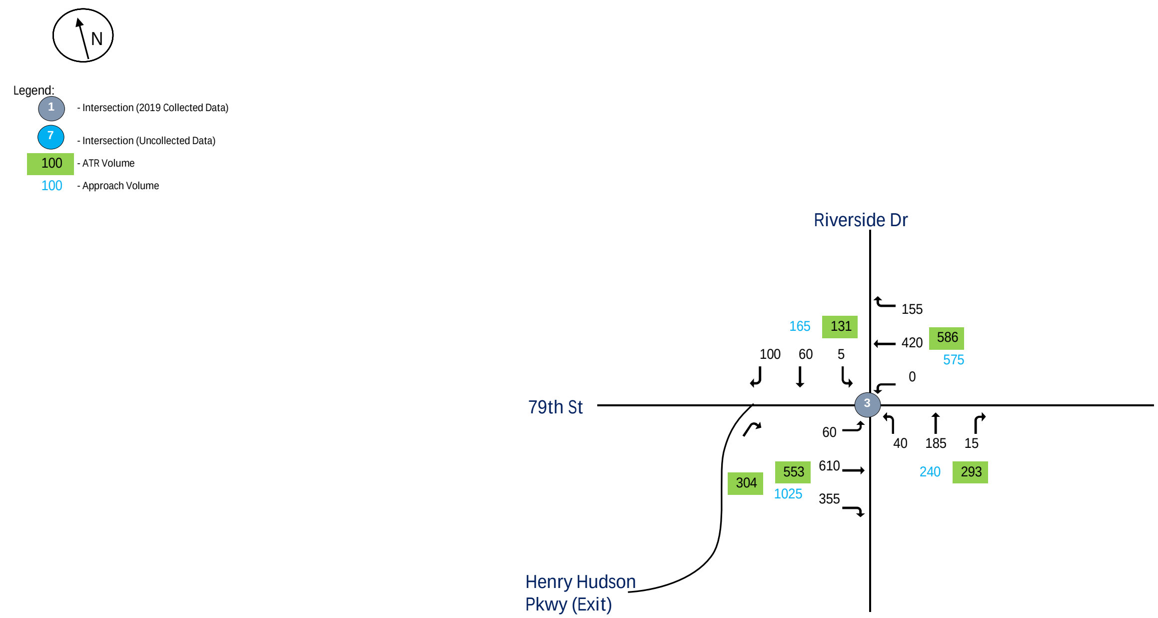
CBD Tolling

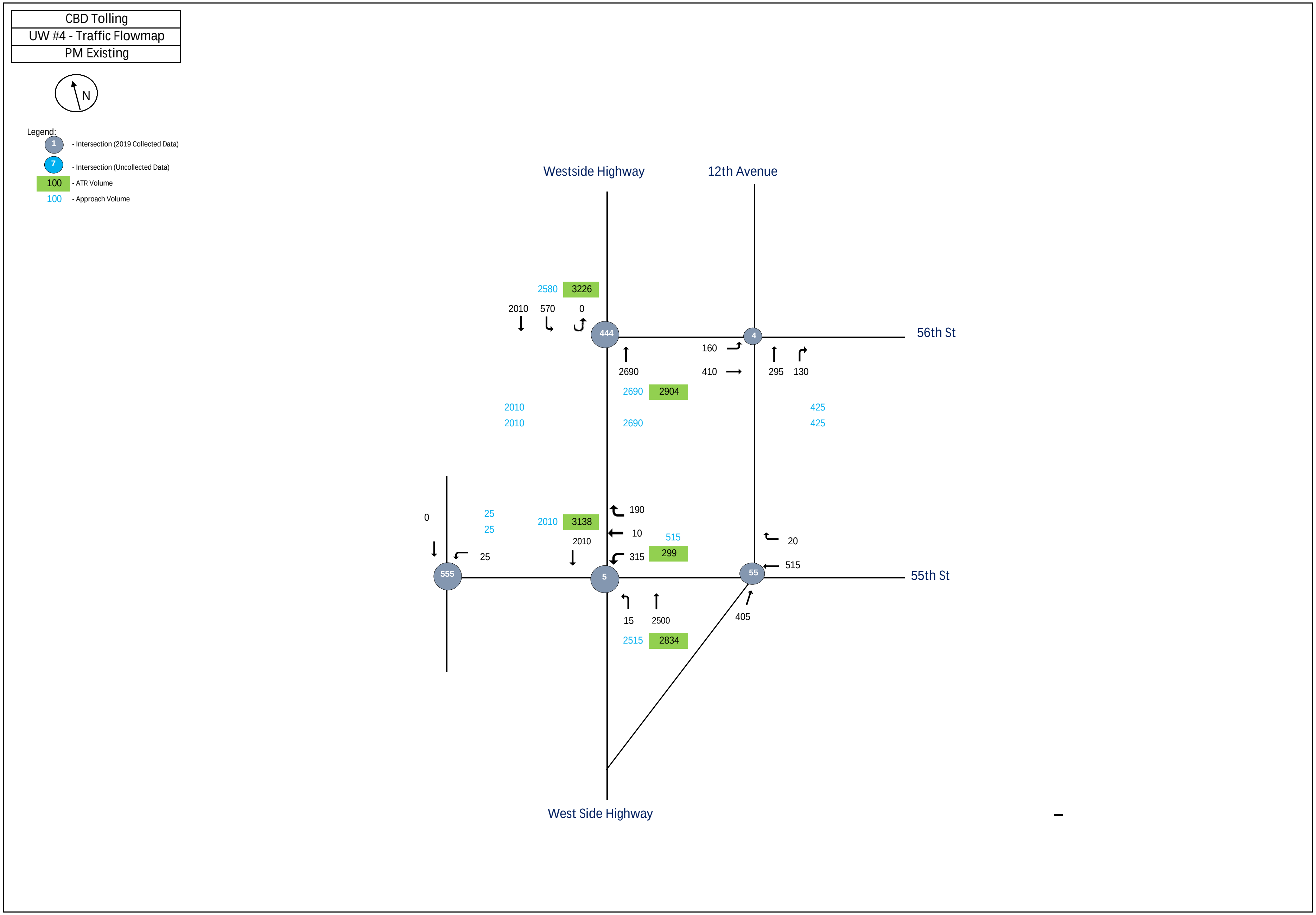
UW #2 - Traffic Flowmap

PM Existing



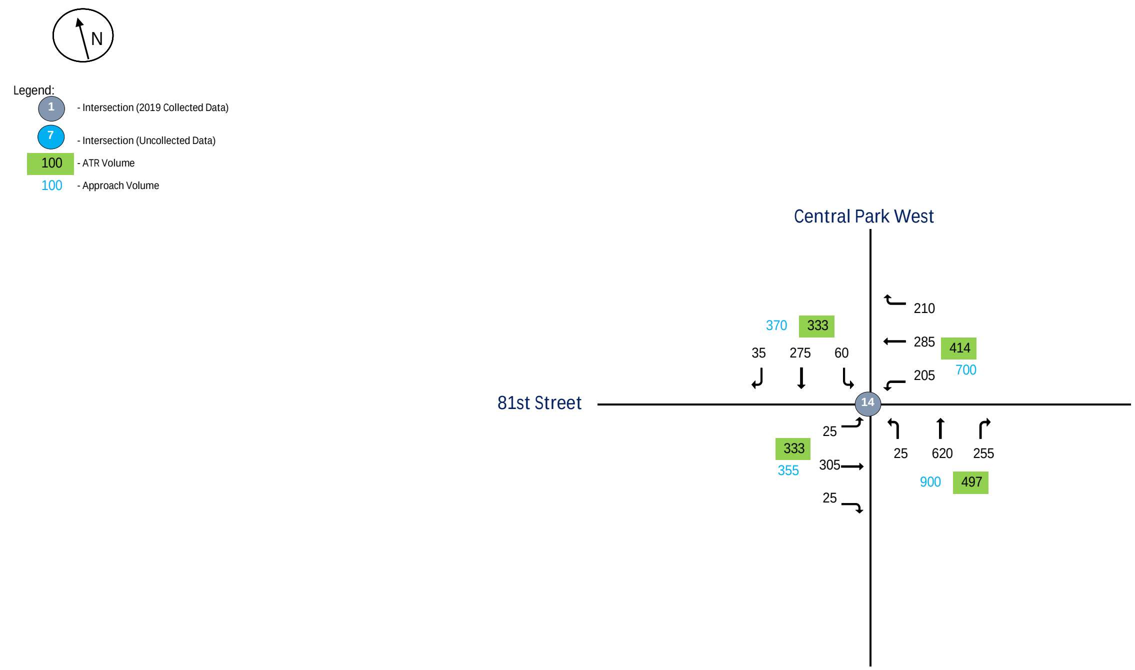
CBD Tolling
UW #3 - Traffic Flowmap
PM Existing



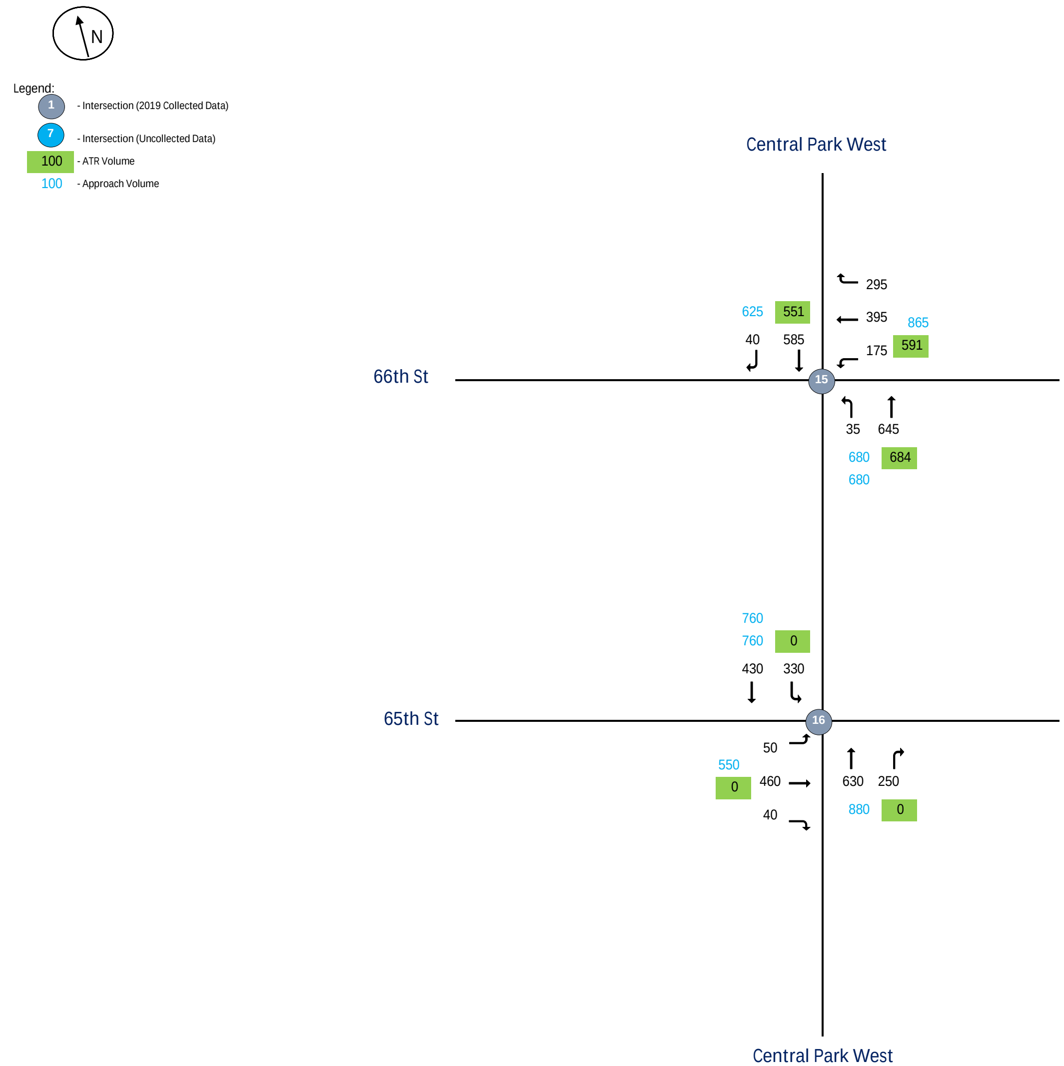


CBD Tolling
UW #4 - Traffic Flowmap
PM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
2580
3226
2010
570
0
444
4
160
410
2690
295
130
2690
2904
2010
2010
2690
425
425
0
25
25
2010
3138
190
10
515
2010
315
299
20
515
555
25
5
55
15
2500
405
2515
2834

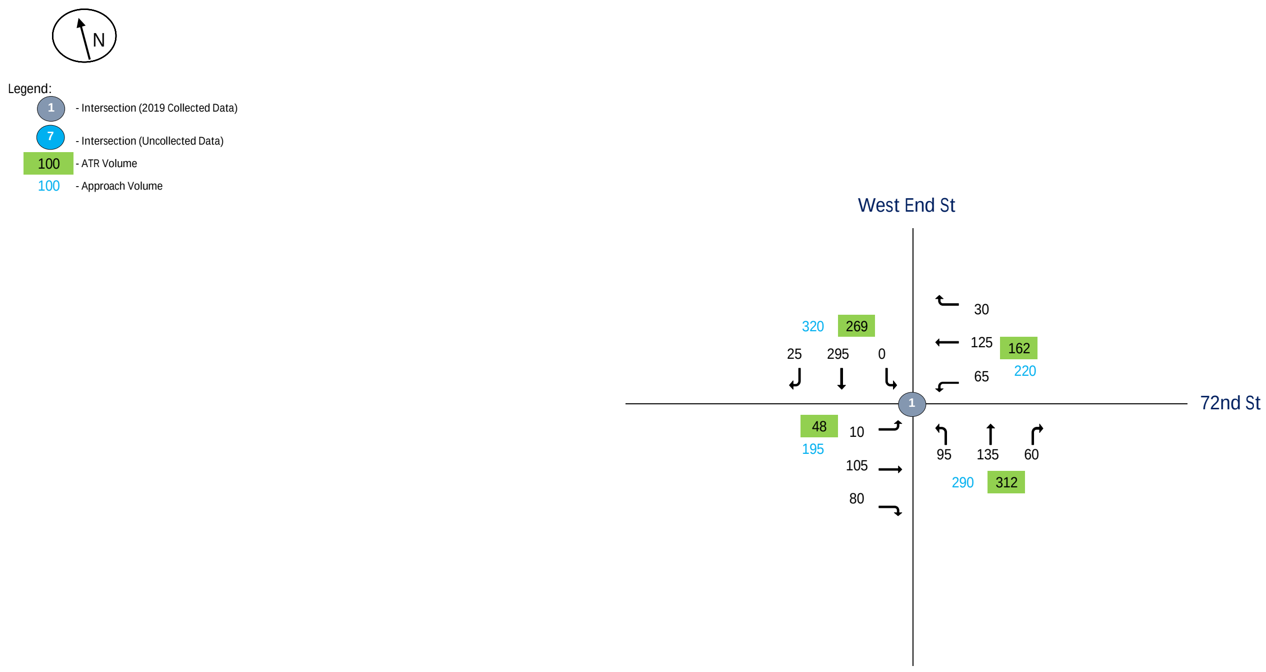
CBD Tolling
UW #5 - Traffic Flowmap
PM Existing



CBD Tolling
UW #6 - Traffic Flowmap
PM Existing



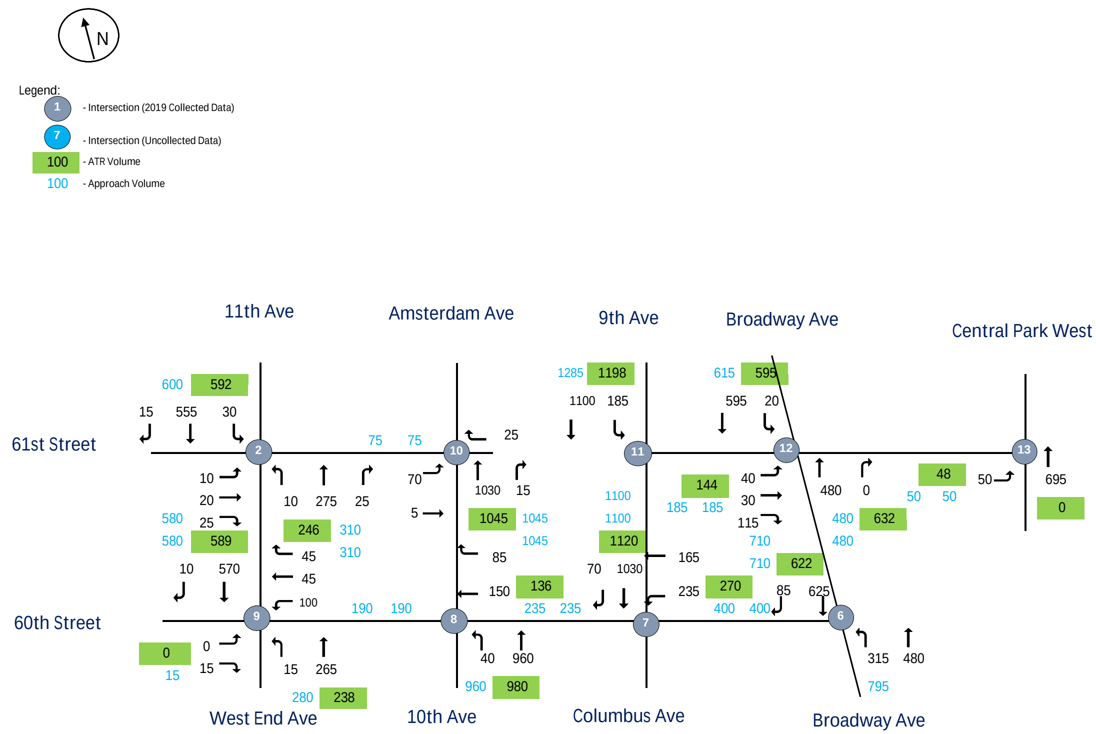
CBD Tolling
UW #1 - Traffic Flowmap
LN Existing



CBD Tolling

UW #2 - Traffic Flowmap

LN Existing



CBD Tolling
UW #3 - Traffic Flowmap
LN Existing

N

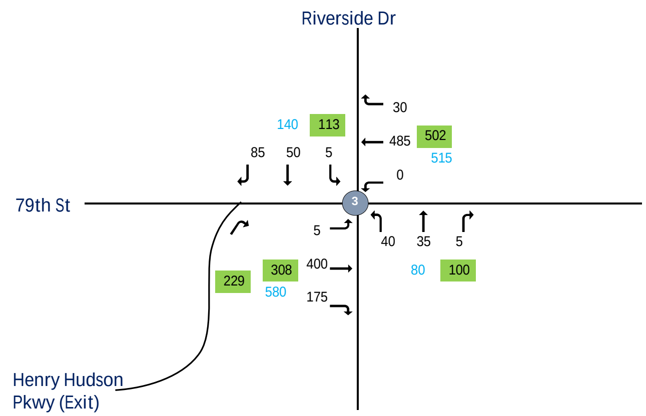
Legend:

1 - Intersection (2019 Collected Data)

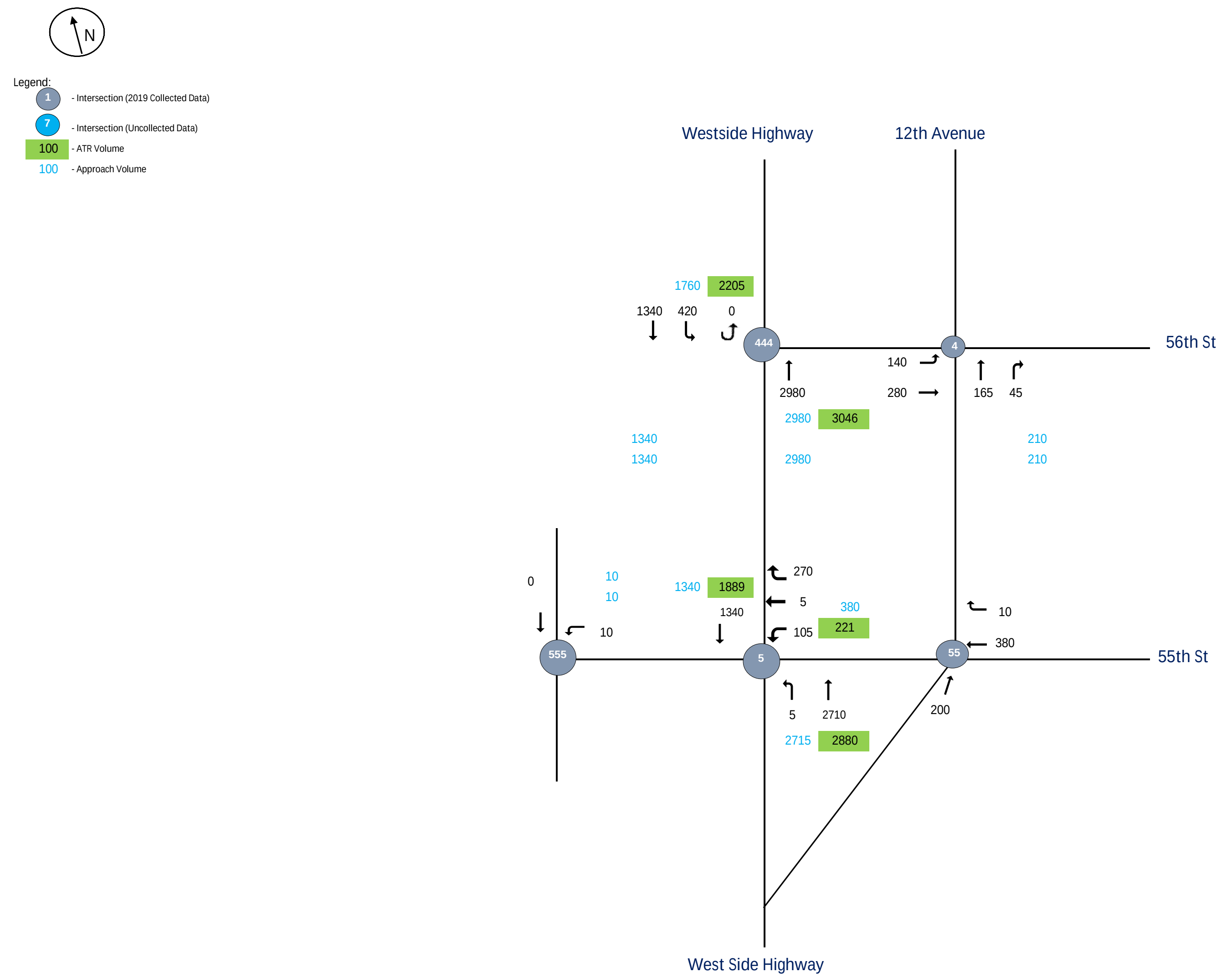
7 - Intersection (Uncollected Data)

100 - ATR Volume

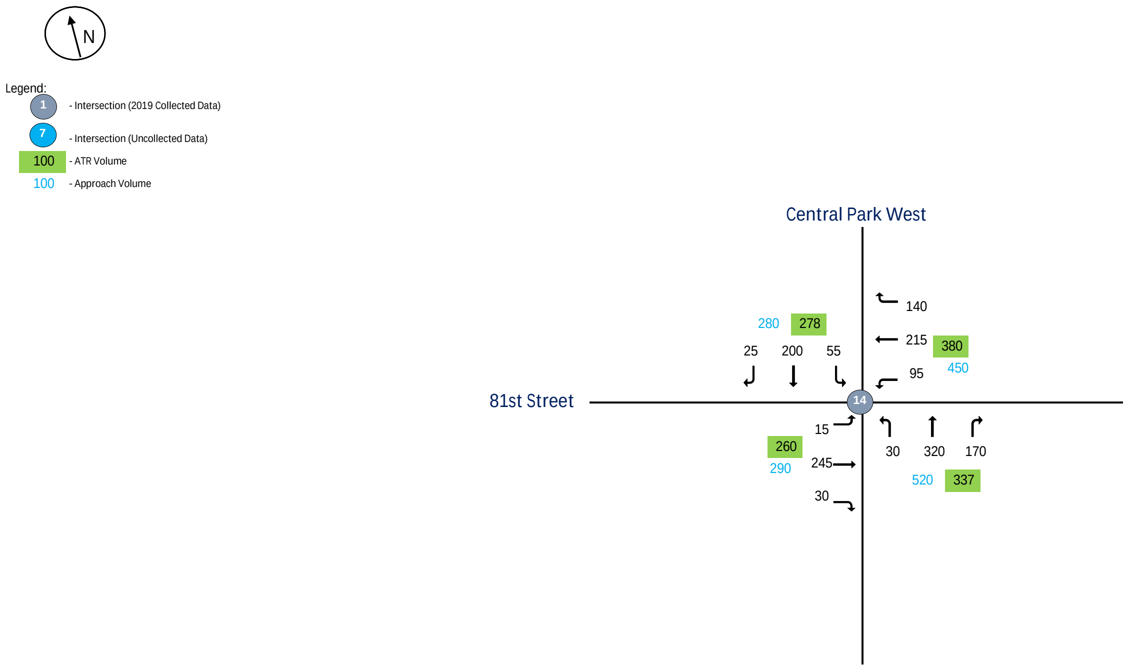
100 - Approach Volume



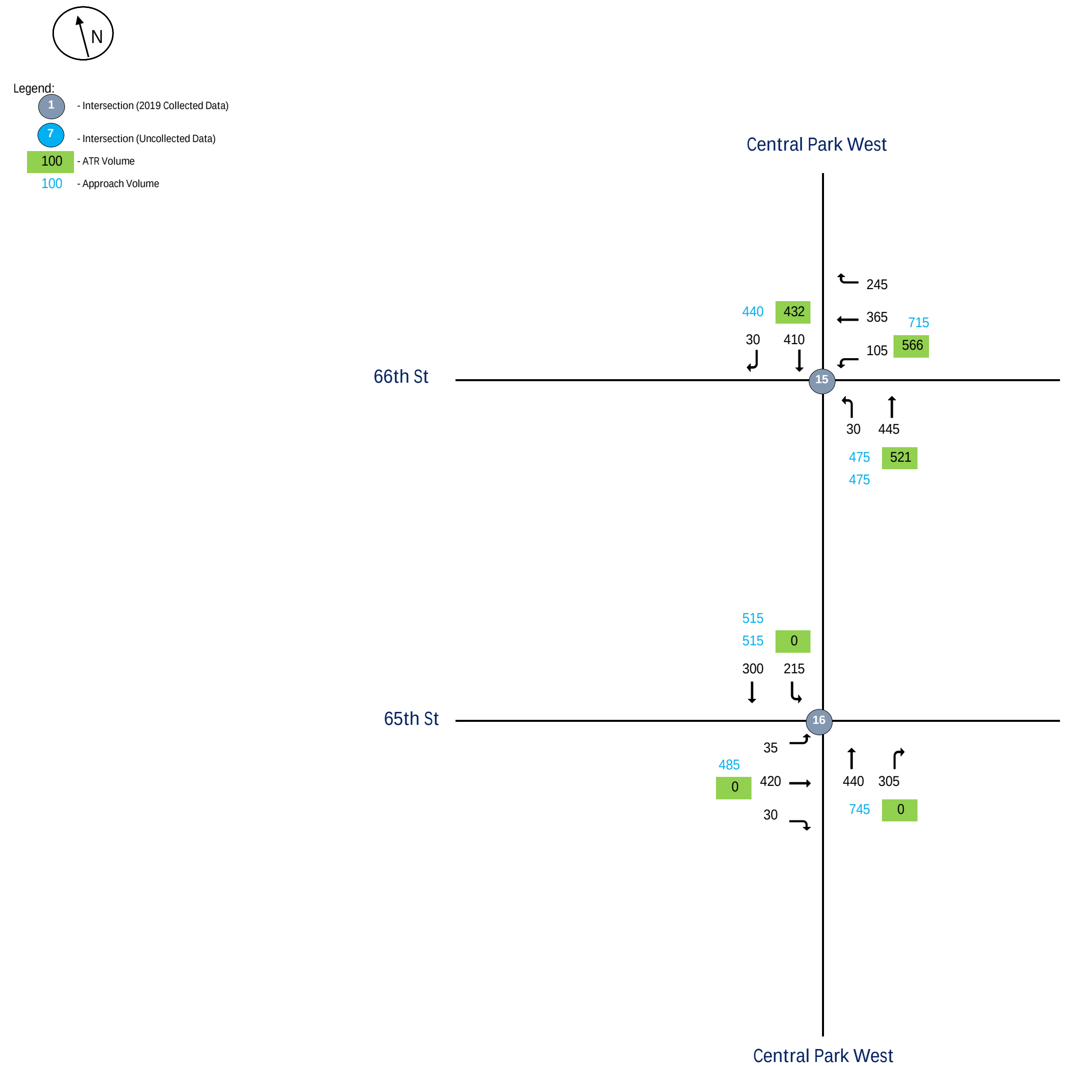
CBD Tolling
UW #4 - Traffic Flowmap
LN Existing



CBD Tolling
UW #5 - Traffic Flowmap
LN Existing



CBD Tolling
UW #6 - Traffic Flowmap
LN Existing



CBD Tolling

9A - Traffic Flowmap

AM No-Action Increment

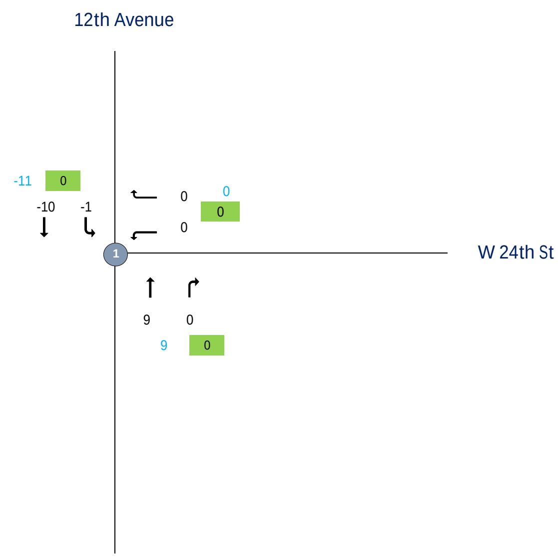
Legend:

1 - Intersection (2019 Collected Data)

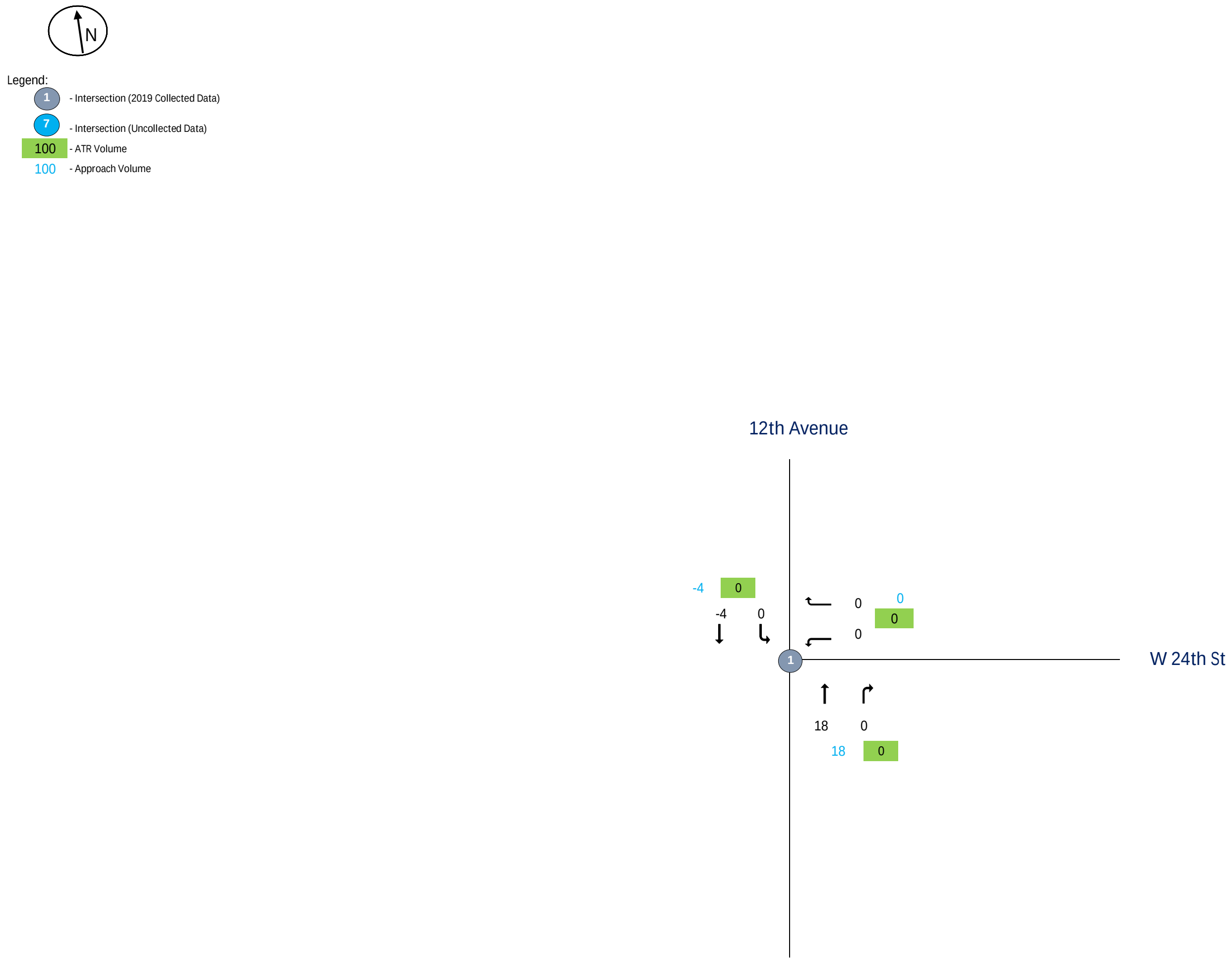
7 - Intersection (Uncollected Data)

100 - ATR Volume

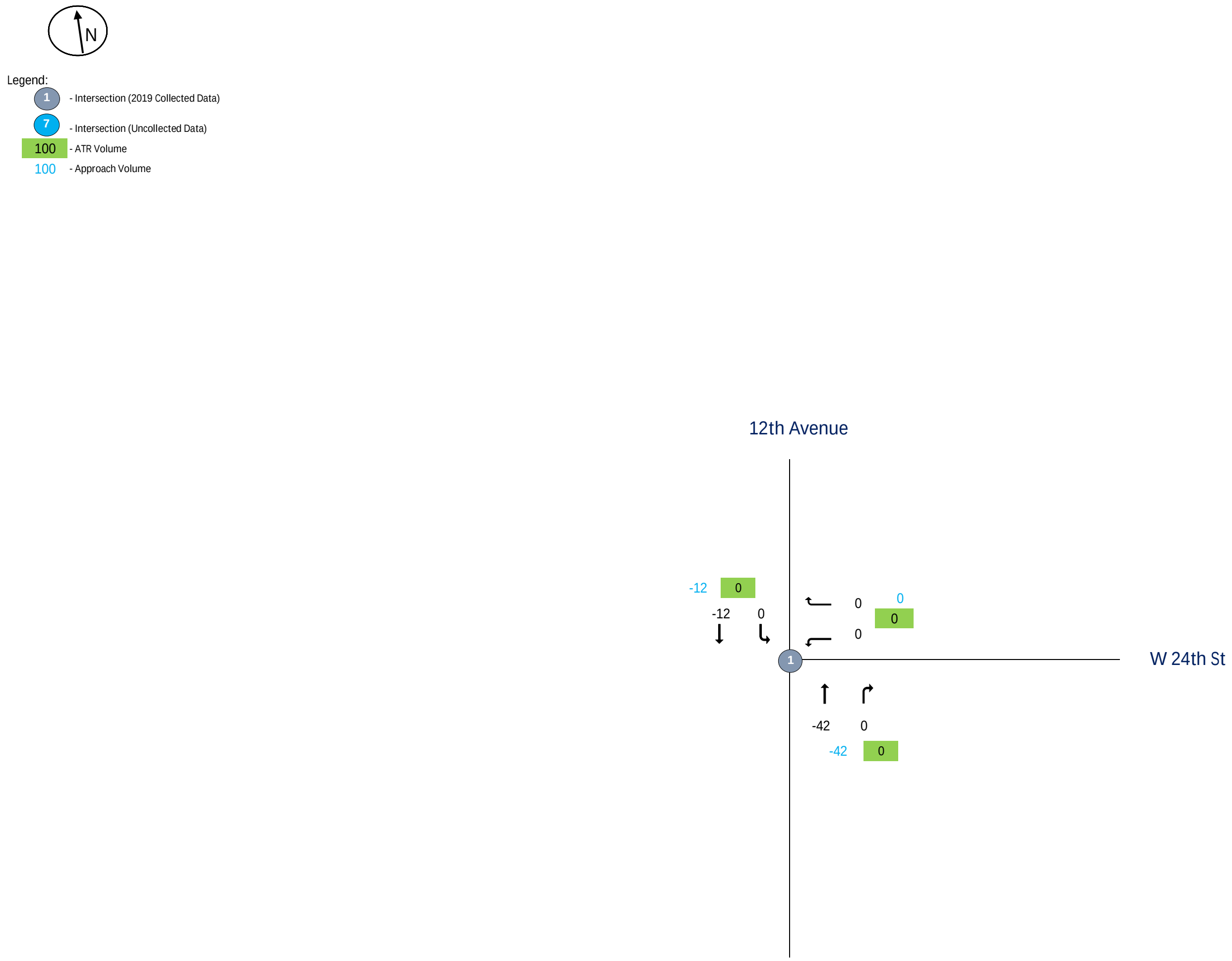
100 - Approach Volume



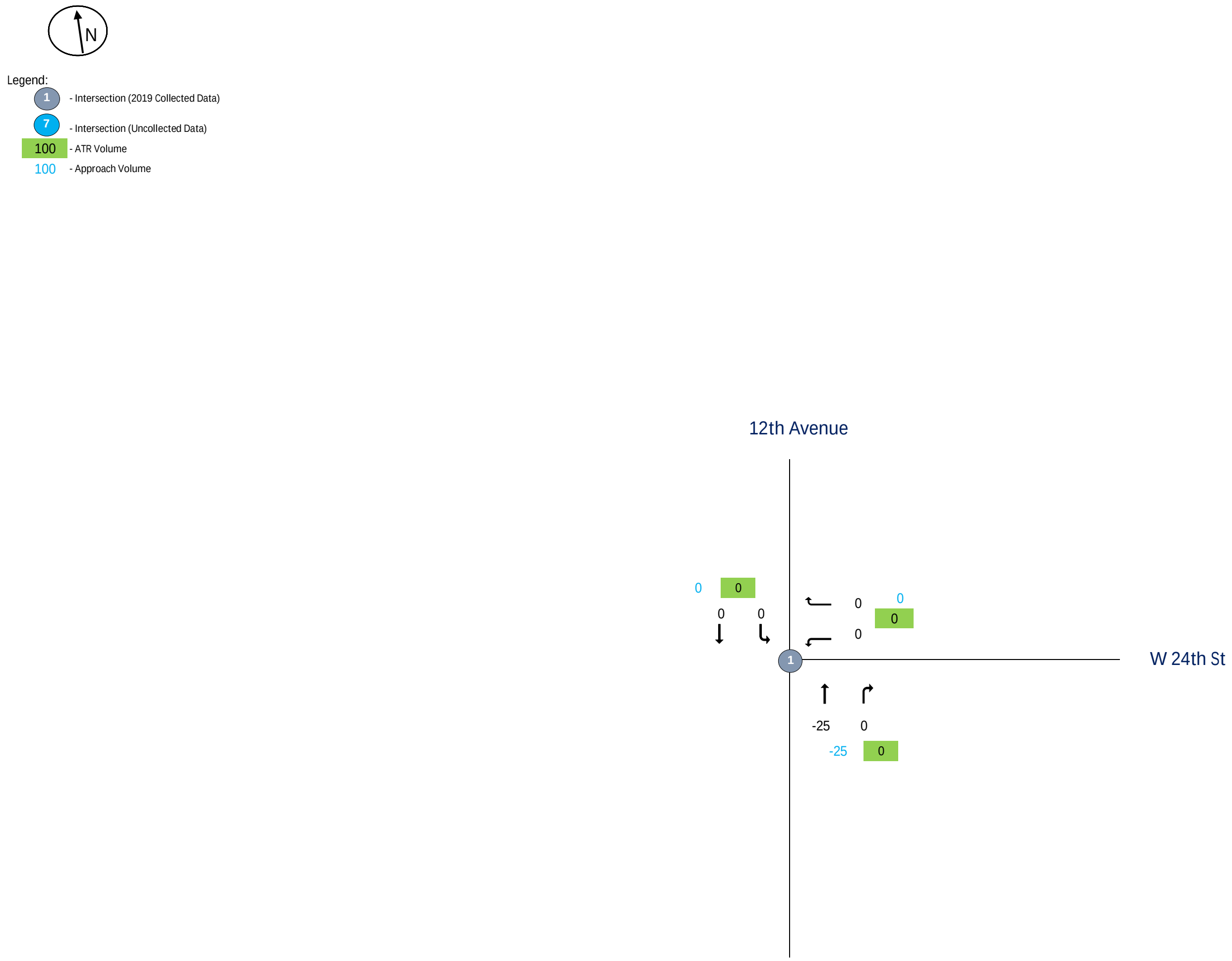
CBD Tolling
9A - Traffic Flowmap
MD No-Action Increment



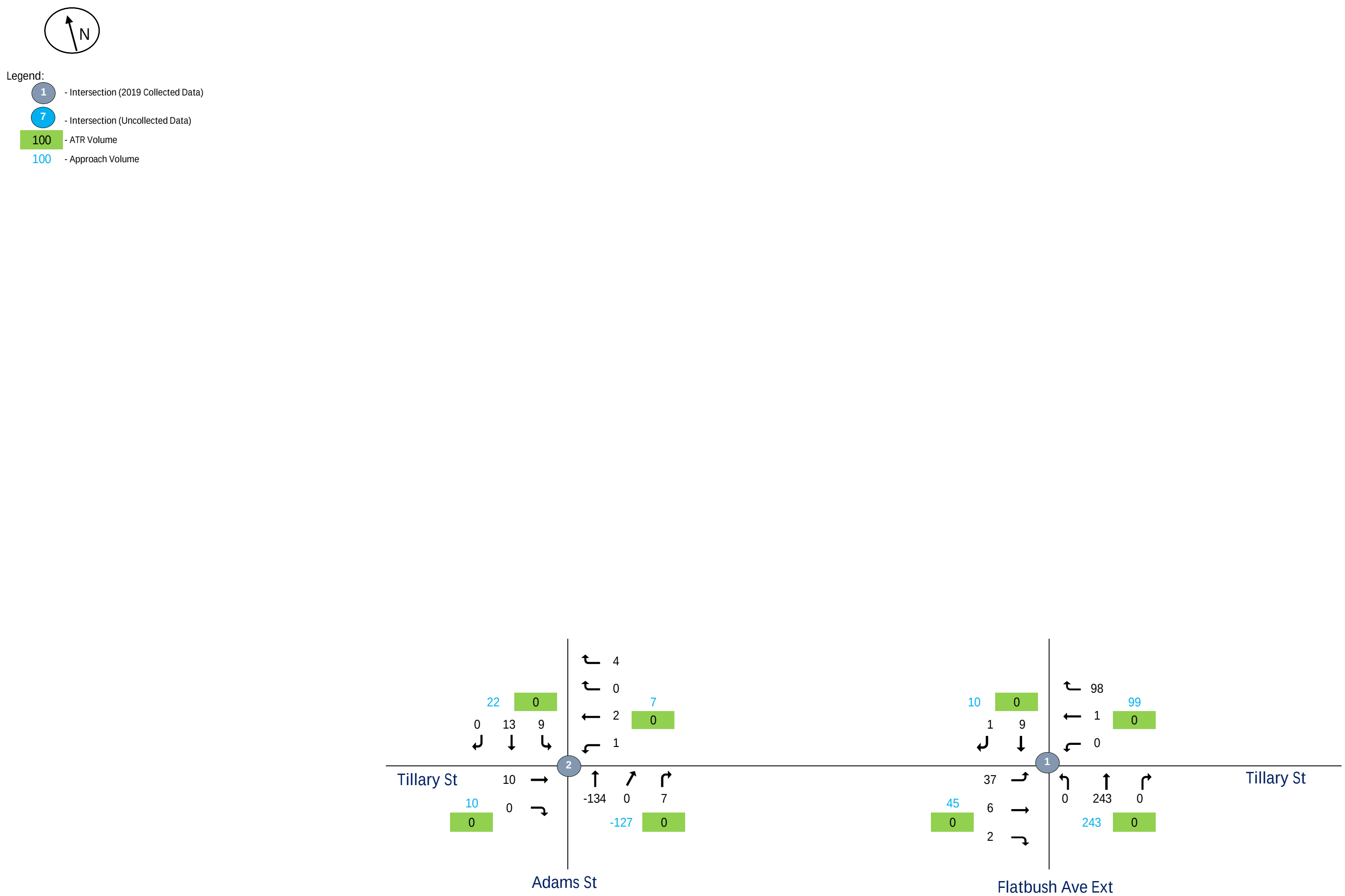
CBD Tolling
9A - Traffic Flowmap
PM No-Action Increment



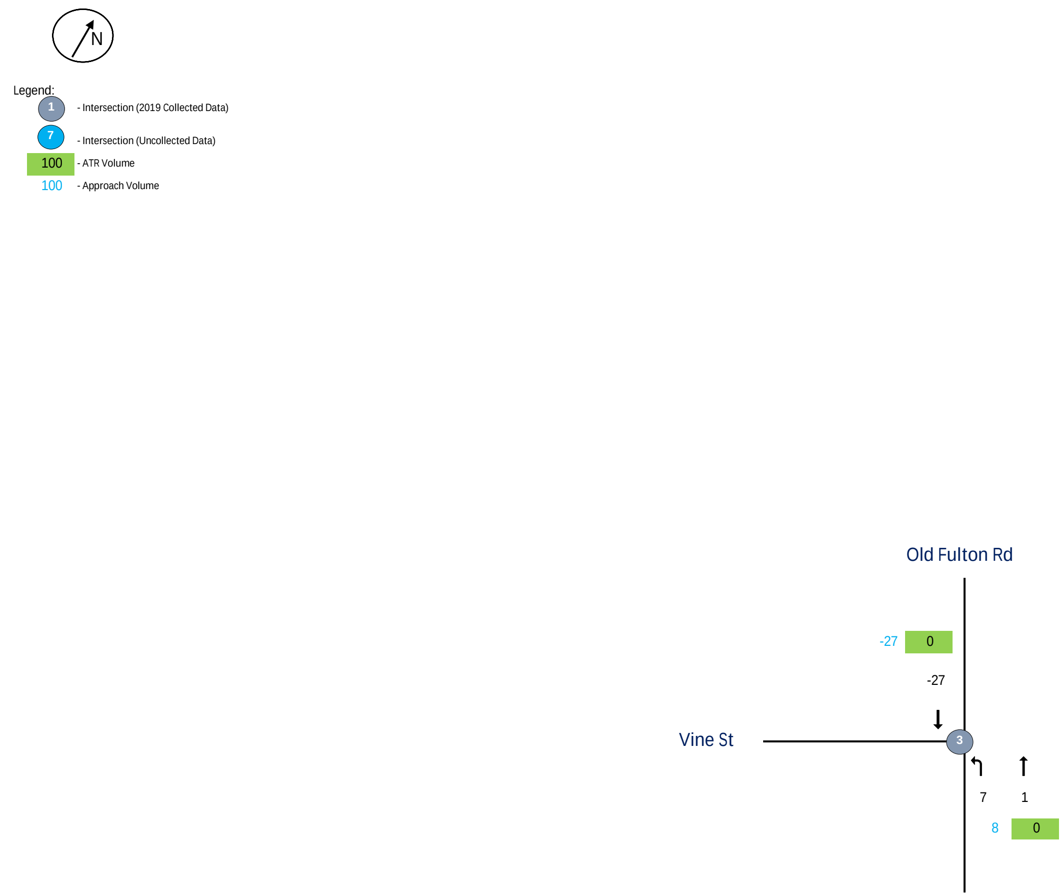
CBD Tolling
9A - Traffic Flowmap
LN No-Action Increment



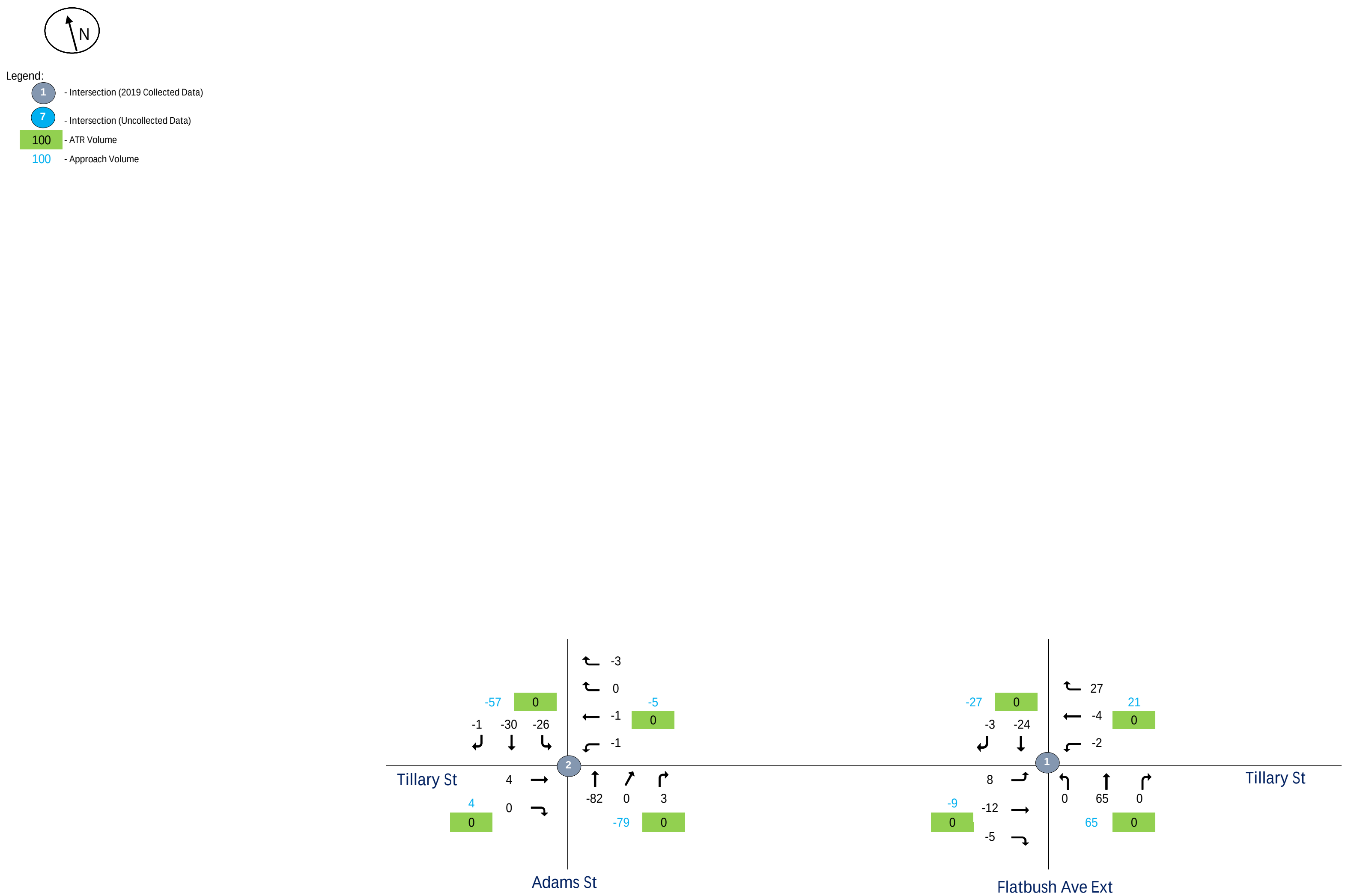
CBD Tolling
Dumbo - Traffic Flowmap
AM No-Action Increment



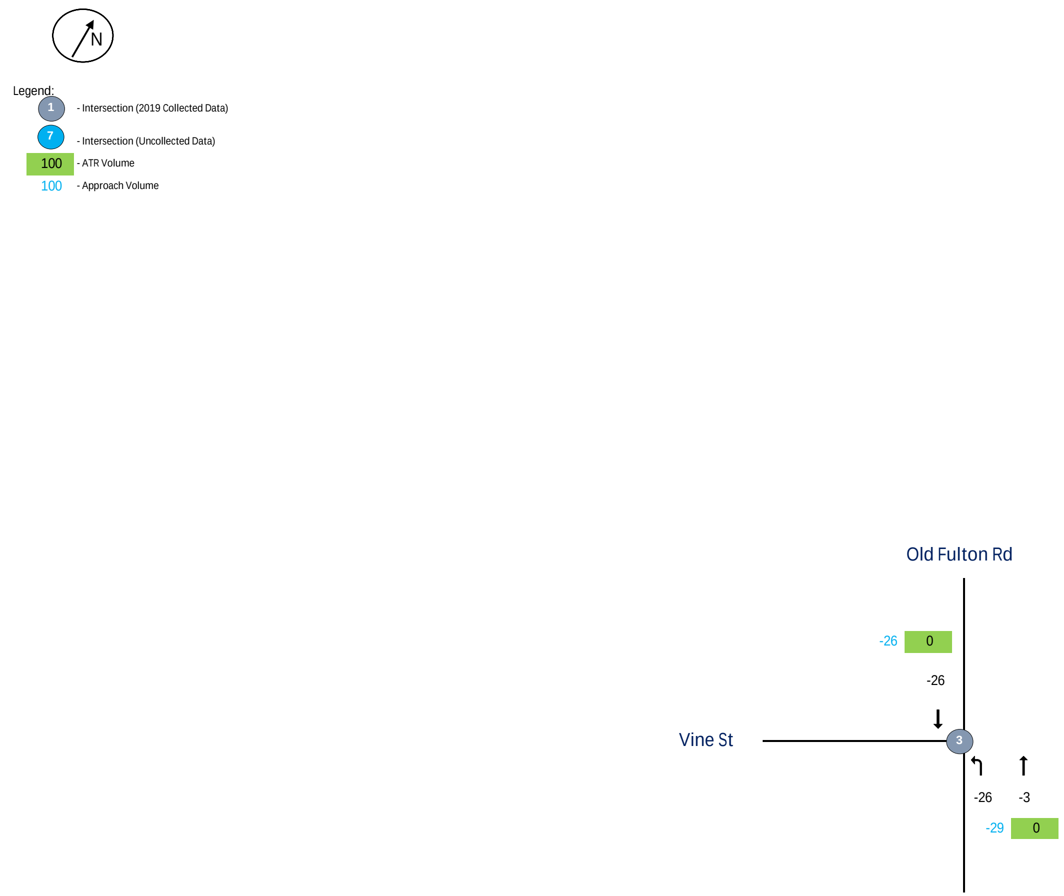
CBD Tolling
Dumbo #2 - Traffic Flowmap
AM No-Action Increment



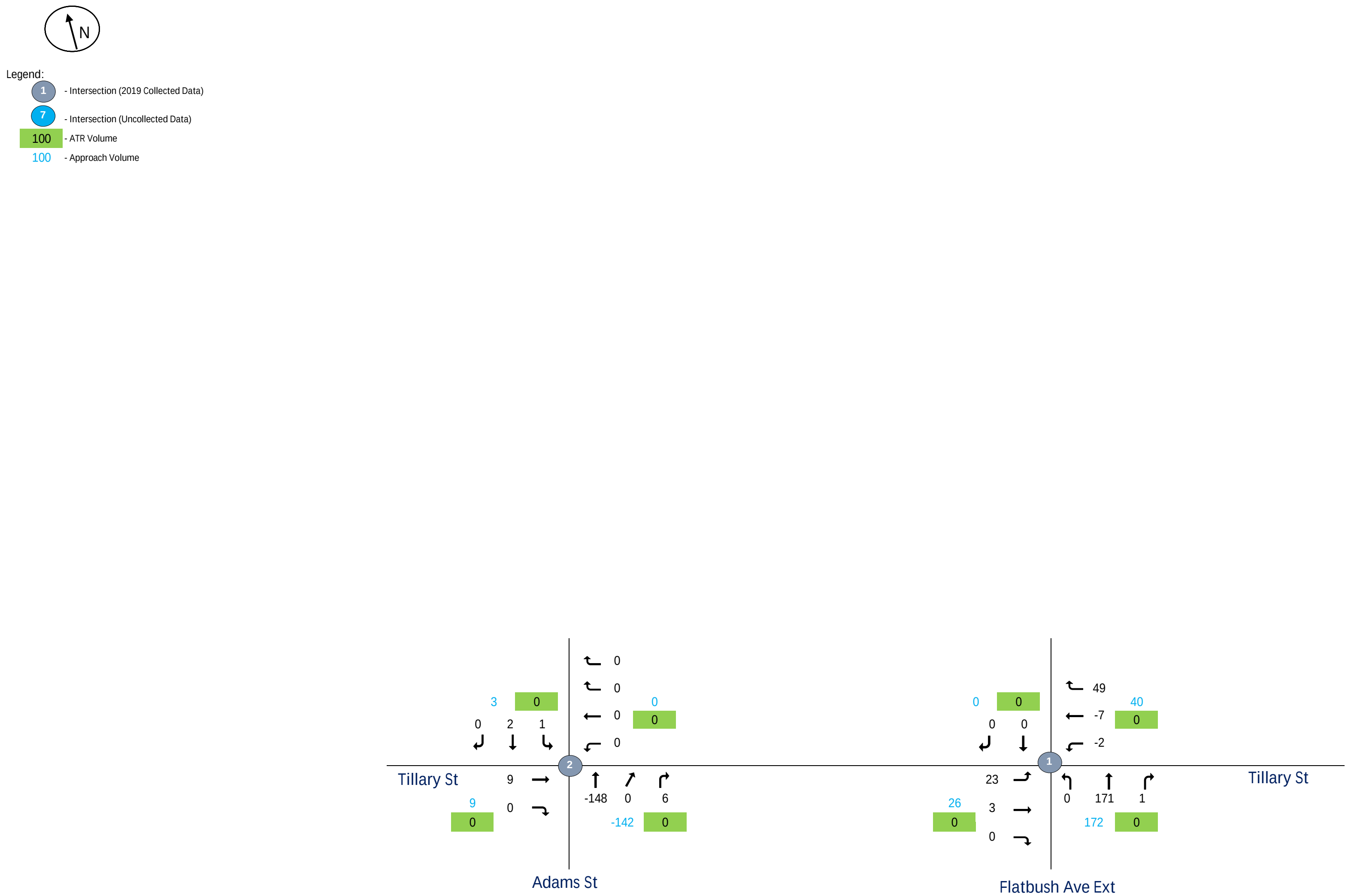
CBD Tolling
Dumbo - Traffic Flowmap
MD No-Action Increment



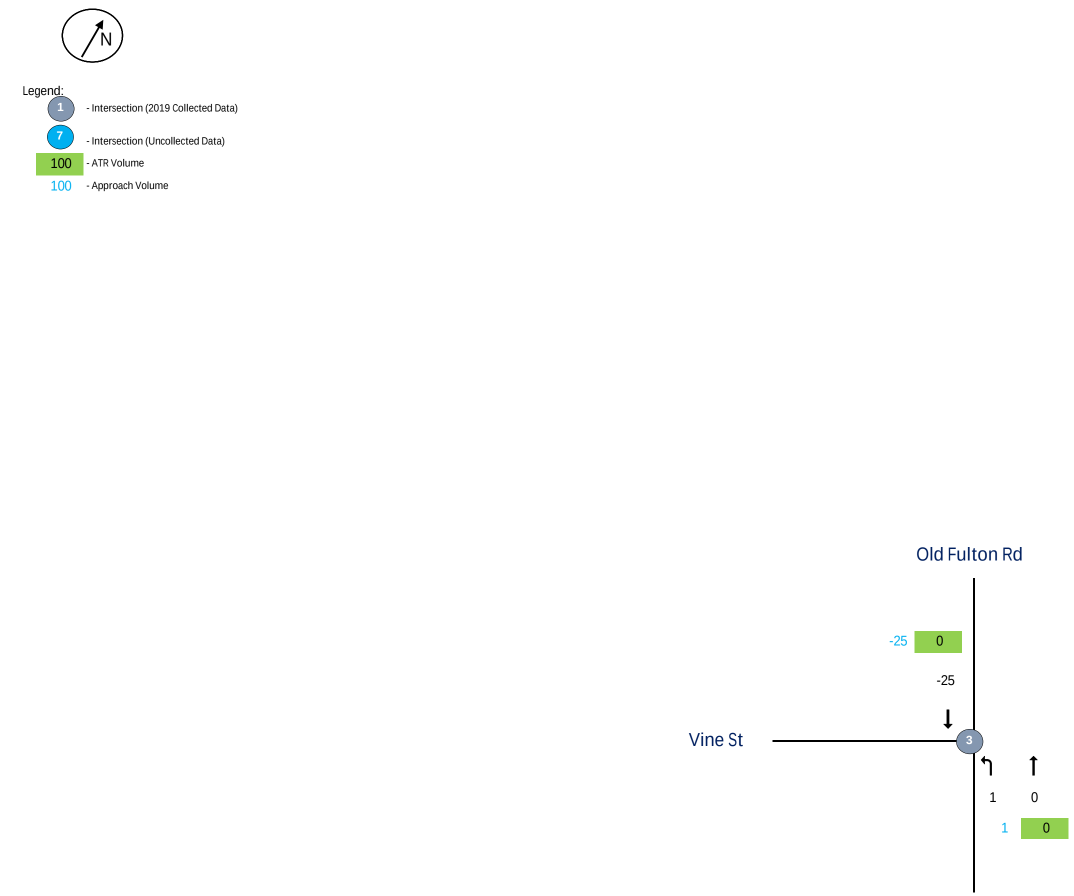
CBD Tolling
Dumbo #2 - Traffic Flowmap
MD No-Action Increment



CBD Tolling
Dumbo - Traffic Flowmap
PM No-Action Increment



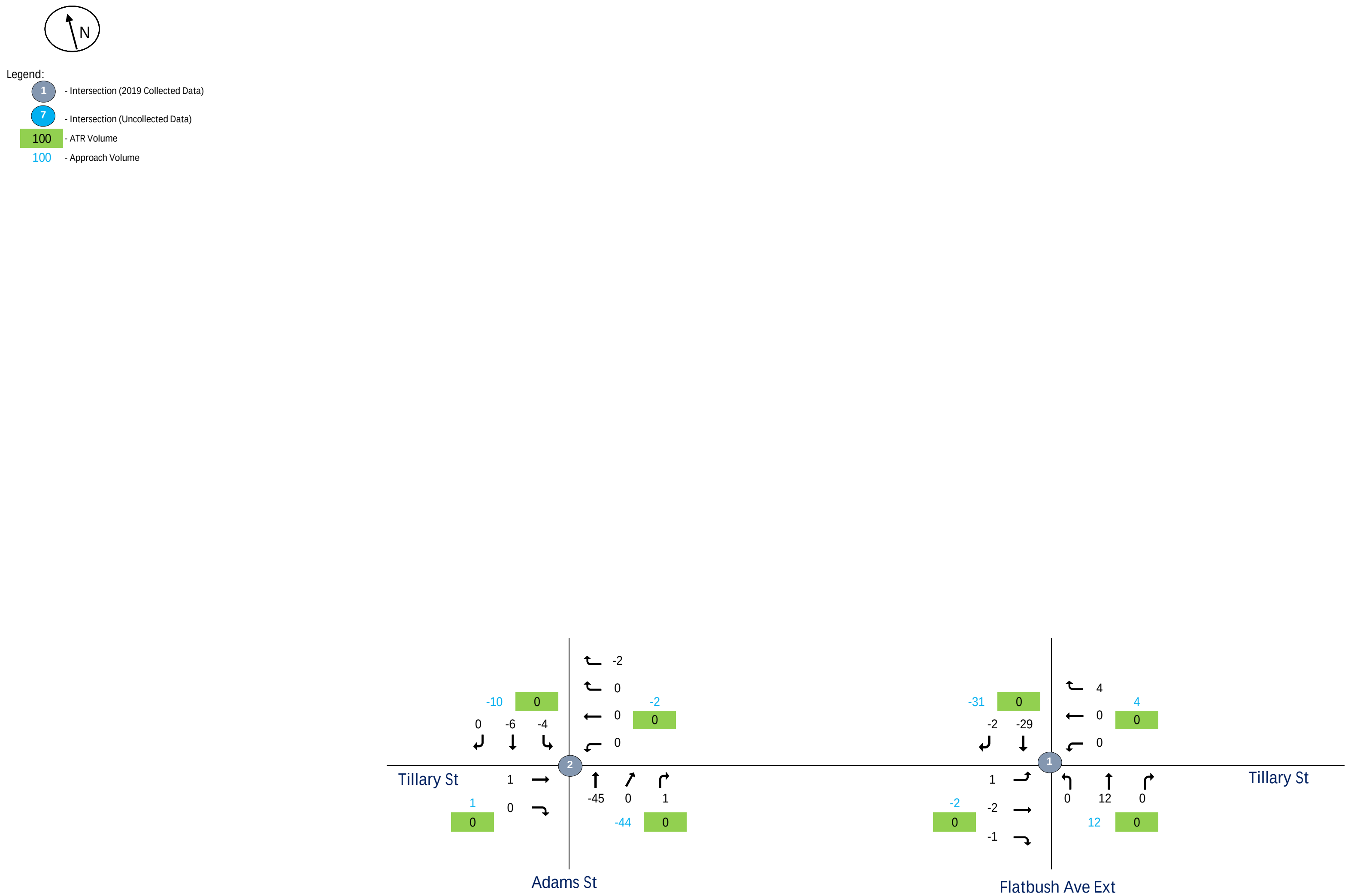
CBD Tolling
Dumbo #2 - Traffic Flowmap
PM No-Action Increment



CBD Tolling

Dumbo - Traffic Flowmap

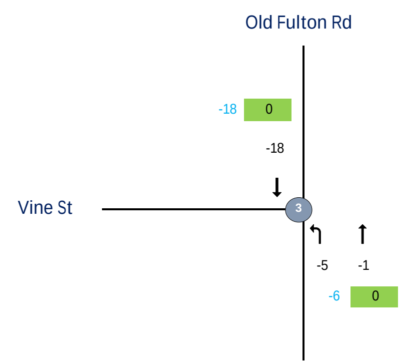
LN No-Action Increment

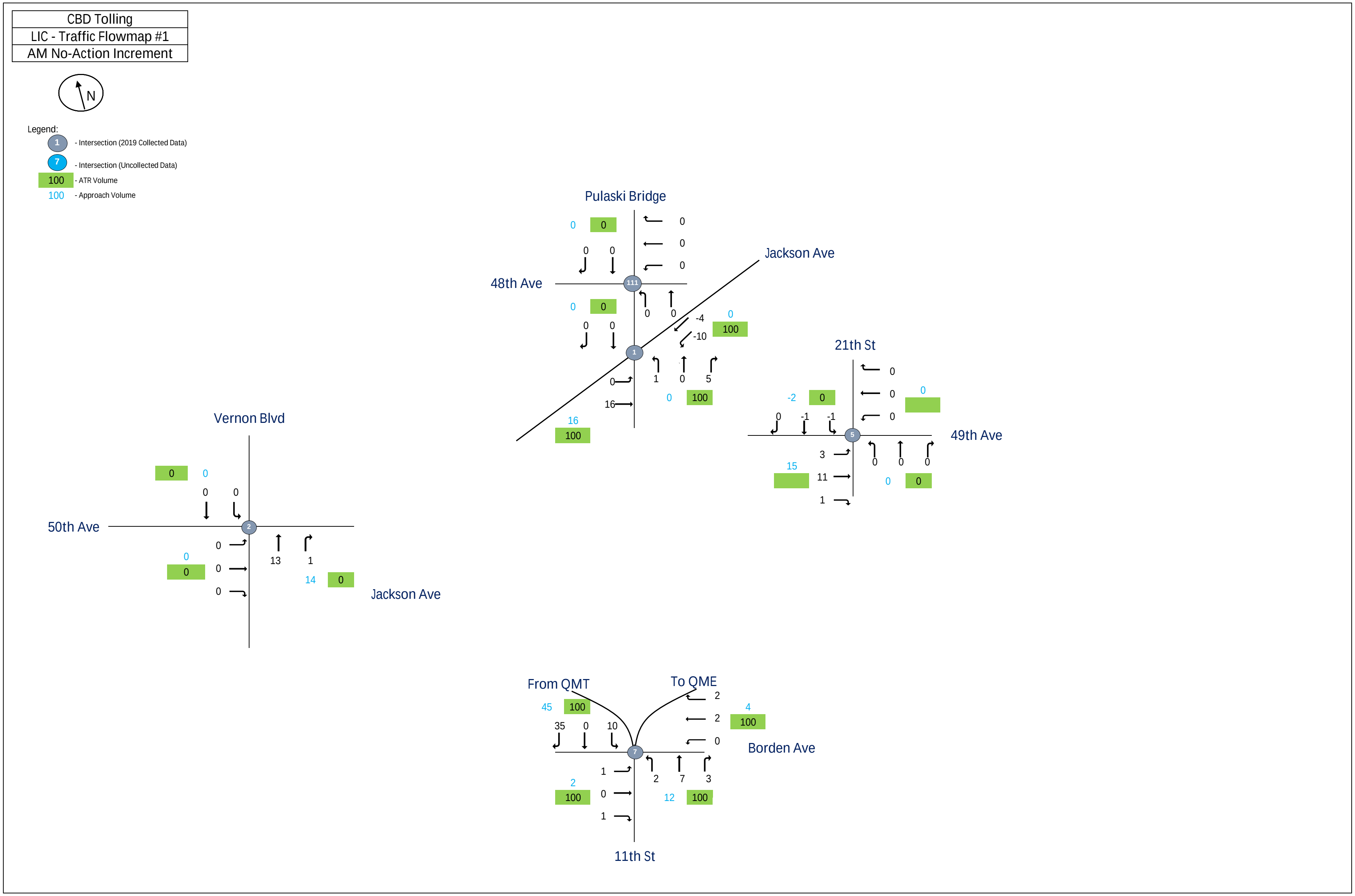


CBD Tolling
Dumbo #2 - Traffic Flowmap
LN No-Action Increment

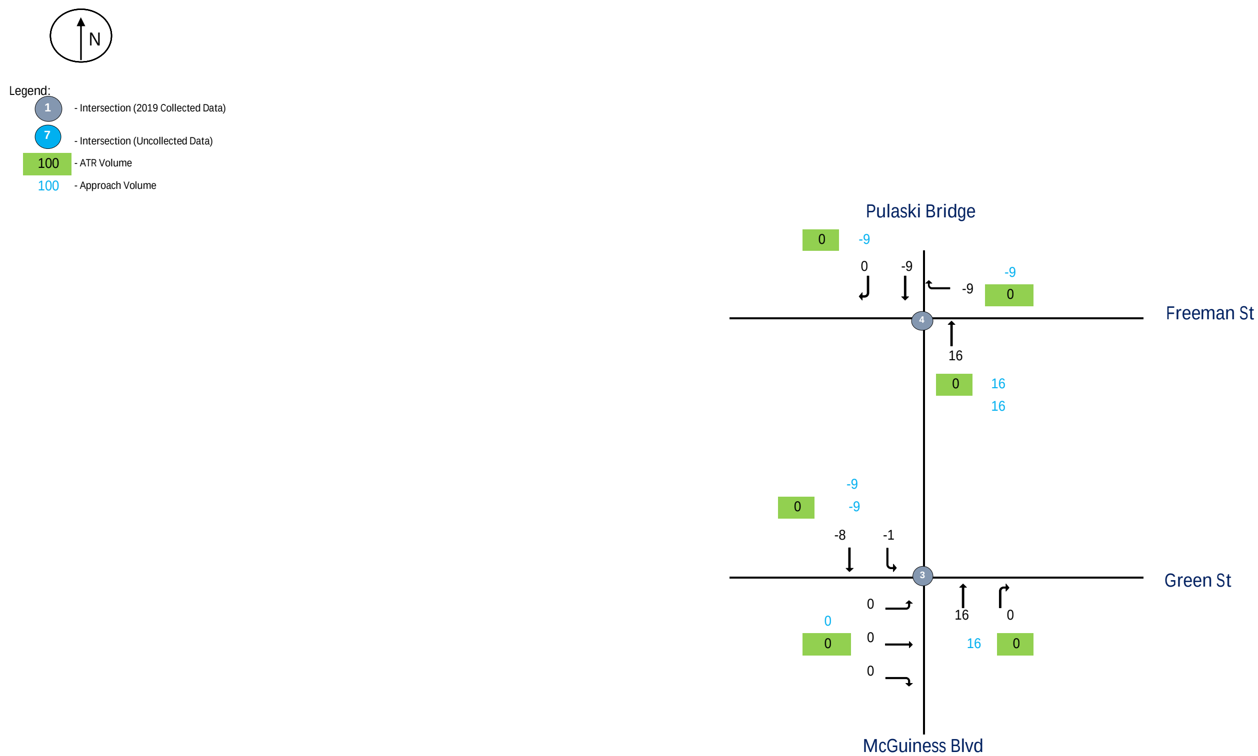
N

Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume

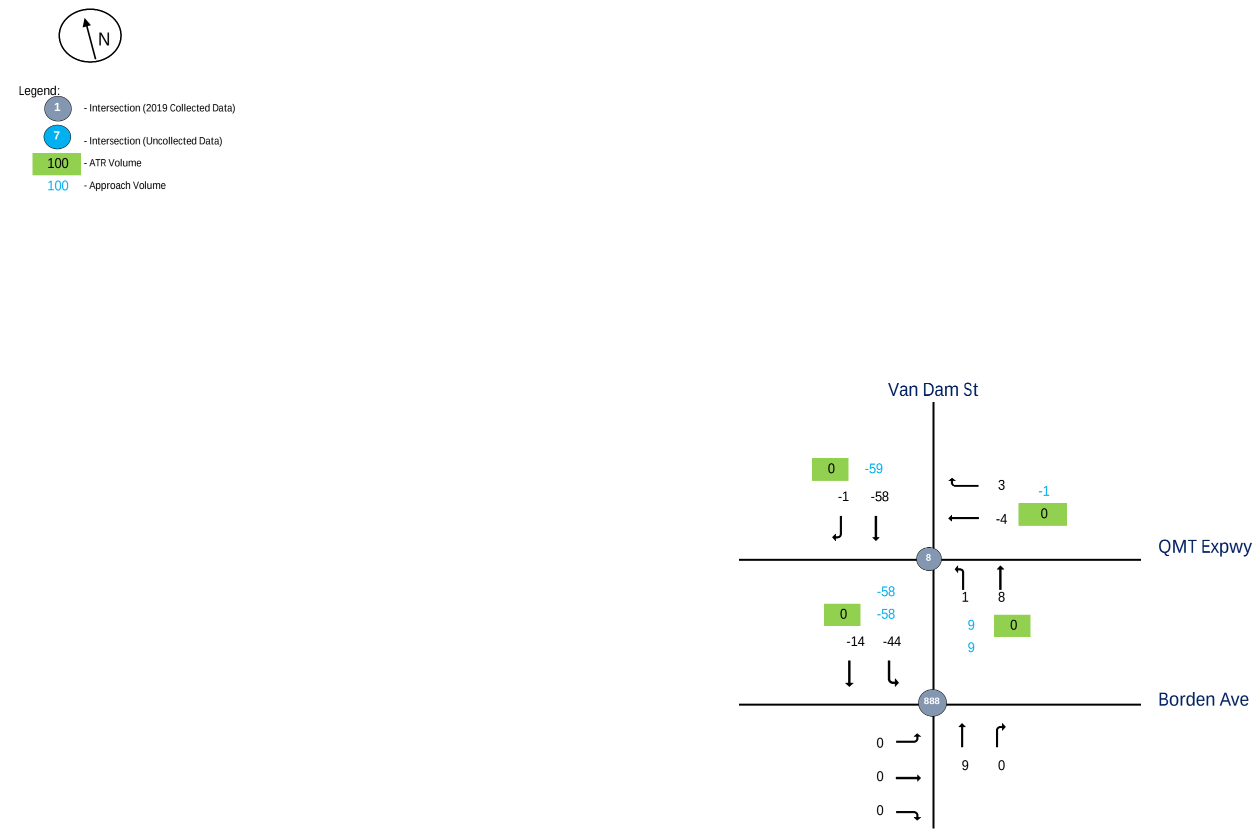



CBD Tolling
LIC - Traffic Flowmap #1
AM No-Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
Jackson Ave
48th Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St

CBD Tolling
LIC - Traffic Flowmap #2
AM No-Action Increment



CBD Tolling
LIC - Traffic Flowmap #3
AM No-Action Increment



CBD Tolling

LIC - Traffic Flowmap #4

AM No-Action Increment

N

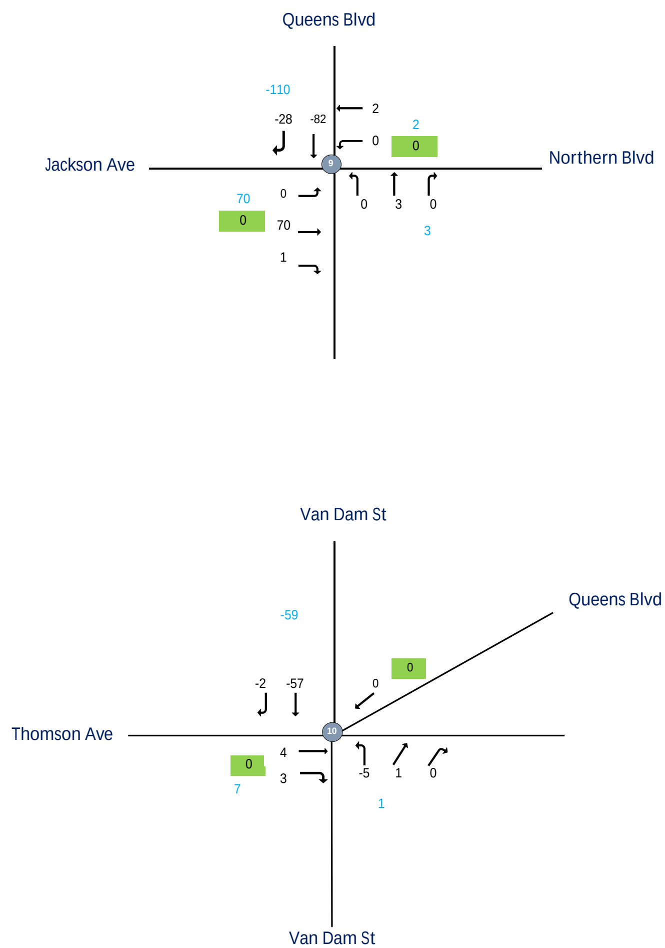
Legend:

1 - Intersection (2019 Collected Data)

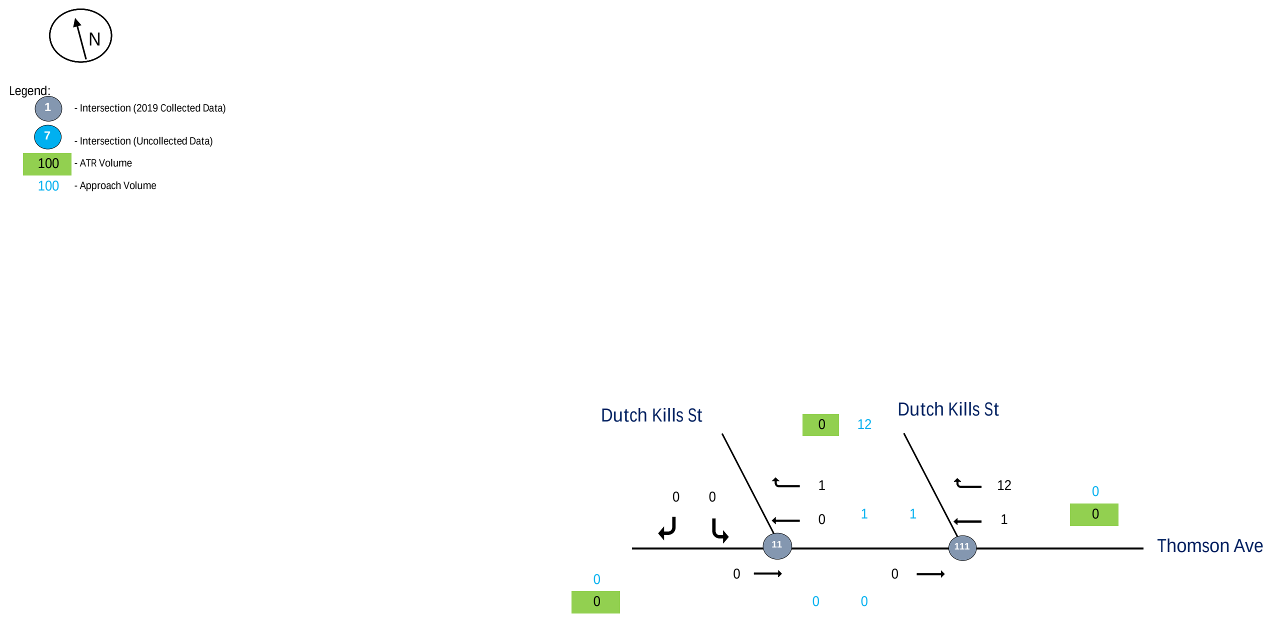
7 - Intersection (Uncollected Data)

100 - ATR Volume

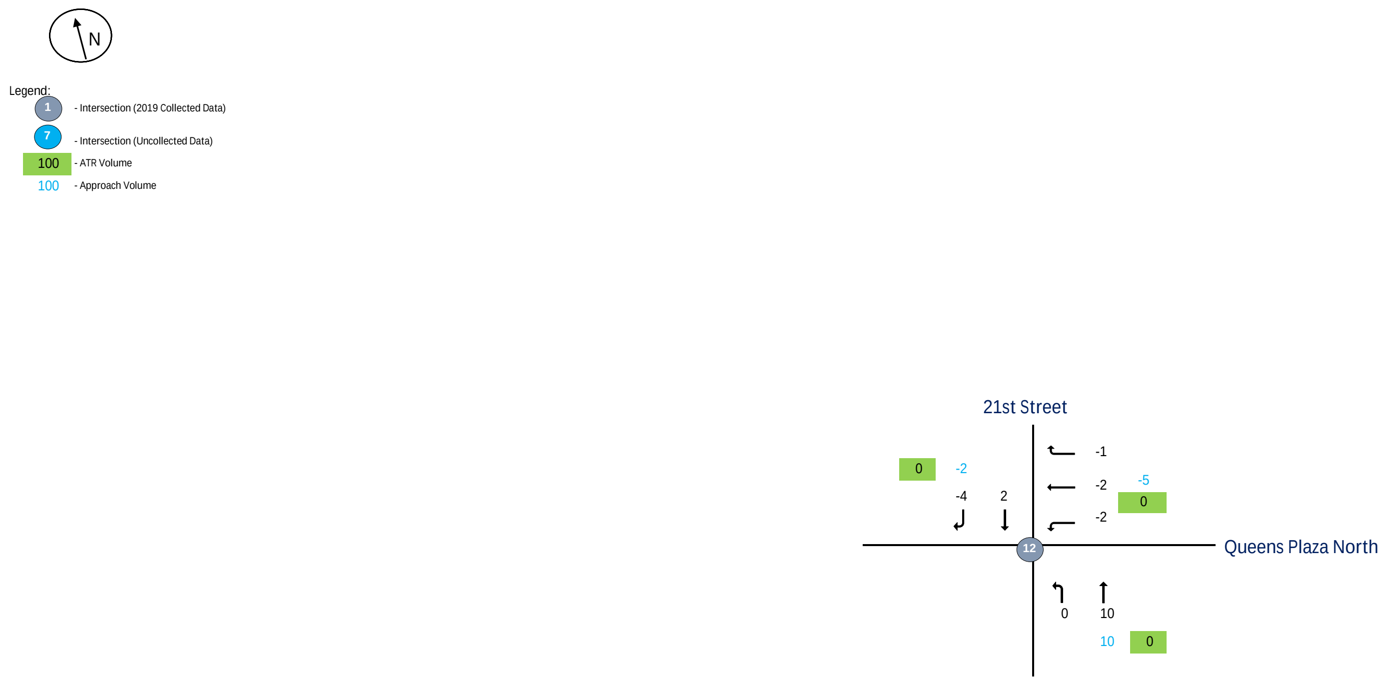
100 - Approach Volume

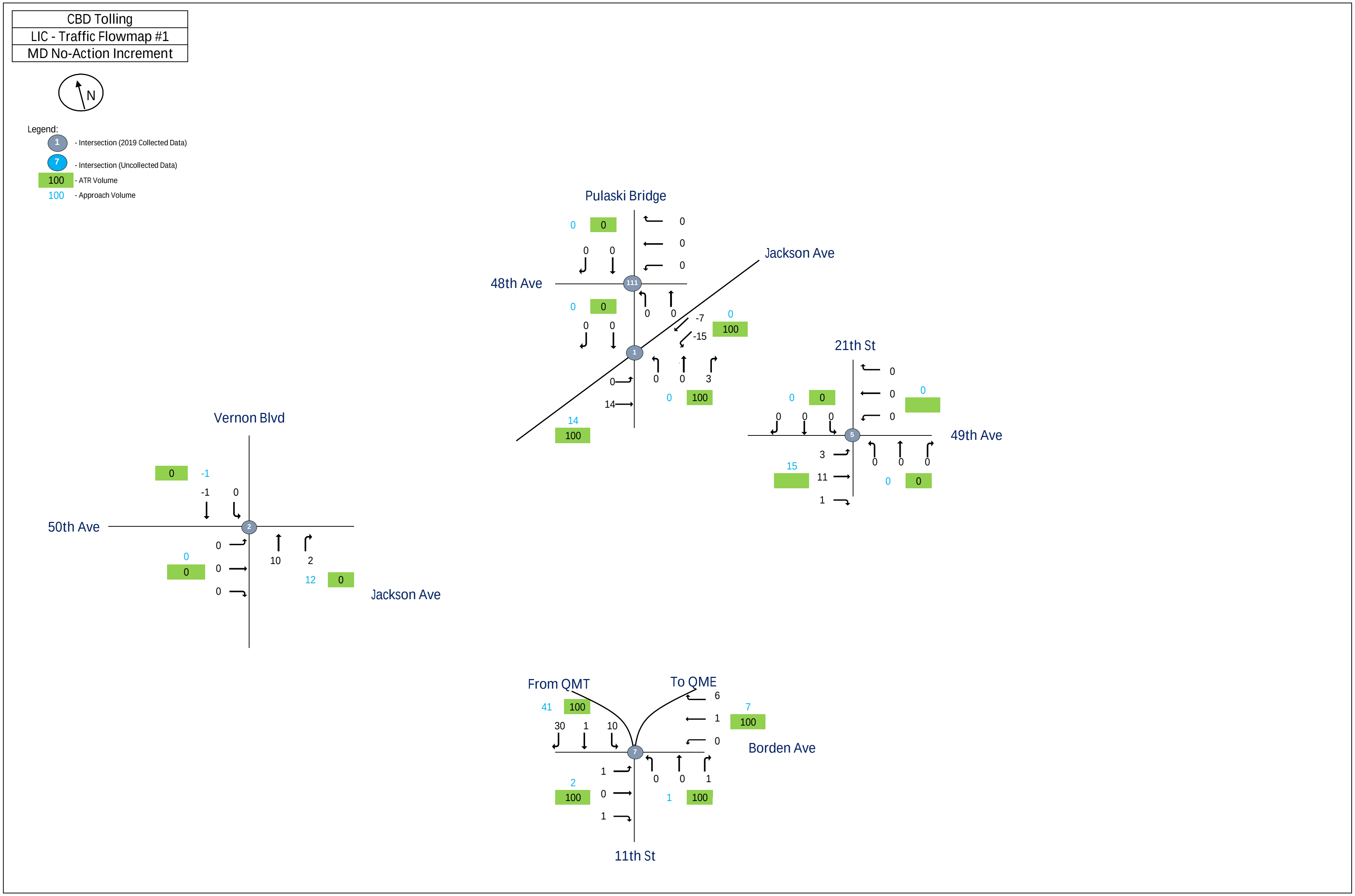


CBD Tolling
LIC - Traffic Flowmap #5
AM No-Action Increment



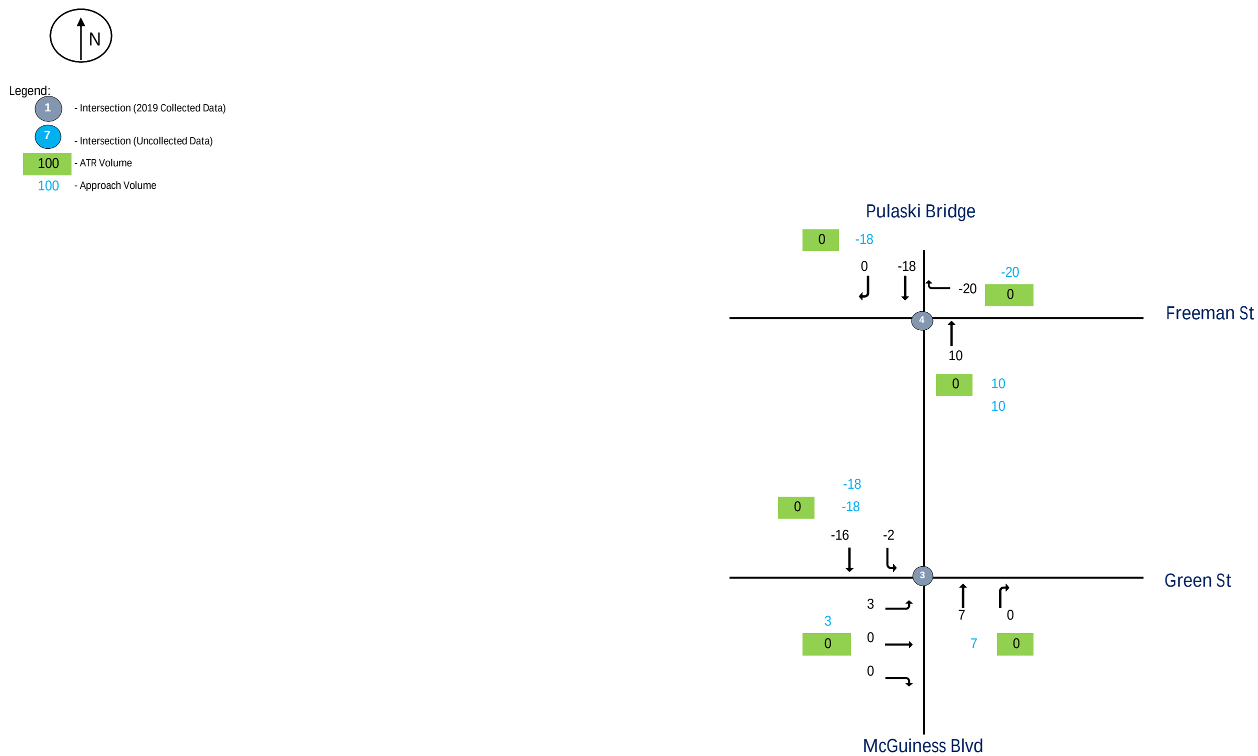
CBD Tolling
LIC - Traffic Flowmap #6
AM No-Action Increment



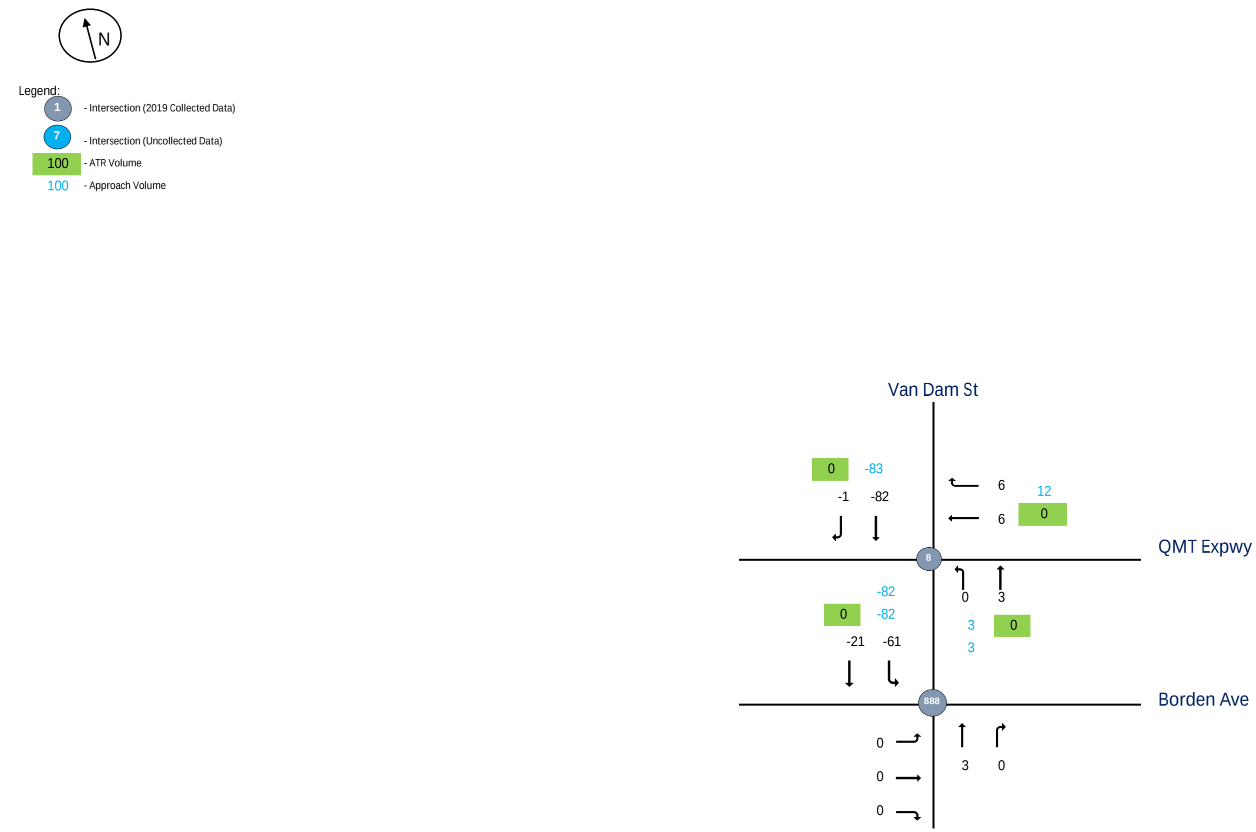


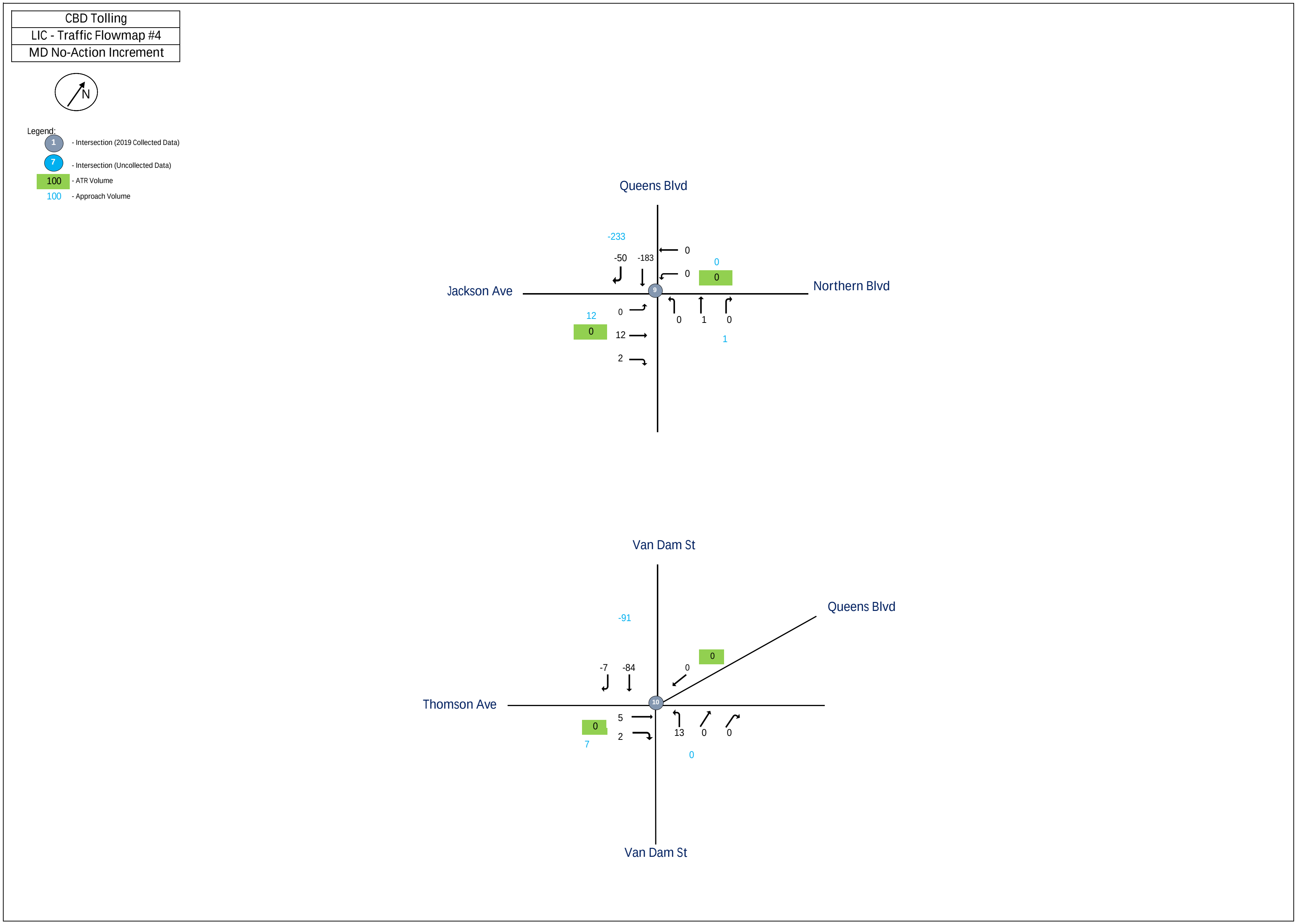
CBD Tolling
LIC - Traffic Flowmap #1
MD No-Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
Jackson Ave
48th Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St

CBD Tolling
LIC - Traffic Flowmap #2
MD No-Action Increment

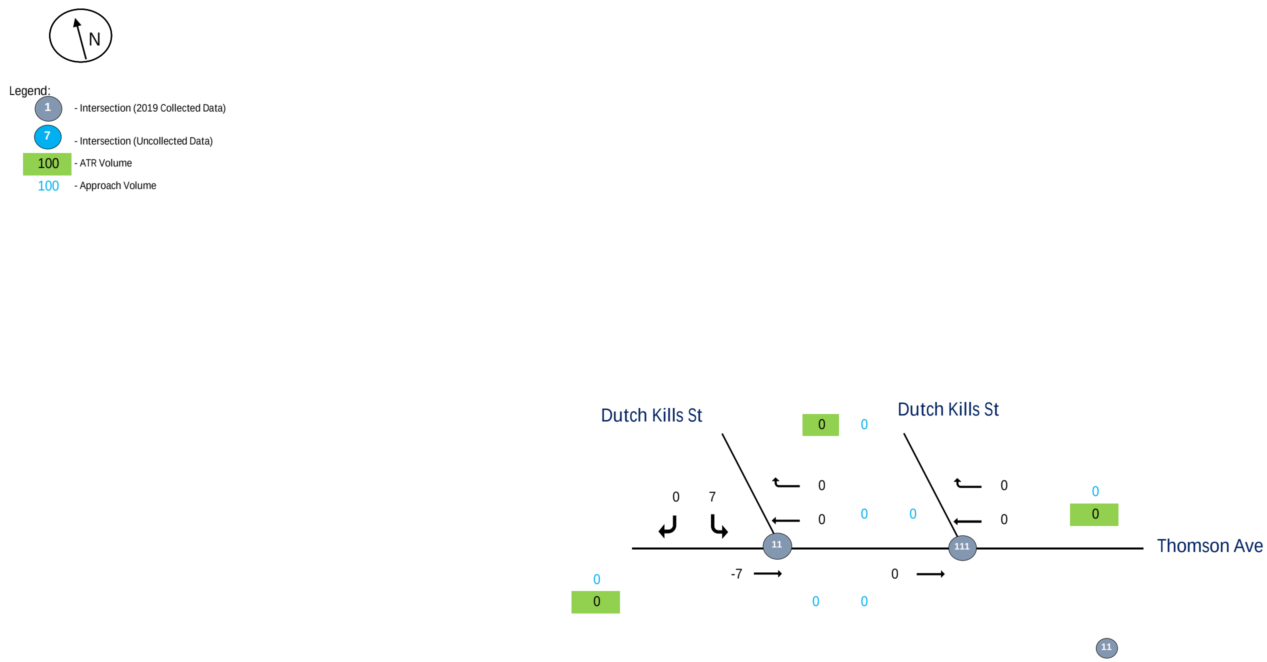


CBD Tolling
LIC - Traffic Flowmap #3
MD No-Action Increment

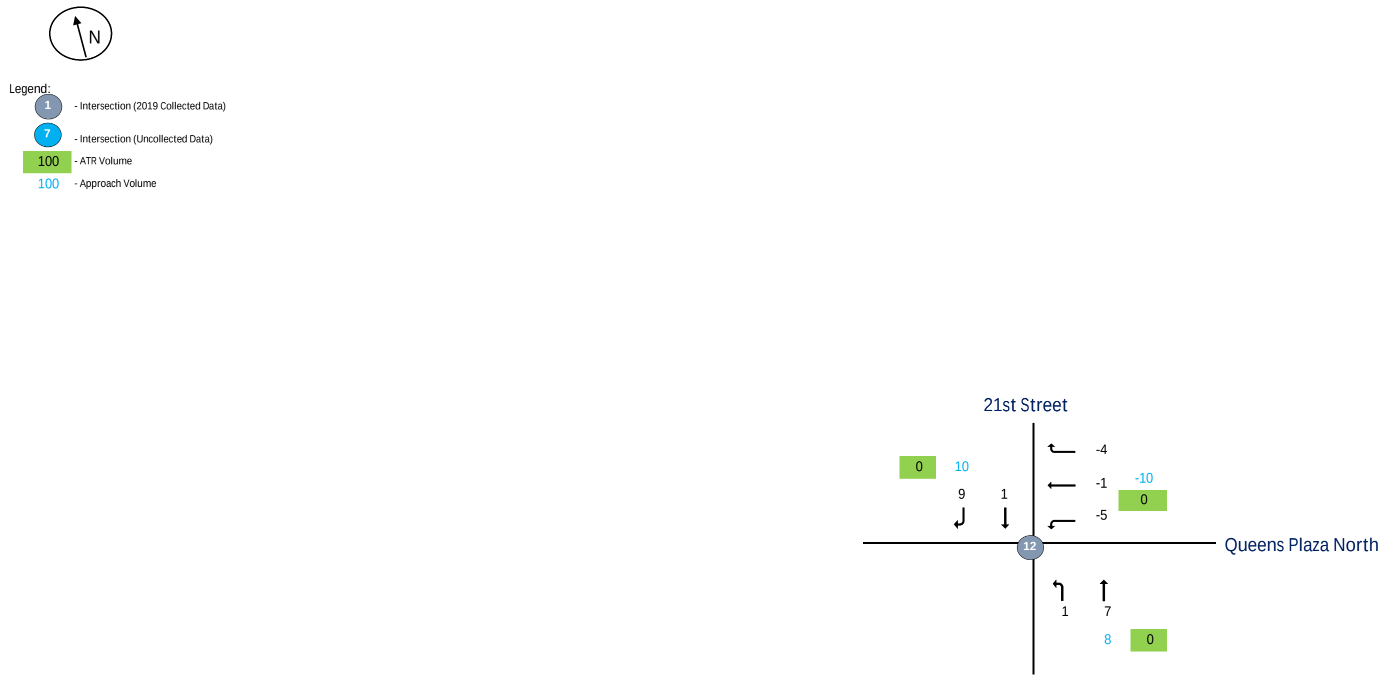


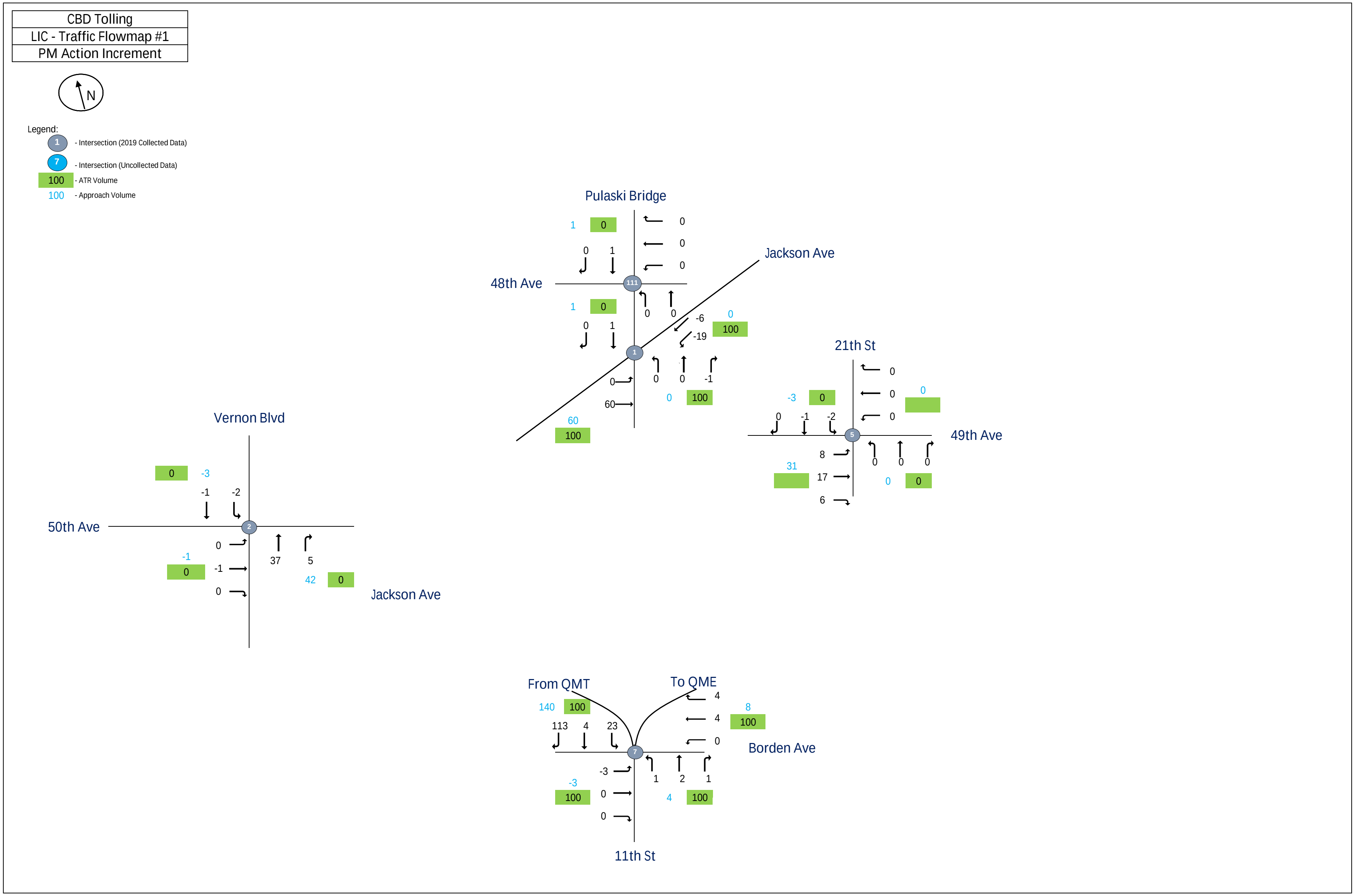

CBD Tolling
LIC - Traffic Flowmap #4
MD No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Queens Blvd
Jackson Ave
Northern Blvd
-233
-50
-183
0
0
0
0
9
0
12
0
12
2
0
1
0
1
Van Dam St
Queens Blvd
Thomson Ave
-91
0
-7
-84
0
10
5
0
2
7
13
0
0
0
Van Dam St

CBD Tolling
LIC - Traffic Flowmap #5
MD No-Action Increment



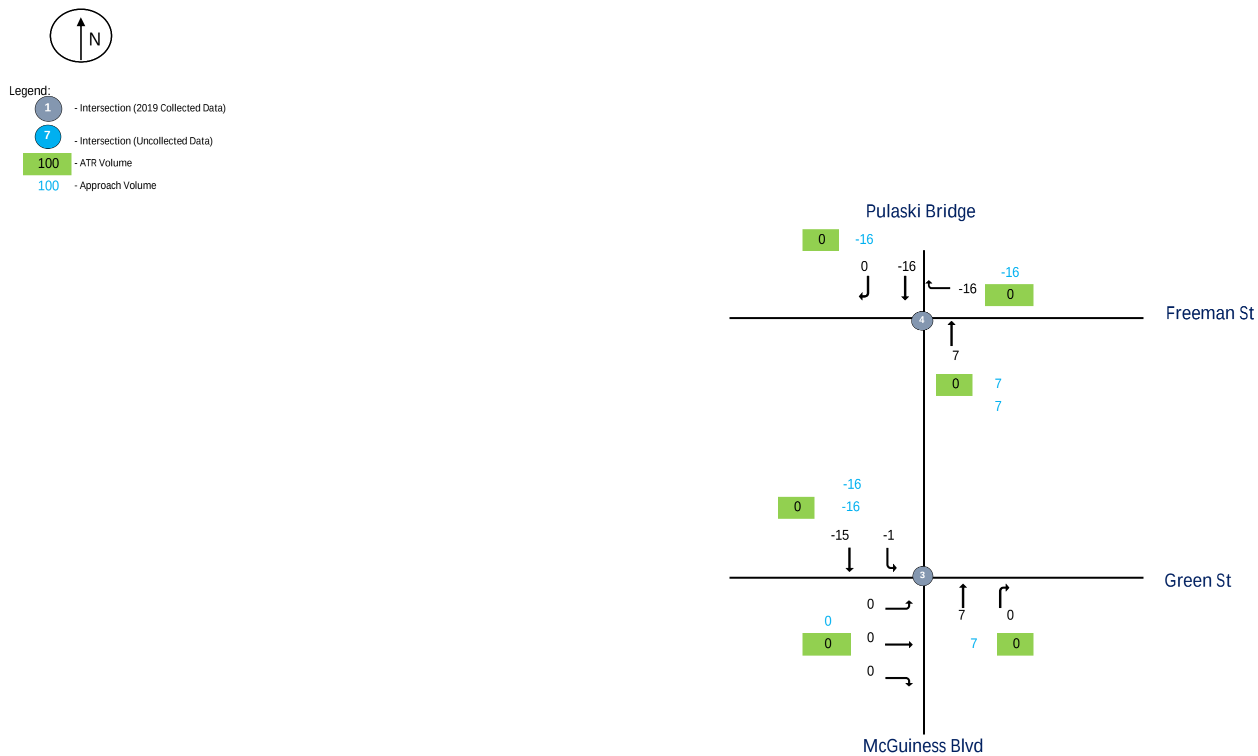
CBD Tolling
LIC - Traffic Flowmap #6
MD No-Action Increment



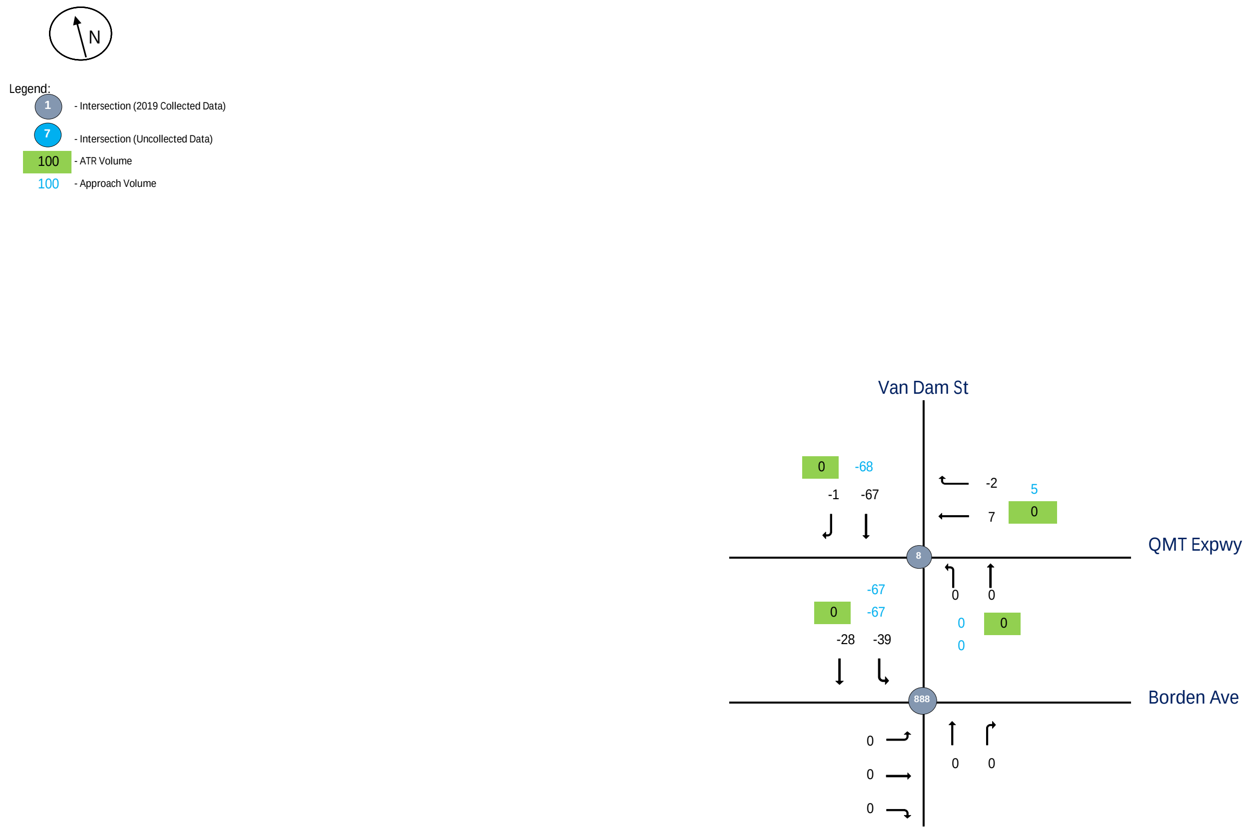


CBD Tolling
LIC - Traffic Flowmap #1
PM Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
Jackson Ave
48th Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St

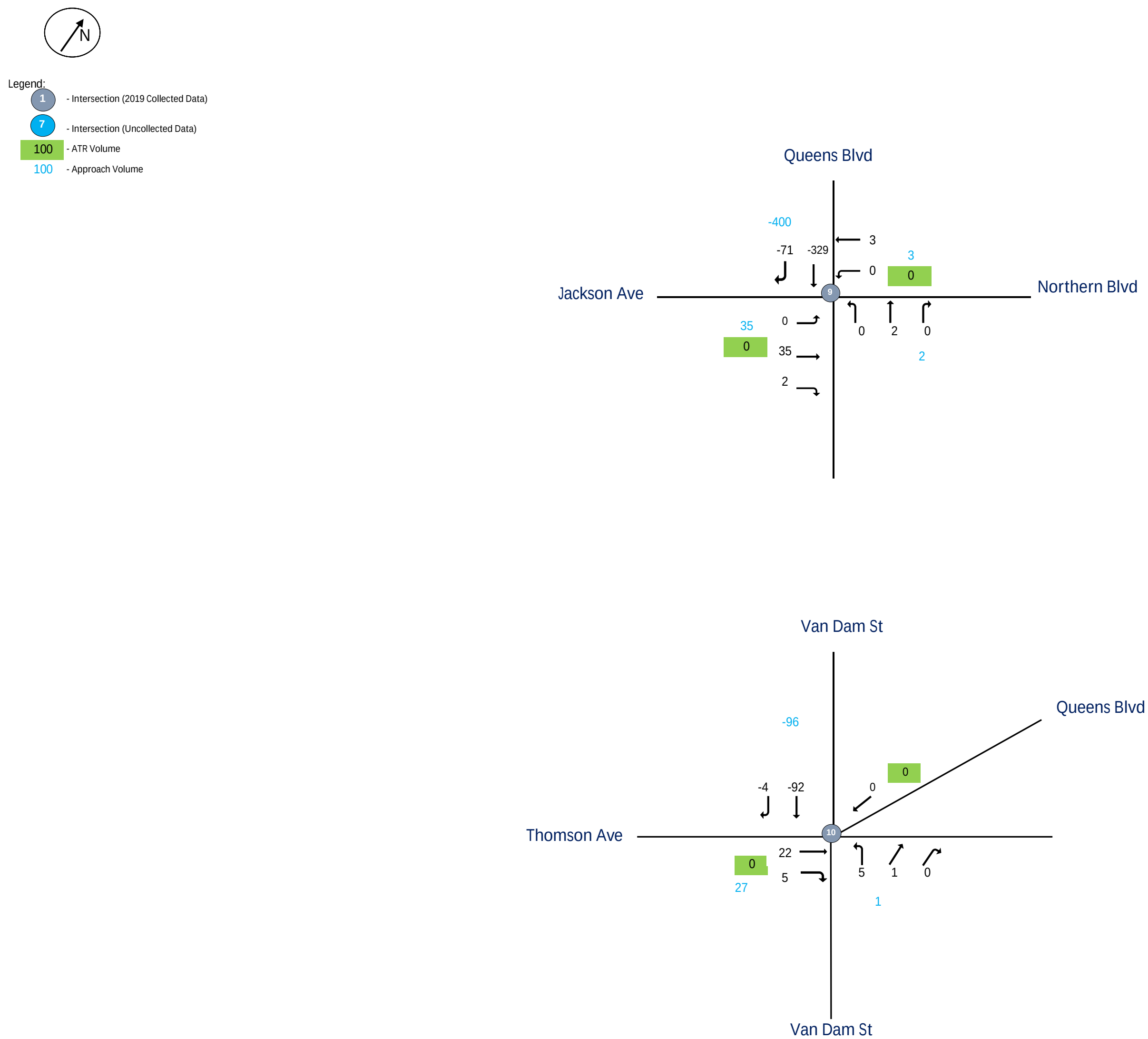
CBD Tolling
LIC - Traffic Flowmap #2
PM Action Increment



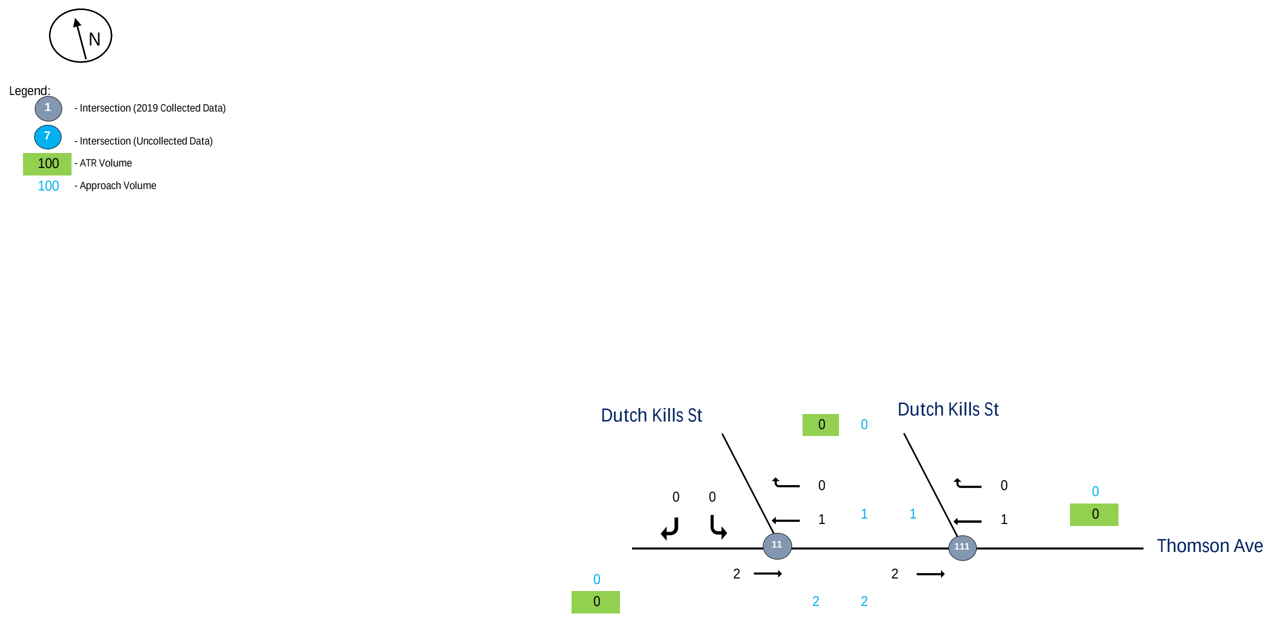
CBD Tolling
LIC - Traffic Flowmap #3
PM Action Increment



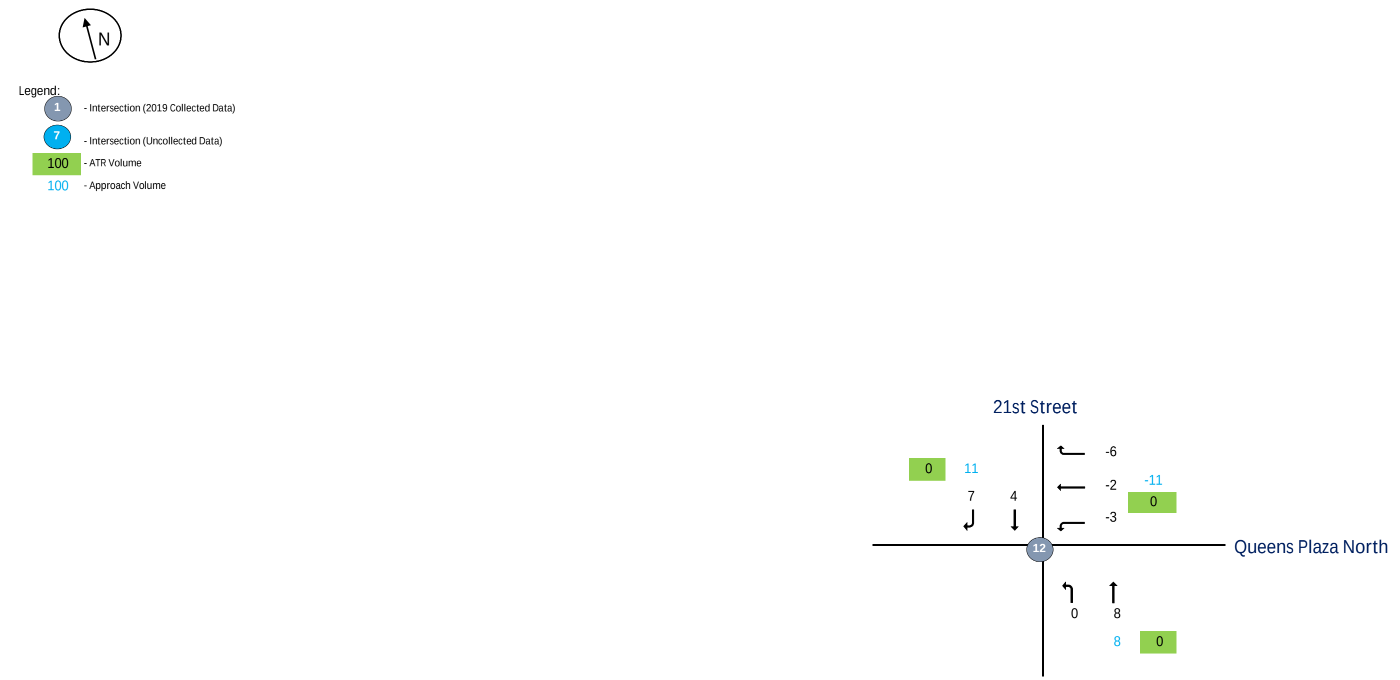
CBD Tolling
LIC - Traffic Flowmap #4
PM Action Increment

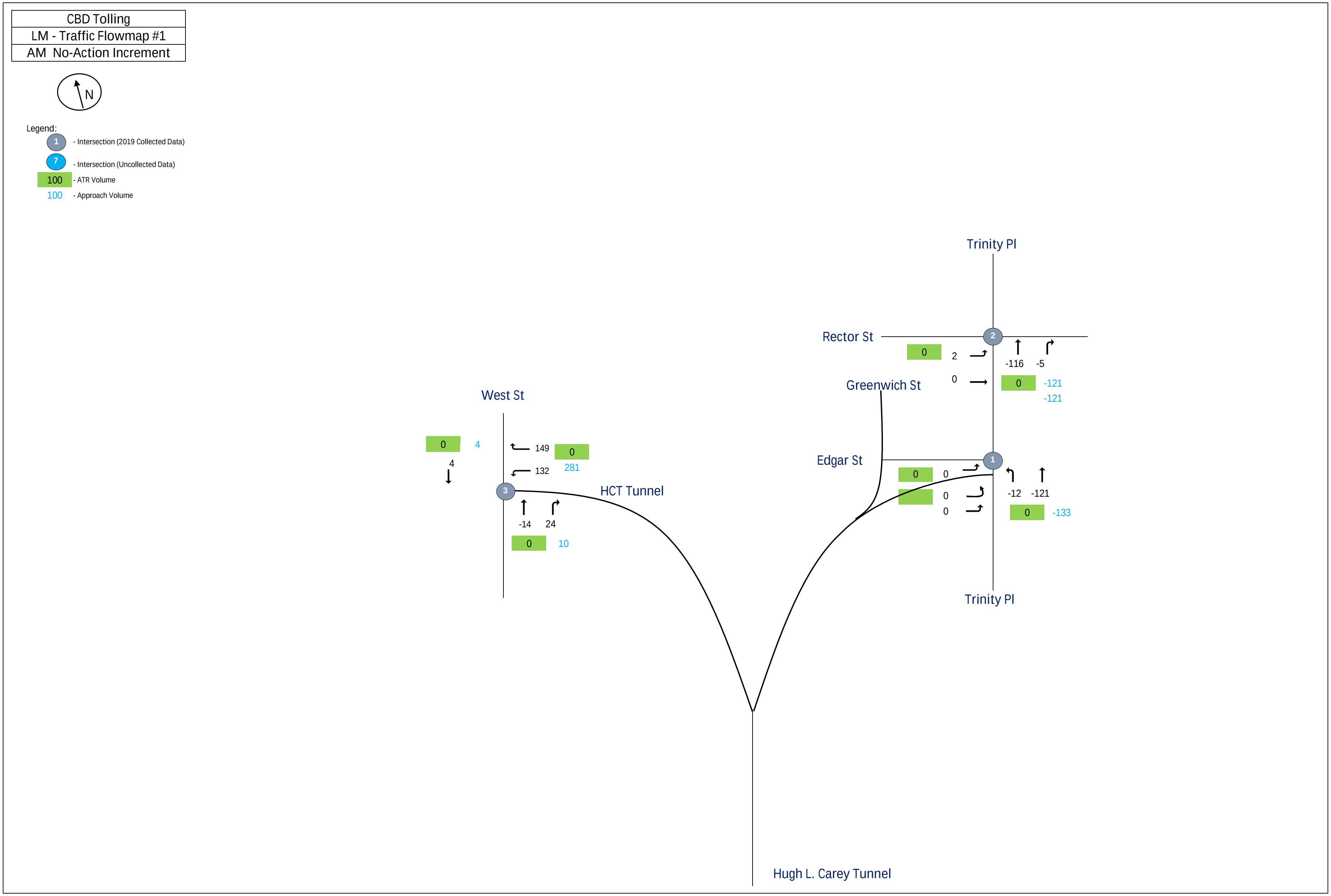


CBD Tolling
LIC - Traffic Flowmap #5
PM Action Increment



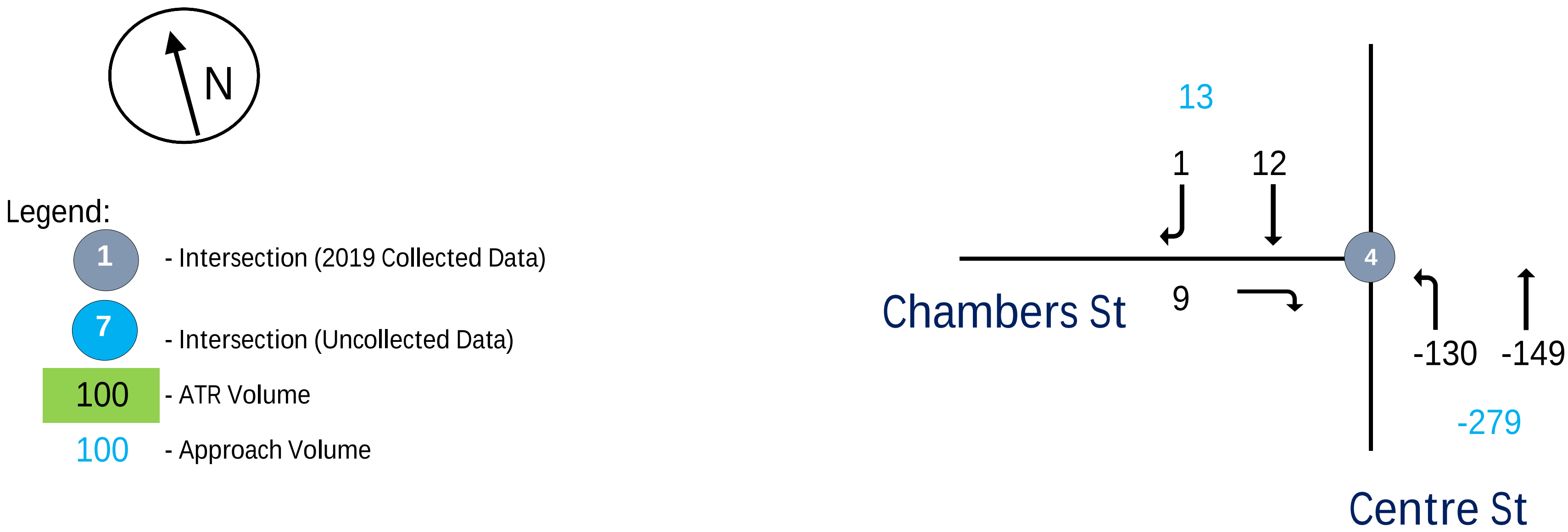
CBD Tolling
LIC - Traffic Flowmap #6
PM Action Increment



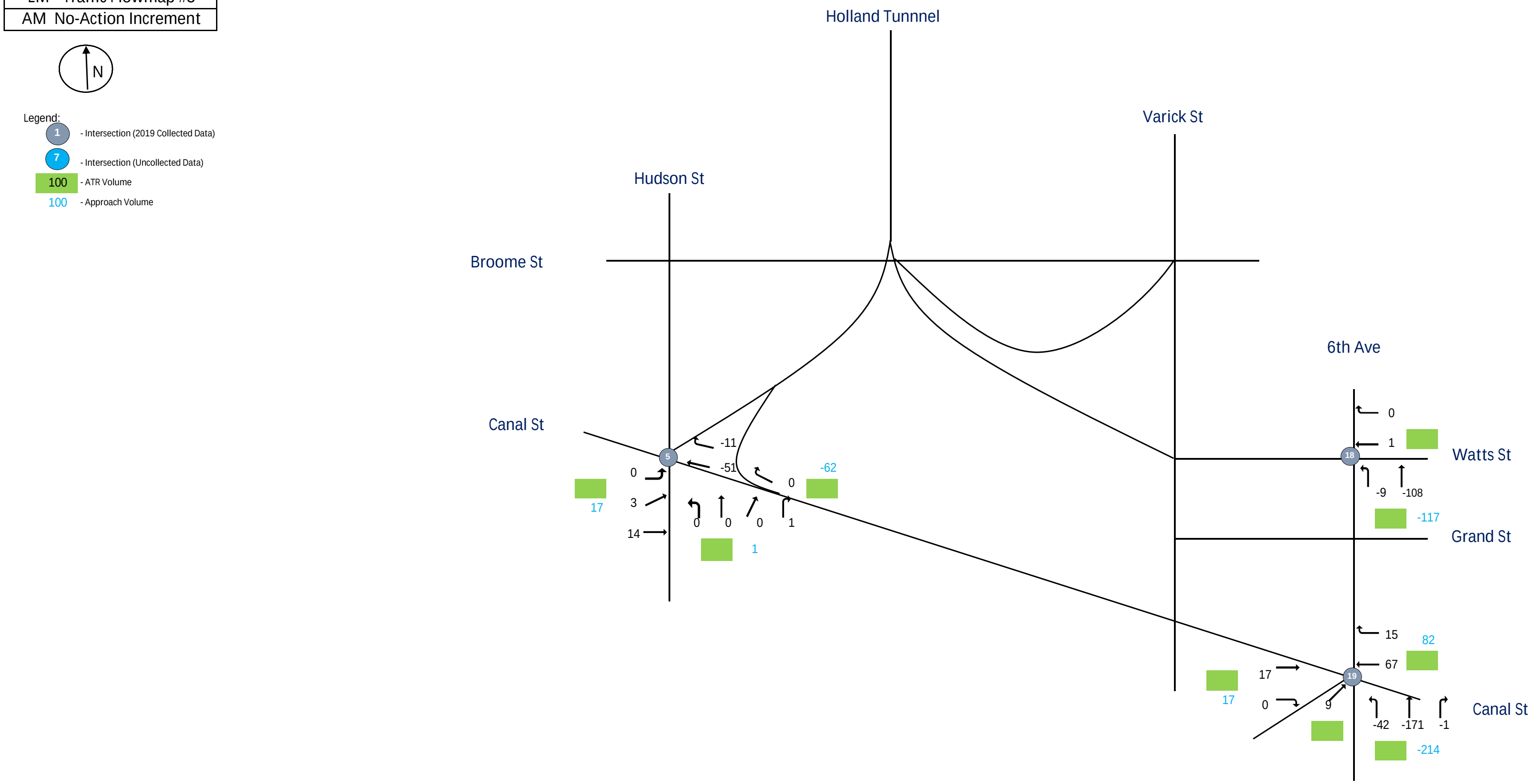


CBD Tolling
LM - Traffic Flowmap #1
AM No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Trinity Pl
Rector St
2
0
2
-116
-5
0
0
-121
-121
Greenwich St
West St
0
4
149
0
4
132
281
3
HCT Tunnel
-14
24
0
10
Edgar St
1
0
0
-12
-121
0
0
0
-133
Trinity Pl
Hugh L. Carey Tunnel

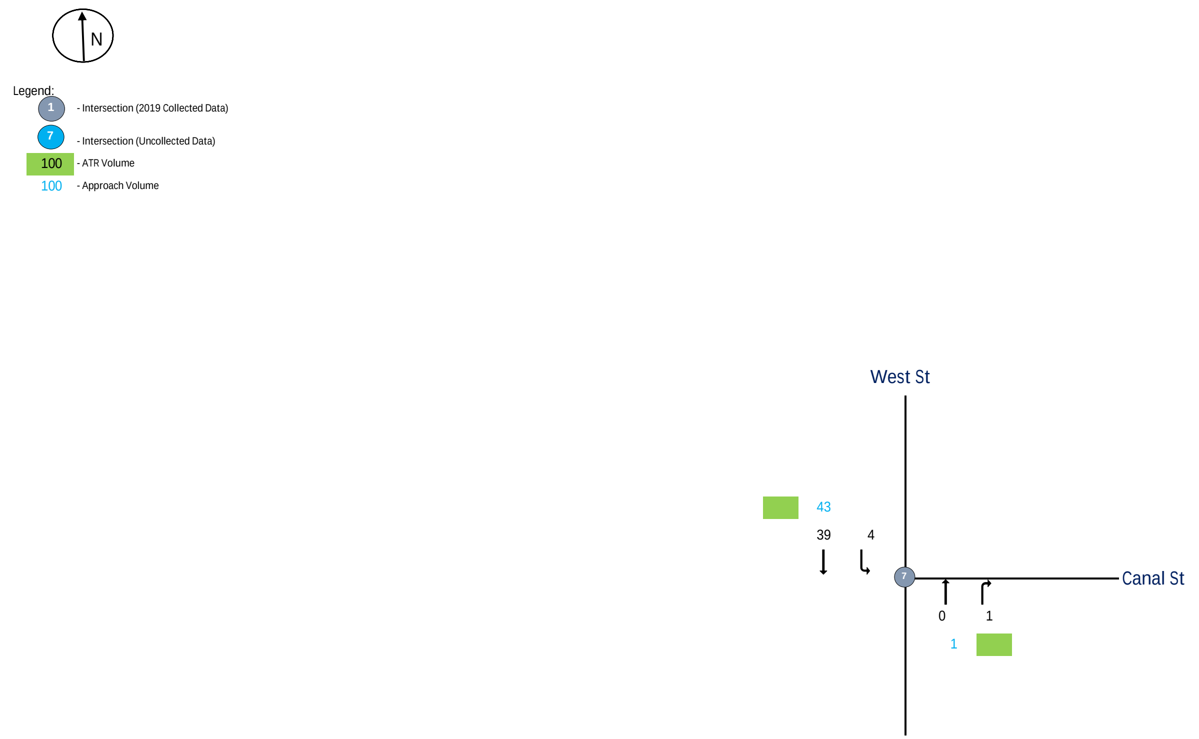
CBD Tolling
LM - Traffic Flowmap #2
AM No-Action Increment



CBD Tolling
LM - Traffic Flowmap #3
AM No-Action Increment



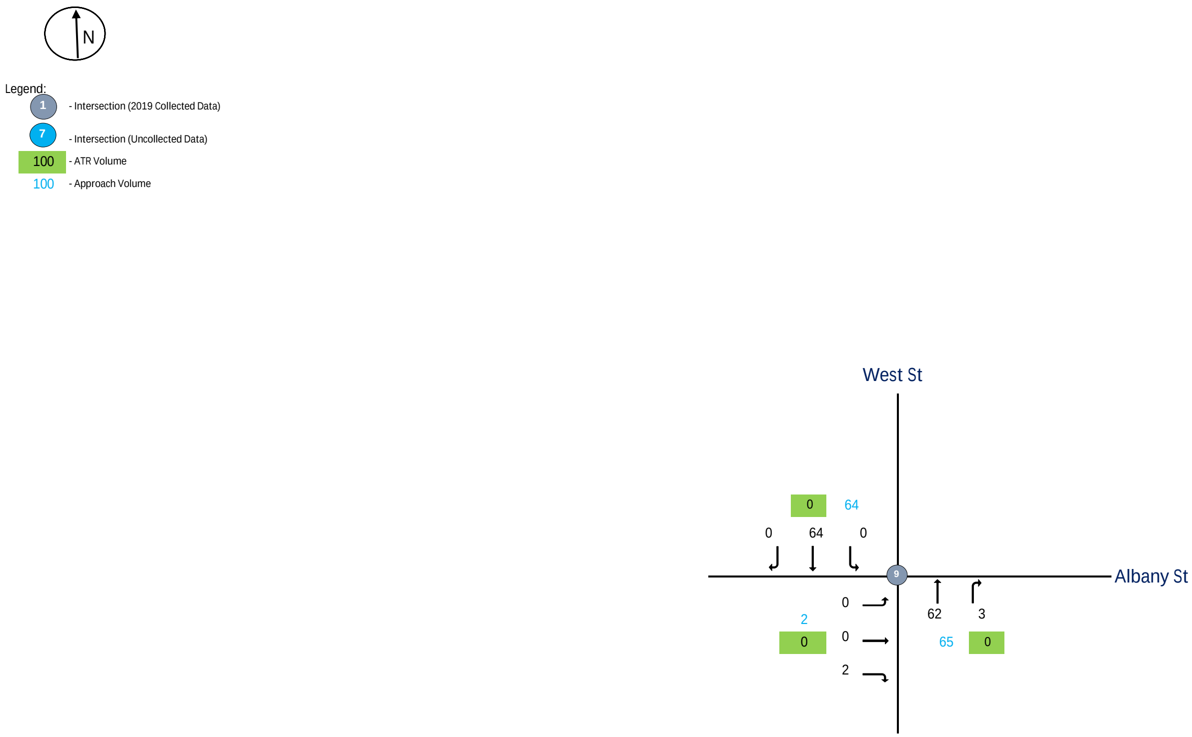
CBD Tolling
LM - Traffic Flowmap #4
AM No-Action Increment



CBD Tolling

LM - Traffic Flowmap #5

AM No-Action Increment



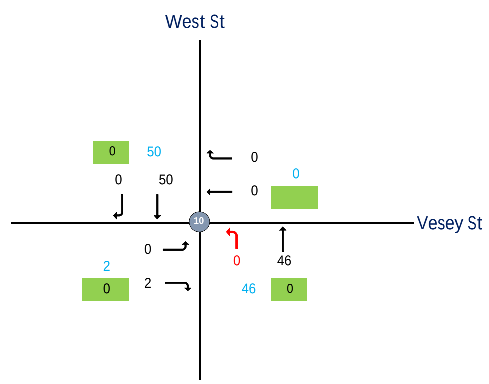
CBD Tolling

LM - Traffic Flowmap #6

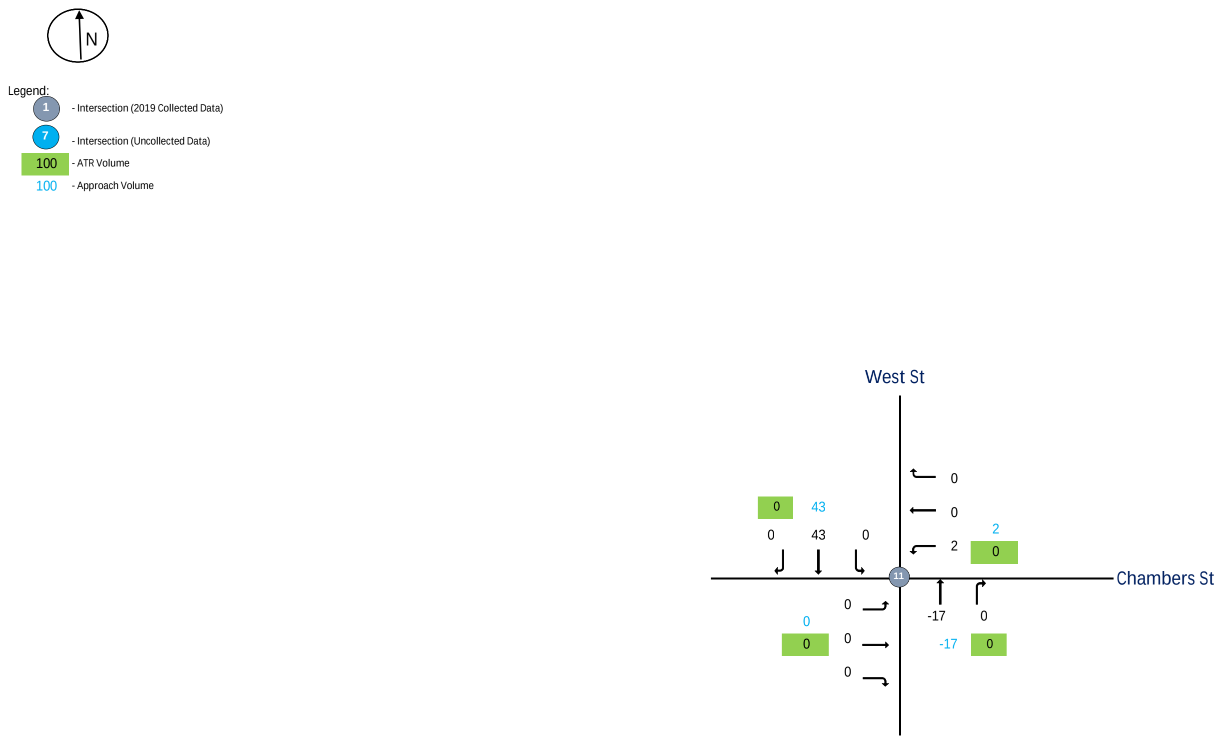
AM No-Action Increment

Legend:

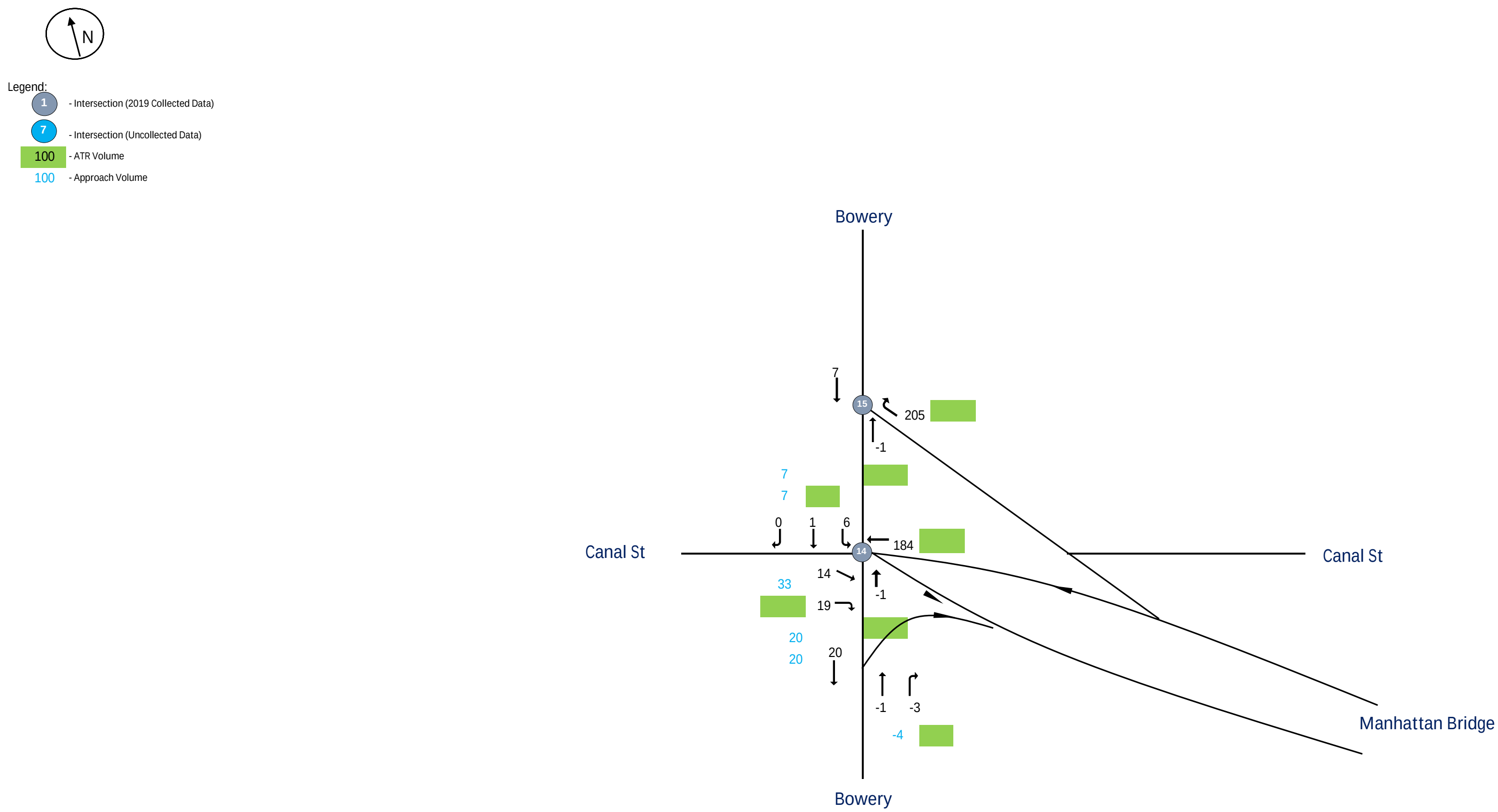
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
- ATR Volume
- Approach Volume
- Illegal movement



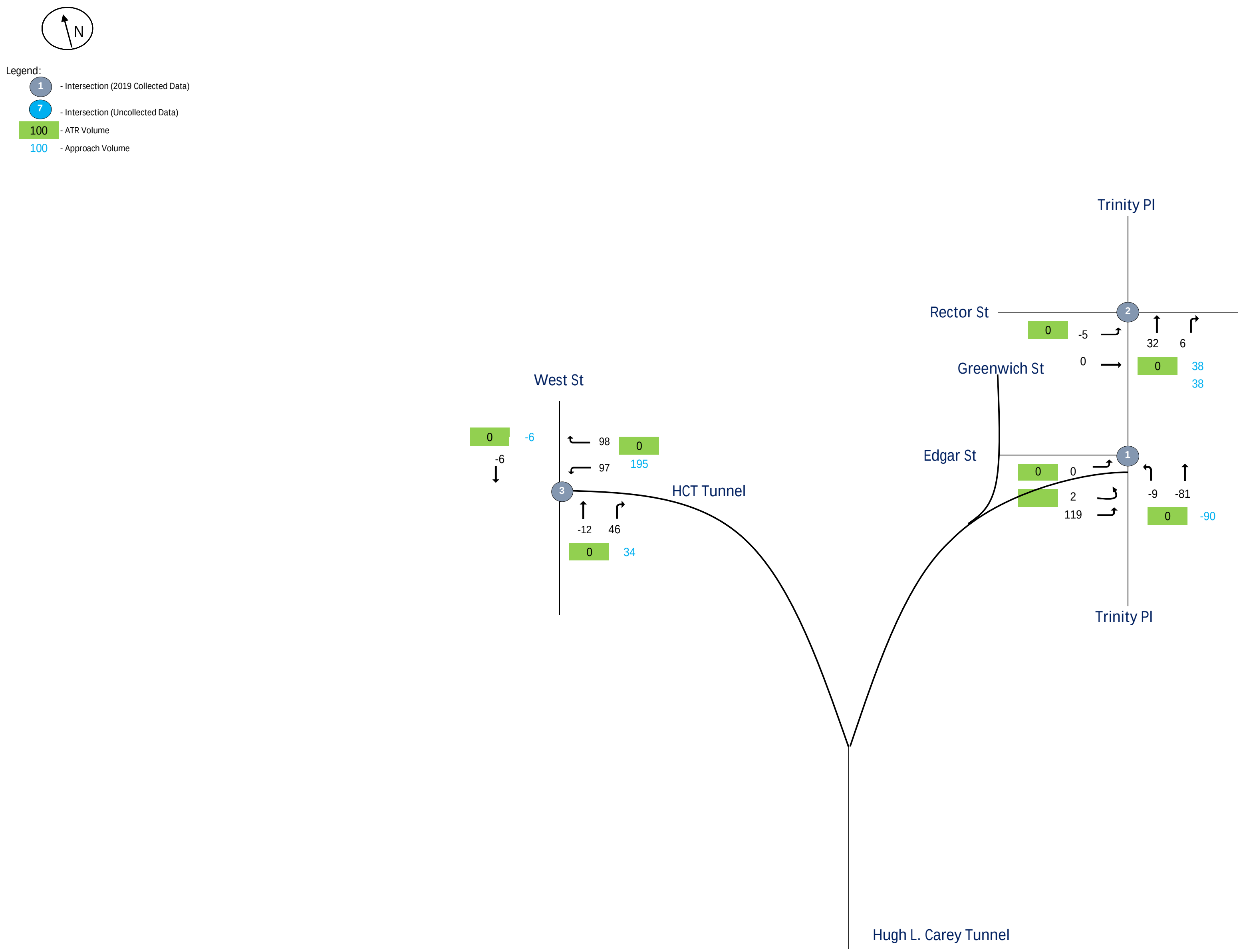
CBD Tolling
LM - Traffic Flowmap #7
AM No-Action Increment



CBD Tolling
LM - Traffic Flowmap #8
AM No-Action Increment



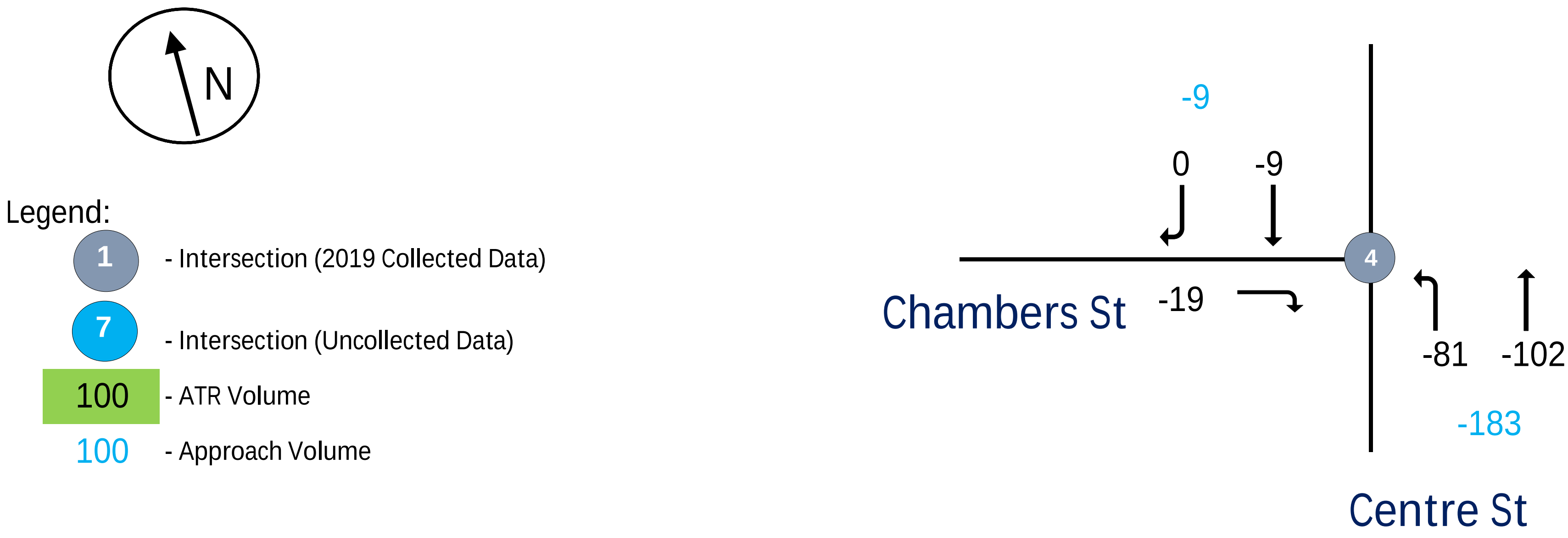
CBD Tolling
LM - Traffic Flowmap #1
MD No-Action Increment



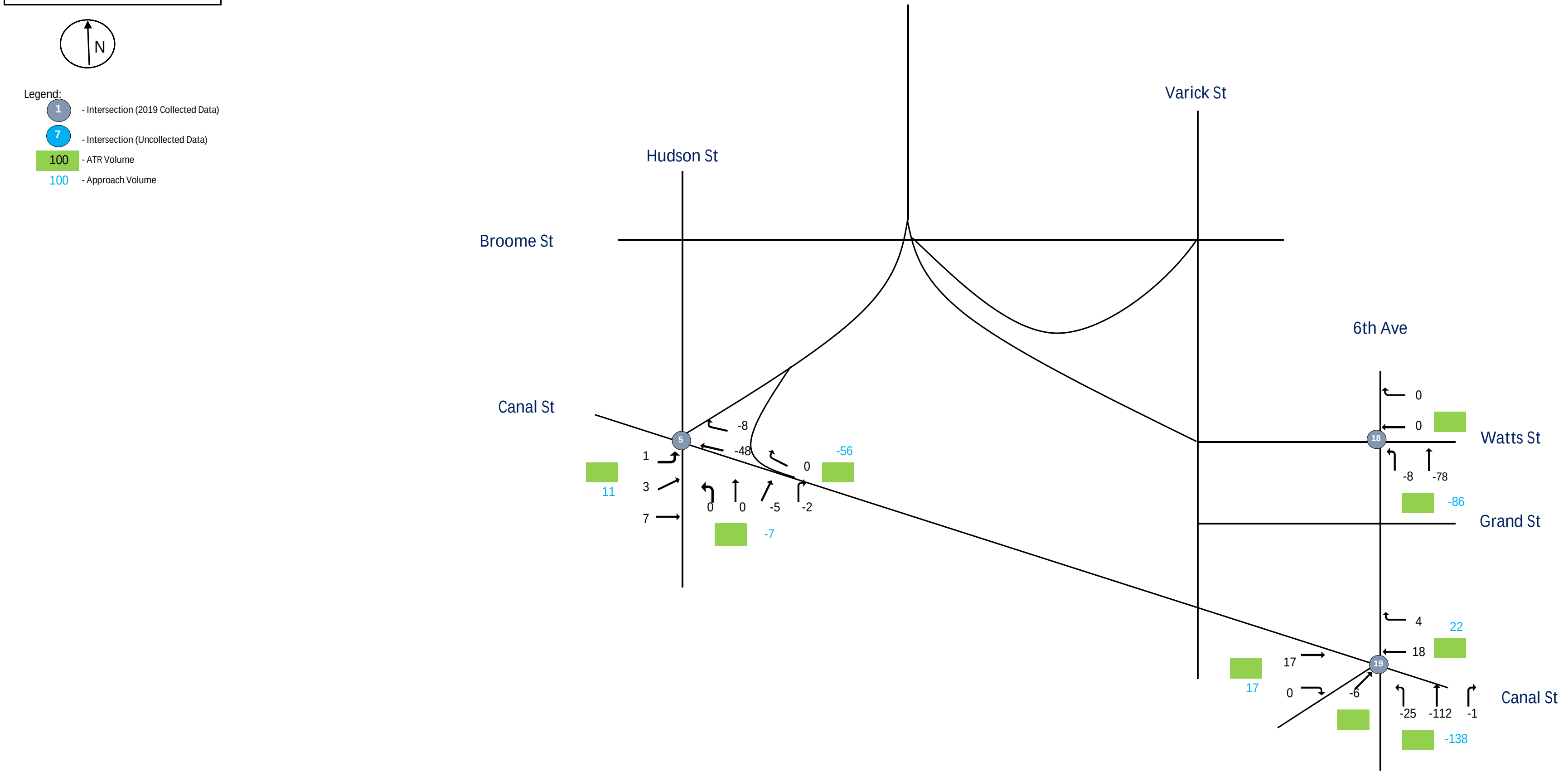
CBD Tolling

LM - Traffic Flowmap #2

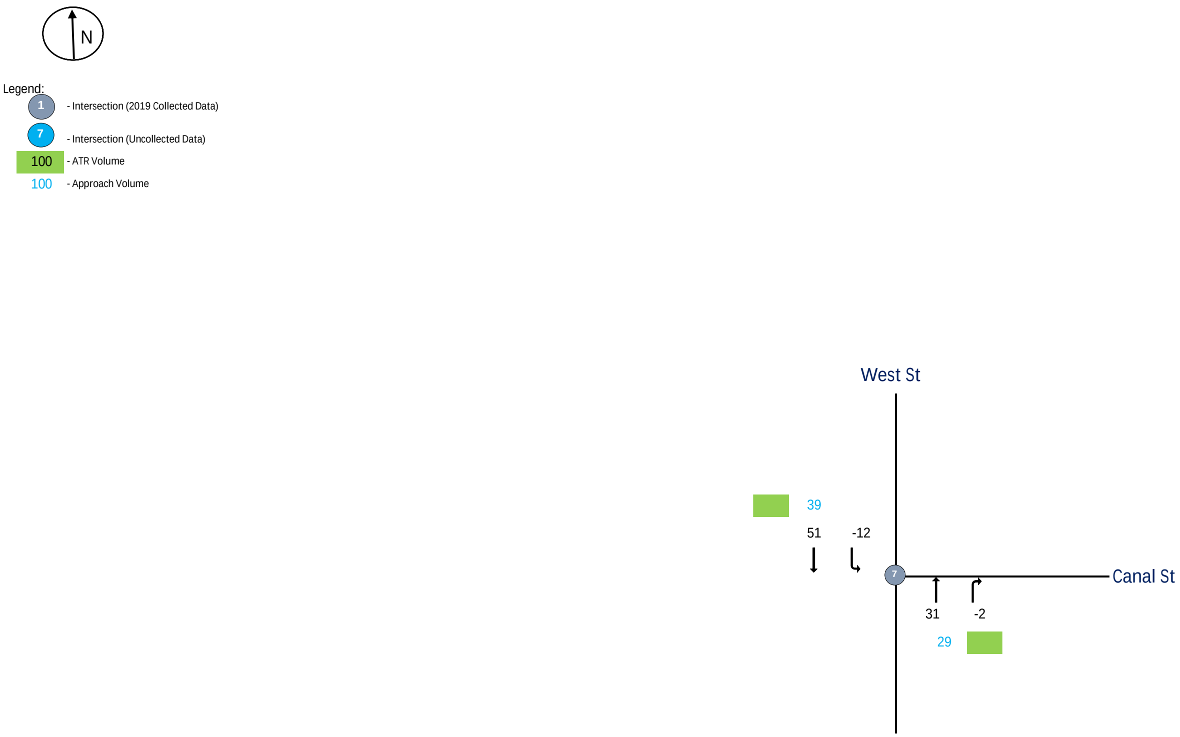
MD No-Action Increment



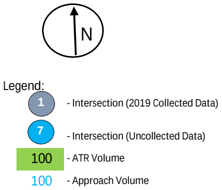
CBD Tolling
LM - Traffic Flowmap #3
MD No-Action Increment

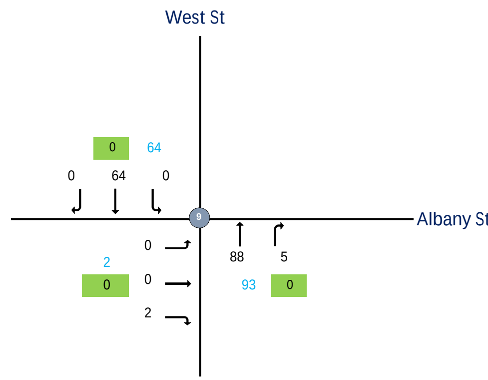


CBD Tolling
LM - Traffic Flowmap #4
MD No-Action Increment

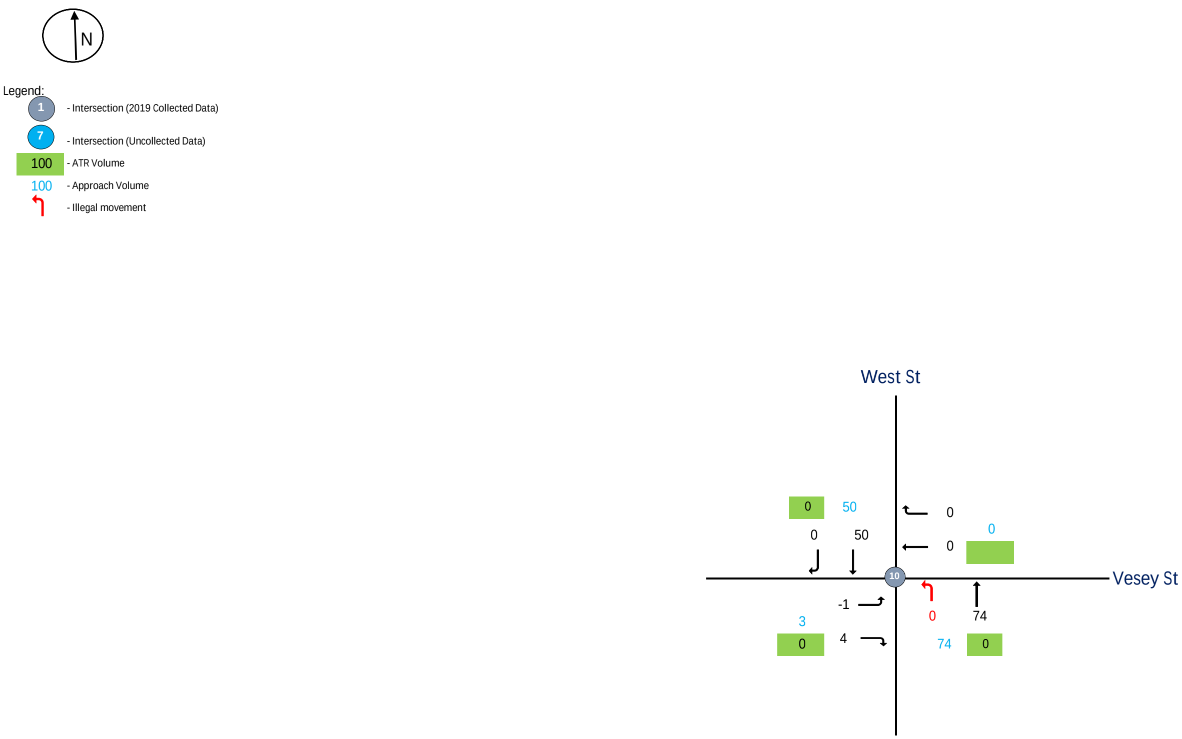


CBD Tolling
LM - Traffic Flowmap #5
MD No-Action Increment

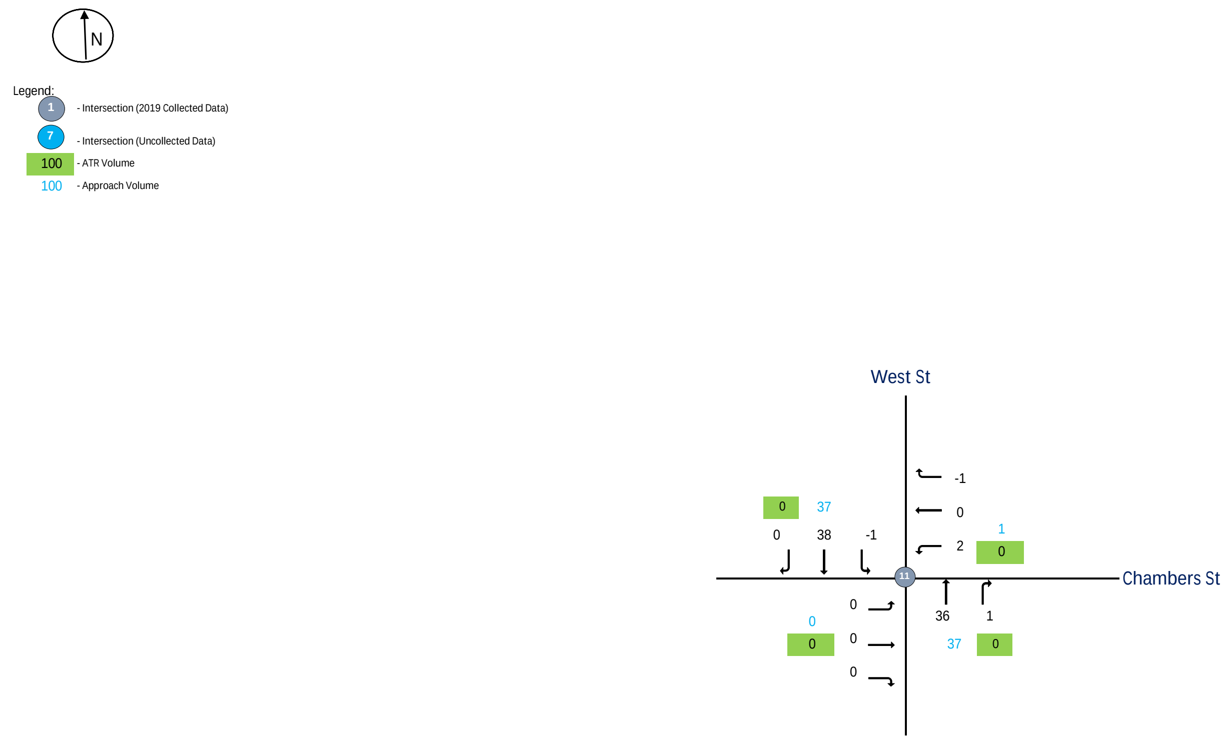




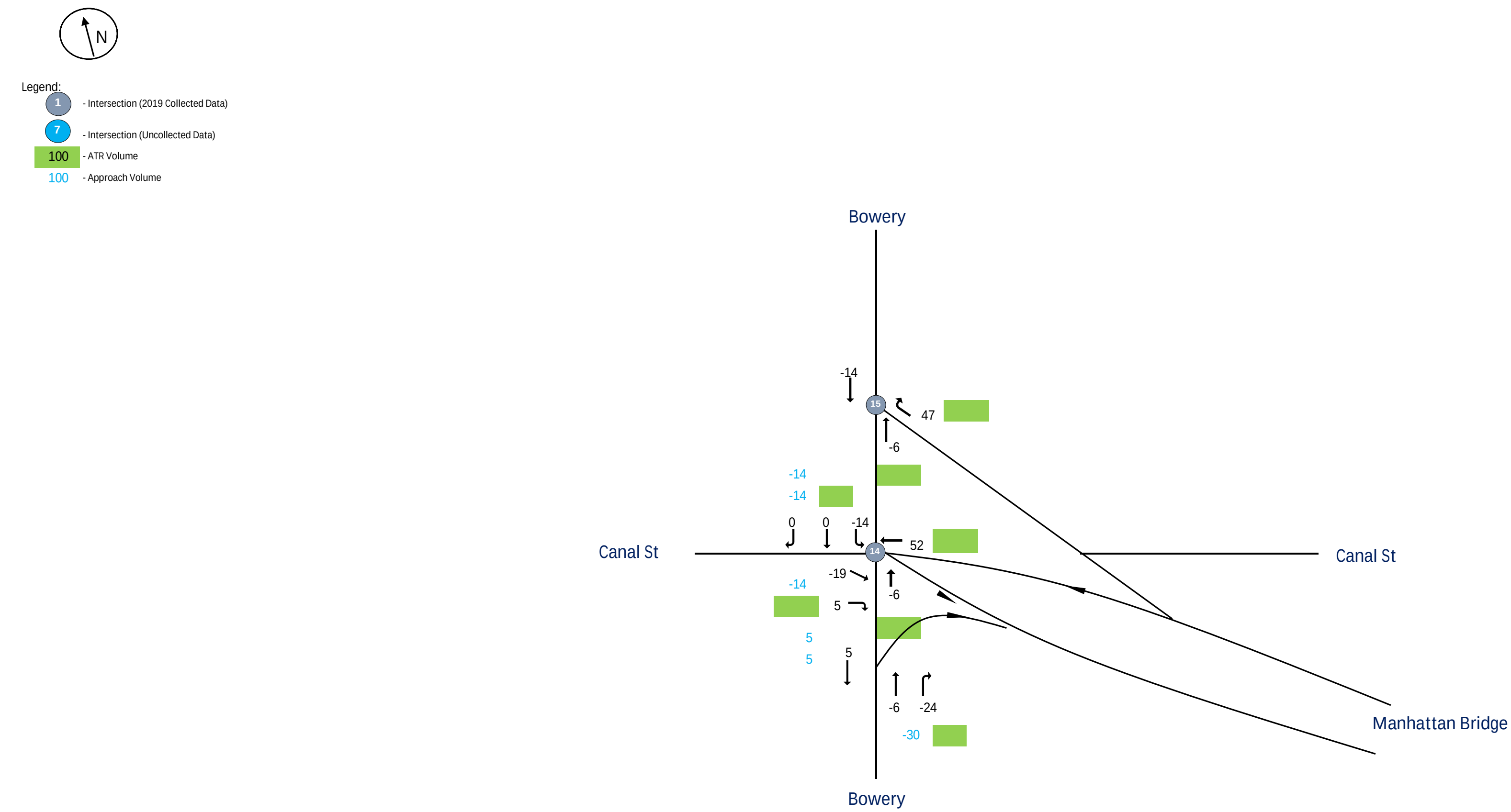
CBD Tolling
LM - Traffic Flowmap #6
MD No-Action Increment



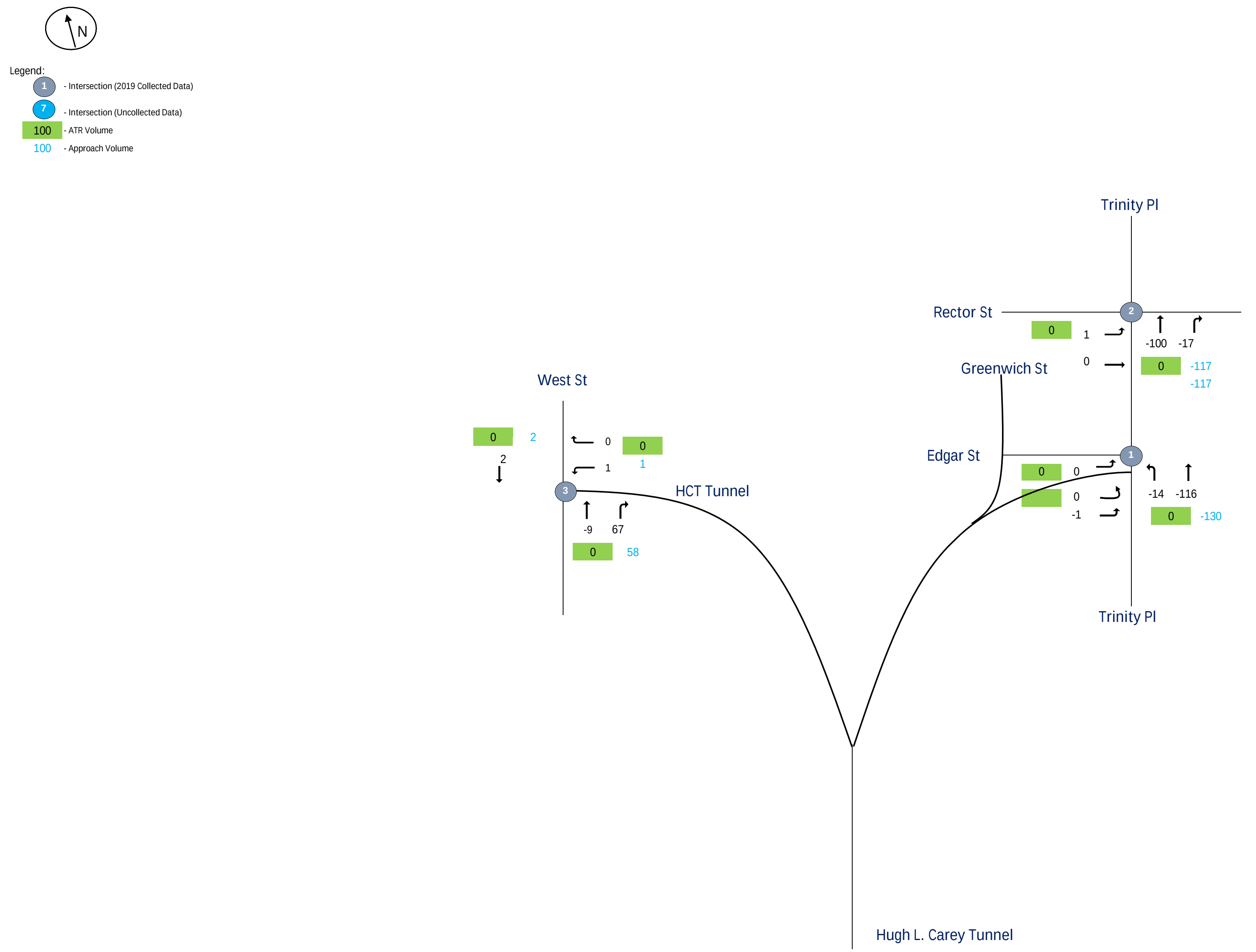
CBD Tolling
LM - Traffic Flowmap #7
MD No-Action Increment



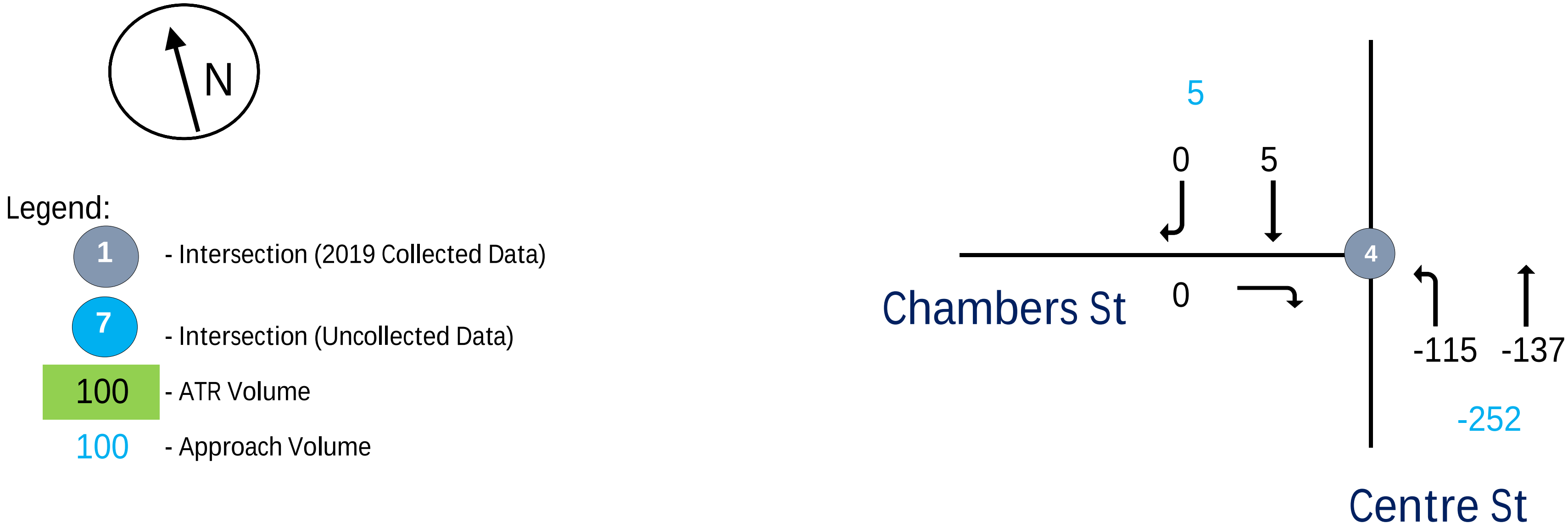
CBD Tolling
LM - Traffic Flowmap #8
MD No-Action Increment

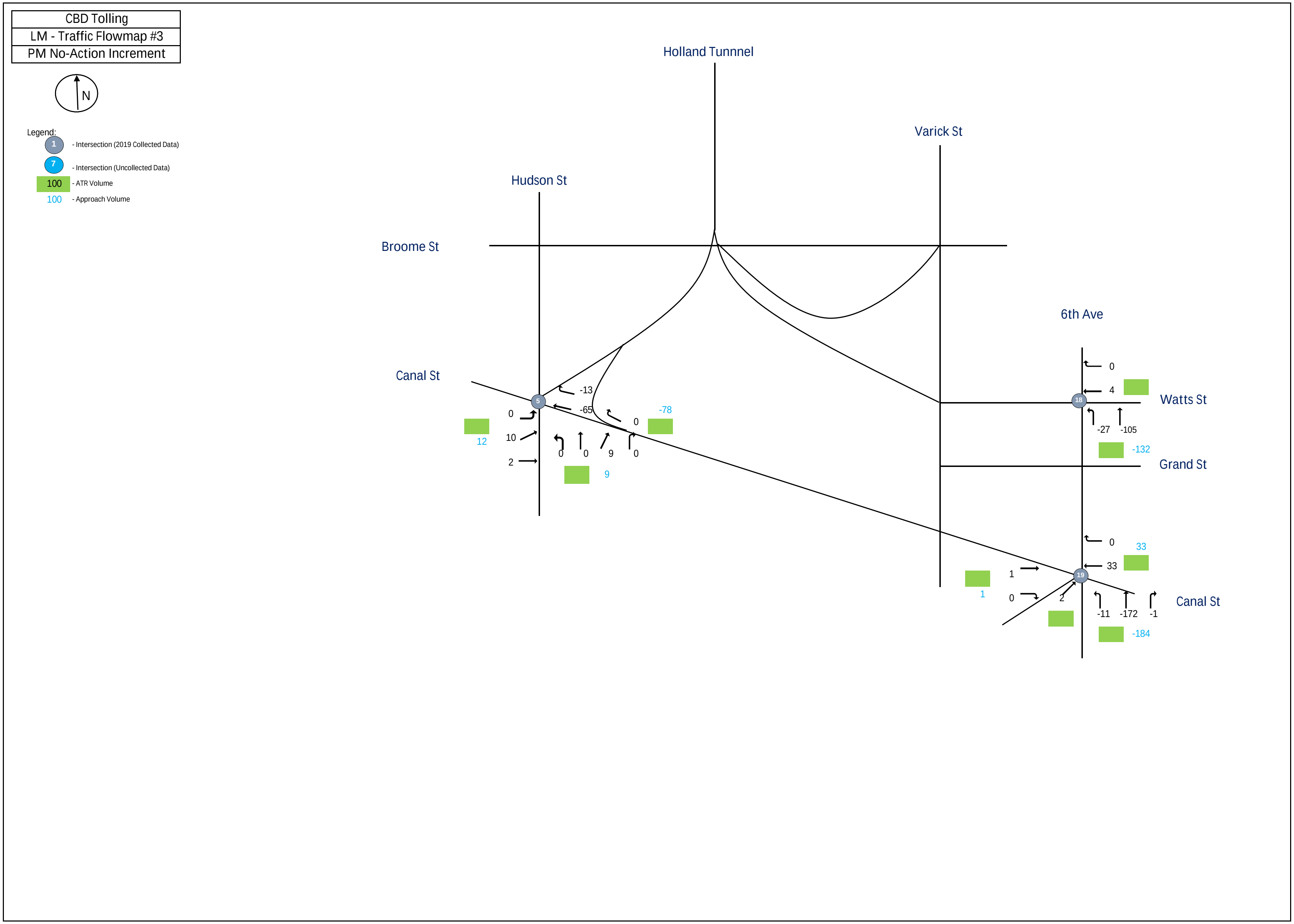


CBD Tolling
LM - Traffic Flowmap #1
PM No-Action Increment



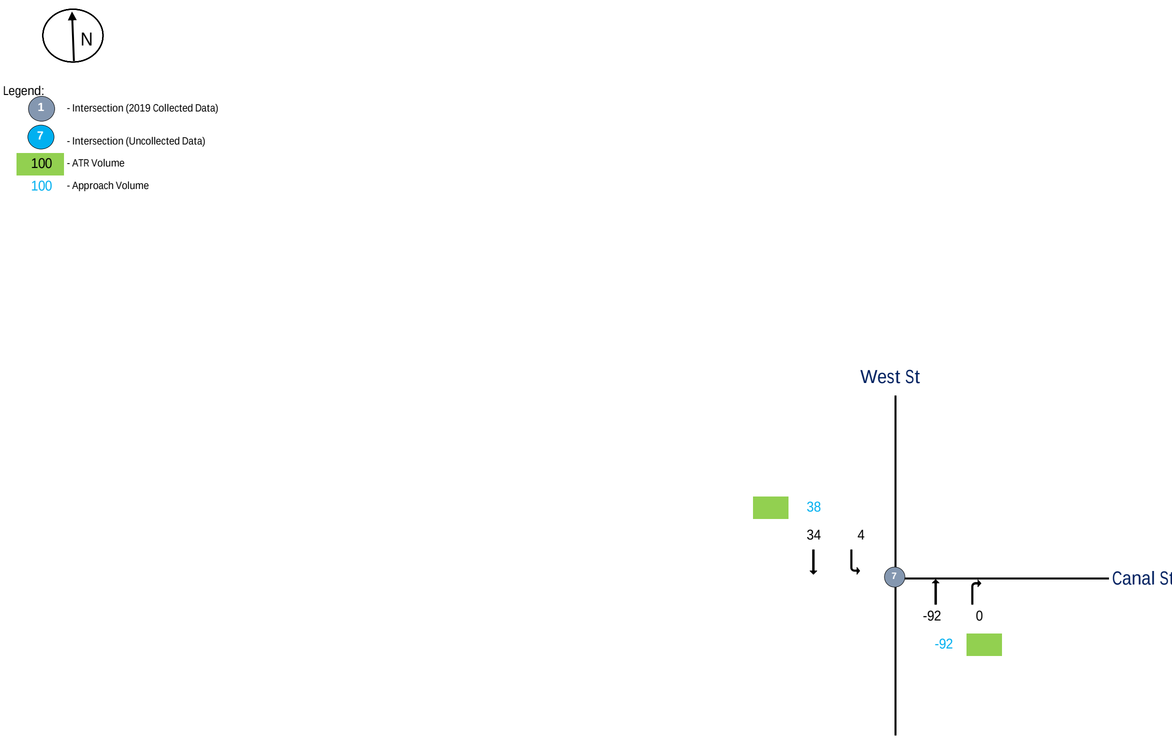
CBD Tolling
LM - Traffic Flowmap #2
PM No-Action Increment



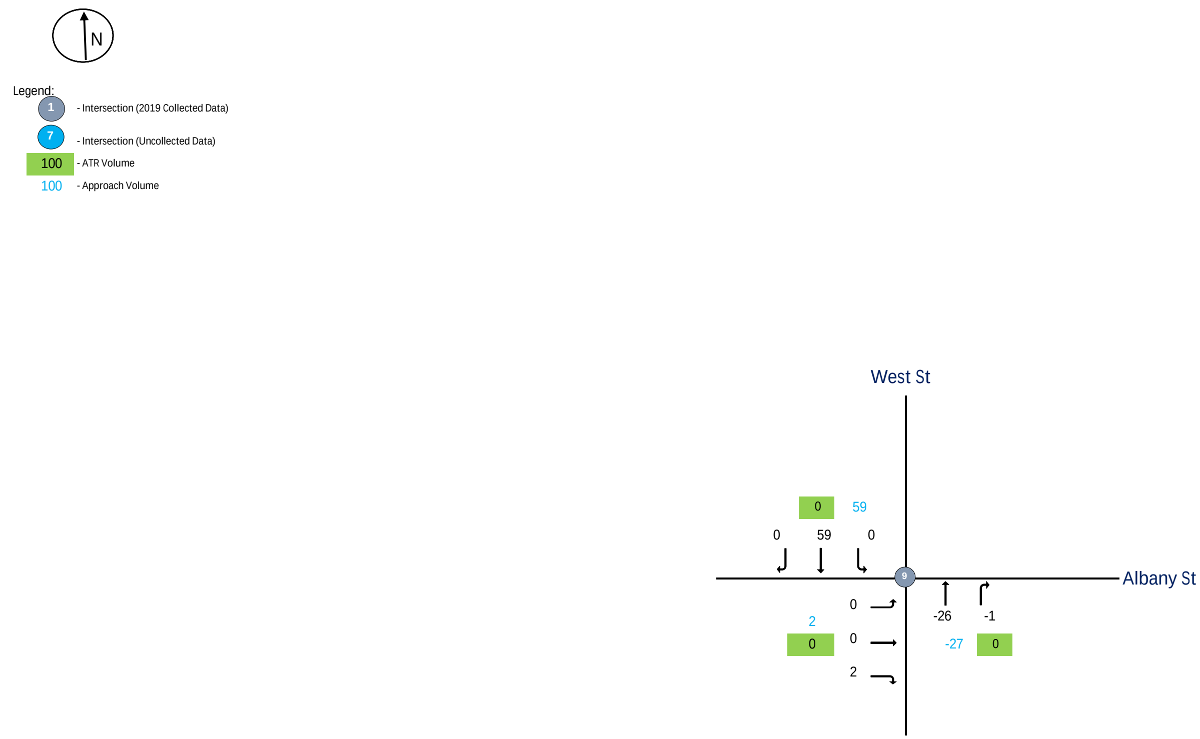


CBD Tolling
LM - Traffic Flowmap #3
PM No-Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Holland Tunnel
Varick St
Hudson St
Broome St
6th Ave
Canal St
Watts St
Grand St
Canal St
-13
-65
-78
0
0
12
10
2
0
0
9
0
9
0
4
-27
-105
-132
0
33
33
1
1
0
2
-11
-172
-1
-184

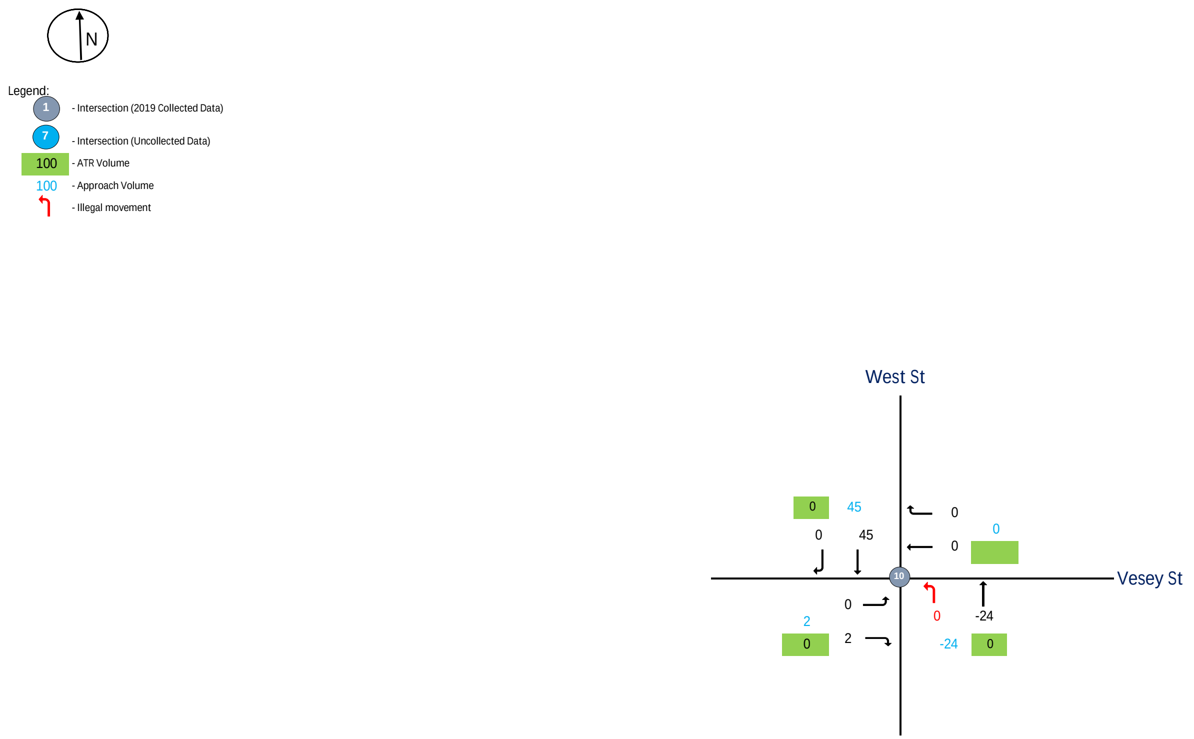
CBD Tolling
LM - Traffic Flowmap #4
PM No-Action Increment



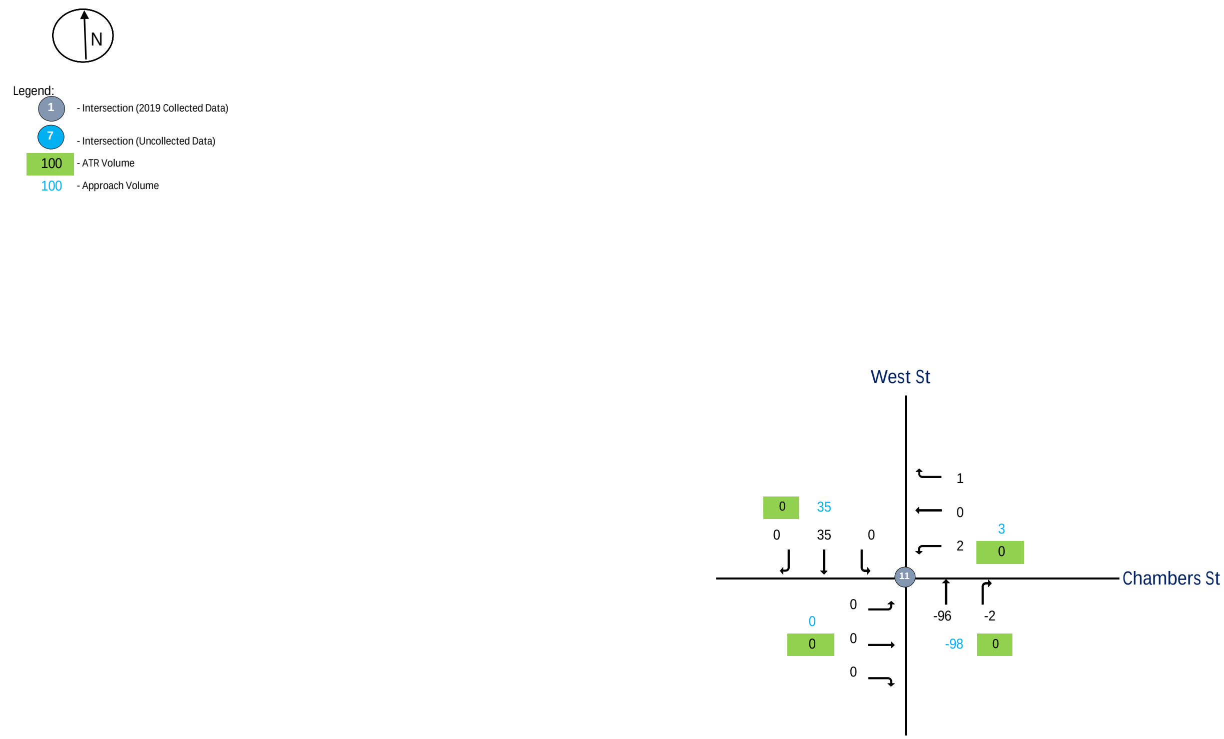
CBD Tolling
LM - Traffic Flowmap #5
PM No-Action Increment



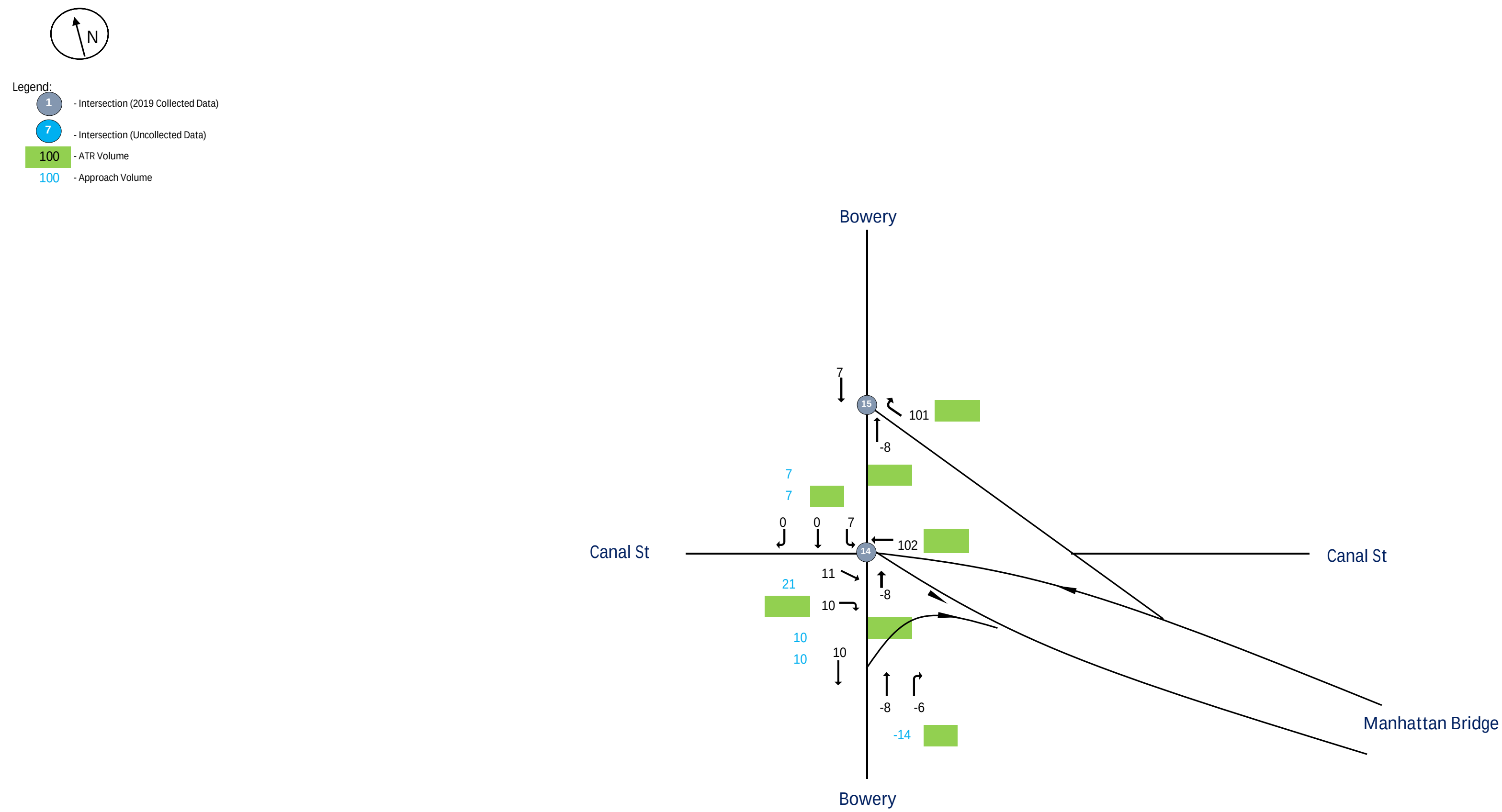
CBD Tolling
LM - Traffic Flowmap #6
PM No-Action Increment

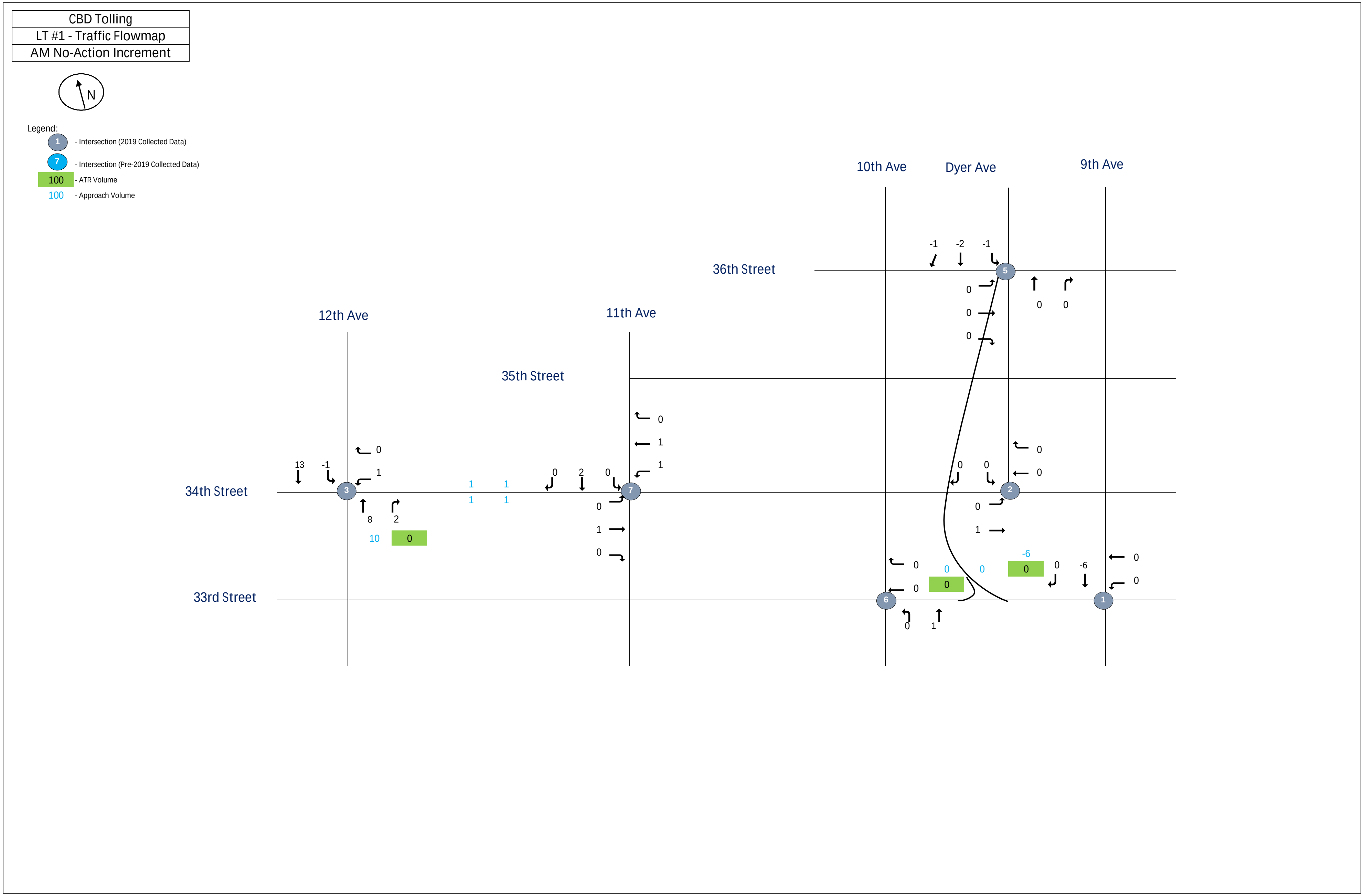


CBD Tolling
LM - Traffic Flowmap #7
PM No-Action Increment



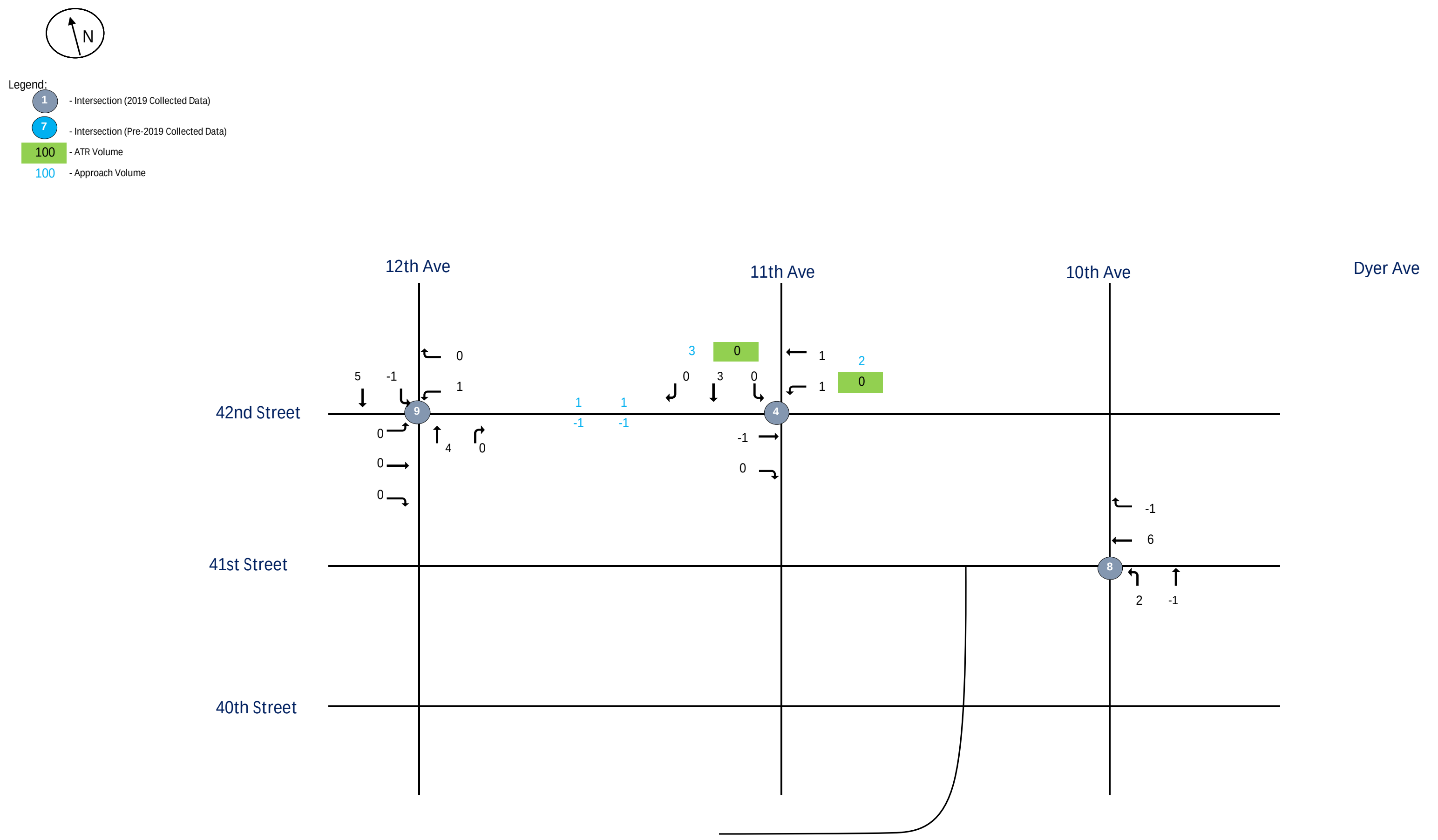
CBD Tolling
LM - Traffic Flowmap #8
PM No-Action Increment

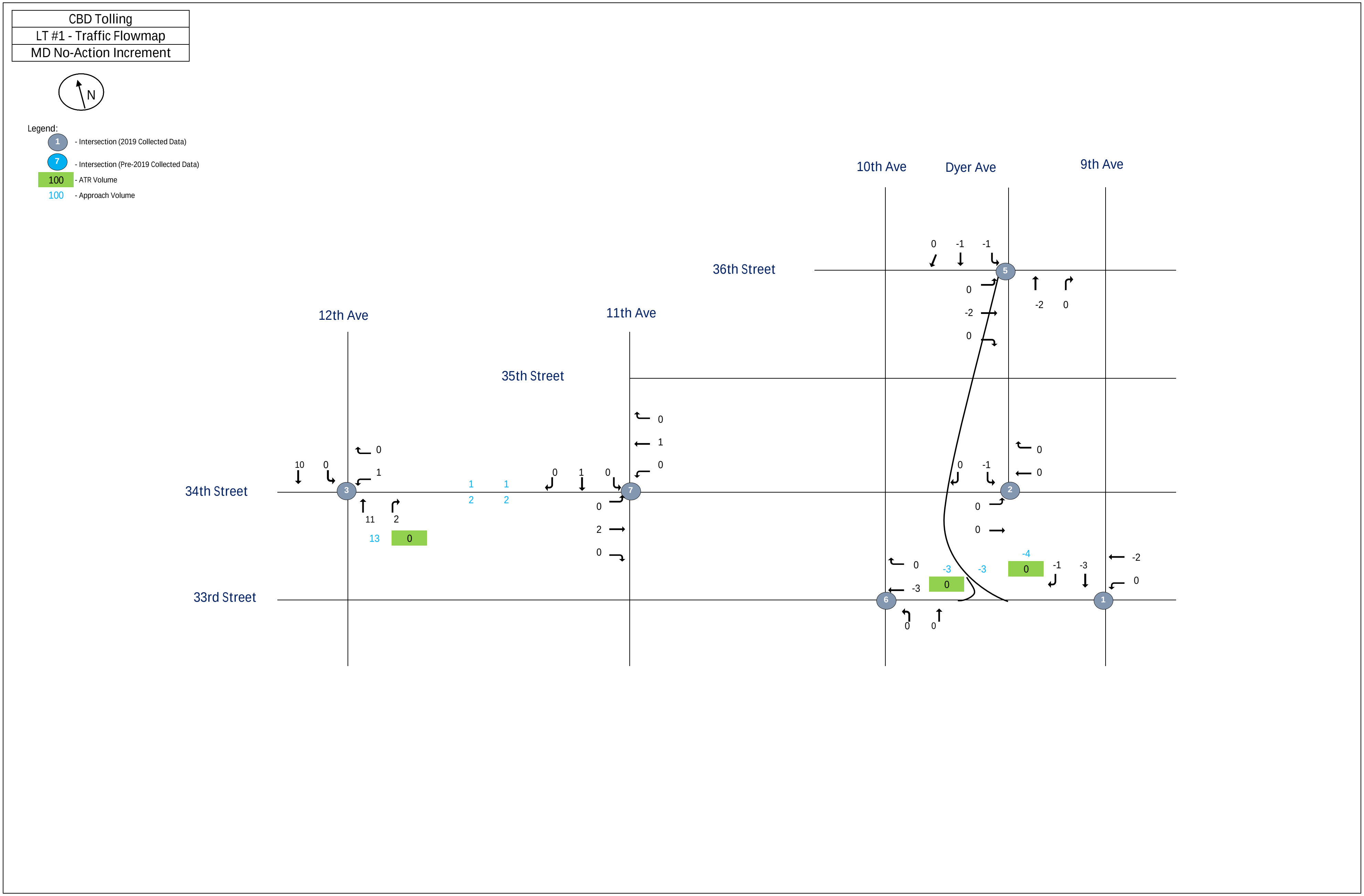




CBD Tolling
LT #1 - Traffic Flowmap
AM No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
36th Street
12th Ave
11th Ave
35th Street
34th Street
33rd Street
-1
-2
-1
0
0
0
0
0
13
-1
0
1
8
2
10
0
1
1
1
1
0
2
0
0
1
1
0
1
0
0
0
0
0
0
1
-6
0
0
-6
0
0
0
0
0
0
0
1

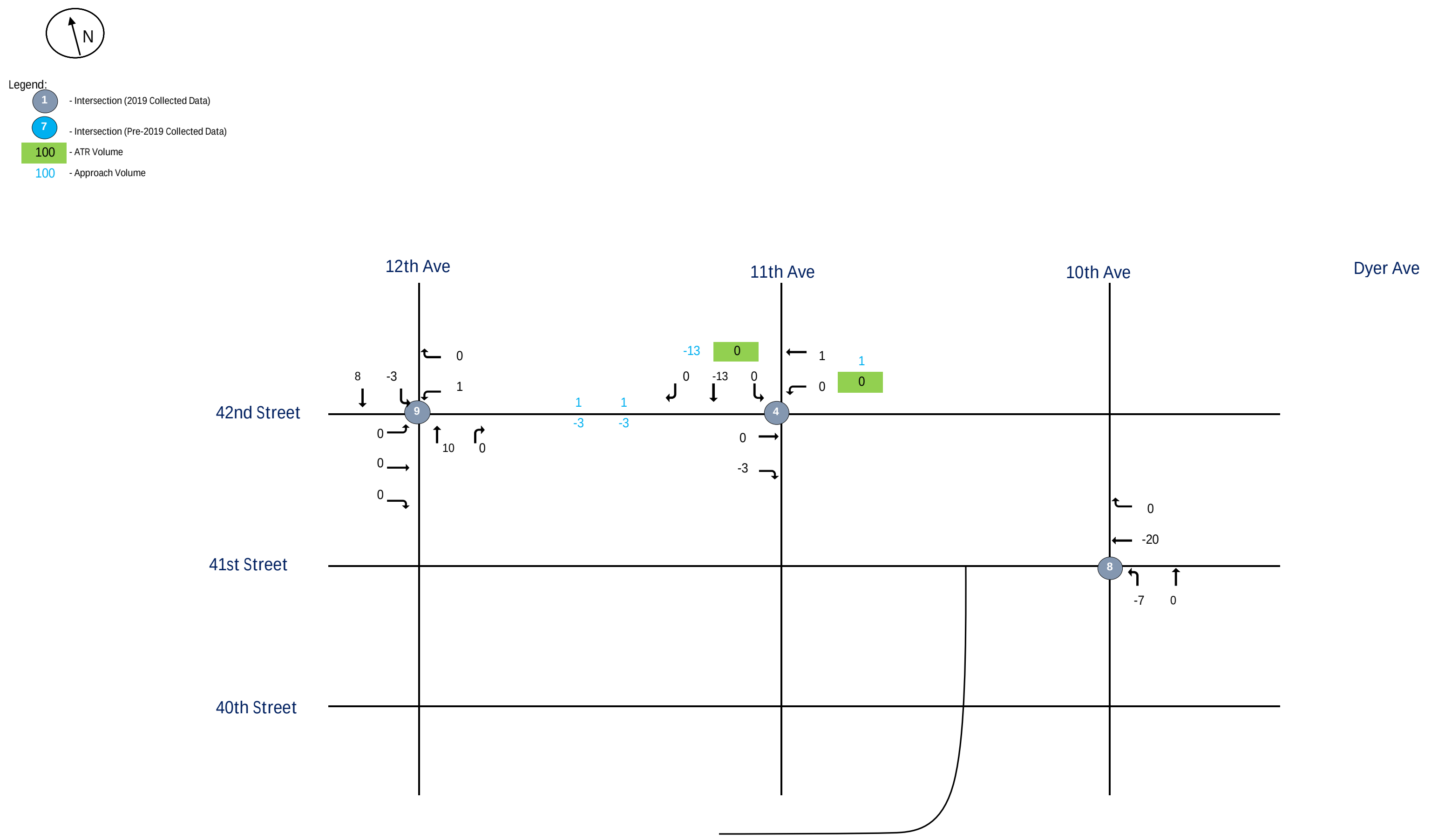
CBD Tolling
LT #2 - Traffic Flowmap
AM No-Action Increment



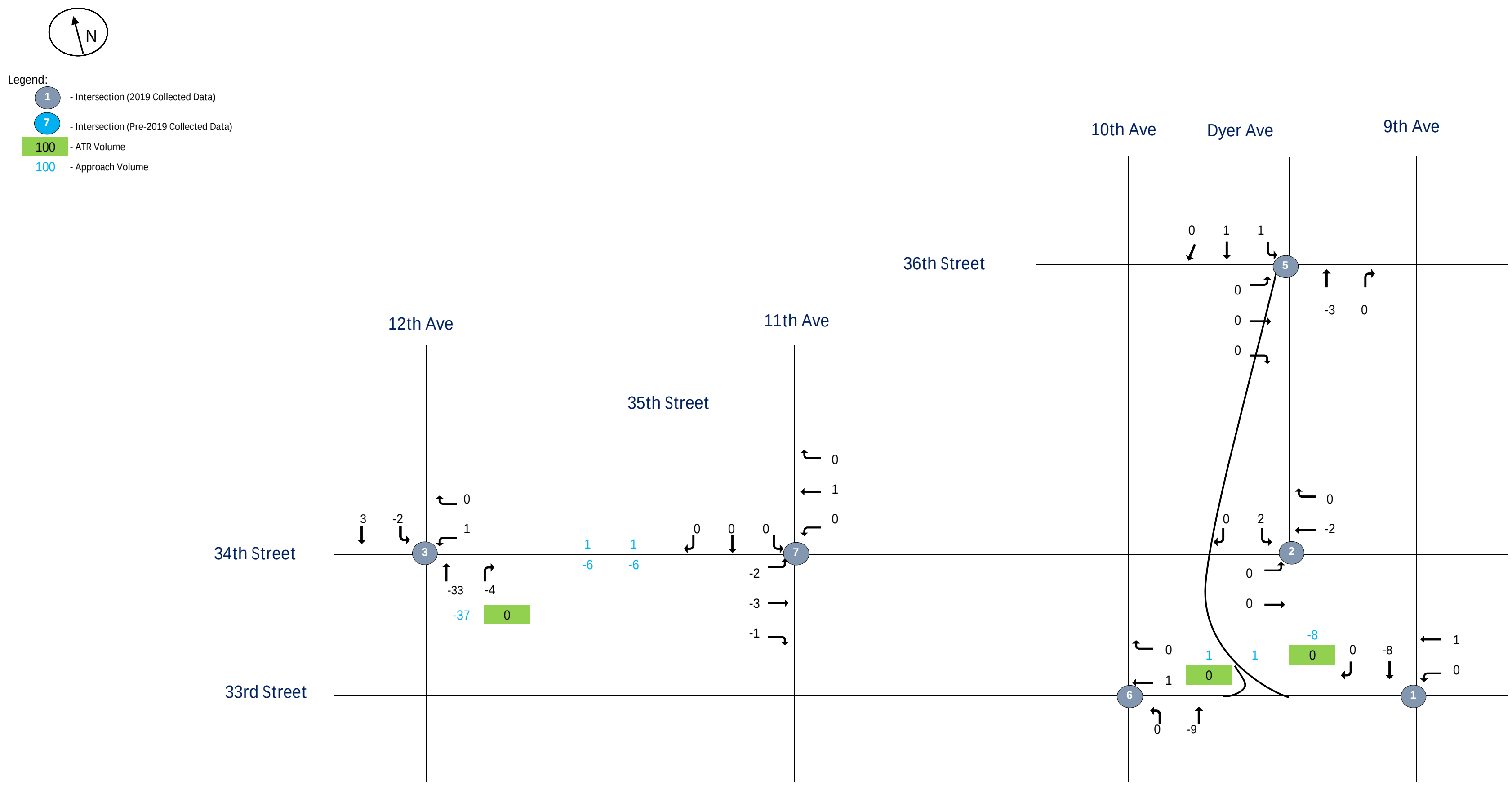


CBD Tolling
LT #1 - Traffic Flowmap
MD No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
36th Street
12th Ave
11th Ave
35th Street
34th Street
33rd Street

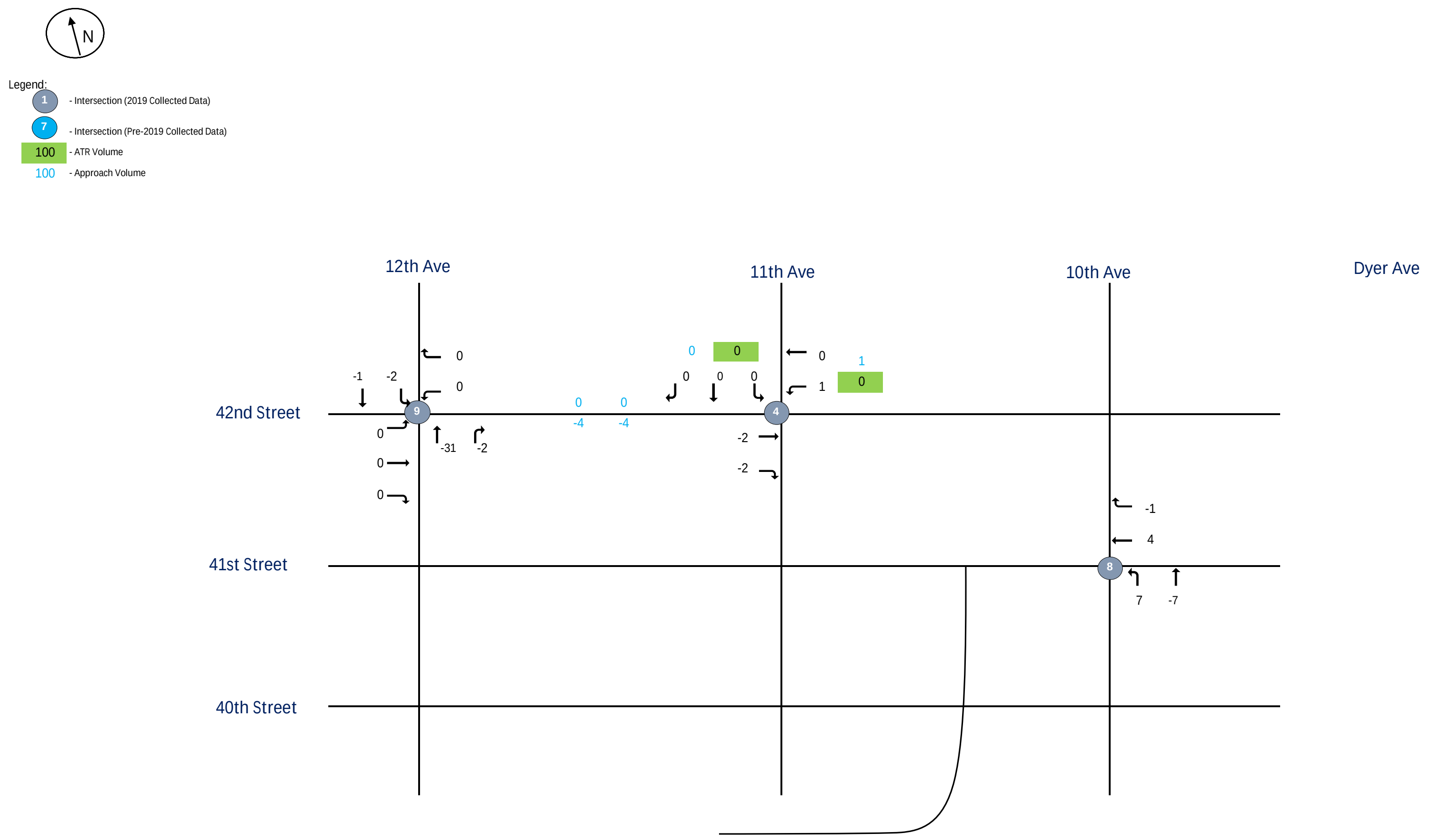
CBD Tolling
LT #2 - Traffic Flowmap
MD No-Action Increment



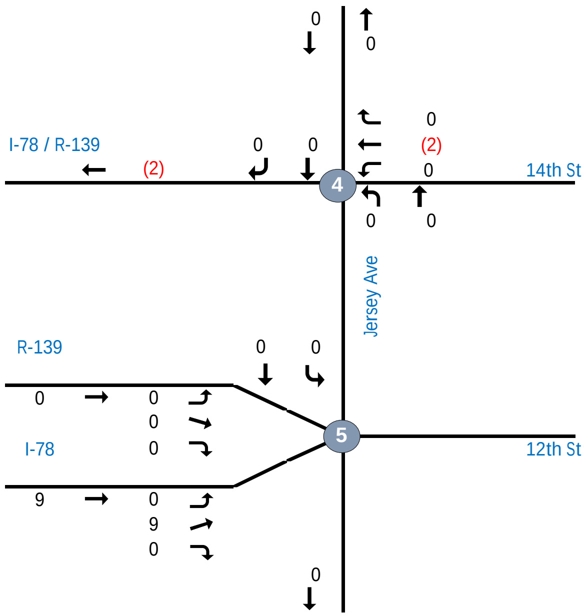
CBD Tolling
LT #1 - Traffic Flowmap
PM No-Action Increment

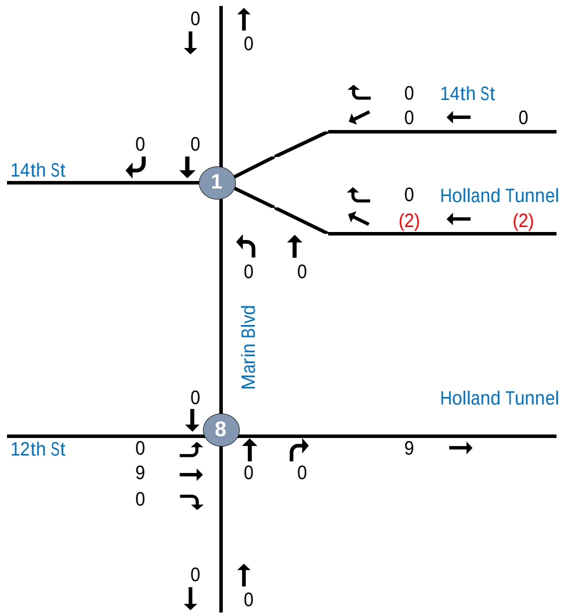


CBD Tolling
LT #2 - Traffic Flowmap
PM No-Action Increment



New Jersey
2021 No-Action Increment
AM Peak Hour

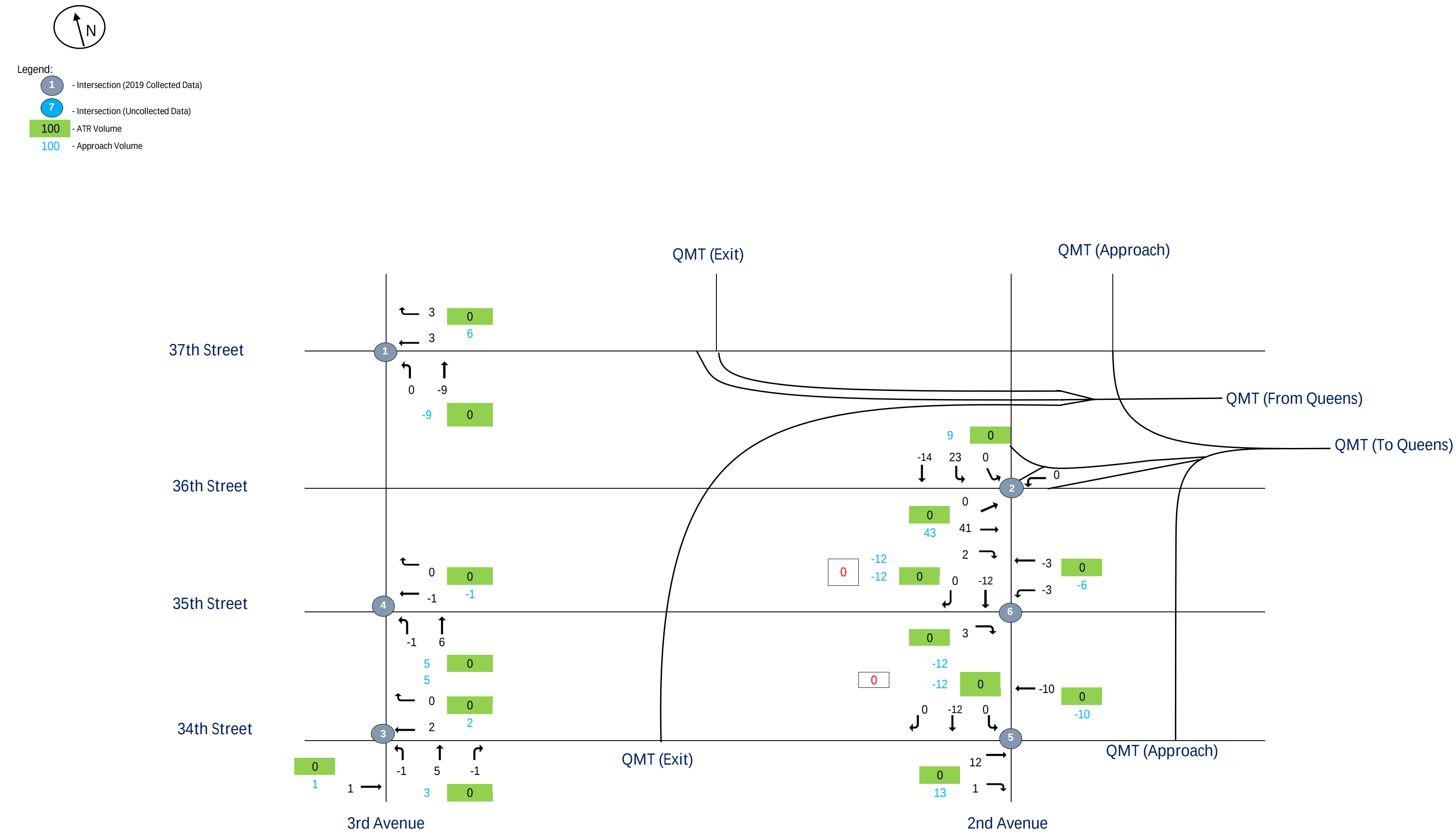




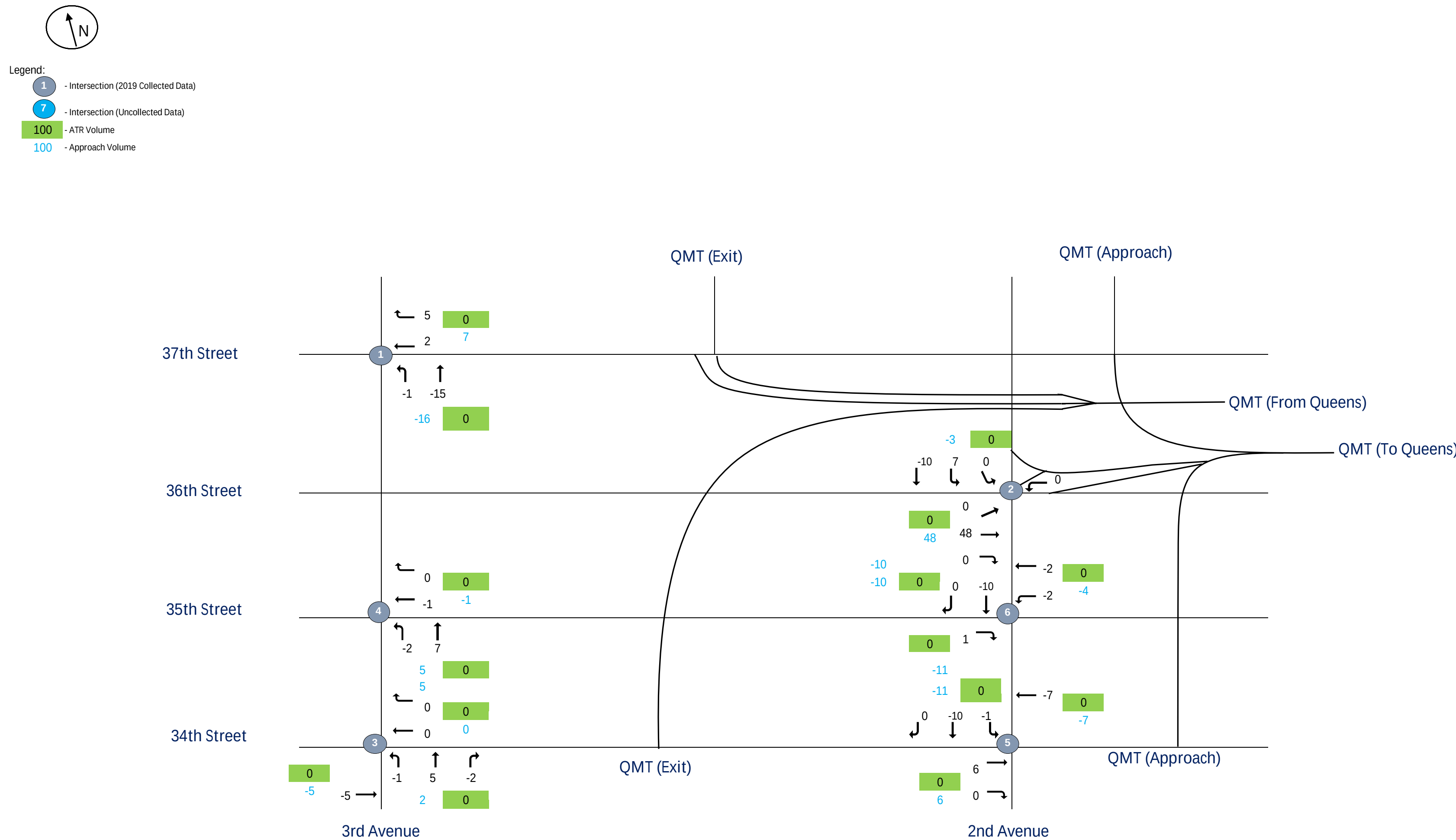
New Jersey
2021 No-Action Increment
MD Peak Hour

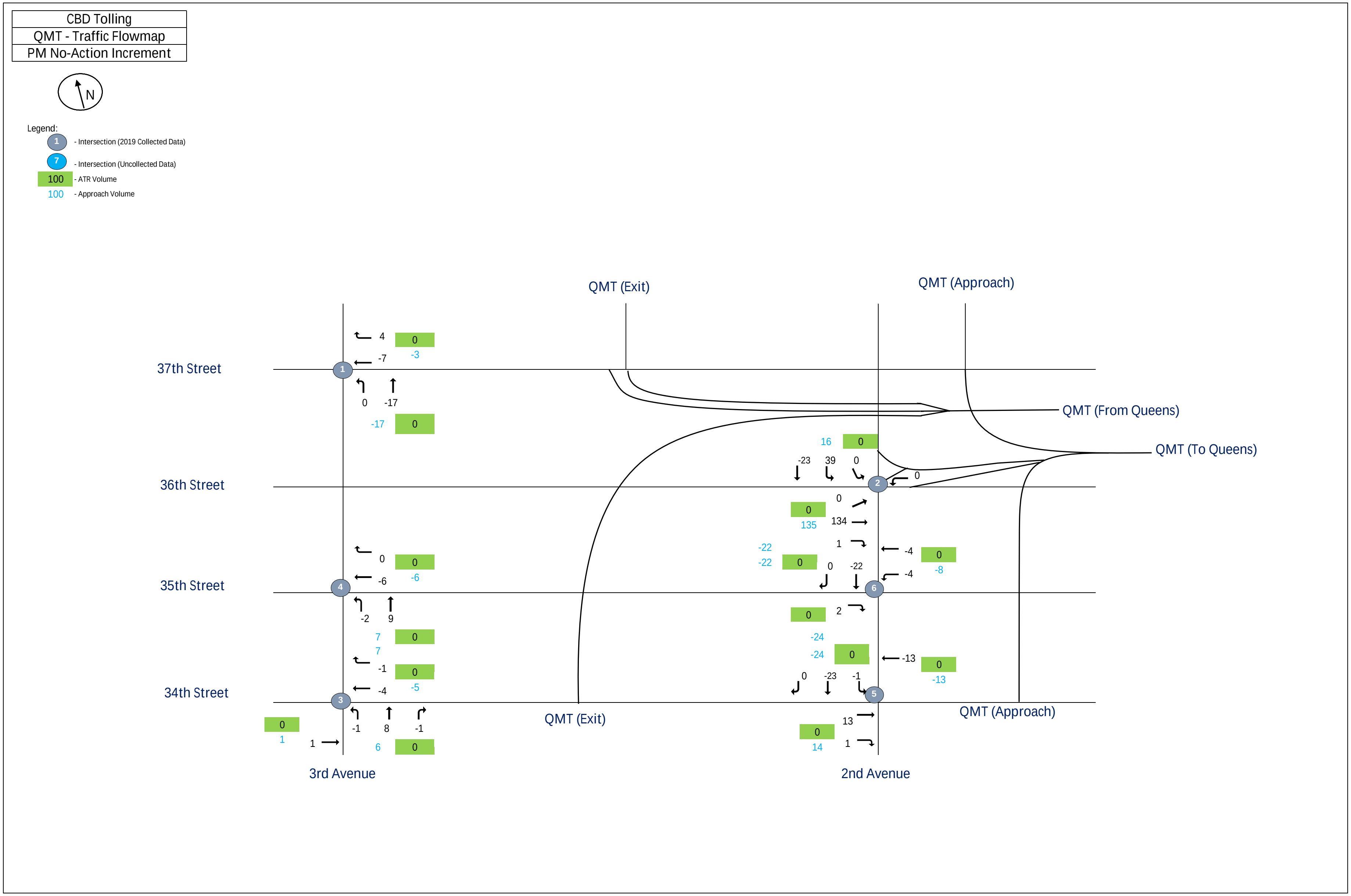
New Jersey
2021 No-Action Increment
PM Peak Hour

CBD Tolling
QMT - Traffic Flowmap
AM No-Action Increment



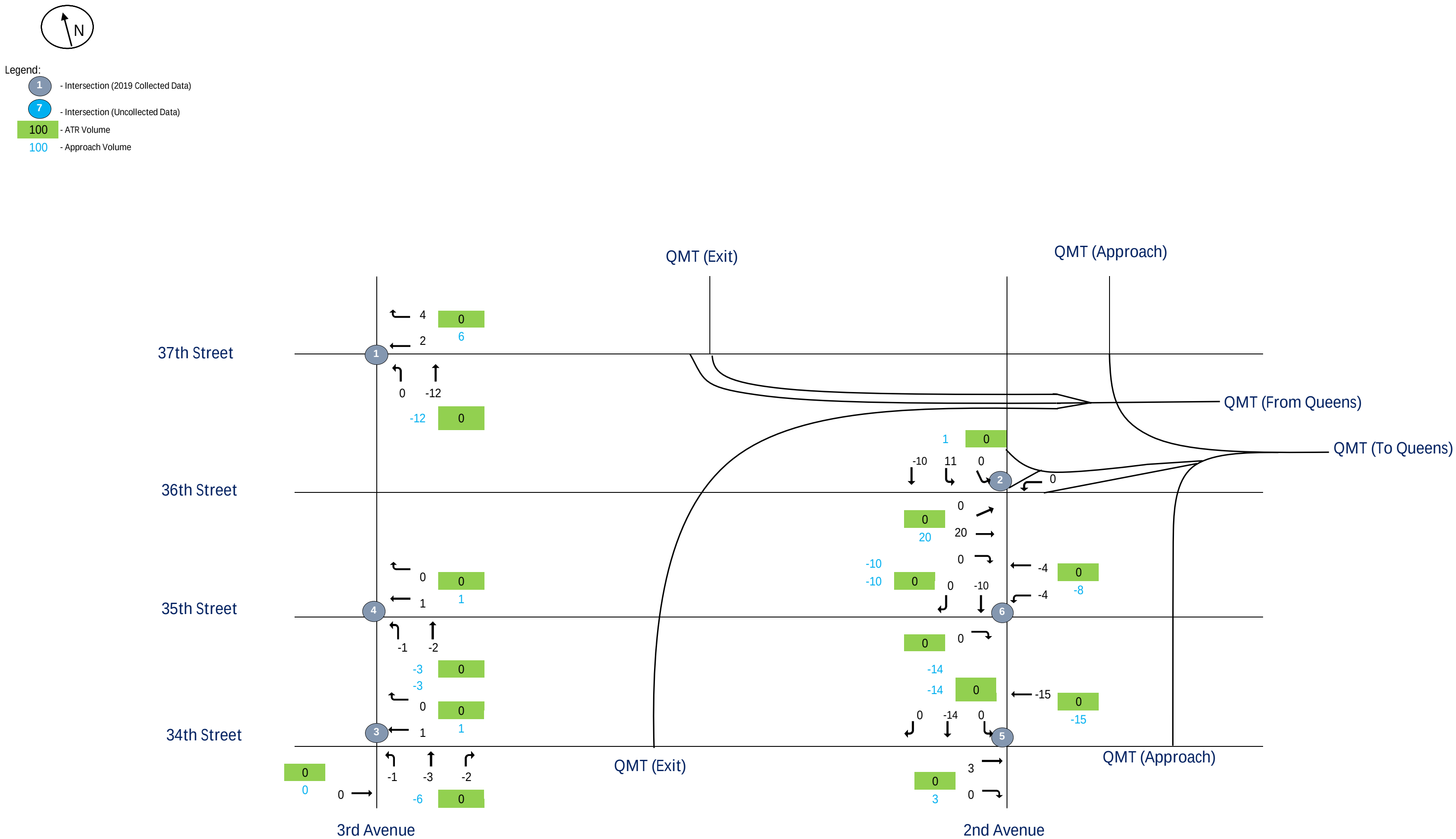
CBD Tolling
QMT - Traffic Flowmap
MD No-Action Increment



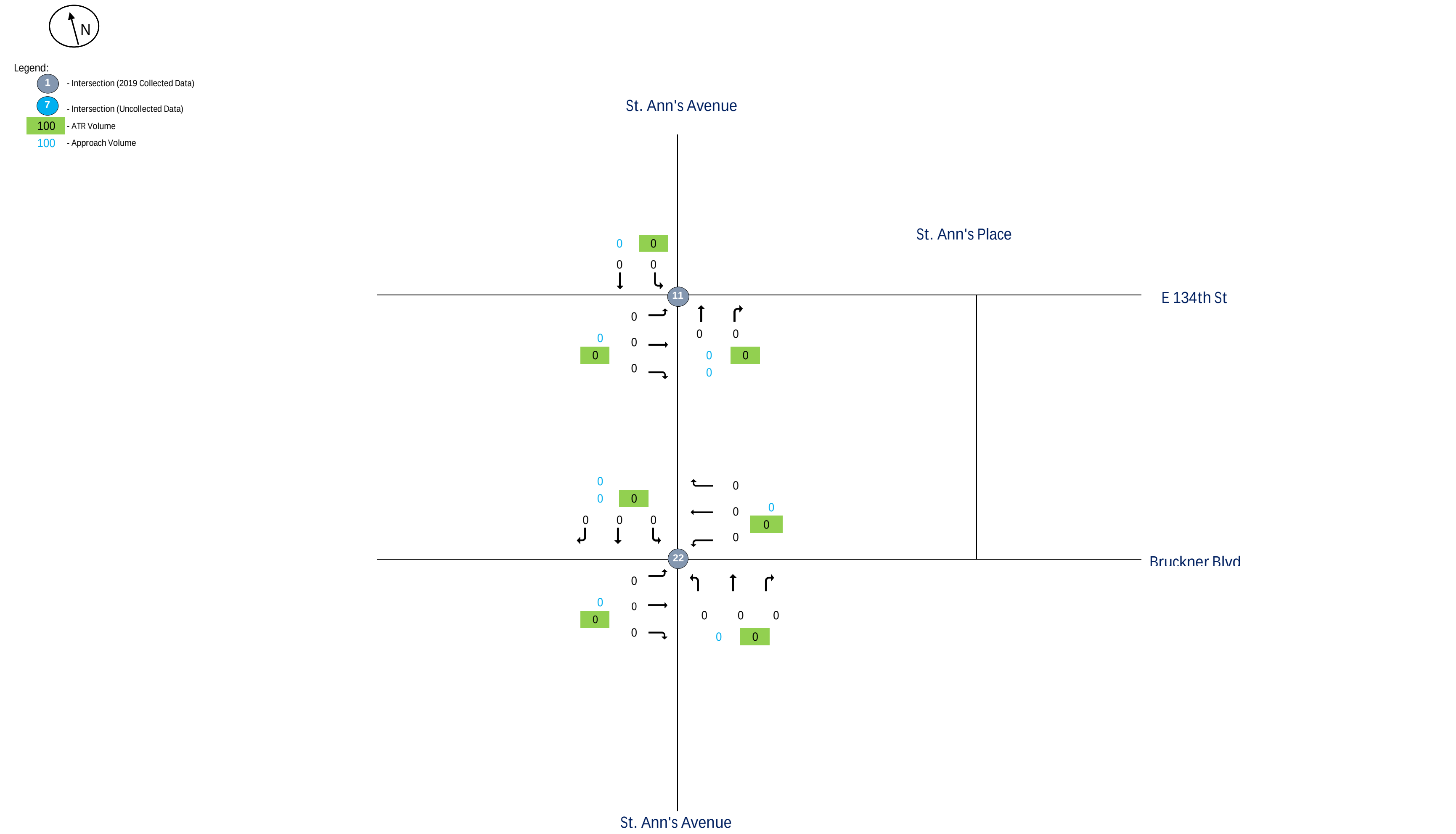


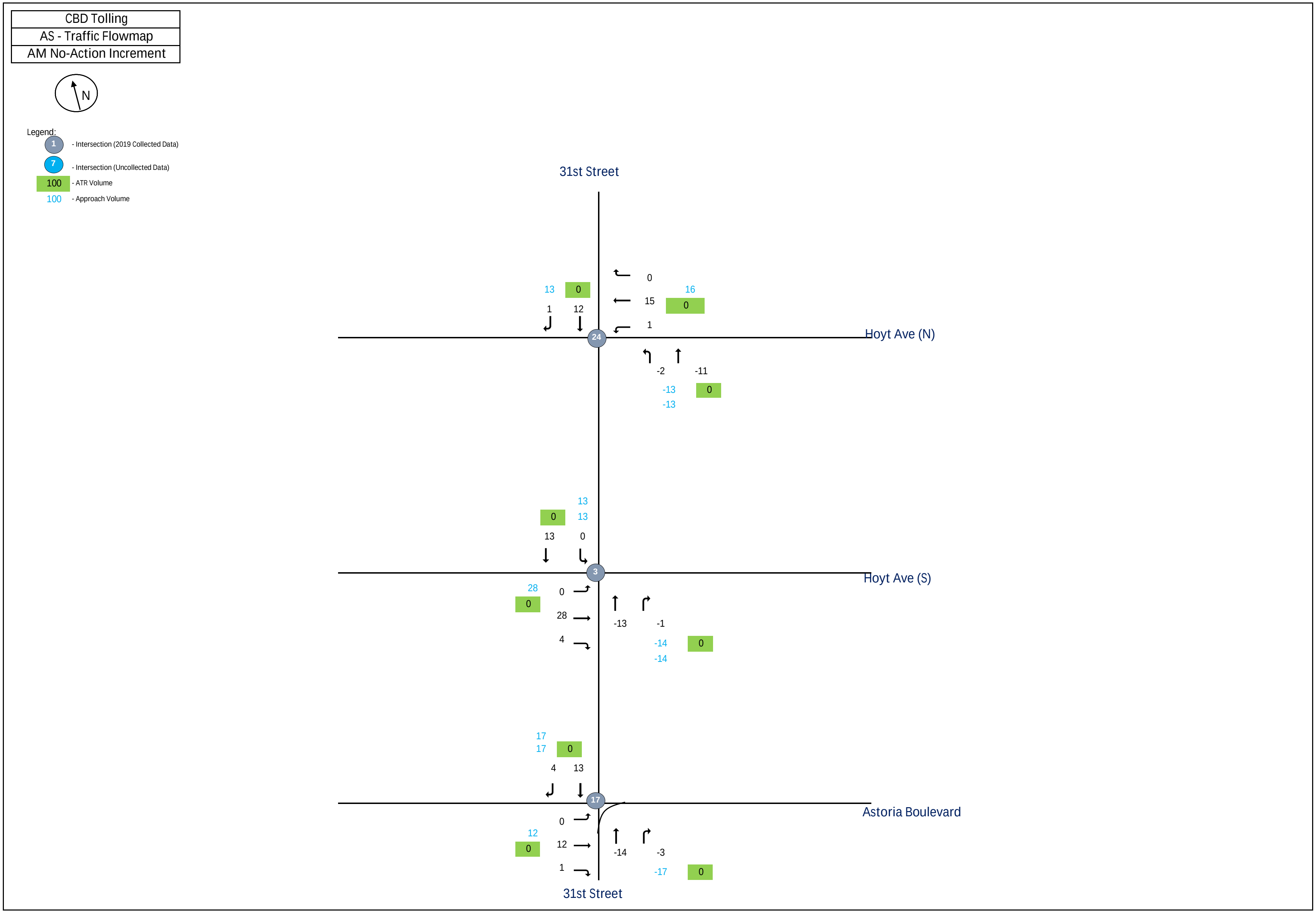
CBD Tolling
QMT - Traffic Flowmap
PM No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
QMT (From Queens)
QMT (To Queens)
37th Street
36th Street
35th Street
34th Street
3rd Avenue
2nd Avenue
QMT (Exit)
QMT (Approach)

CBD Tolling
QMT - Traffic Flowmap
LN No-Action Increment



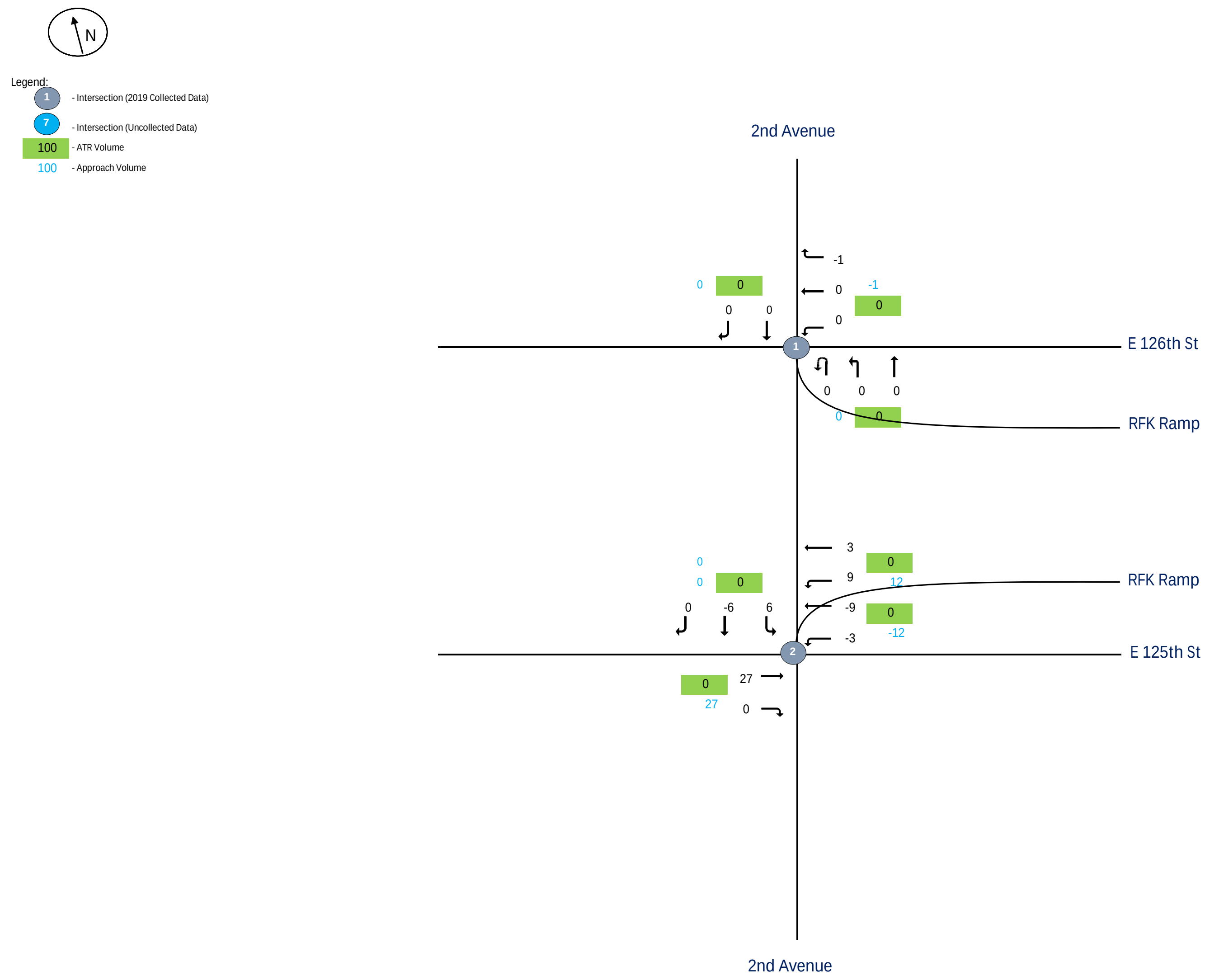
CBD Tolling
RKB - Traffic Flowmap
AM No-Action Increment



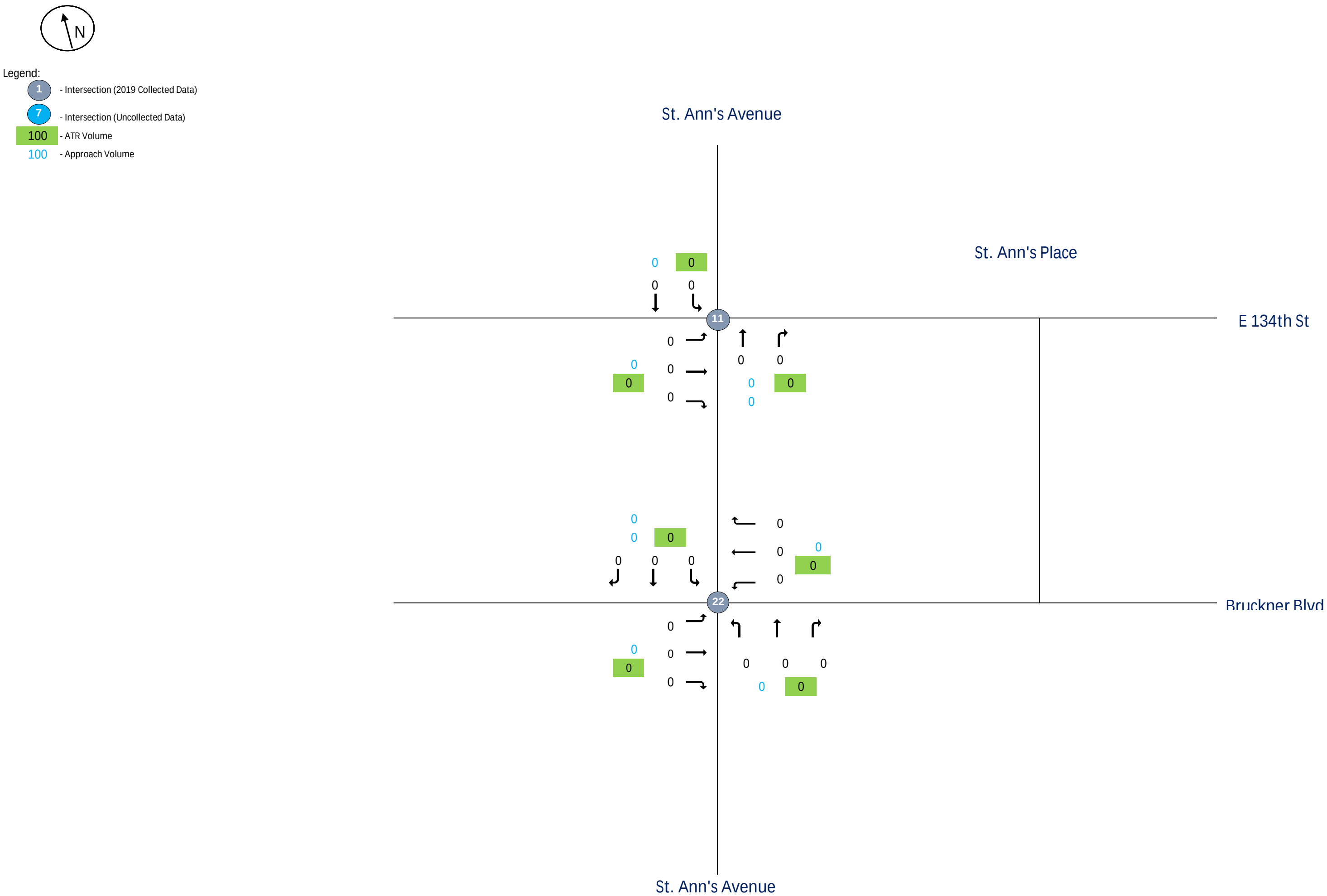


CBD Tolling
AS - Traffic Flowmap
AM No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
Hoyt Ave (N)
Hoyt Ave (S)
Astoria Boulevard
31st Street
24
3
17
13
0
1
12
0
15
1
16
0
-2
-11
-13
-13
0
13
13
0
13
0
28
0
0
28
4
-13
-1
-14
-14
0
17
17
0
4
13
0
12
12
0
1
-14
-3
-17
0

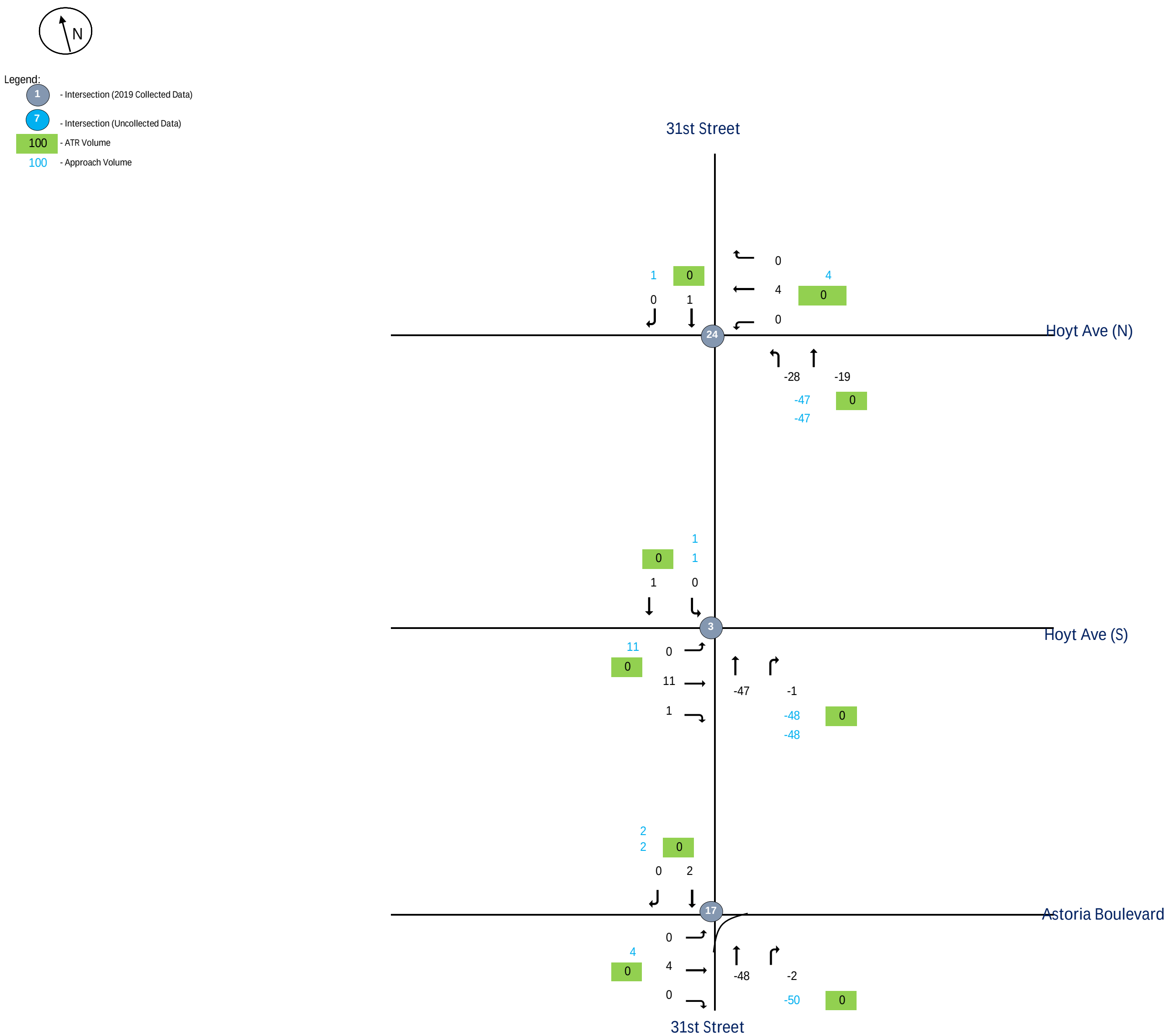
CBD Tolling
RKM - Traffic Flowmap
AM No-Action Increment



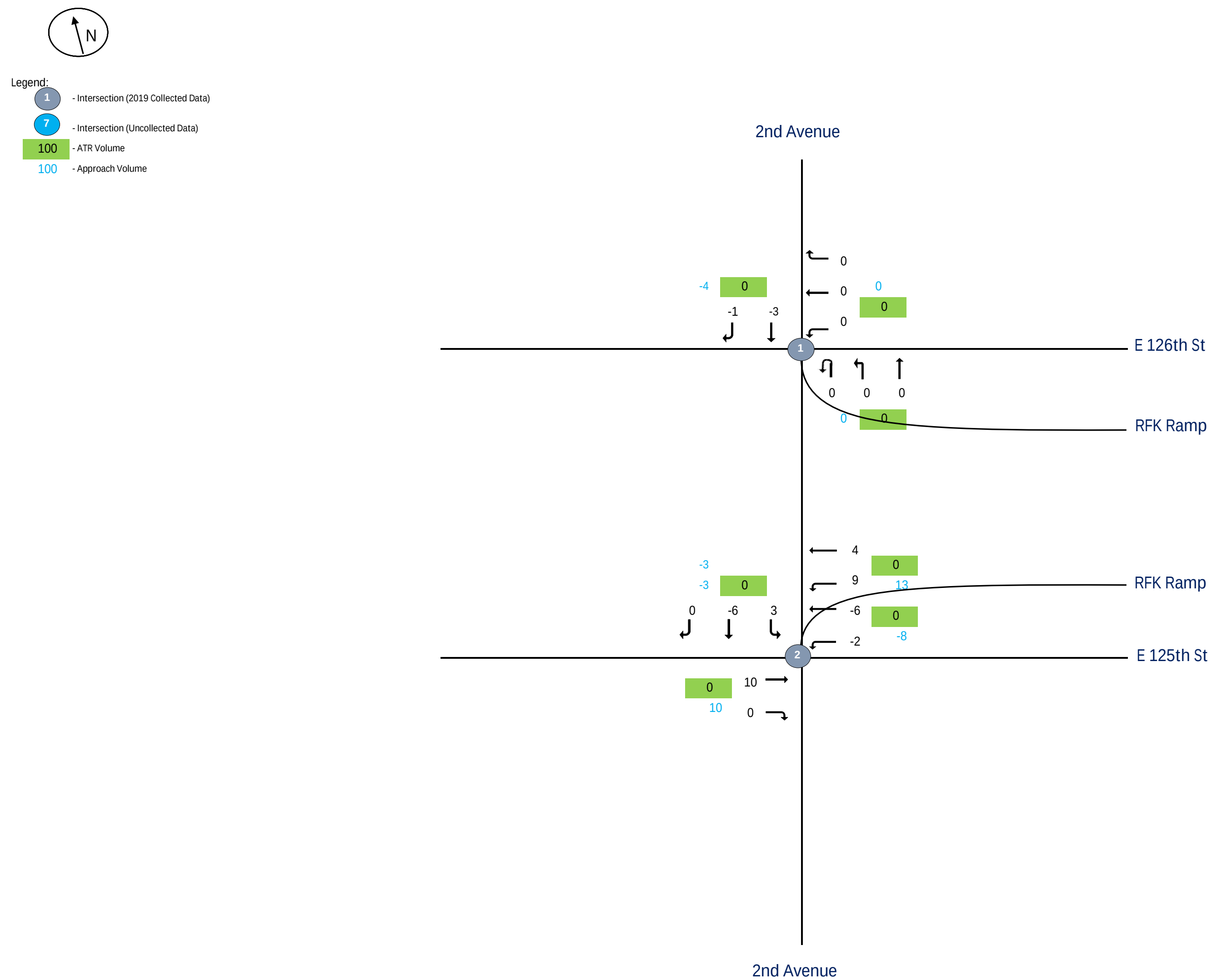
CBD Tolling
RKB - Traffic Flowmap
MD No-Action Increment



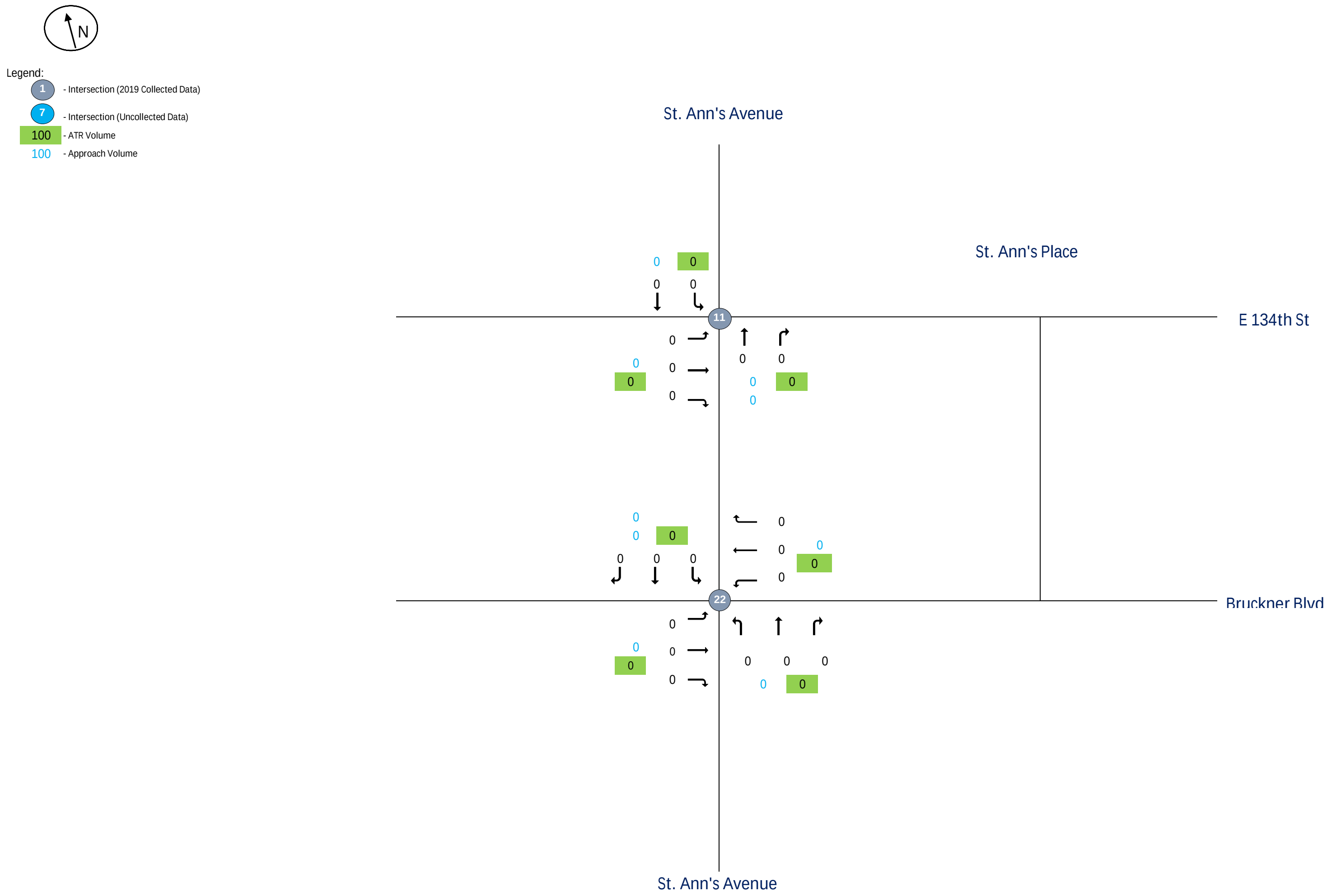
CBD Tolling
AS - Traffic Flowmap
MD No-Action Increment



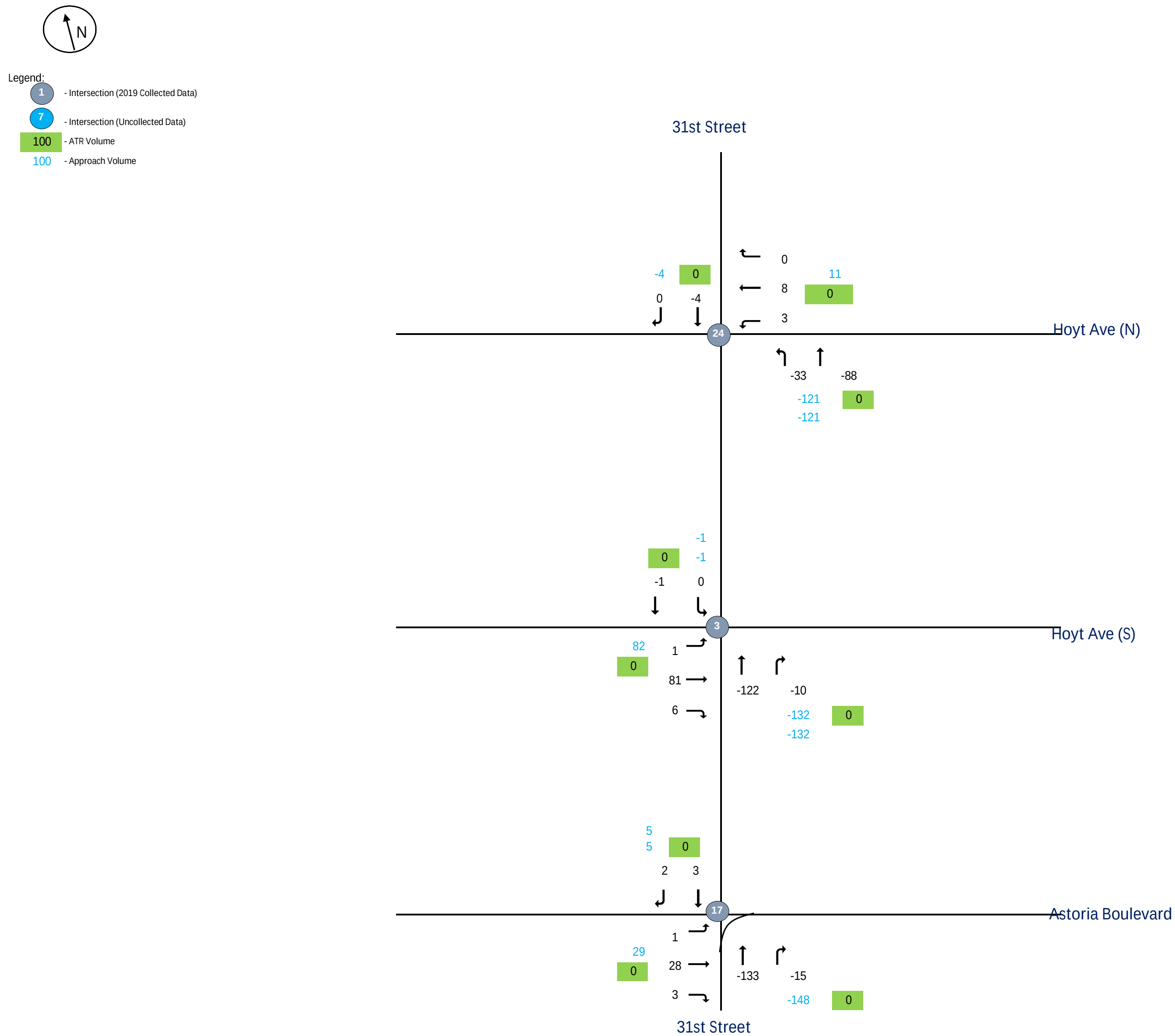
CBD Tolling
RKM - Traffic Flowmap
MD No-Action Increment

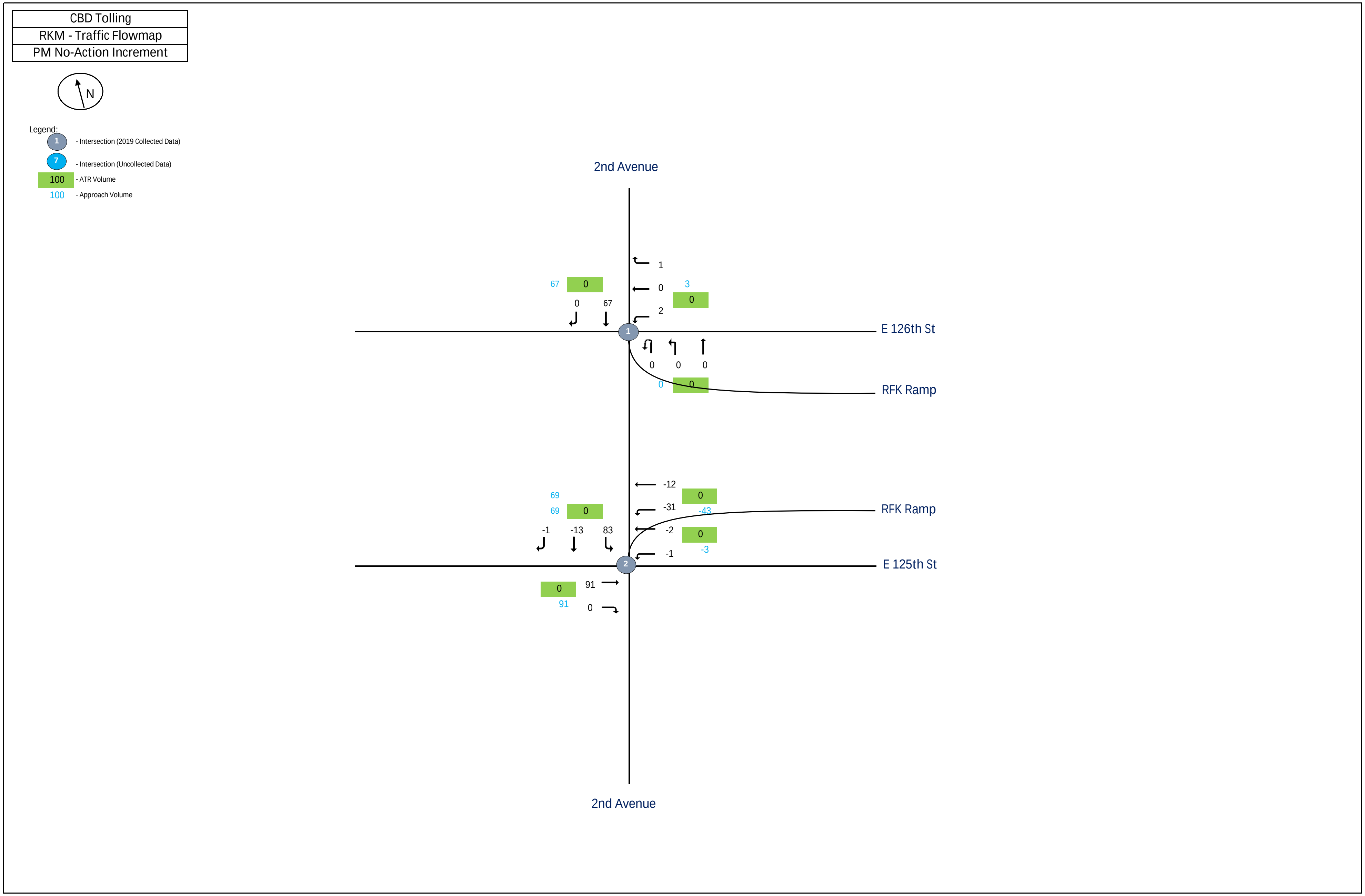


CBD Tolling
RKB - Traffic Flowmap
PM No-Action Increment

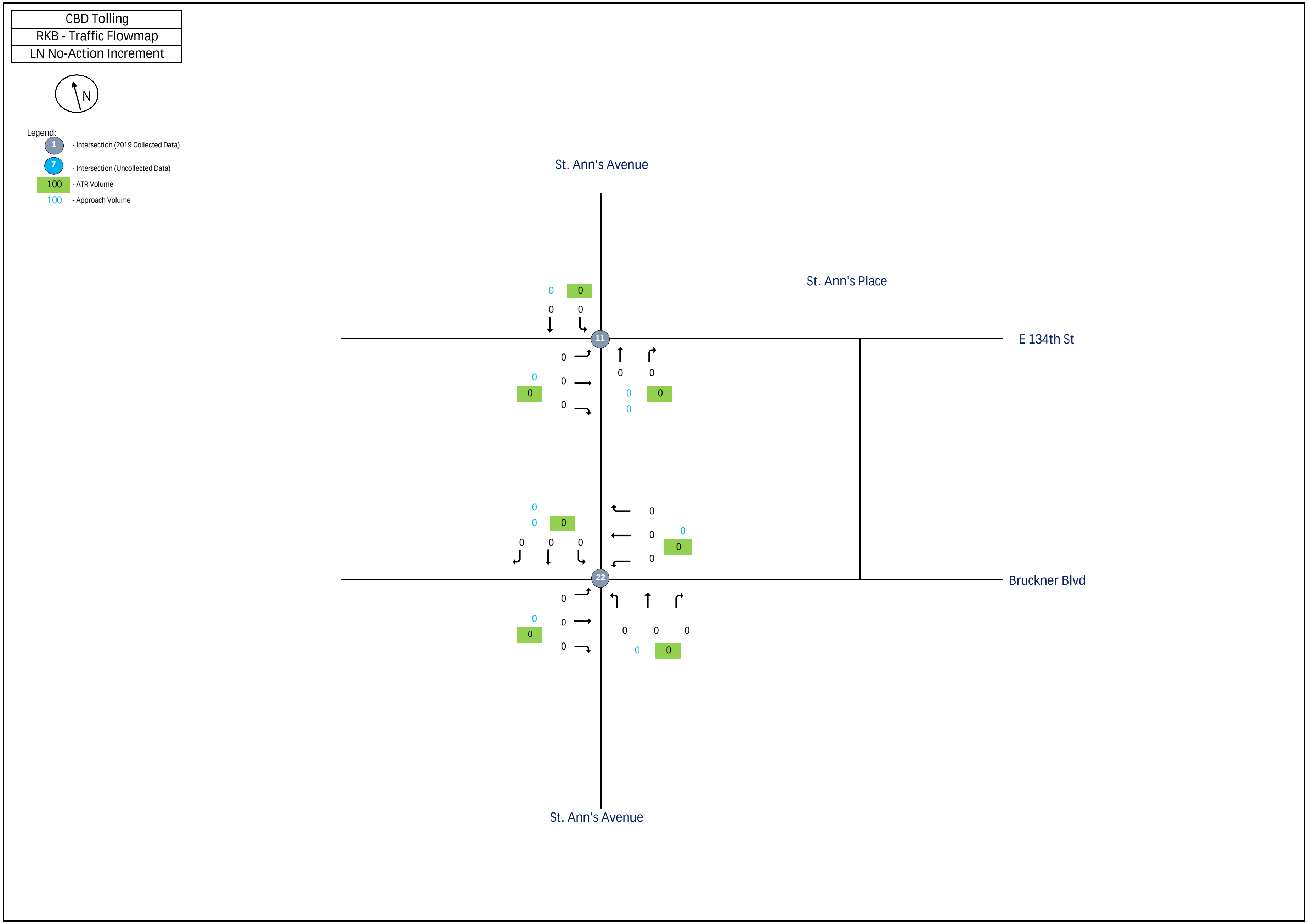


CBD Tolling
AS - Traffic Flowmap
PM No-Action Increment



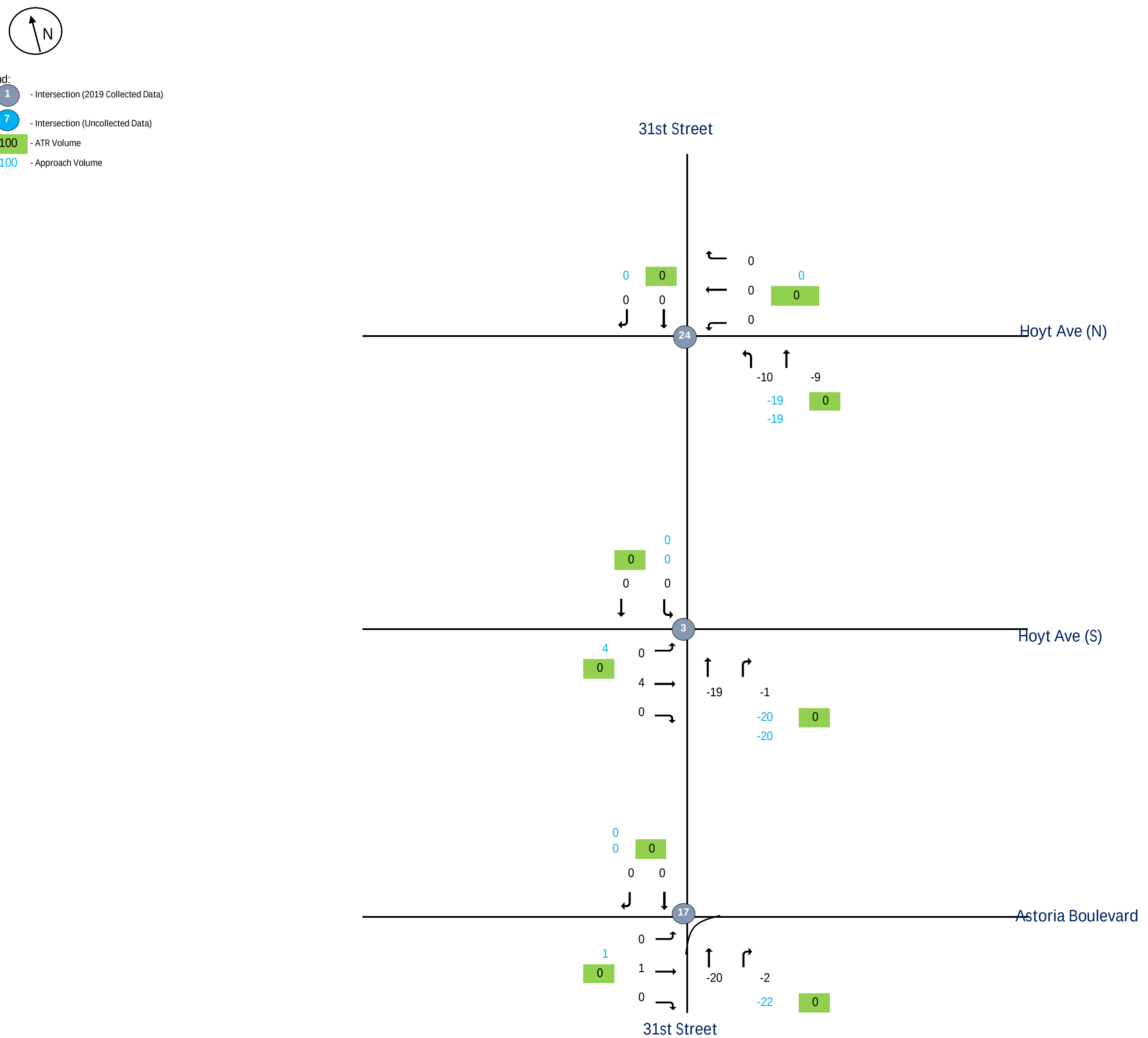


CBD Tolling
RKM - Traffic Flowmap
PM No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
2nd Avenue
E 126th St
RFK Ramp
RFK Ramp
E 125th St
2nd Avenue
1
0
2
3
0
67
0
0
67
0
0
0
0
0
-12
-31
-2
-1
0
-43
0
-3
69
69
0
-1
-13
83
91
0
0
91

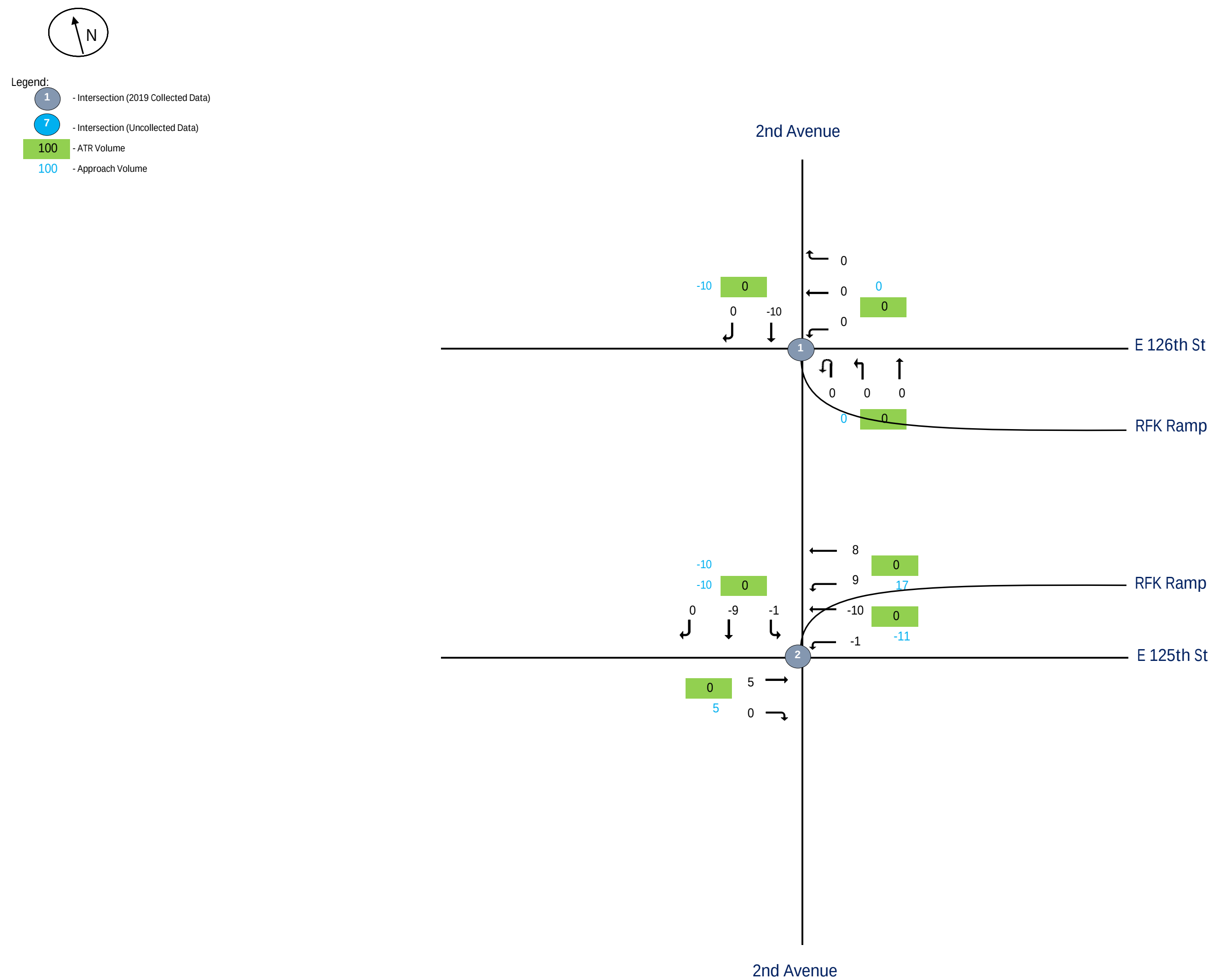

CBD Tolling
RKB - Traffic Flowmap
LN No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
St. Ann's Avenue
St. Ann's Place
E 134th St
Bruckner Blvd
St. Ann's Avenue
11
22
0

CBD Tolling
AS - Traffic Flowmap
LN No-Action Increment

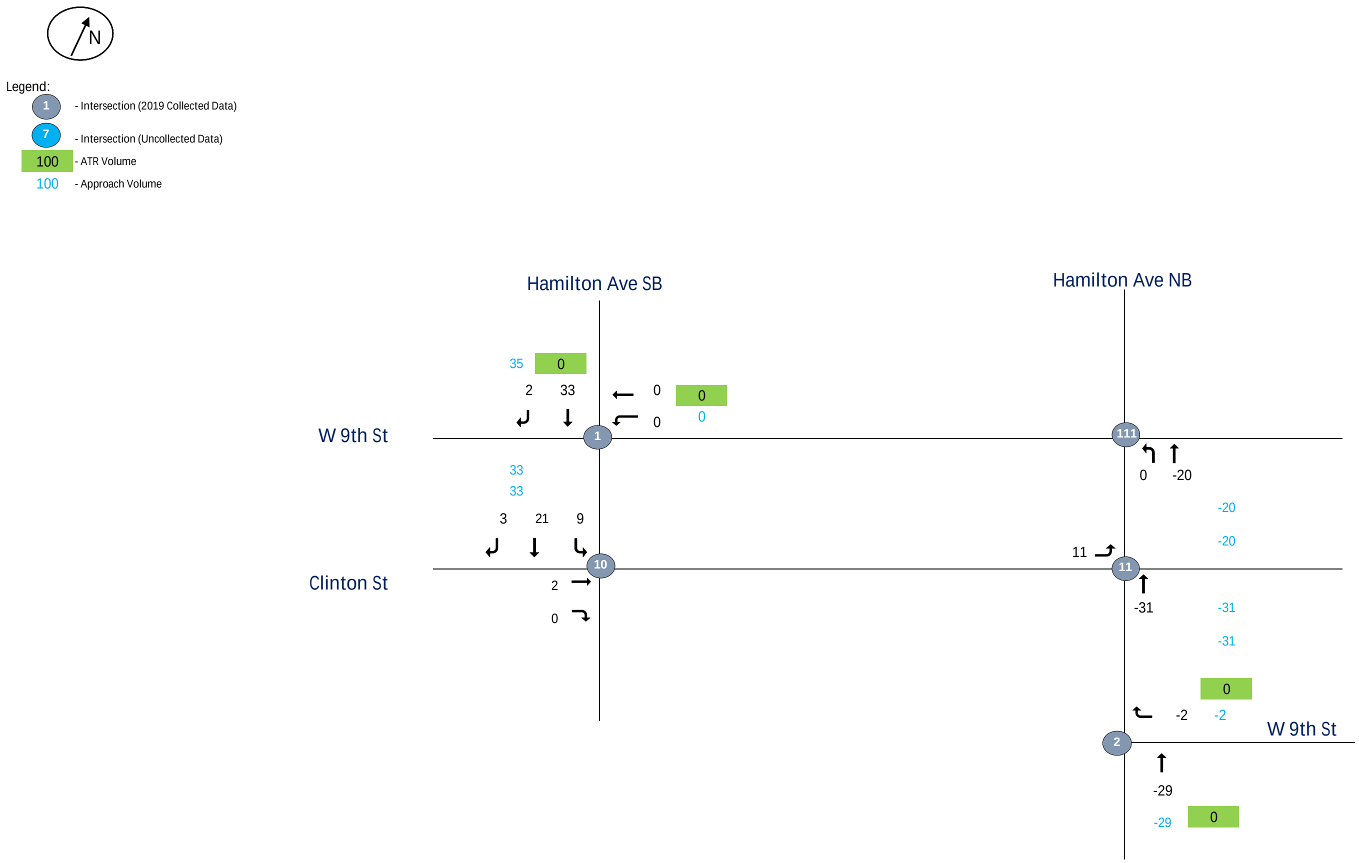
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume



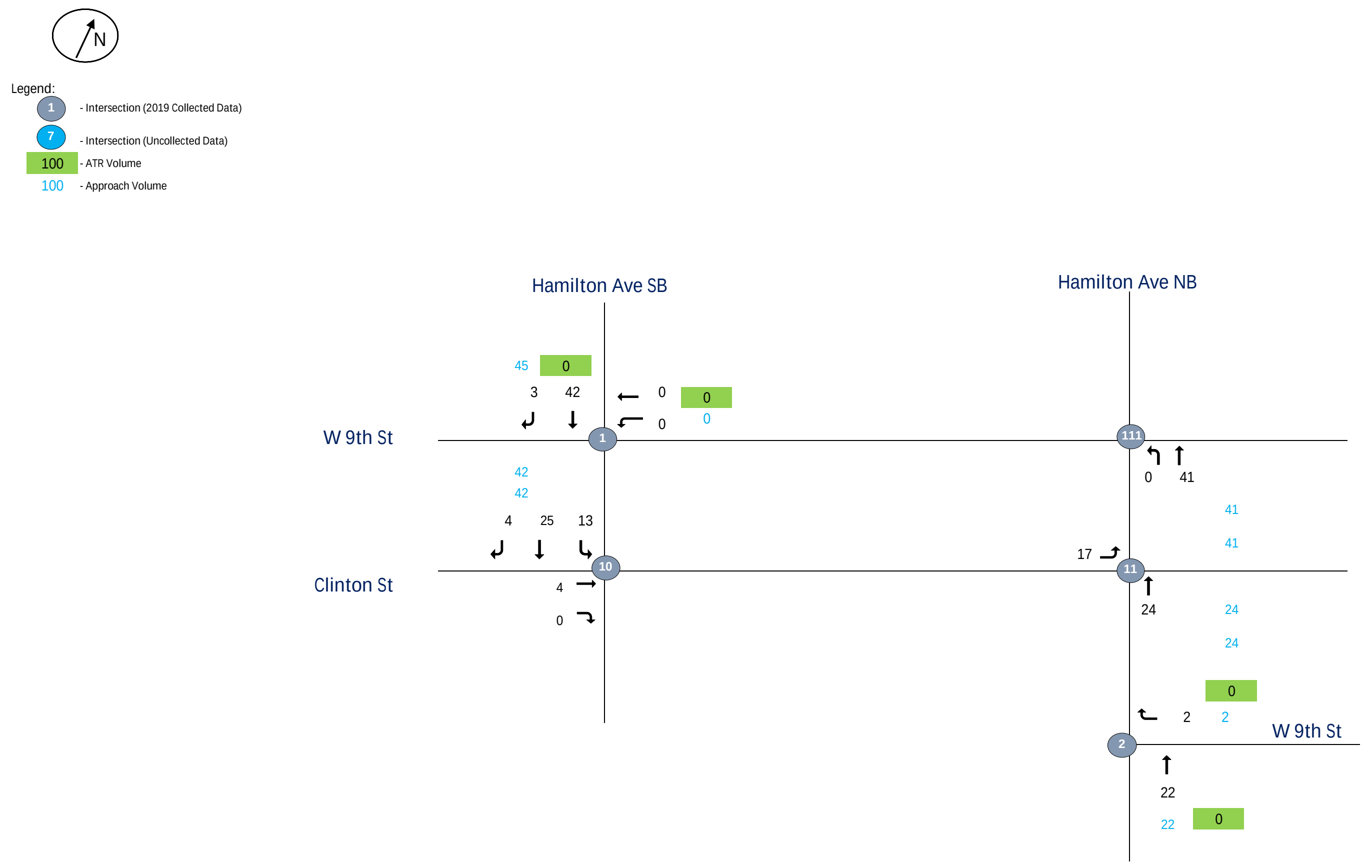
CBD Tolling
RKM - Traffic Flowmap
LN No-Action Increment



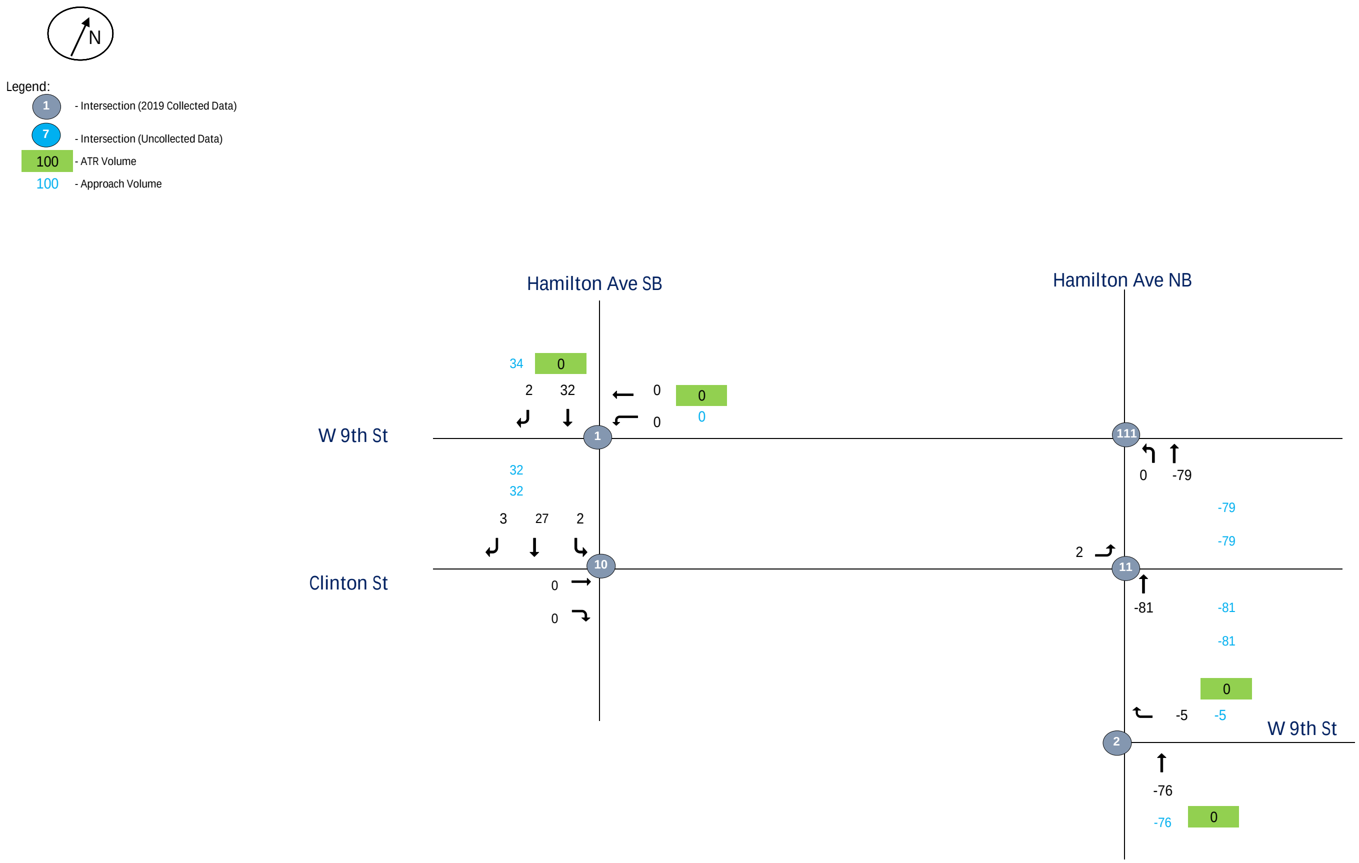
CBD Tolling
Red Hook- Traffic Flowmap
AM No-Action Increment



CBD Tolling
Red Hook- Traffic Flowmap
MD No-Action Increment

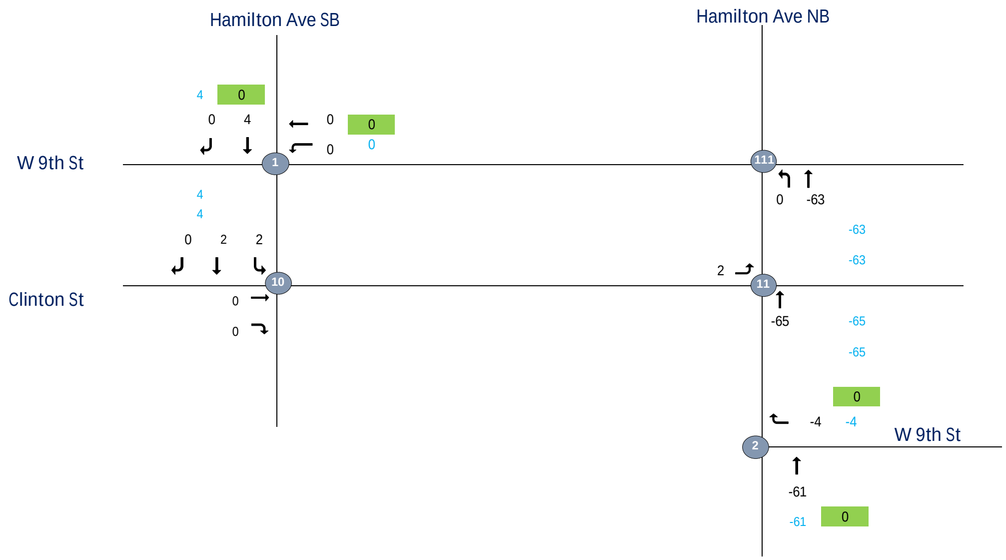


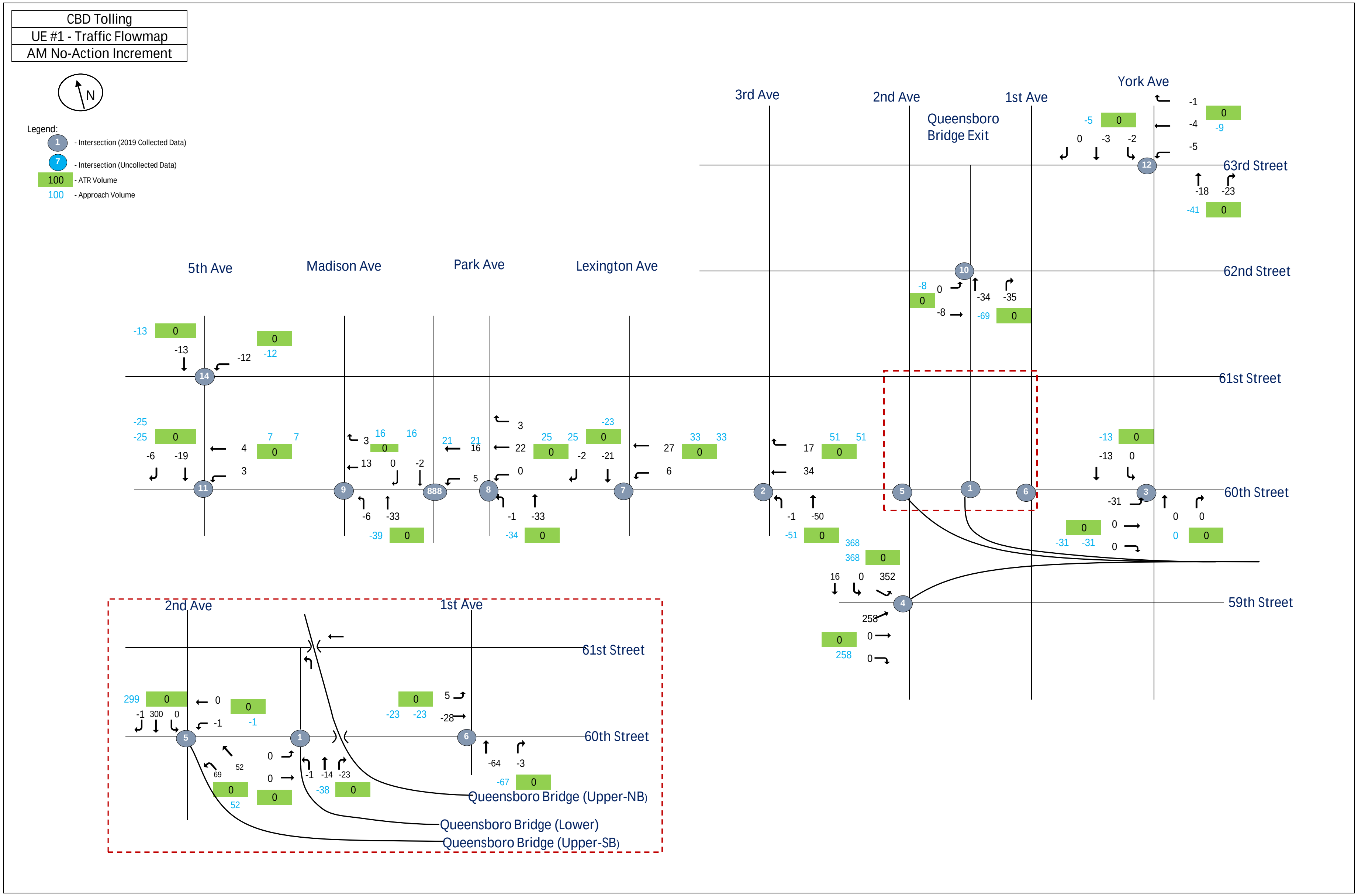
CBD Tolling
Red Hook- Traffic Flowmap
PM No-Action Increment

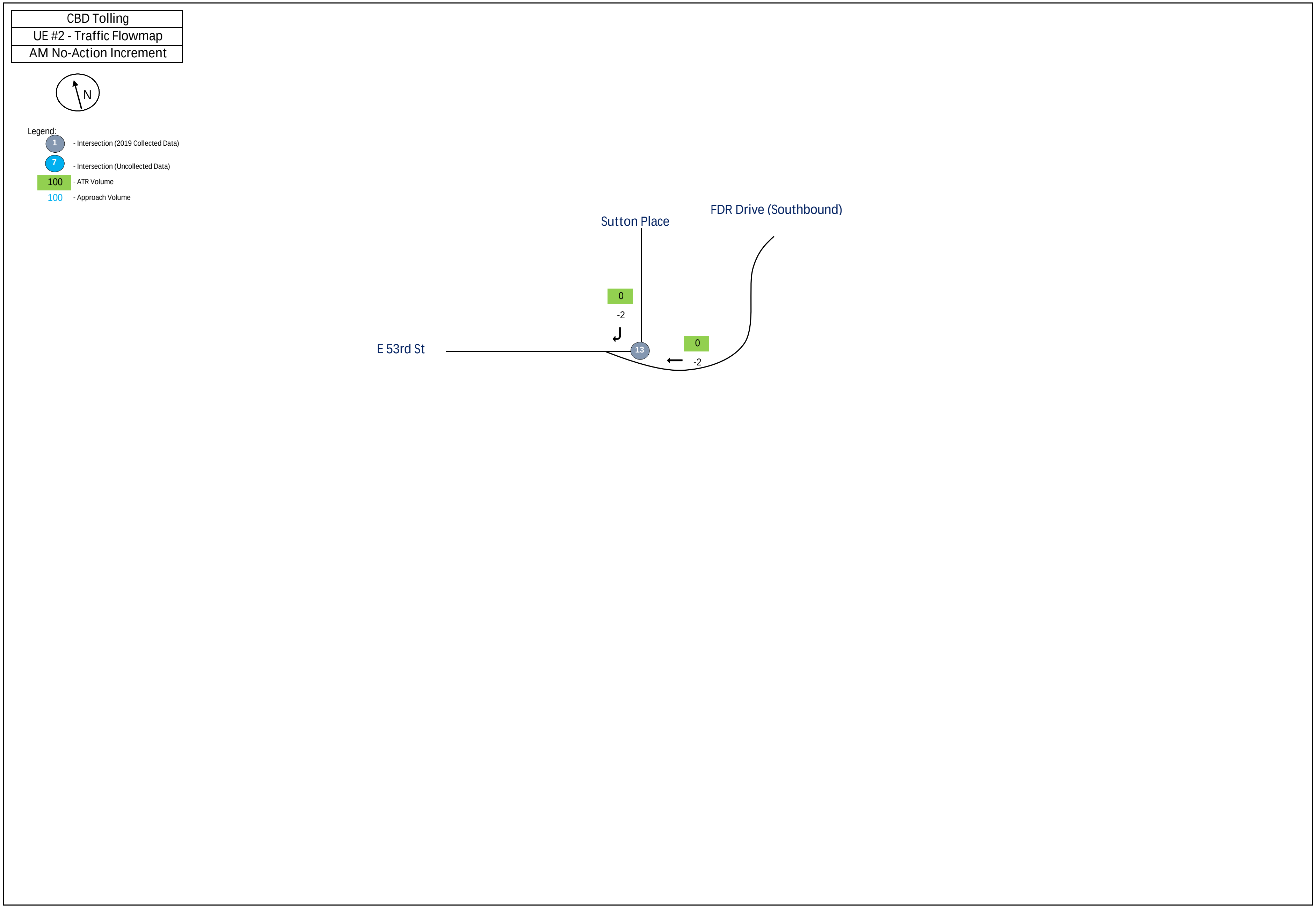


CBD Tolling
Red Hook- Traffic Flowmap
LN No-Action Increment

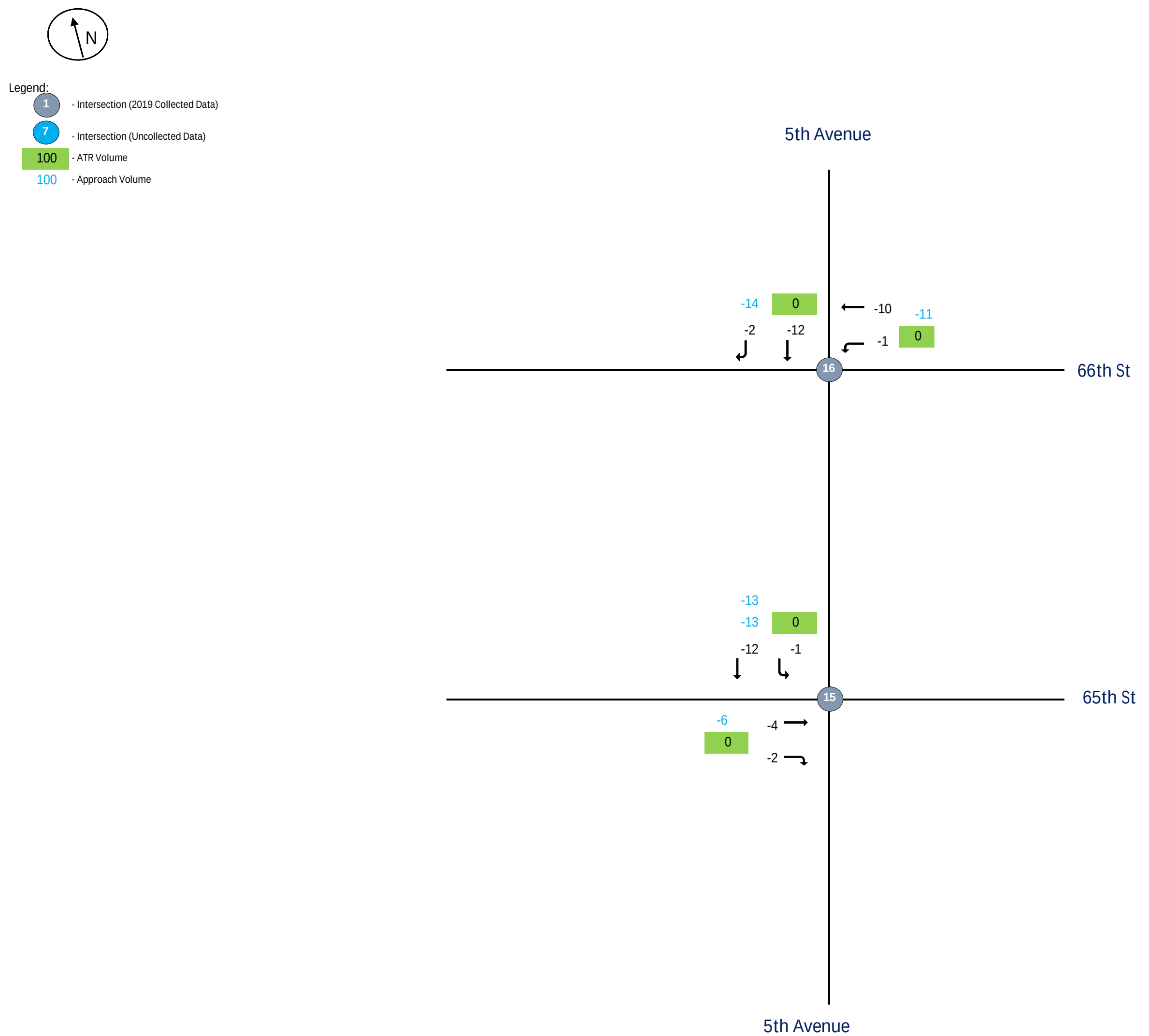
Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume




CBD Tolling
UE #1 - Traffic Flowmap
AM No-Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)


CBD Tolling
UE #2 - Traffic Flowmap
AM No-Action Increment
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Sutton Place
FDR Drive (Southbound)
E 53rd St
0
-2
13
0
-2

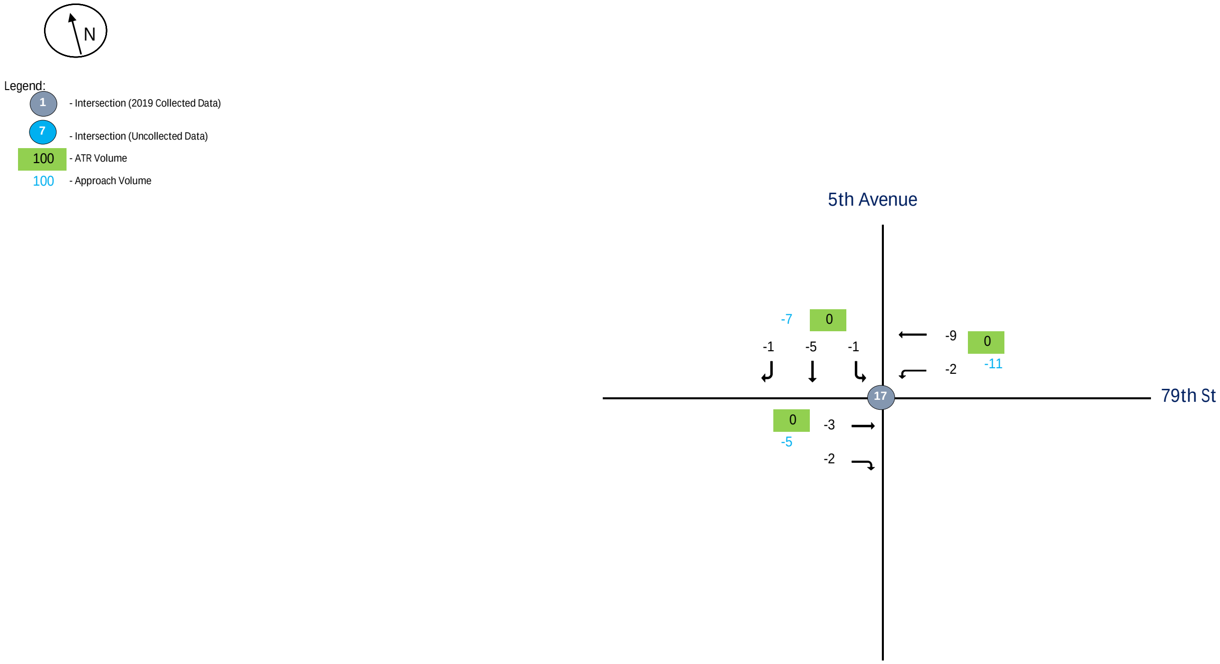
CBD Tolling
UE #3 - Traffic Flowmap
AM No-Action Increment



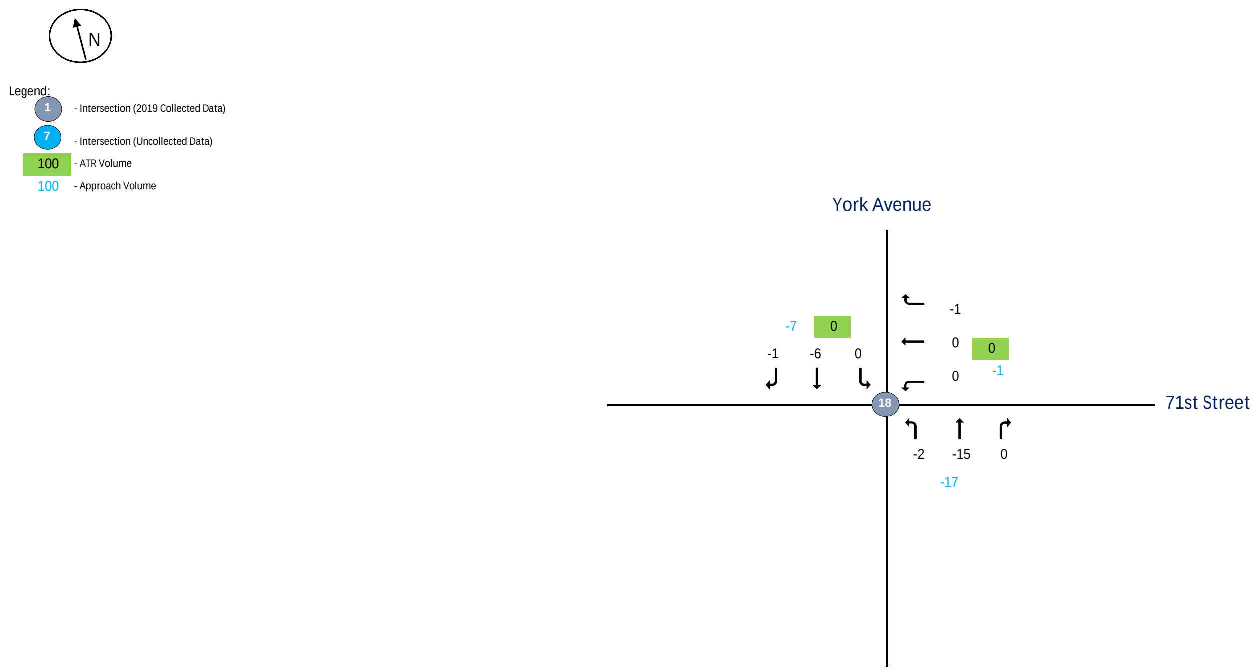
CBD Tolling

UE #3 - Traffic Flowmap

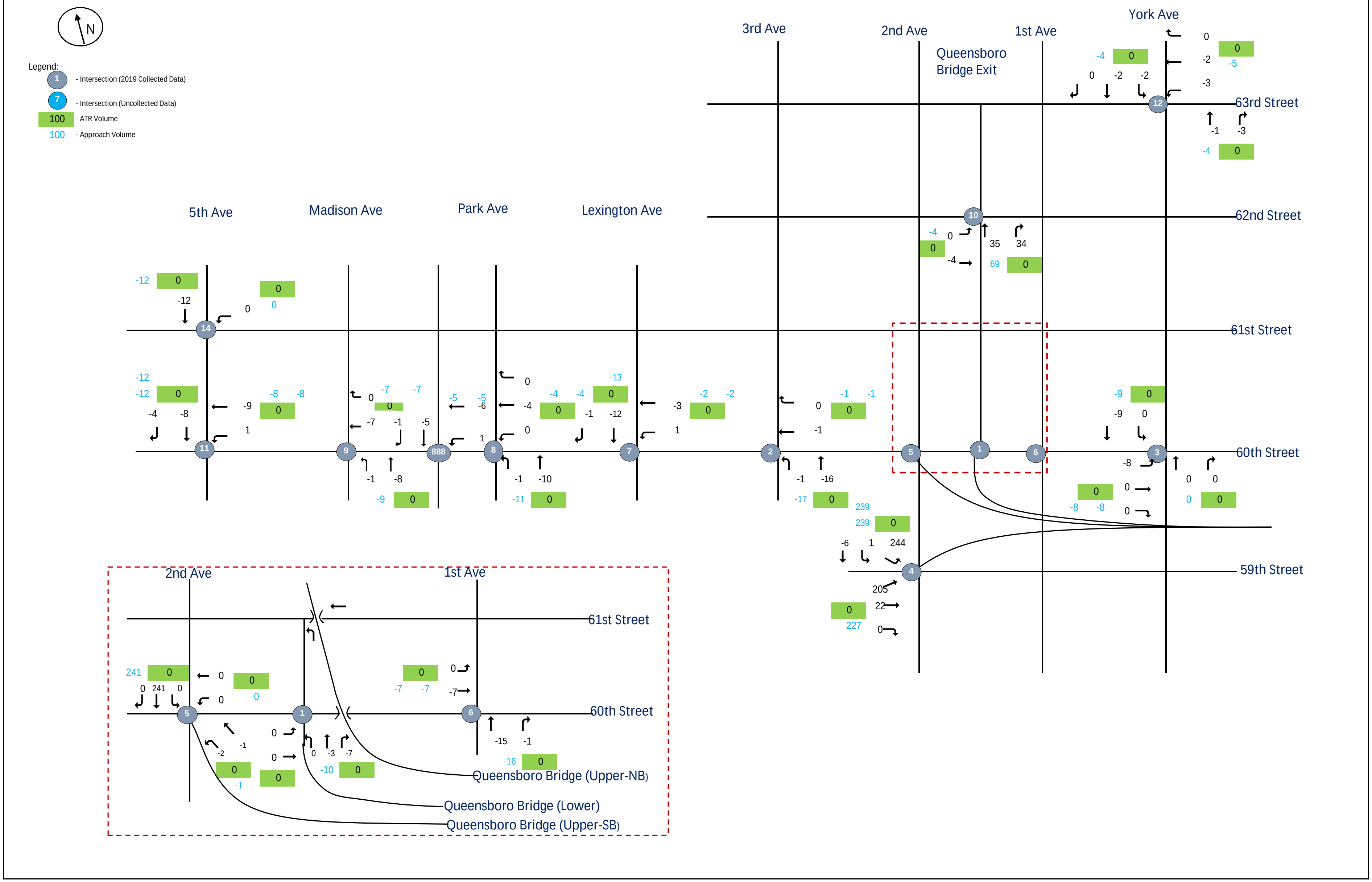
AM No-Action Increment



CBD Tolling
UE #4 - Traffic Flowmap
AM No-Action Increment

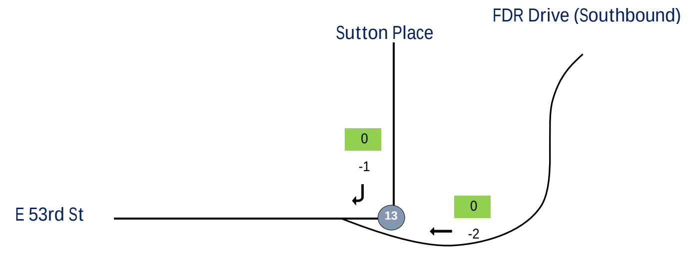


CBD Tolling
UE #1 - Traffic Flowmap
MD No-Action Increment

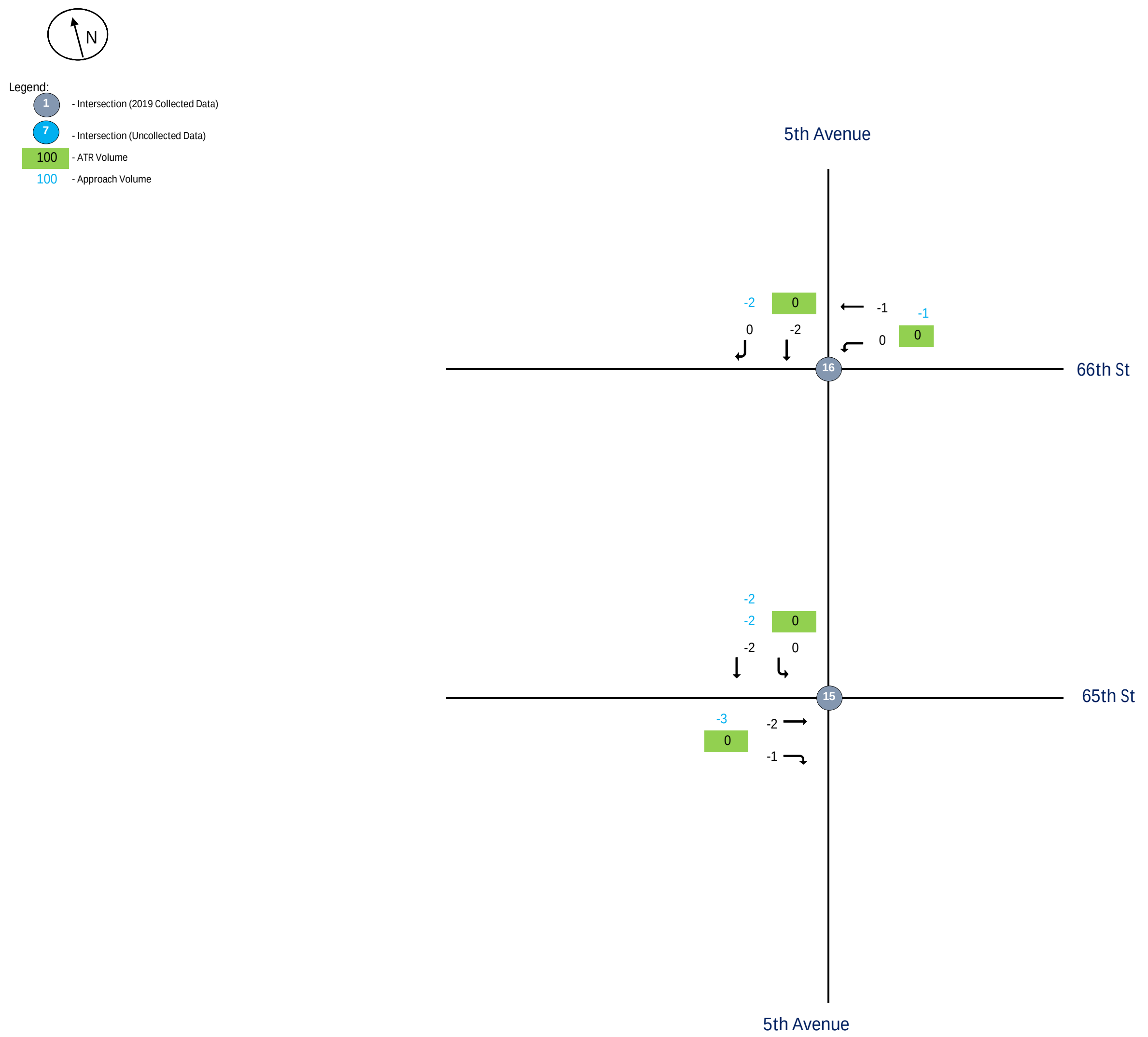


CBD Tolling
UE #2 - Traffic Flowmap
MD No-Action Increment

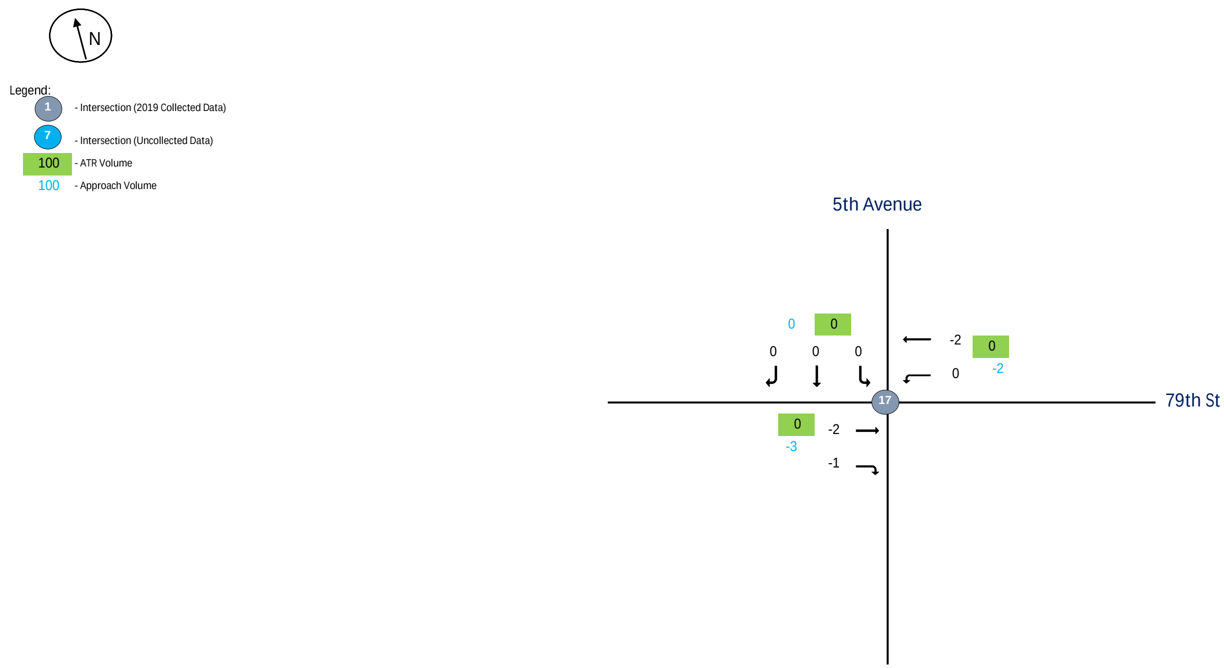
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume



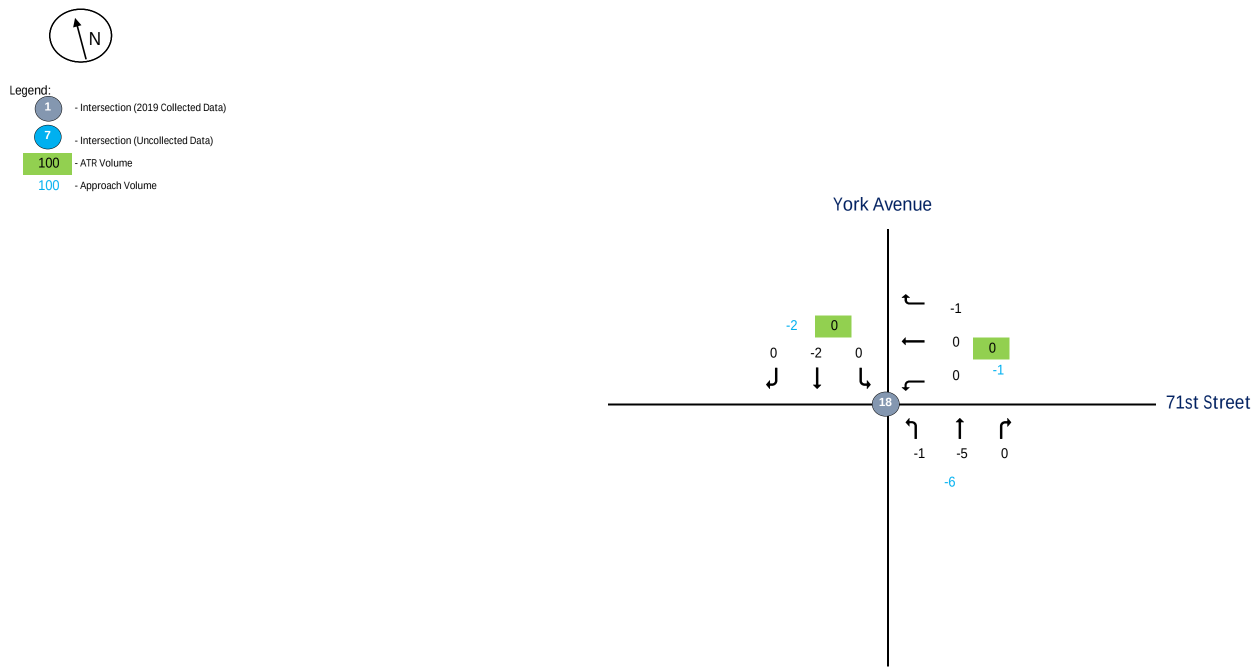
CBD Tolling
UE #3 - Traffic Flowmap
MD No-Action Increment



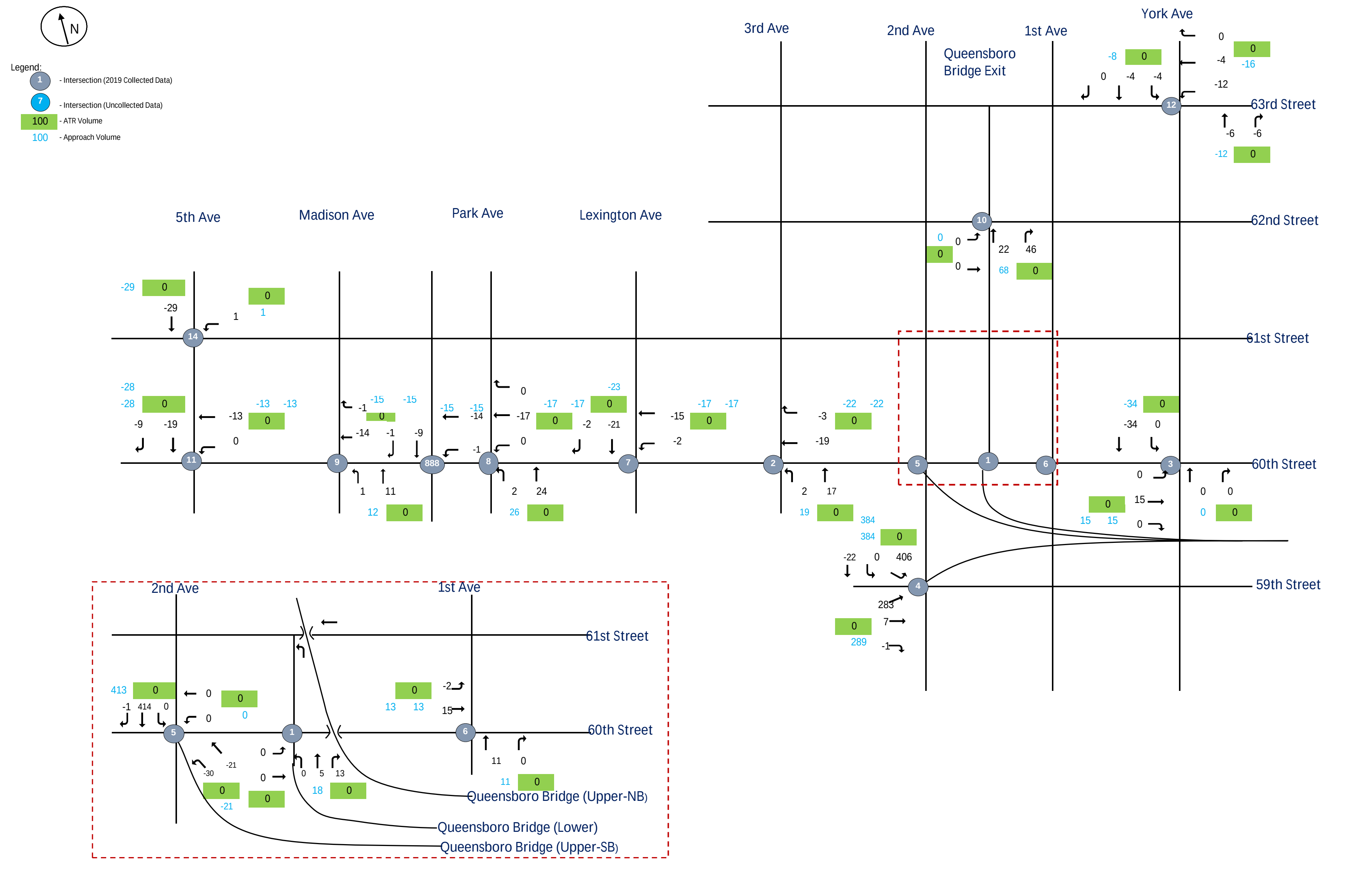
CBD Tolling
UE #3 - Traffic Flowmap
MD No-Action Increment



CBD Tolling
UE #4 - Traffic Flowmap
MD No-Action Increment

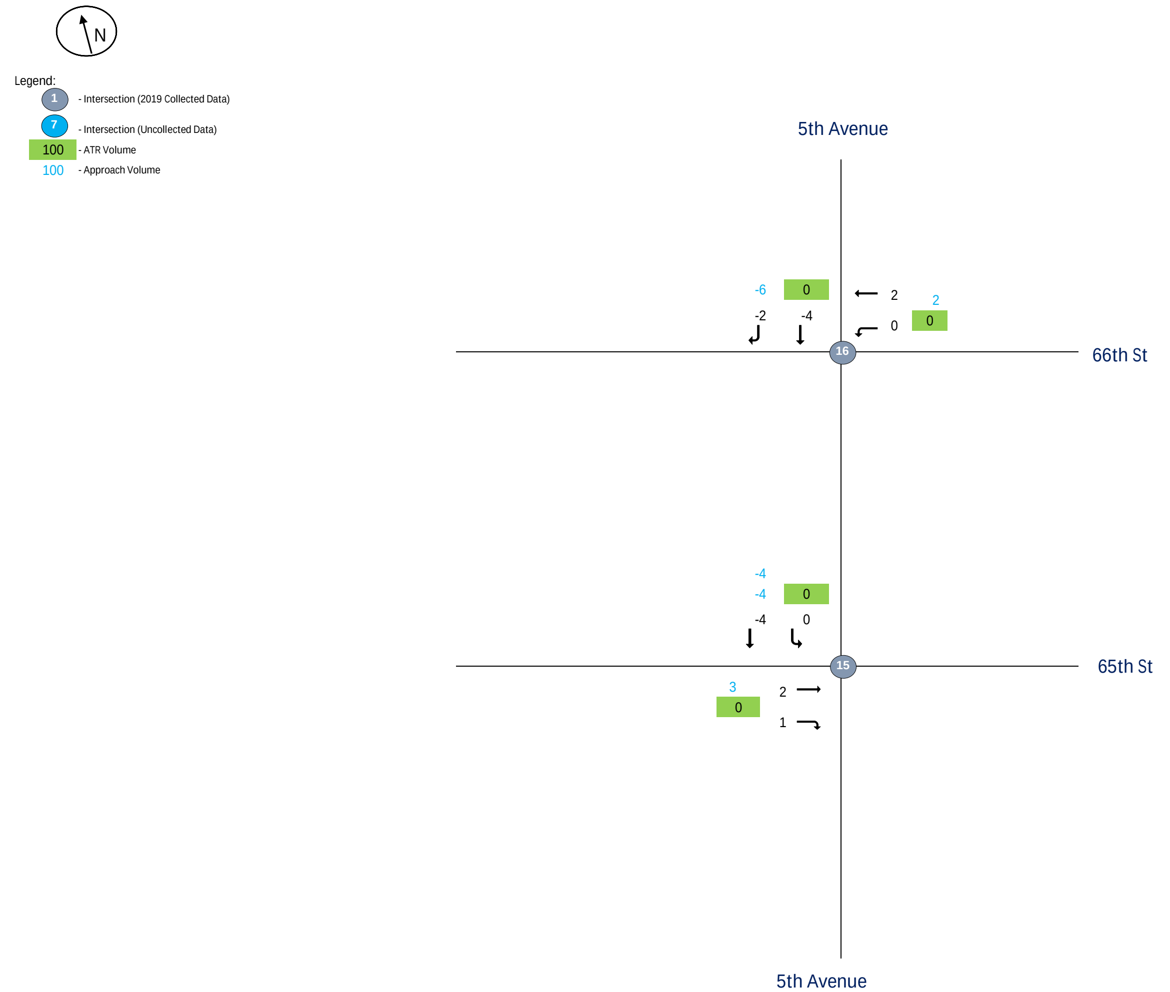


CBD Tolling
UE #1 - Traffic Flowmap
PM No-Action Increment

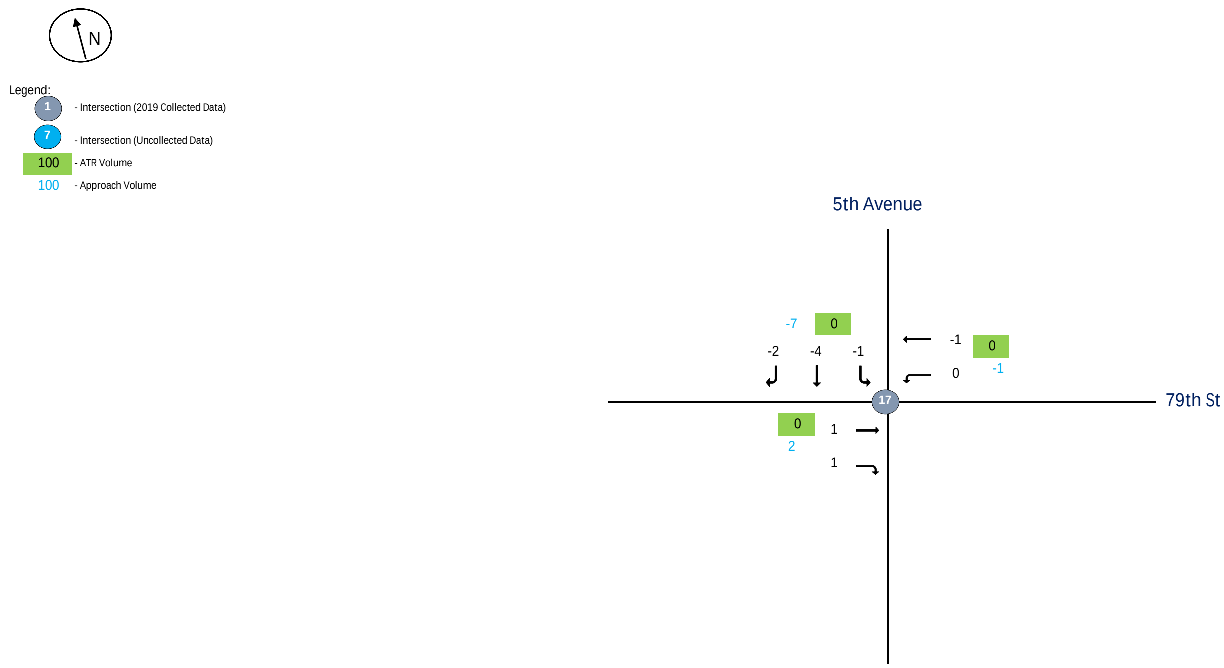


CBD Tolling
UE #2 - Traffic Flowmap
PM No-Action Increment

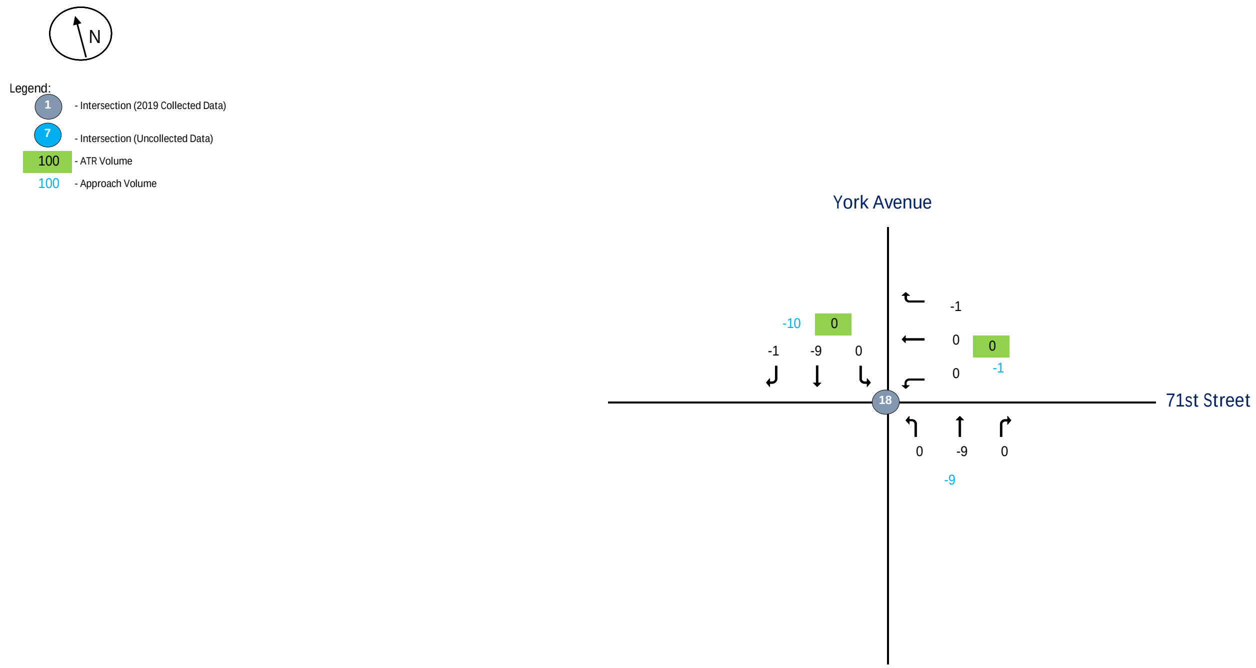
CBD Tolling
UE #3 - Traffic Flowmap
PM No-Action Increment

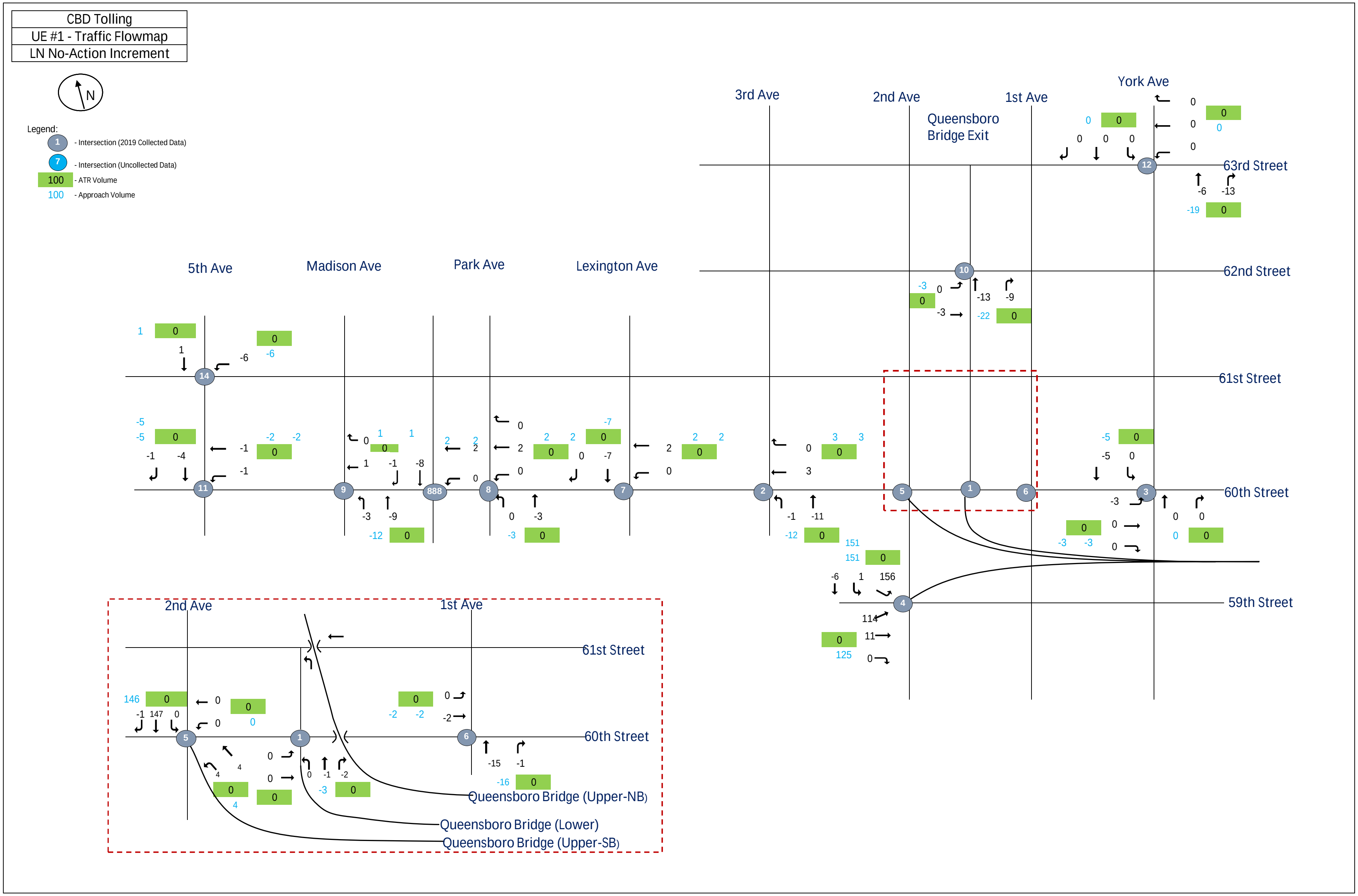


CBD Tolling
UE #3 - Traffic Flowmap
PM No-Action Increment



CBD Tolling
UE #4 - Traffic Flowmap
PM No-Action Increment





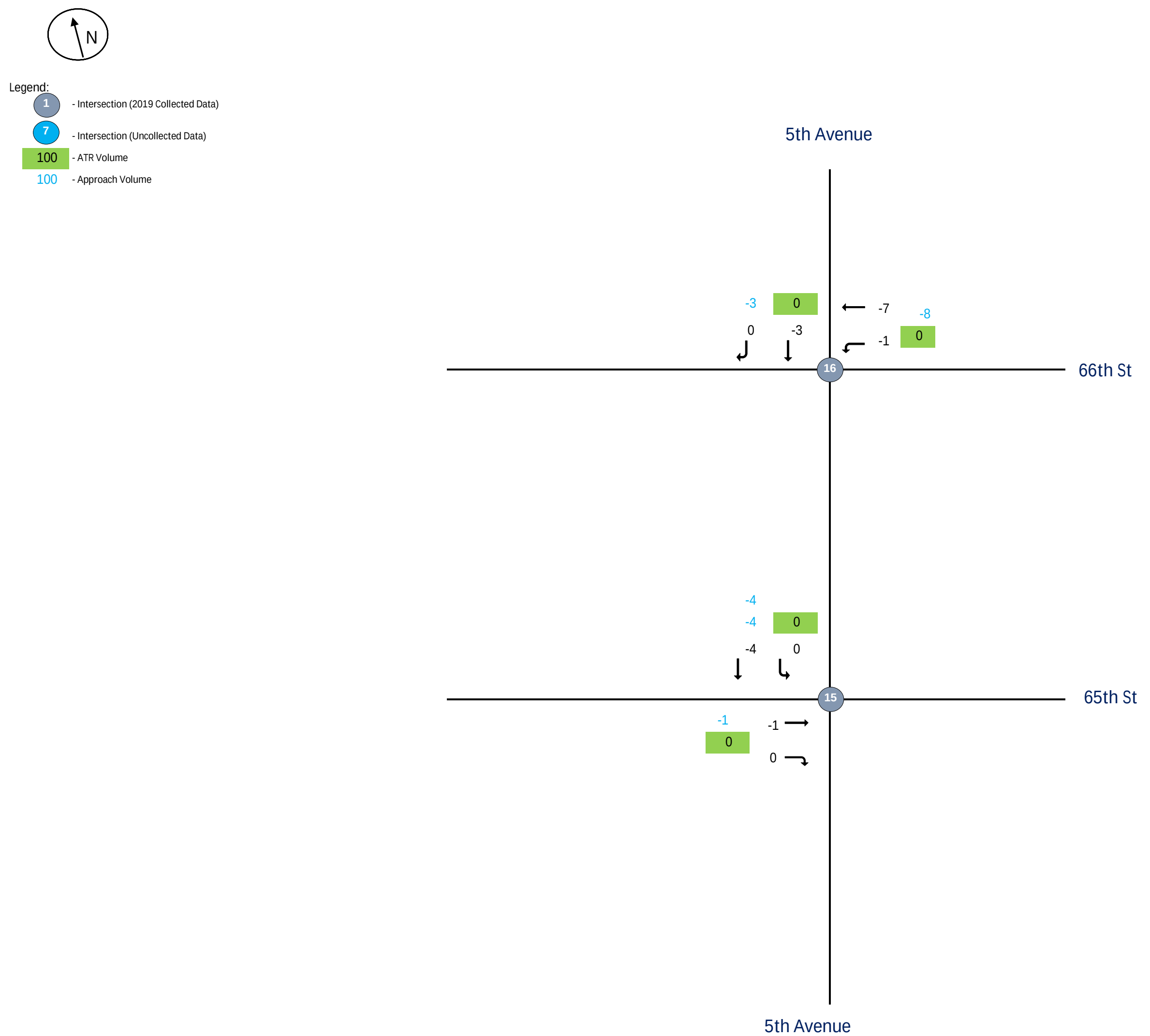
CBD Tolling
UE #1 - Traffic Flowmap
LN No-Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling

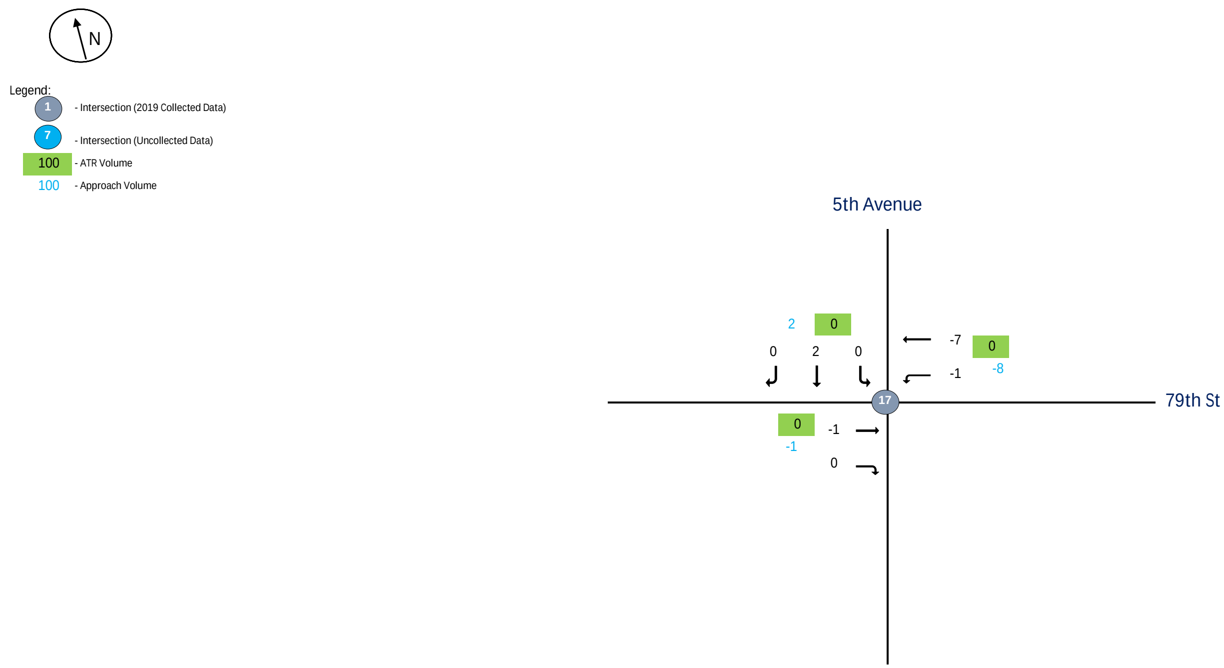
UE #2 - Traffic Flowmap

LN No-Action Increment

CBD Tolling
UE #3 - Traffic Flowmap
LN No-Action Increment



CBD Tolling
UE #3 - Traffic Flowmap
LN No-Action Increment



CBD Tolling

UE #4 - Traffic Flowmap

LN No-Action Increment

N

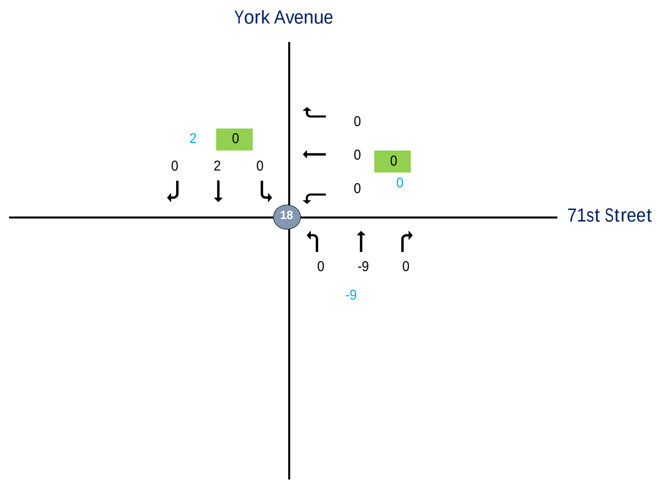
Legend:

1 - Intersection (2019 Collected Data)

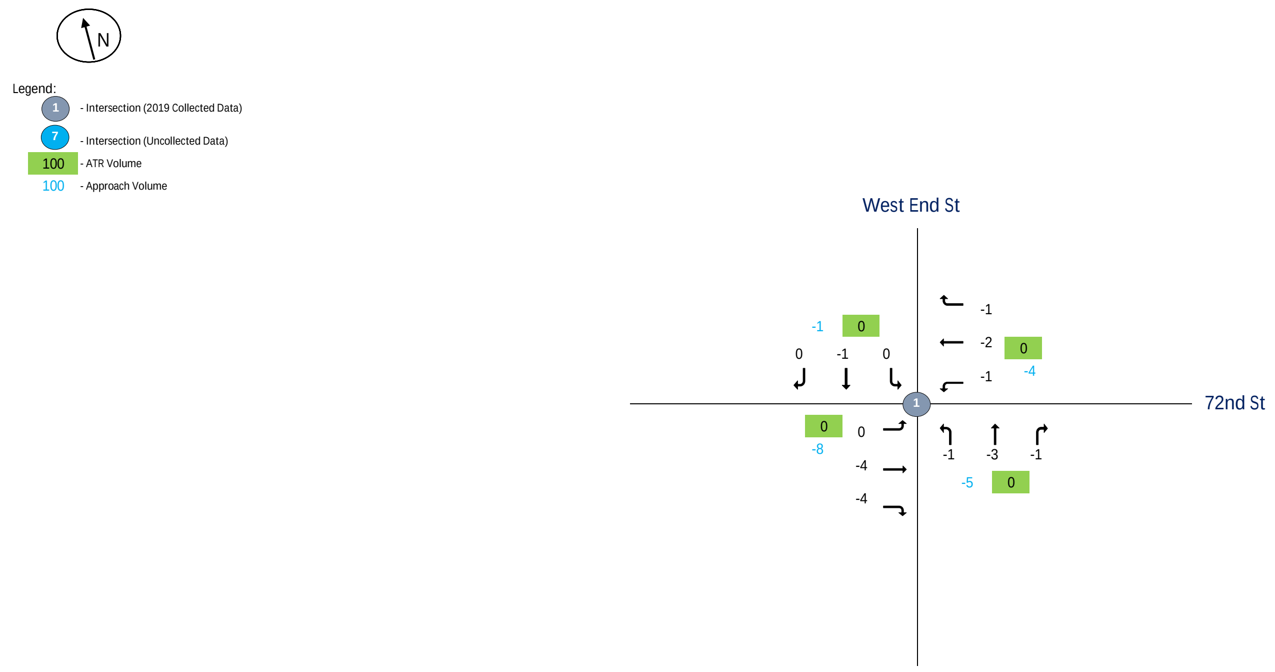
7 - Intersection (Uncollected Data)

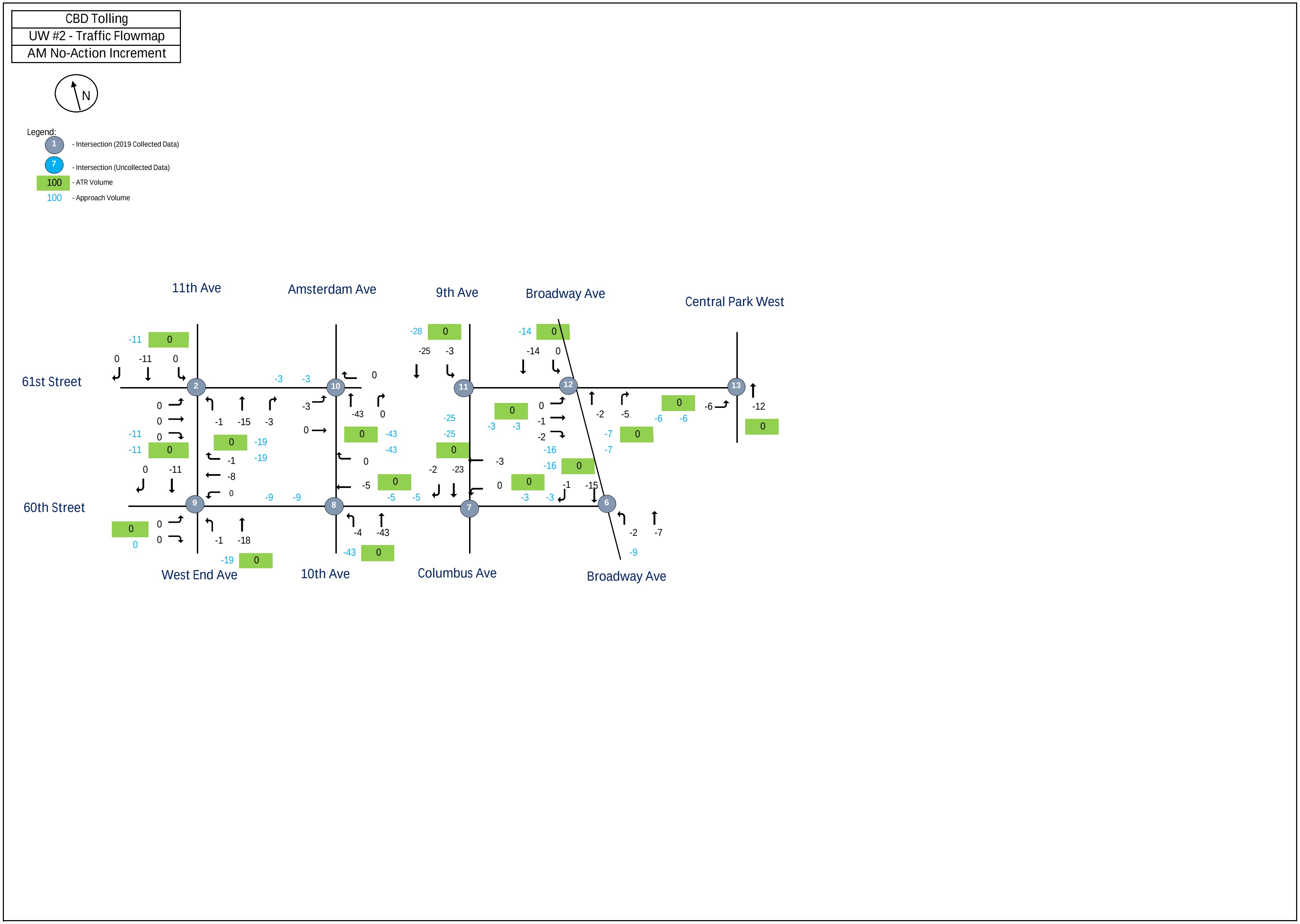
100 - ATR Volume

100 - Approach Volume

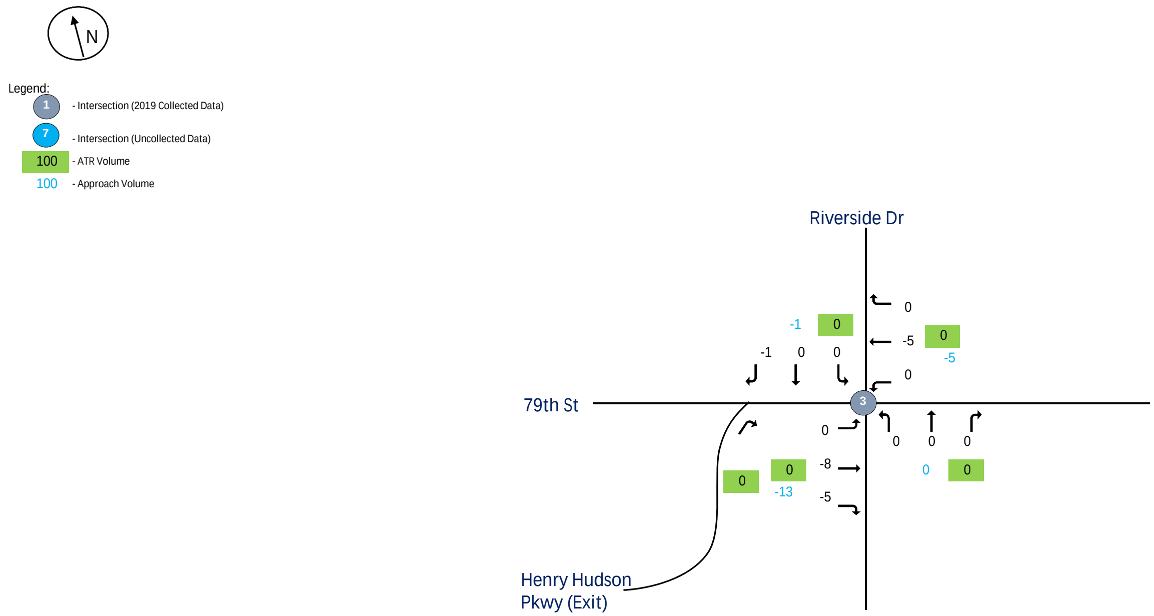


CBD Tolling
UW #1 - Traffic Flowmap
AM No-Action Increment

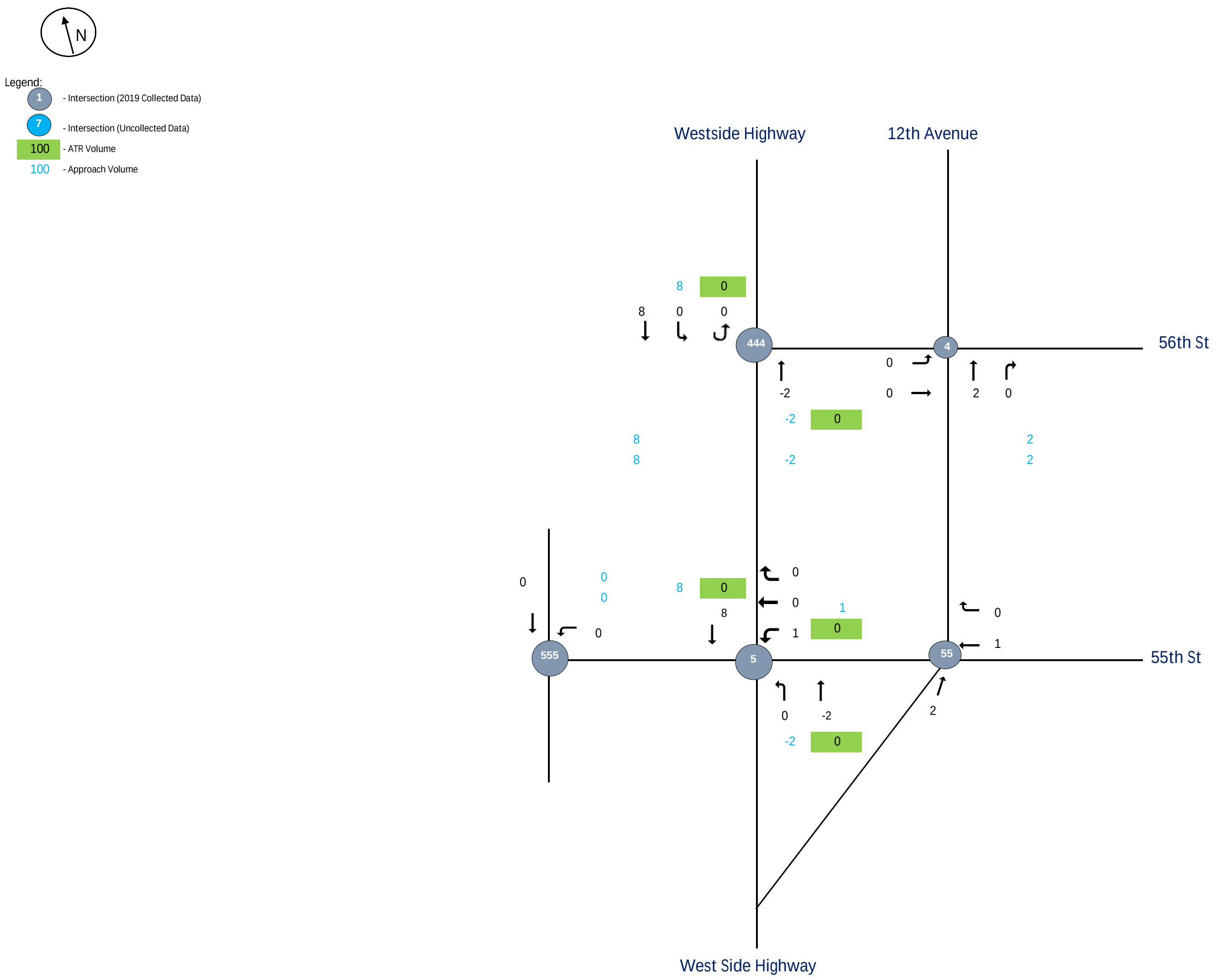



CBD Tolling
UW #2 - Traffic Flowmap
AM No-Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
11th Ave
Amsterdam Ave
9th Ave
Broadway Ave
Central Park West
61st Street
60th Street
West End Ave
10th Ave
Columbus Ave
Broadway Ave

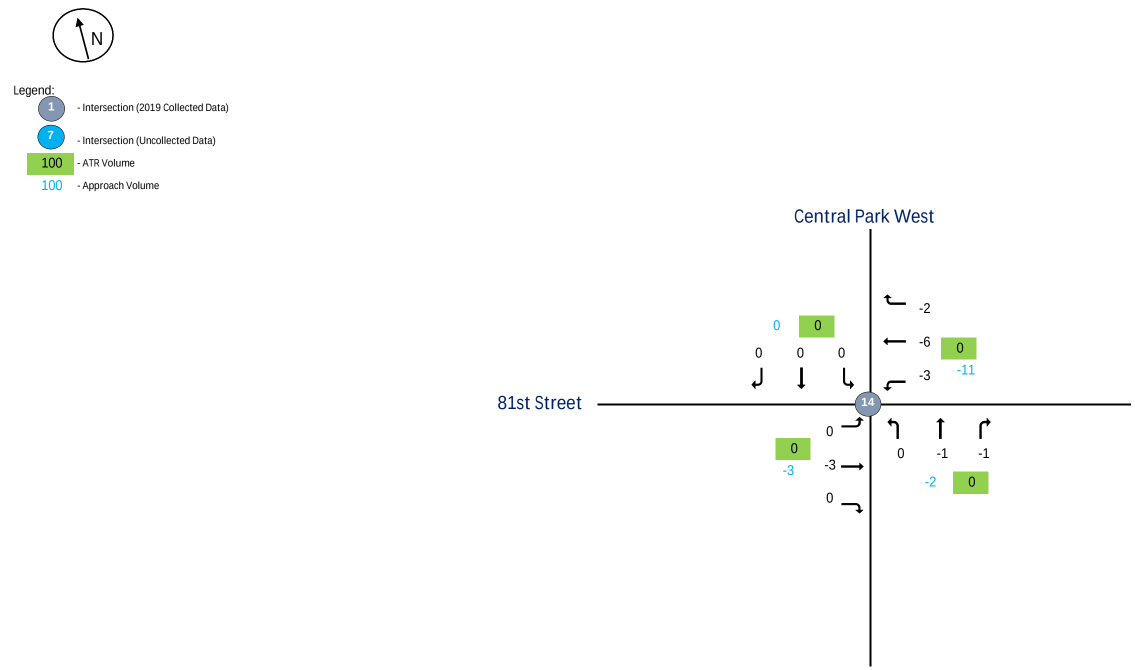
CBD Tolling
UW #3 - Traffic Flowmap
AM No-Action Increment

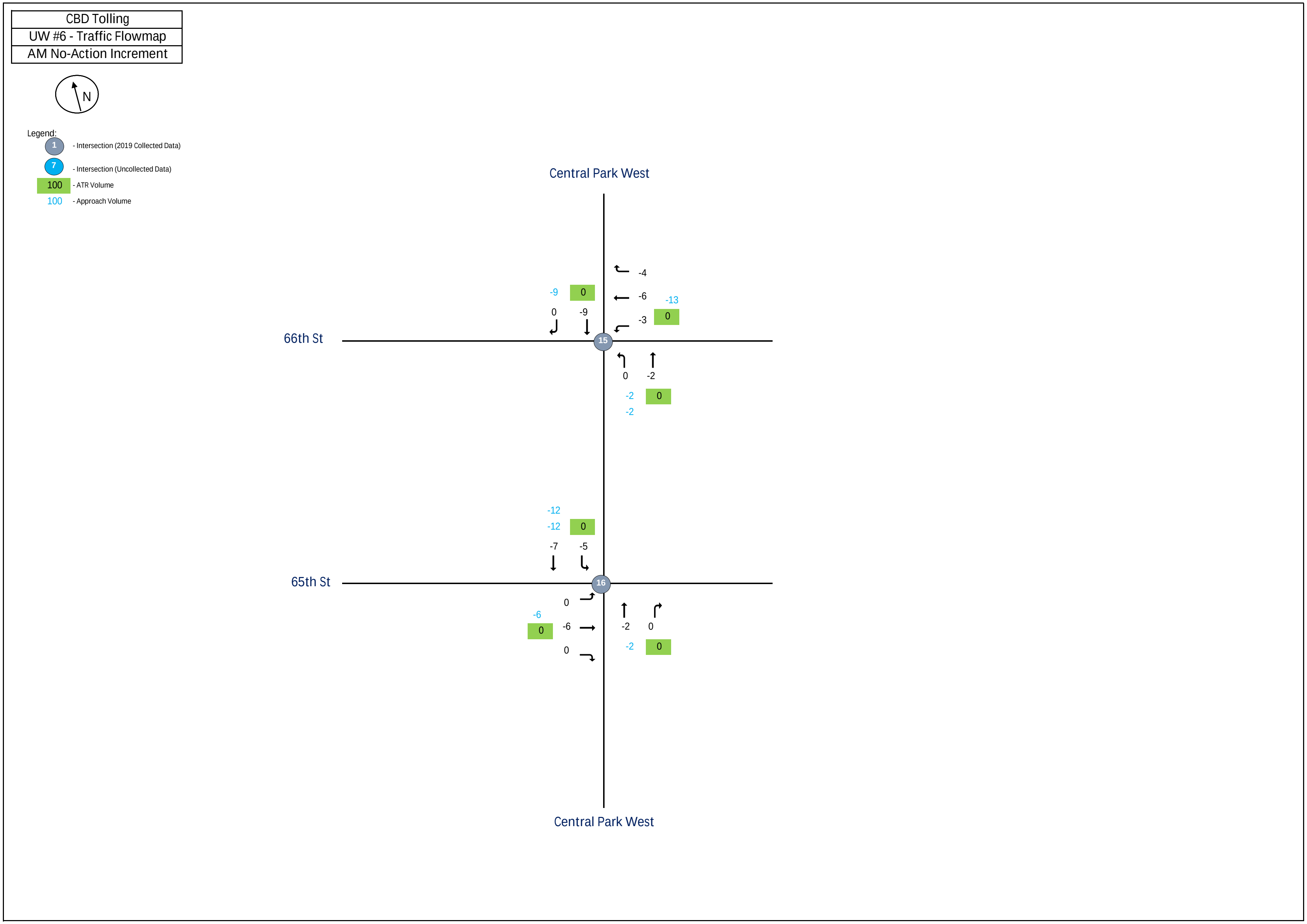


CBD Tolling
UW #4 - Traffic Flowmap
AM No-Action Increment



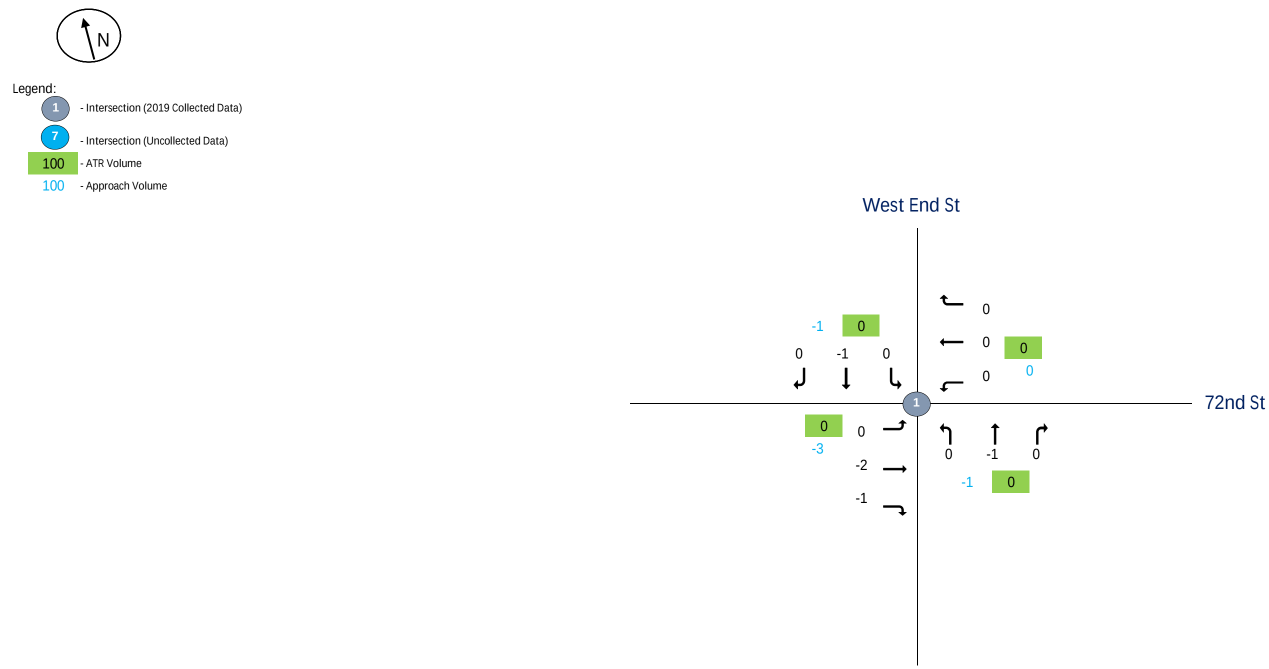
CBD Tolling
UW #5 - Traffic Flowmap
AM No-Action Increment



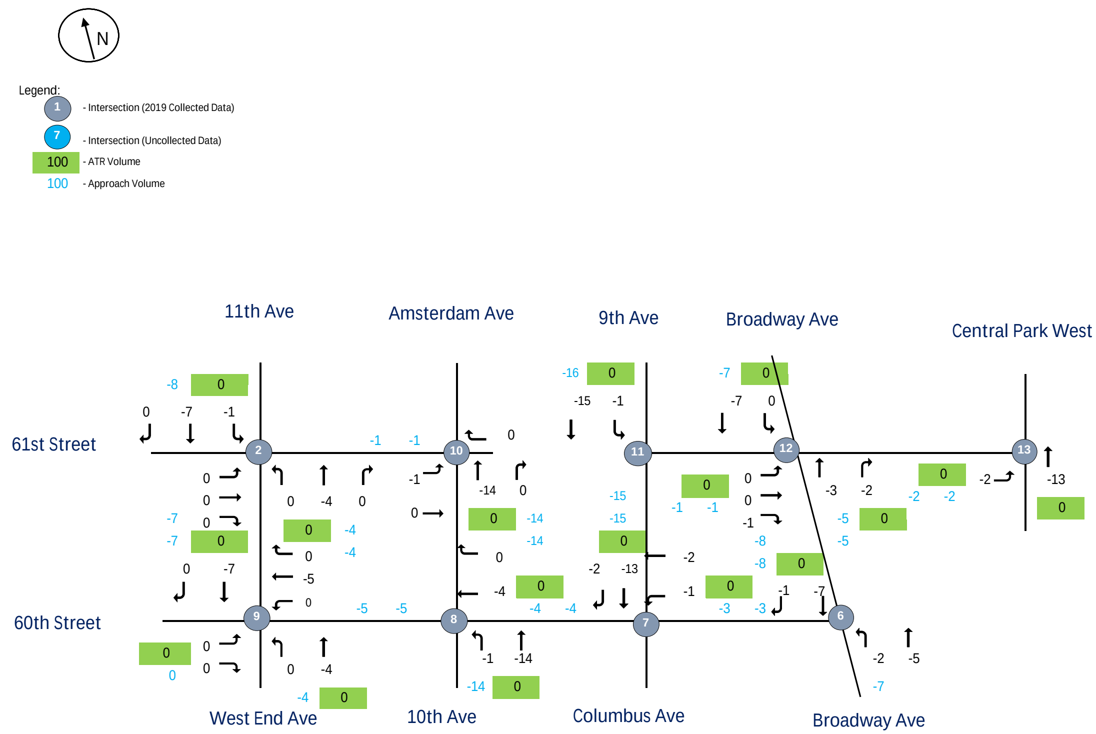


CBD Tolling
UW #6 - Traffic Flowmap
AM No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Central Park West
66th St
-4
-9
0
-6
-13
0
-9
-3
0
15
0
-2
-2
0
-2
-12
-12
0
-7
-5
65th St
16
0
-6
-6
0
-2
0
0
-2
0
Central Park West

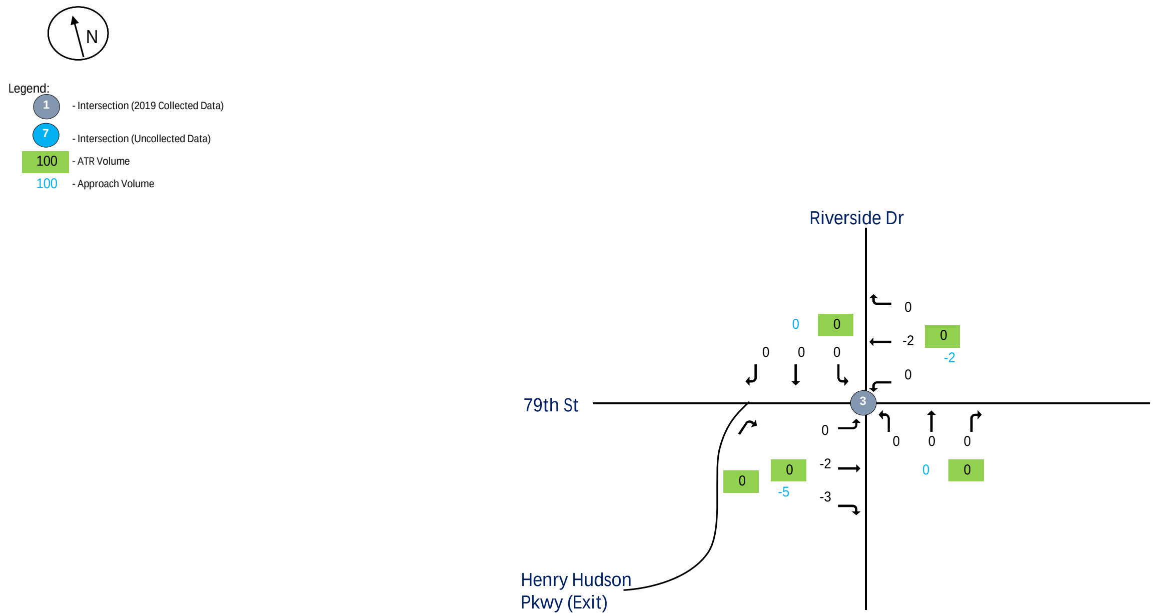
CBD Tolling
UW #1 - Traffic Flowmap
MD No-Action Increment



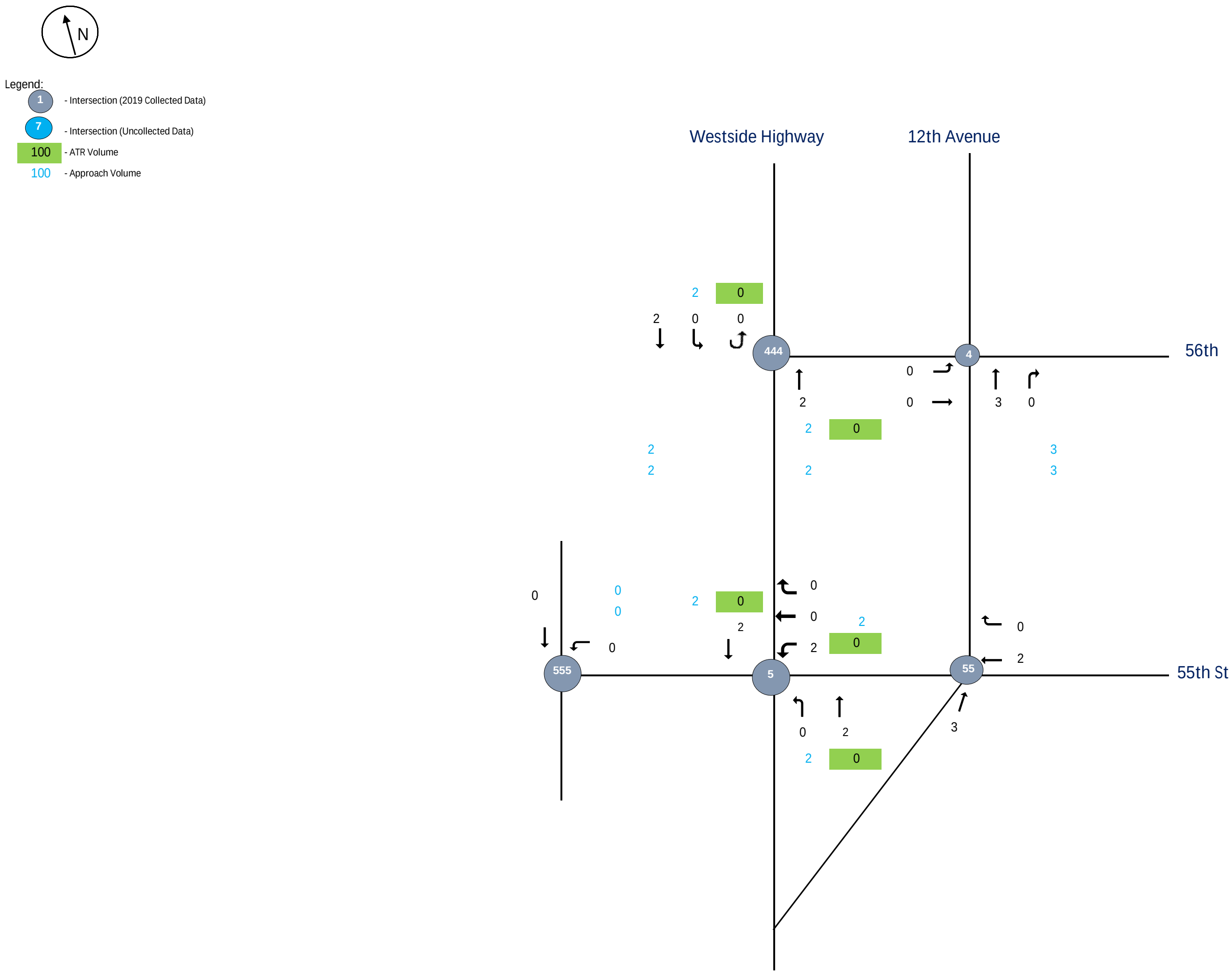
CBD Tolling
UW #2 - Traffic Flowmap
MD No-Action Increment



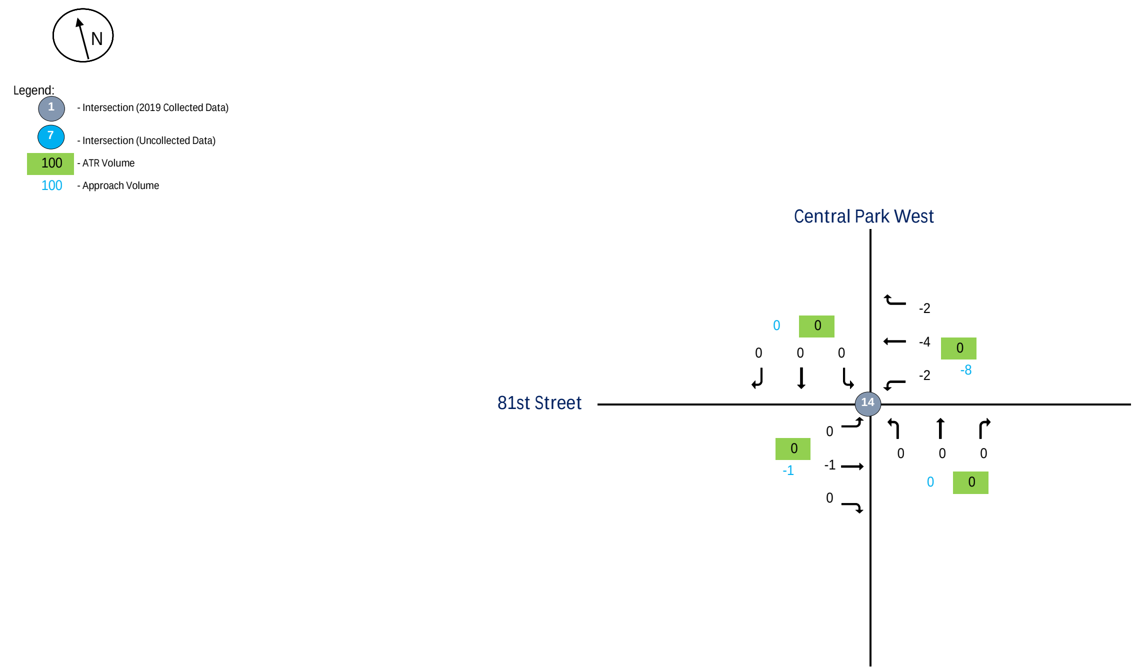
CBD Tolling
UW #3 - Traffic Flowmap
MD No-Action Increment



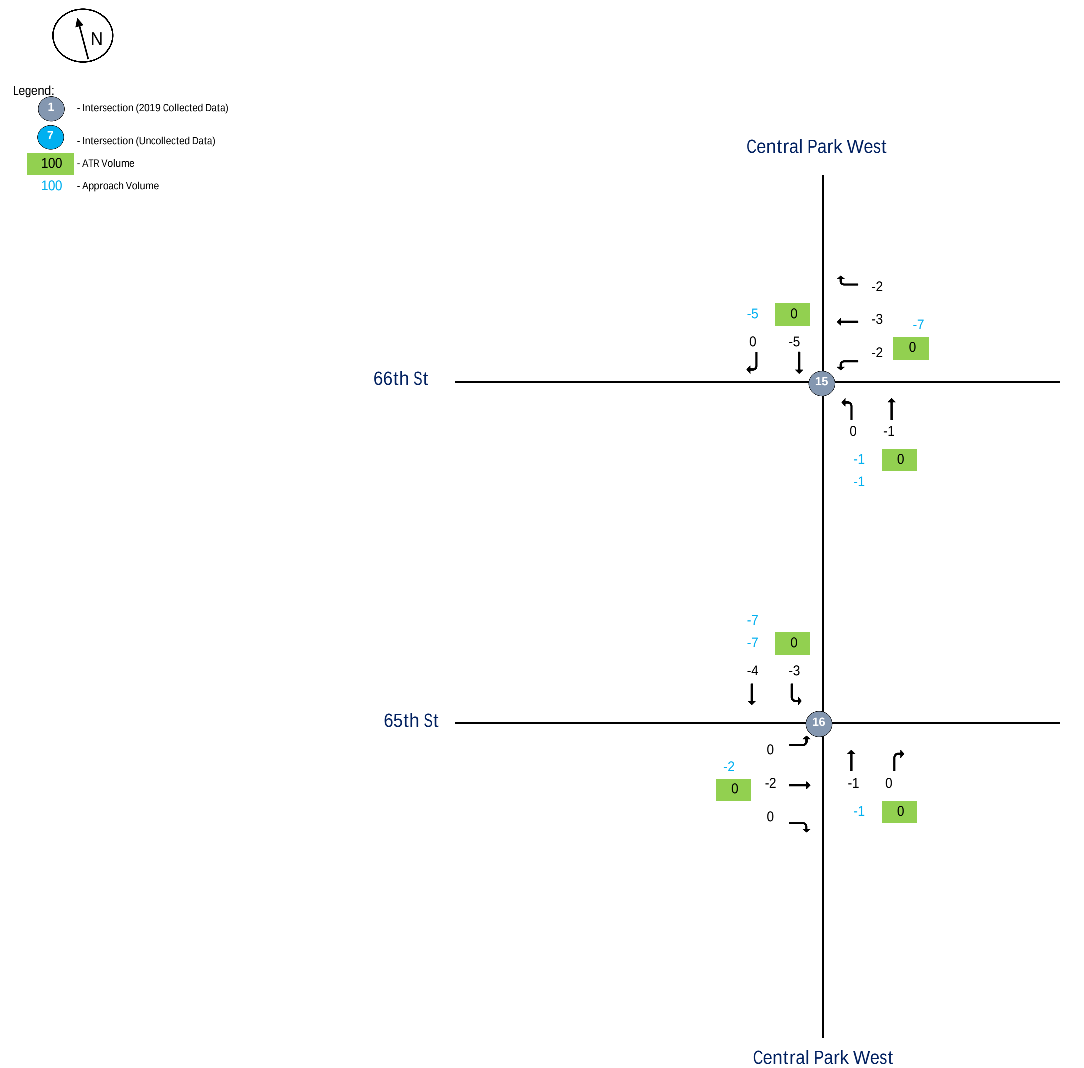
CBD Tolling
UW #4 - Traffic Flowmap
MD No-Action Increment



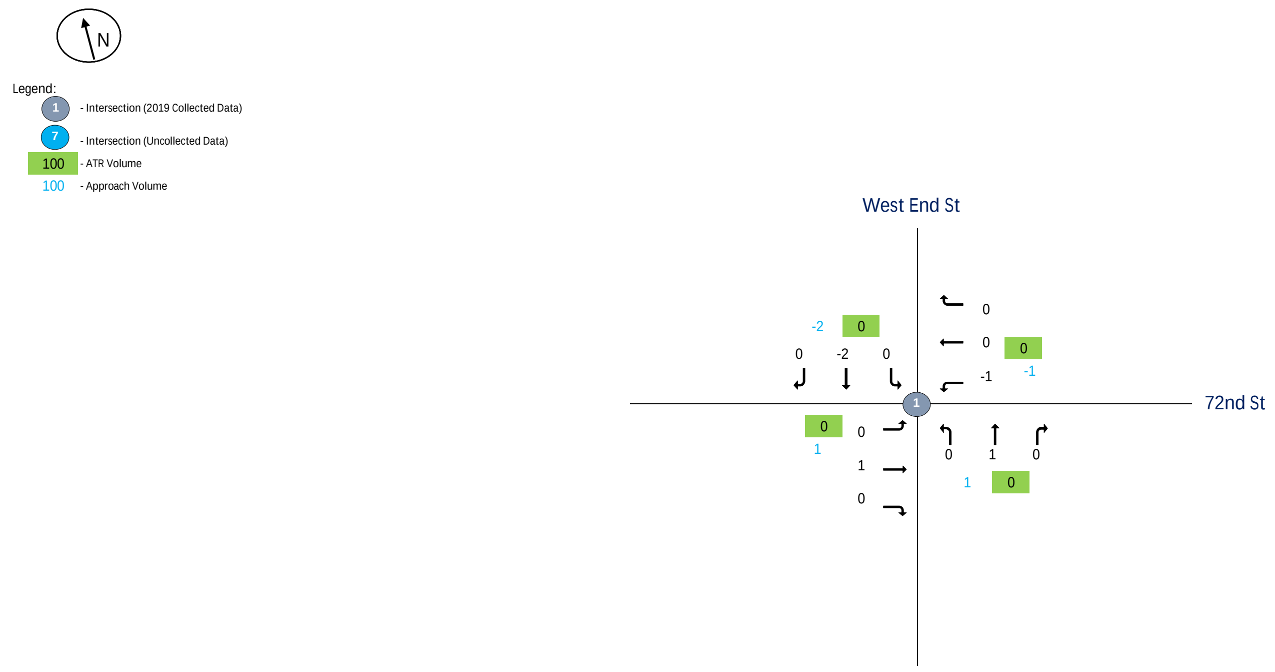
CBD Tolling
UW #5 - Traffic Flowmap
MD No-Action Increment



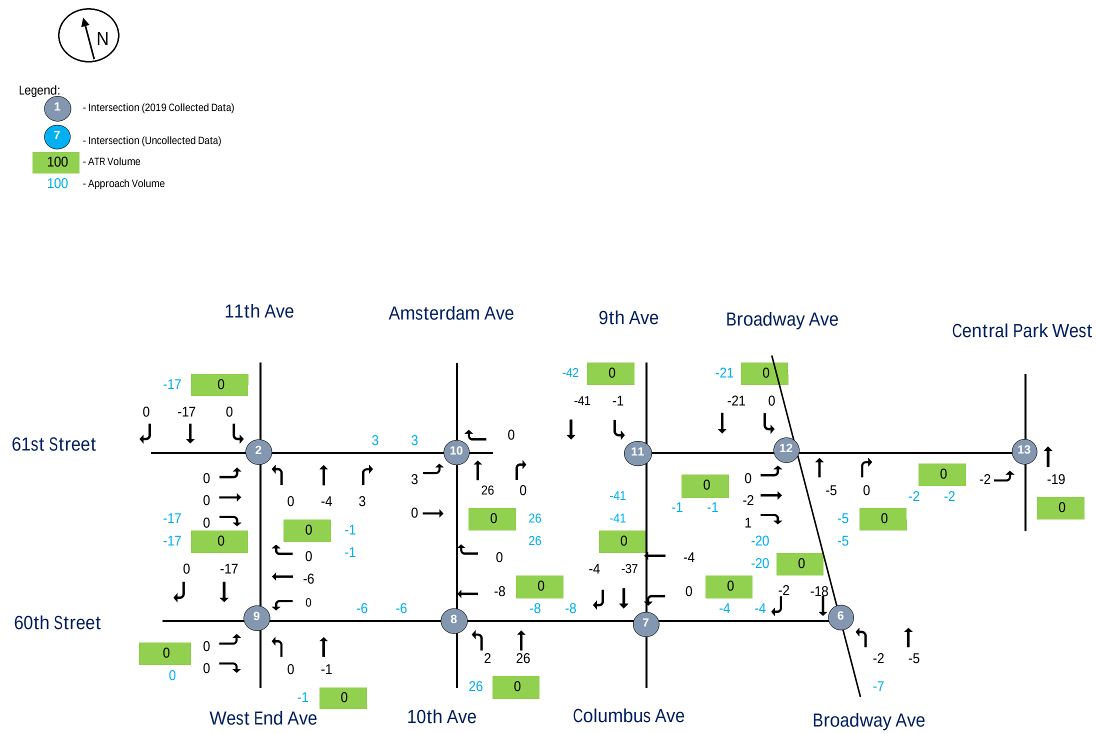
CBD Tolling
UW #6 - Traffic Flowmap
MD No-Action Increment



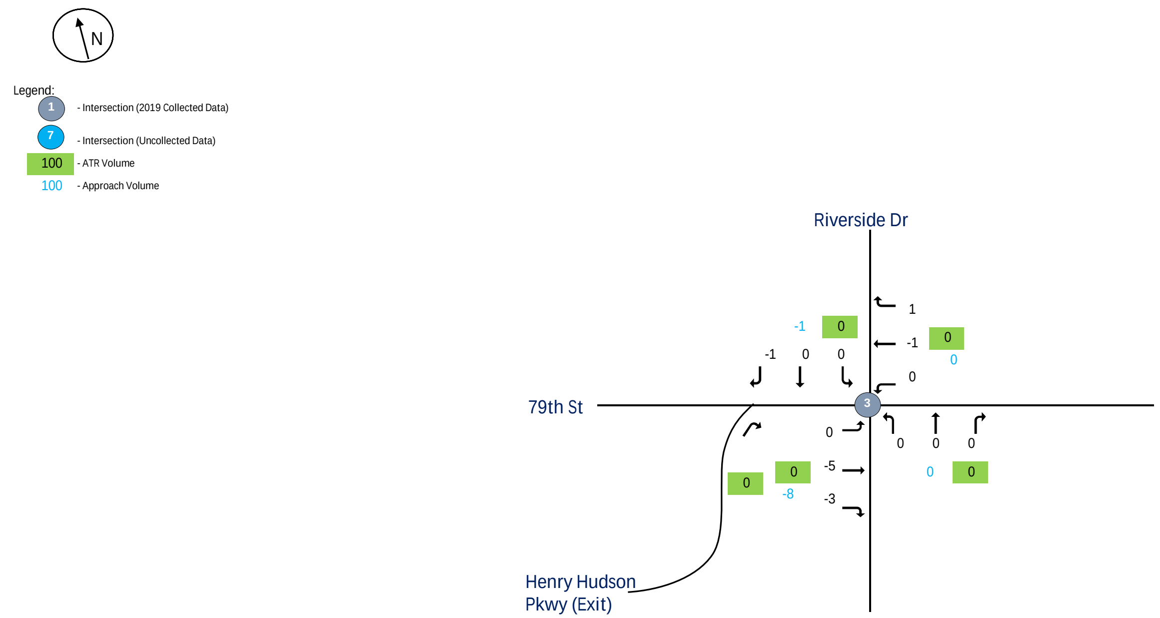
CBD Tolling
UW #1 - Traffic Flowmap
PM No-Action Increment

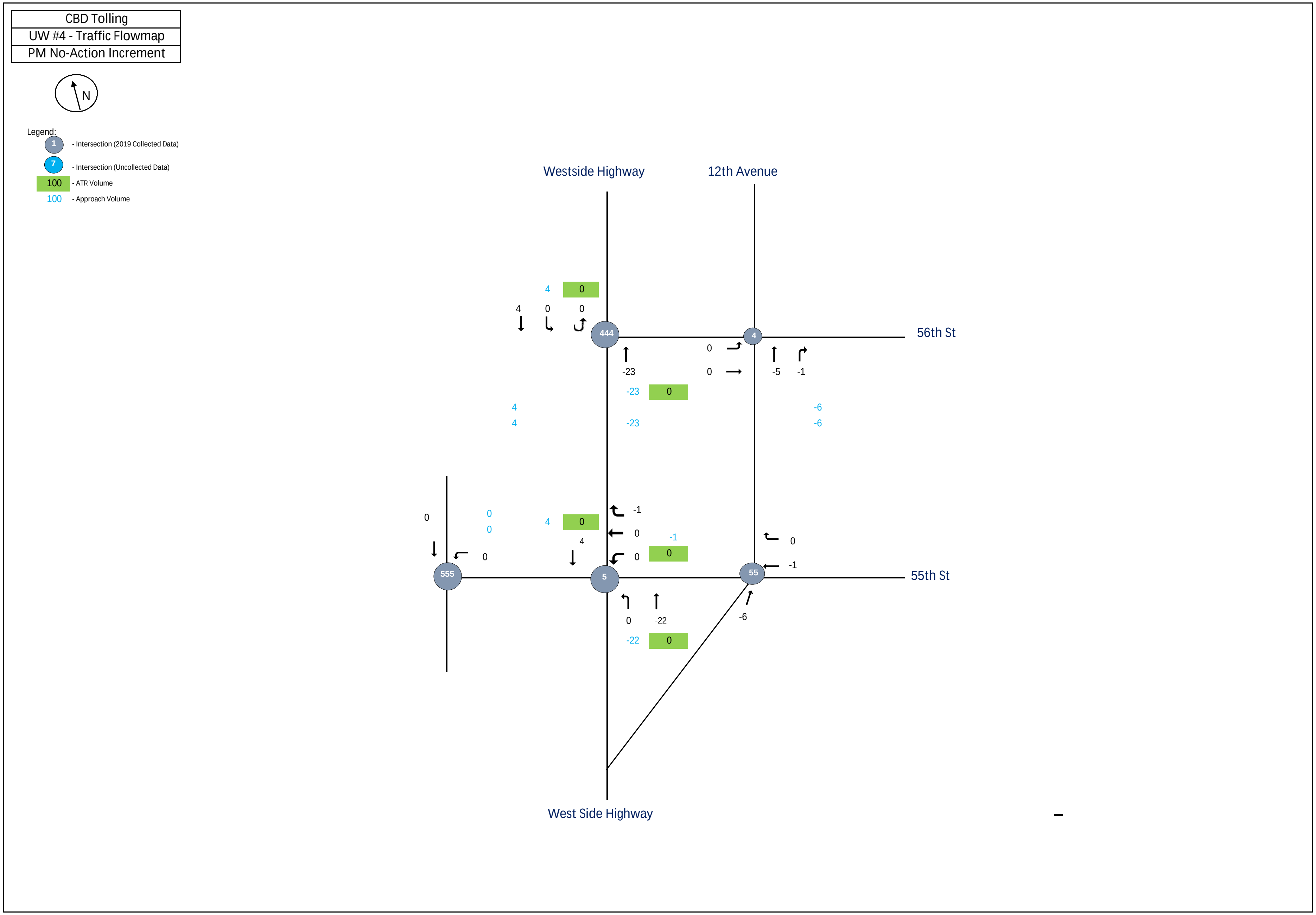


CBD Tolling
UW #2 - Traffic Flowmap
PM No-Action Increment

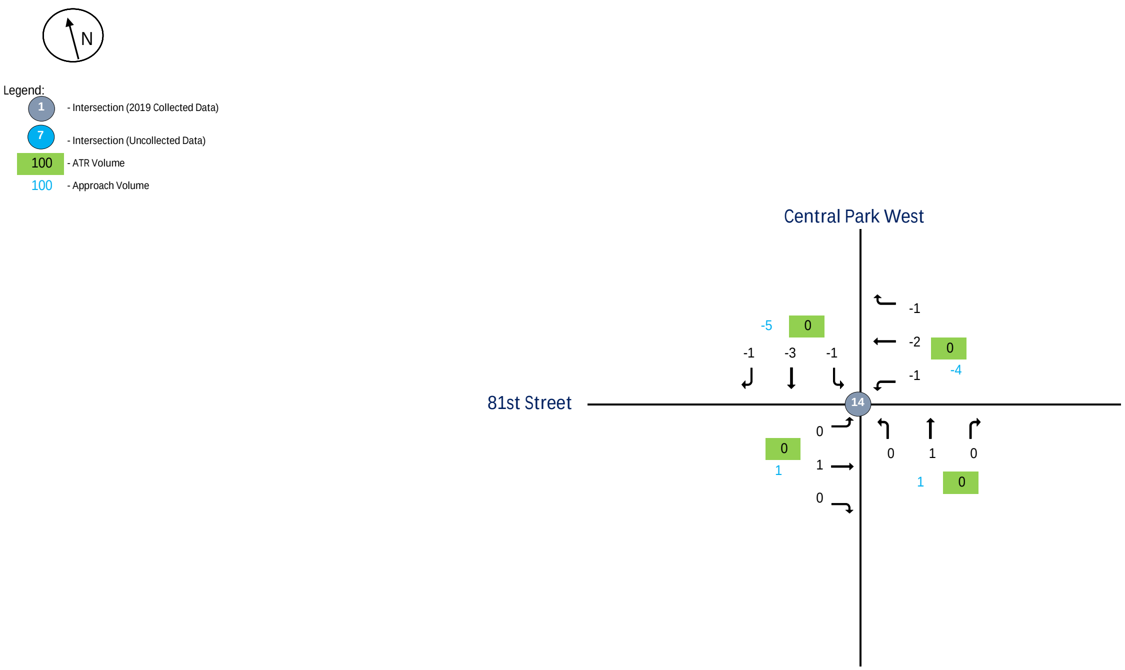


CBD Tolling
UW #3 - Traffic Flowmap
PM No-Action Increment

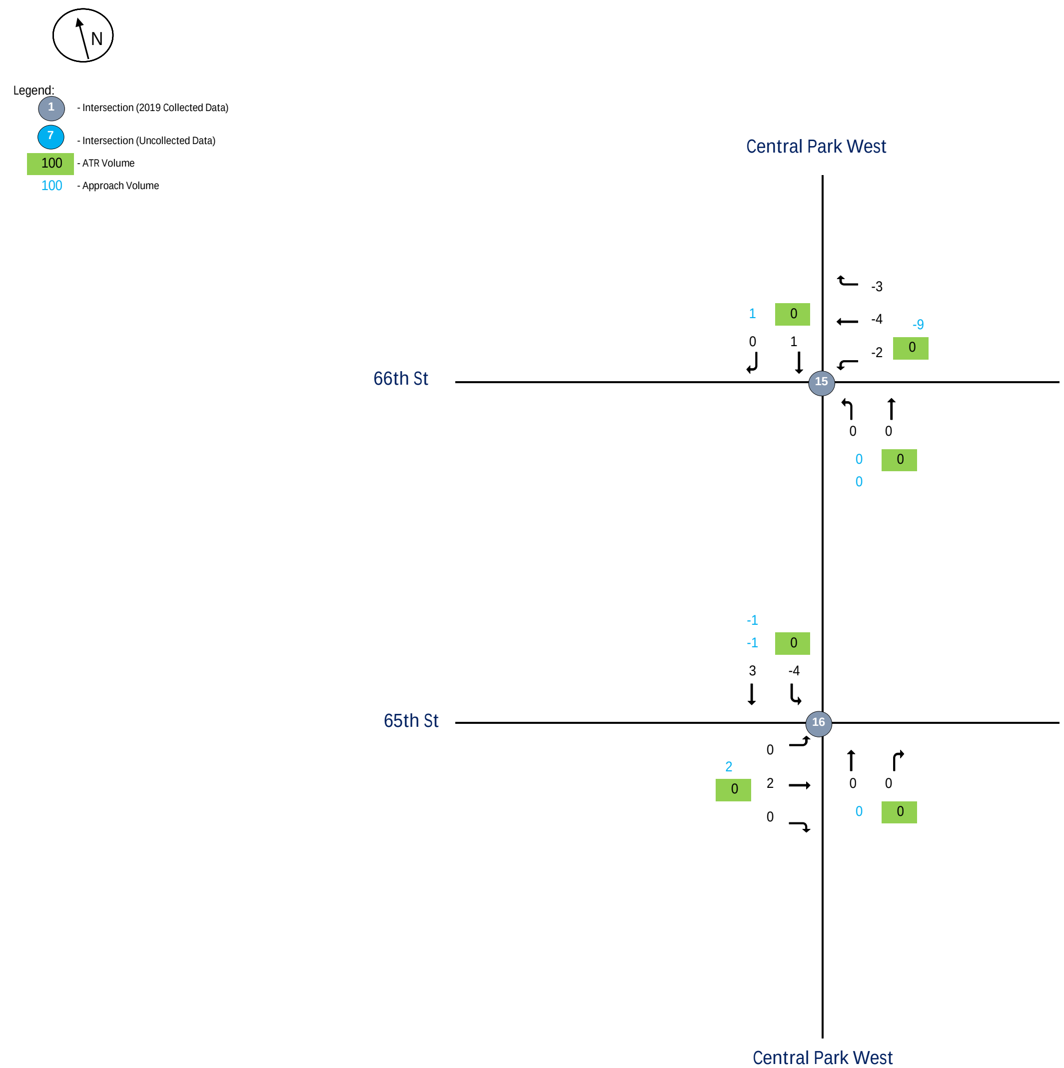



CBD Tolling
UW #4 - Traffic Flowmap
PM No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
444
4
5
55
555
4
0
4
0
0
-23
-23
0
0
0
-5
-1
4
4
-23
-6
-6
0
0
0
4
0
-1
0
-1
0
4
0
0
0
-1
0
-22
-6
-22
0

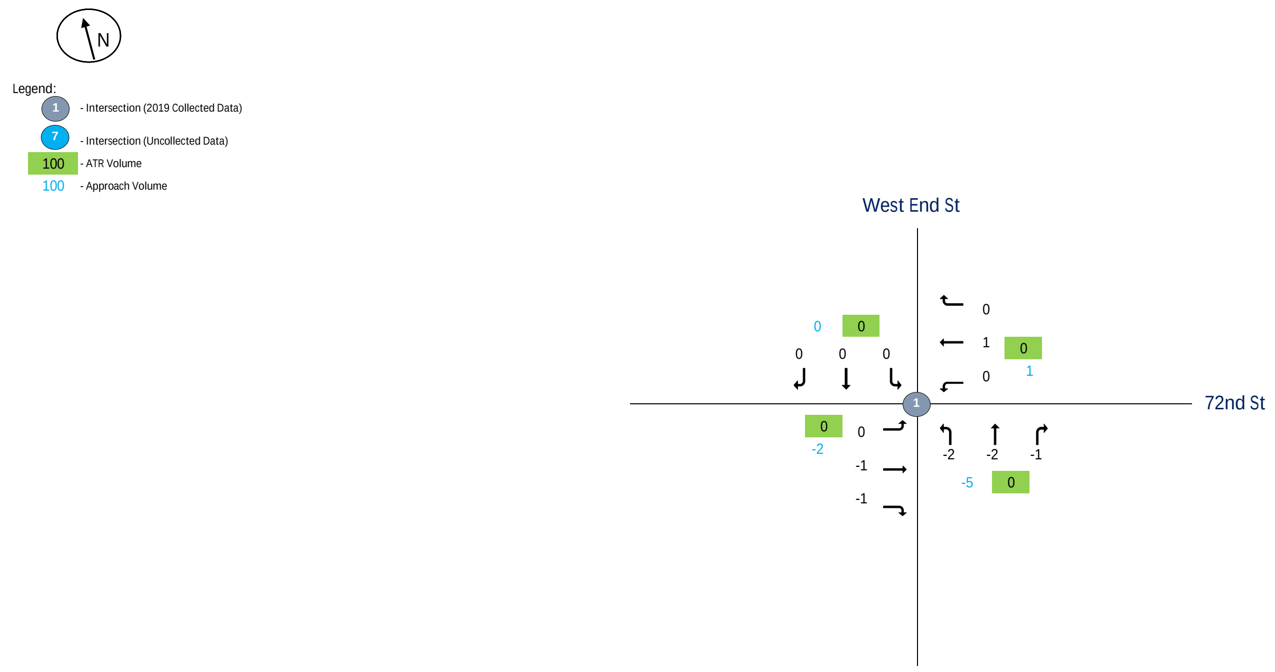
CBD Tolling
UW #5 - Traffic Flowmap
PM No-Action Increment



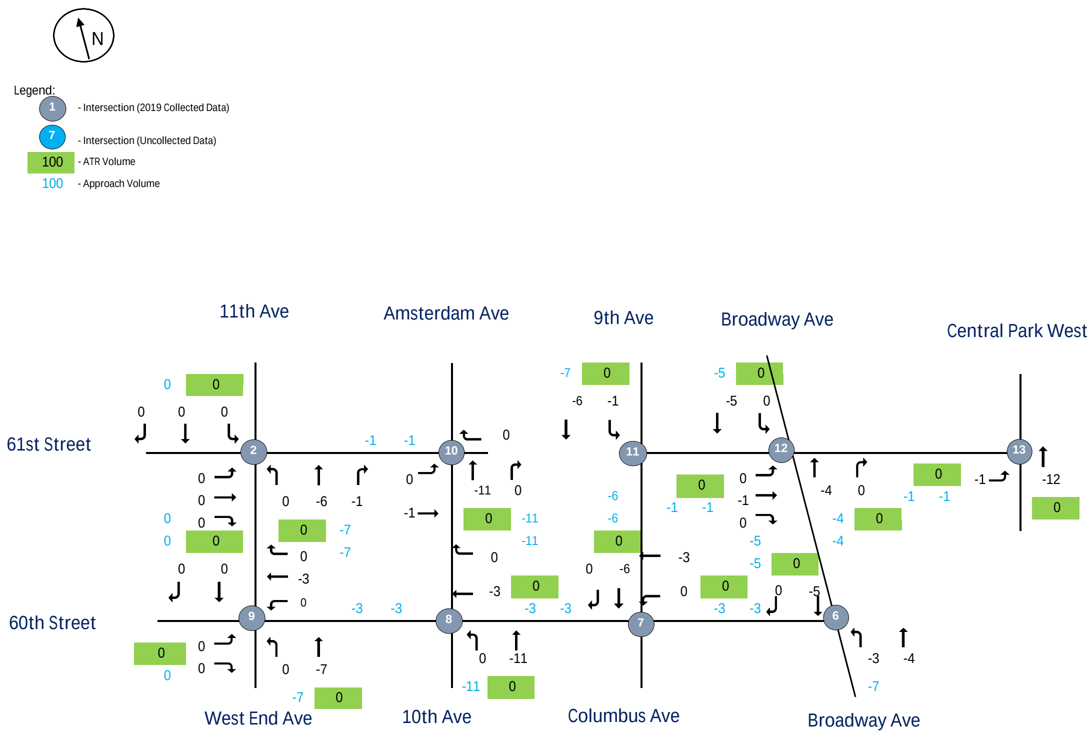
CBD Tolling
UW #6 - Traffic Flowmap
PM No-Action Increment



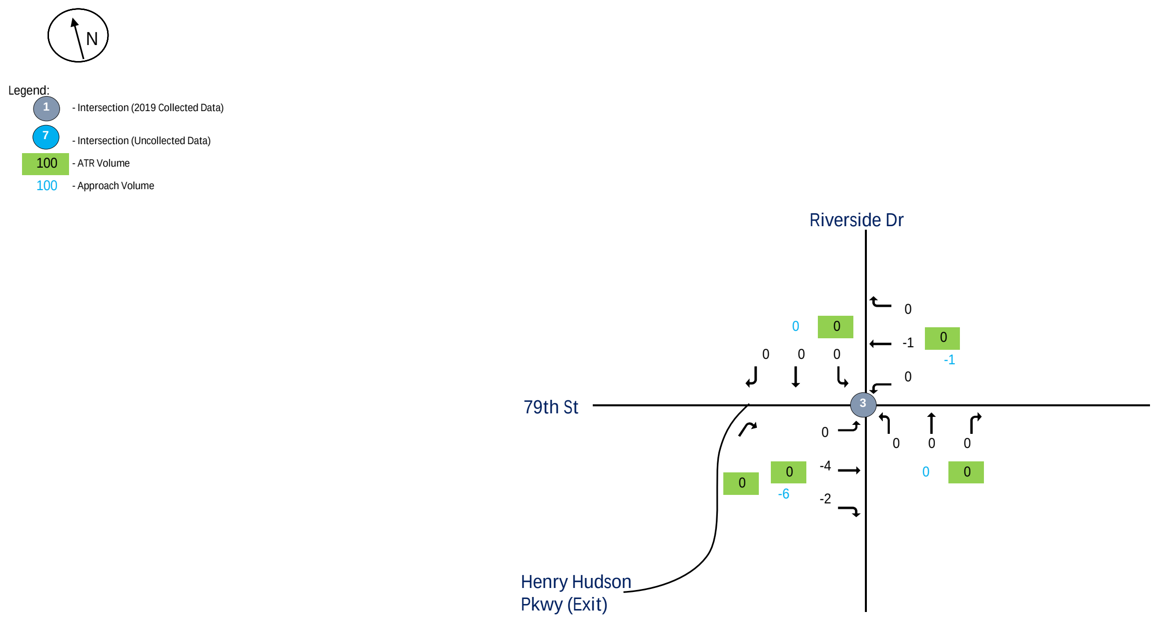
CBD Tolling
UW #1 - Traffic Flowmap
LN No-Action Increment



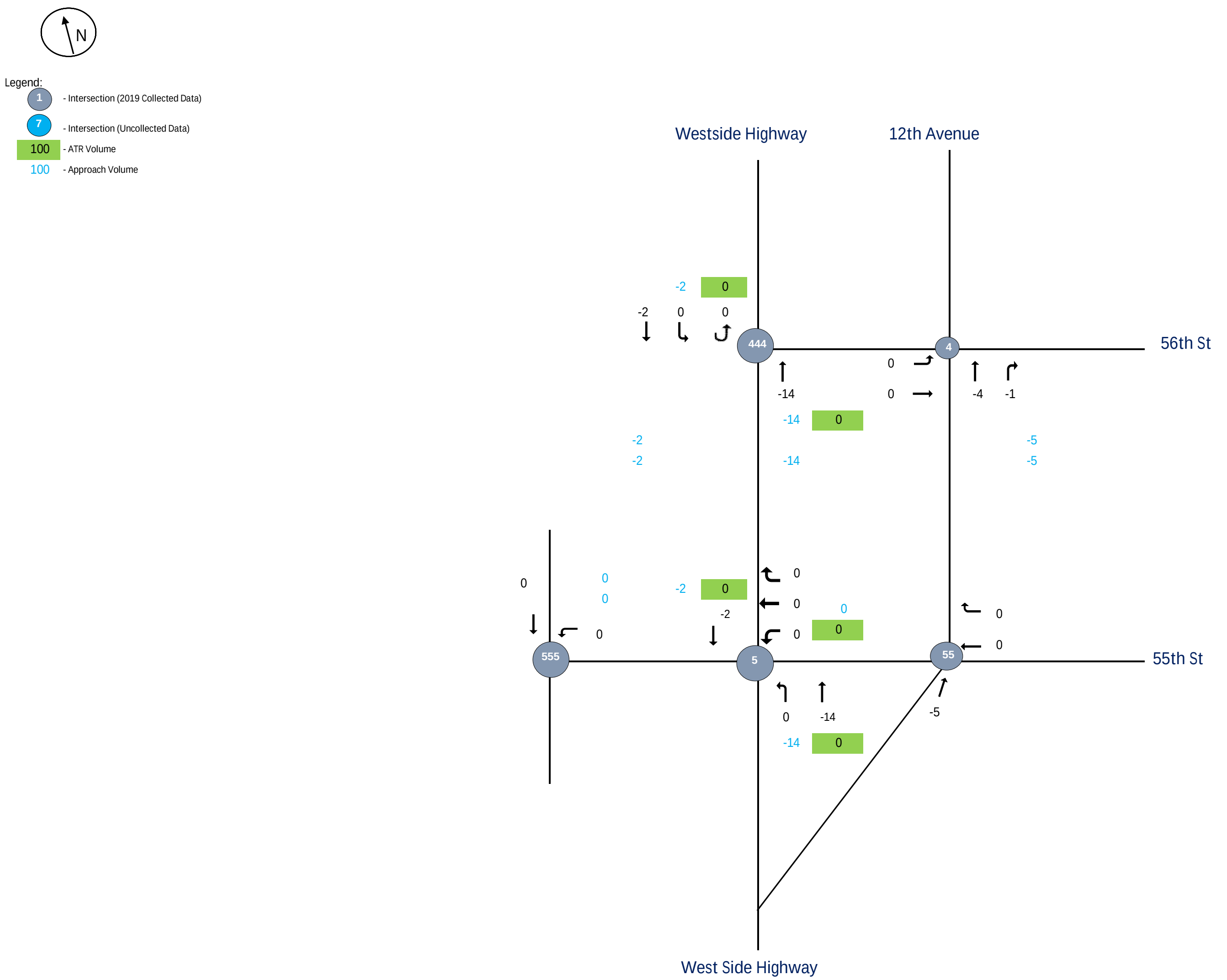
CBD Tolling
UW #2 - Traffic Flowmap
LN No-Action Increment



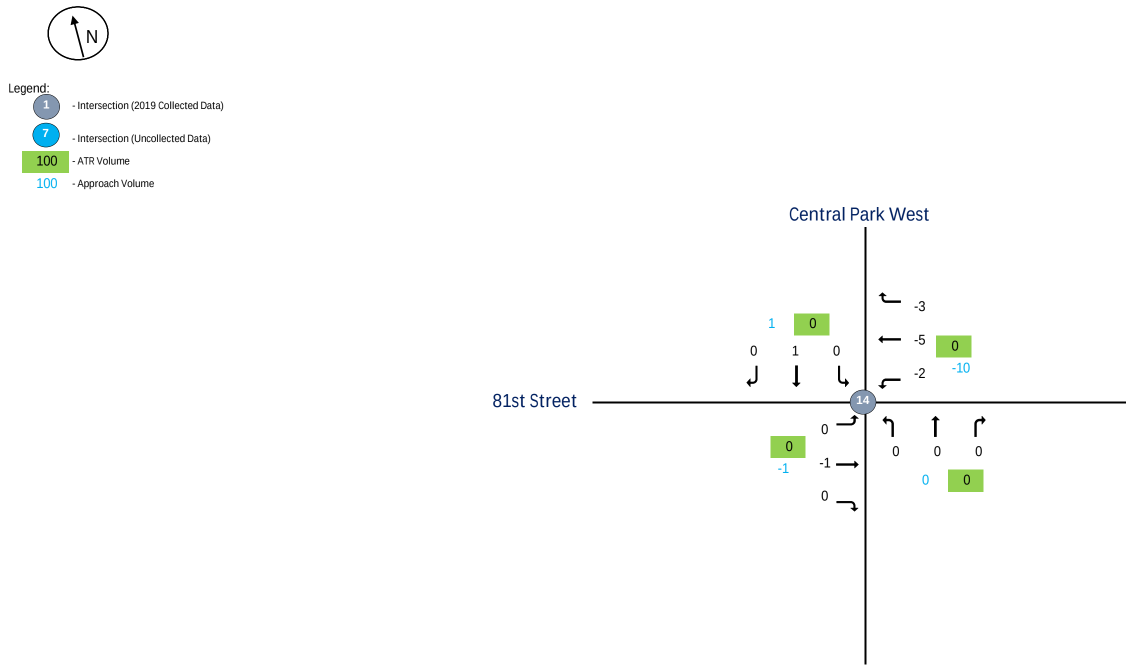
CBD Tolling
UW #3 - Traffic Flowmap
LN No-Action Increment



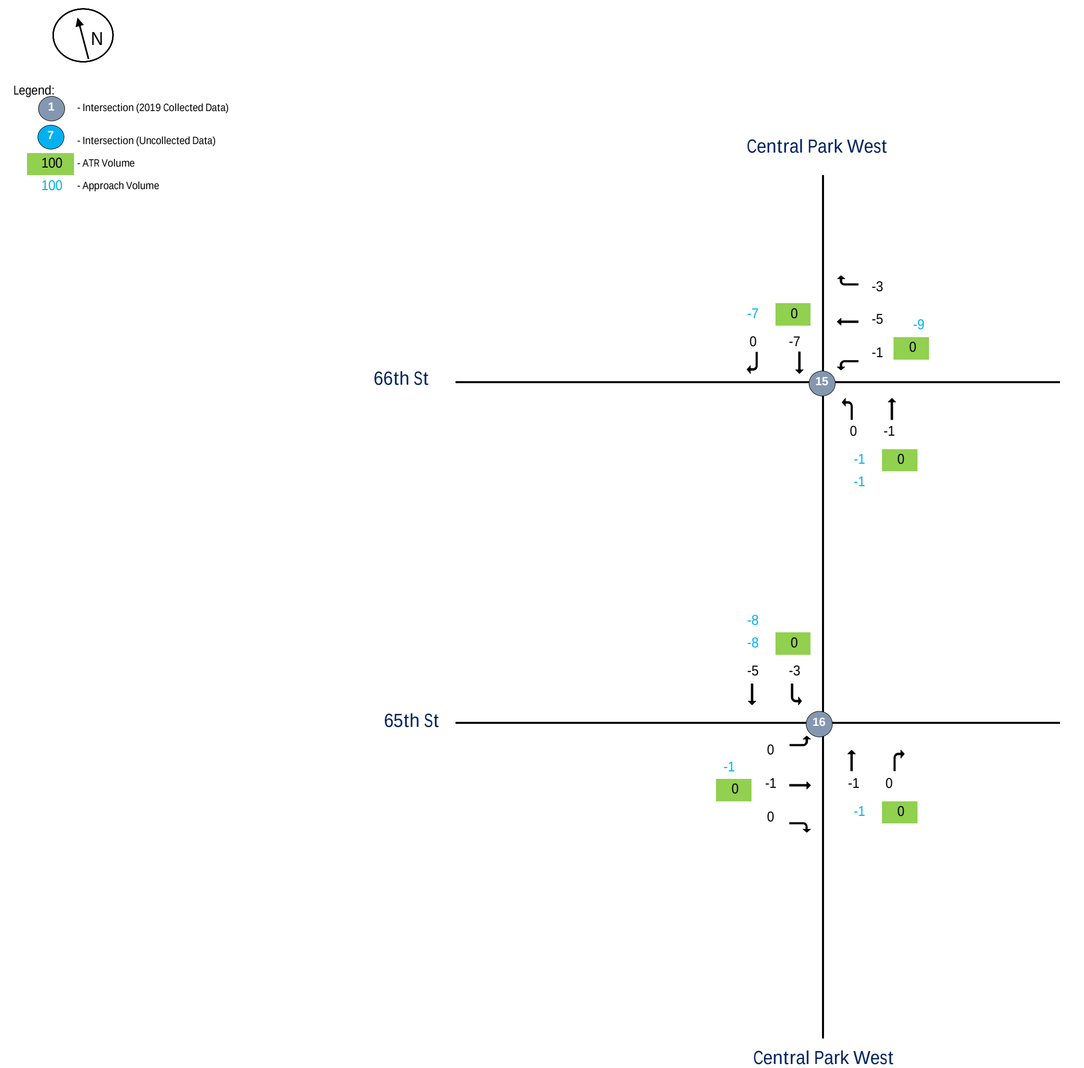
CBD Tolling
UW #4 - Traffic Flowmap
LN No-Action Increment



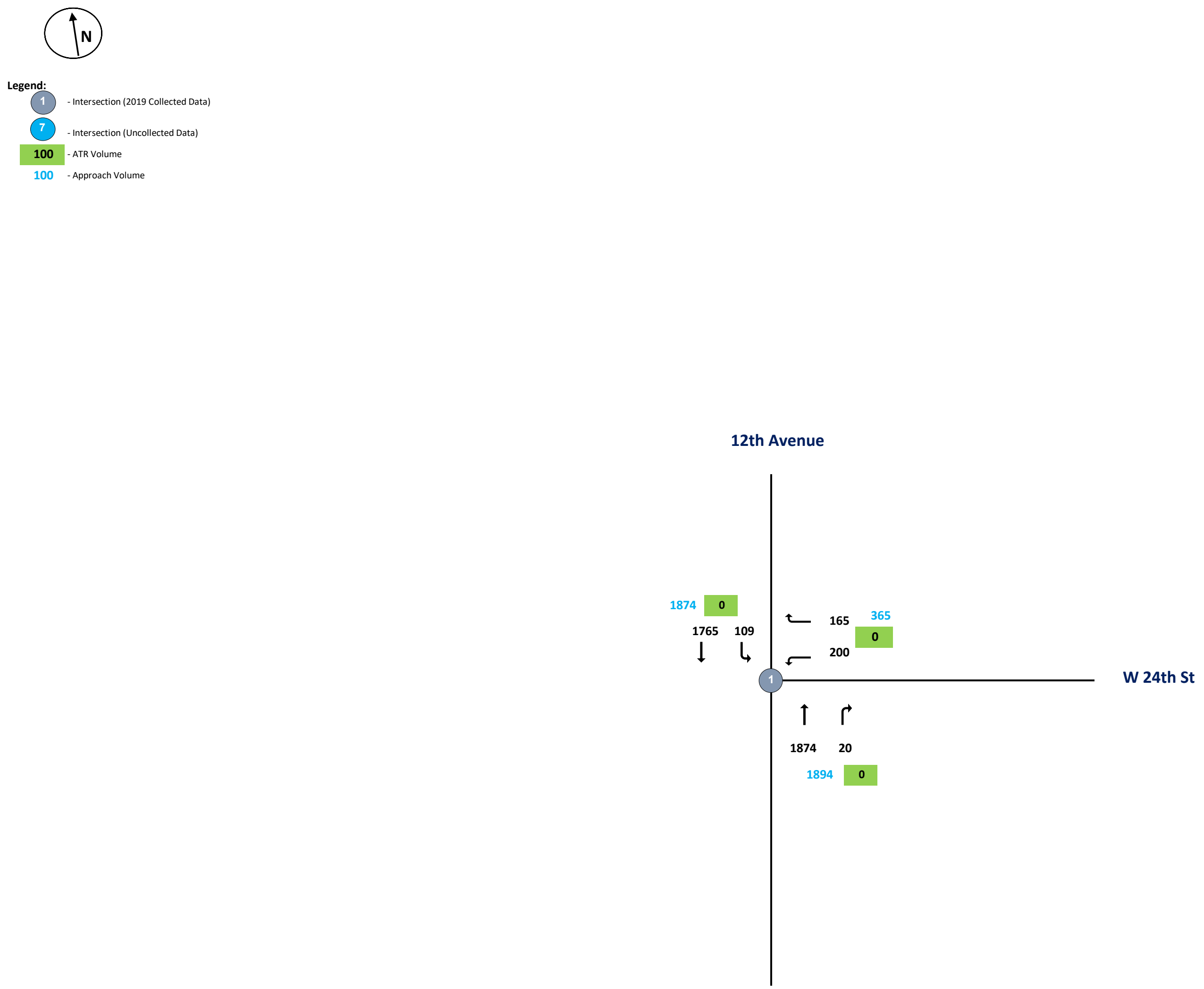
CBD Tolling
UW #5 - Traffic Flowmap
LN No-Action Increment



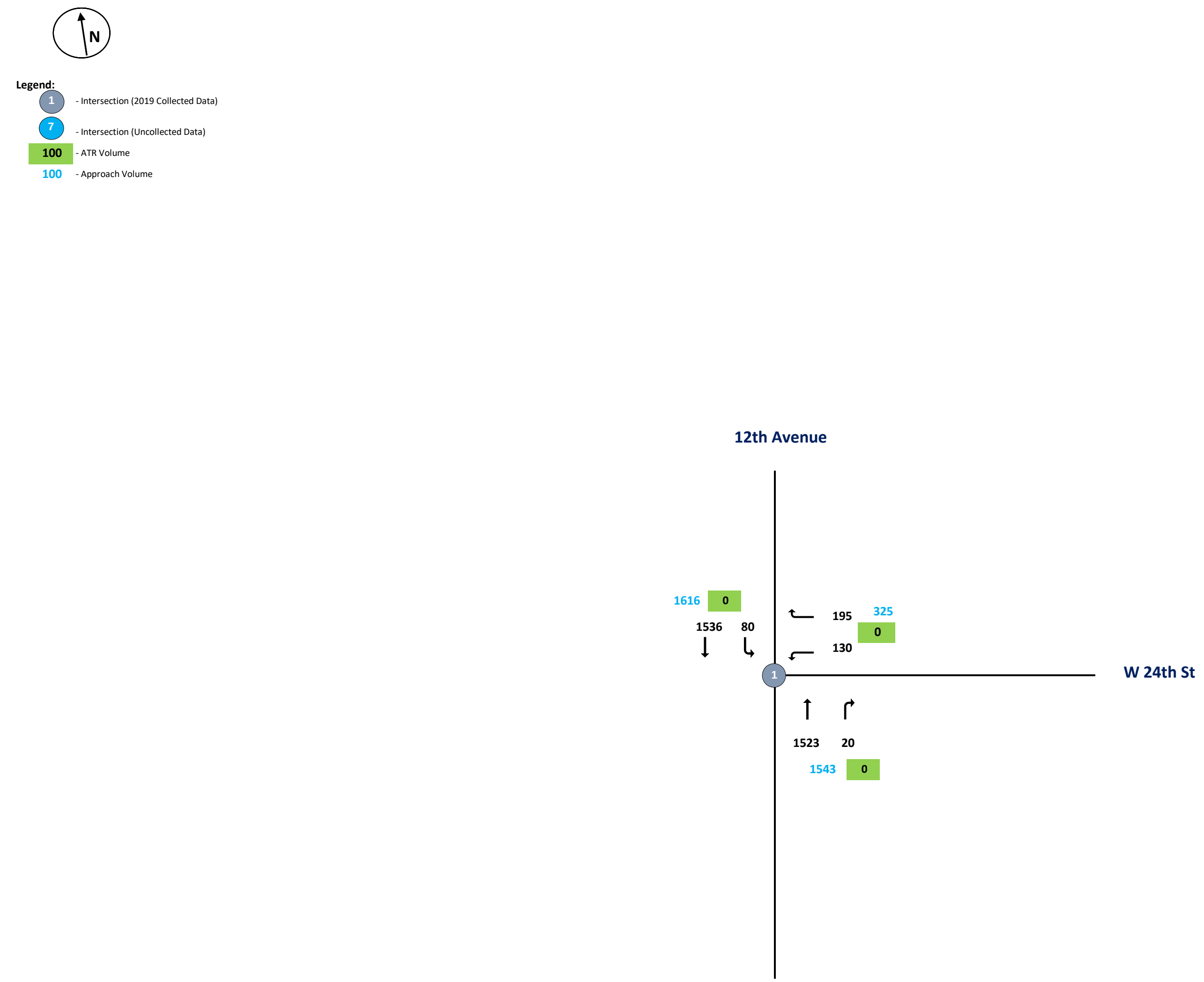
CBD Tolling
UW #6 - Traffic Flowmap
LN No-Action Increment



CBD Tolling
9A - Traffic Flowmap
AM No Action



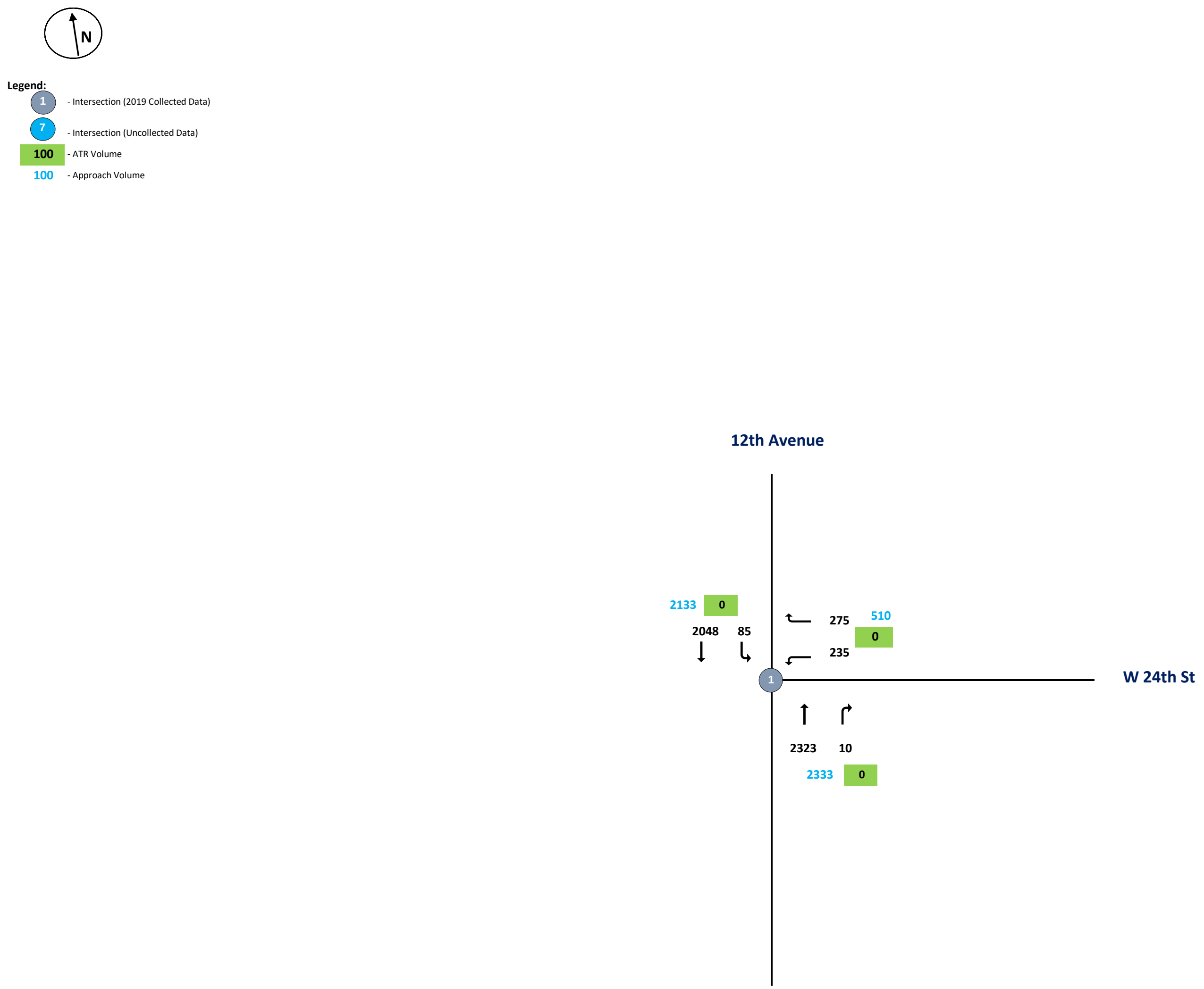
CBD Tolling
9A - Traffic Flowmap
MD No Action



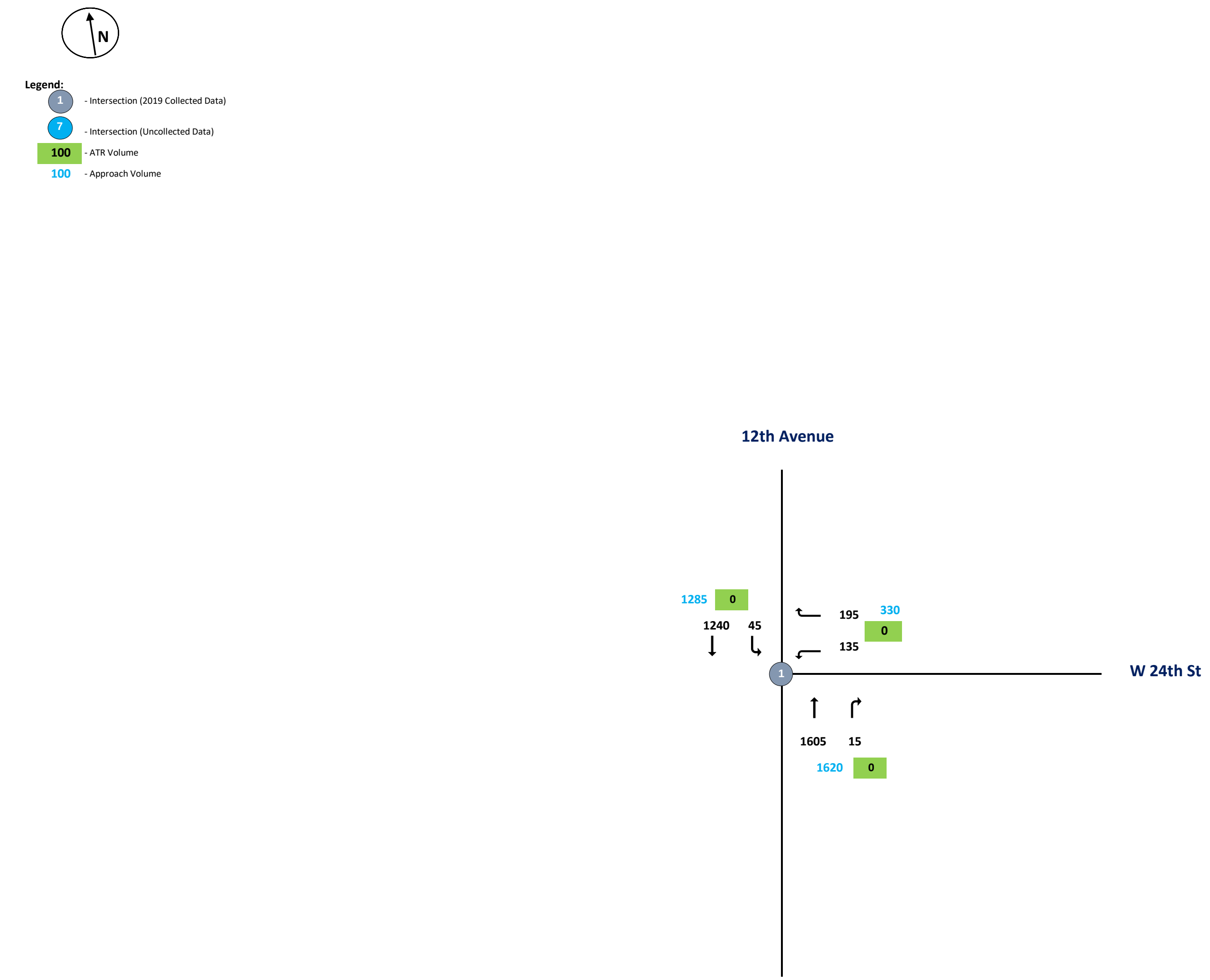
CBD Tolling

9A - Traffic Flowmap

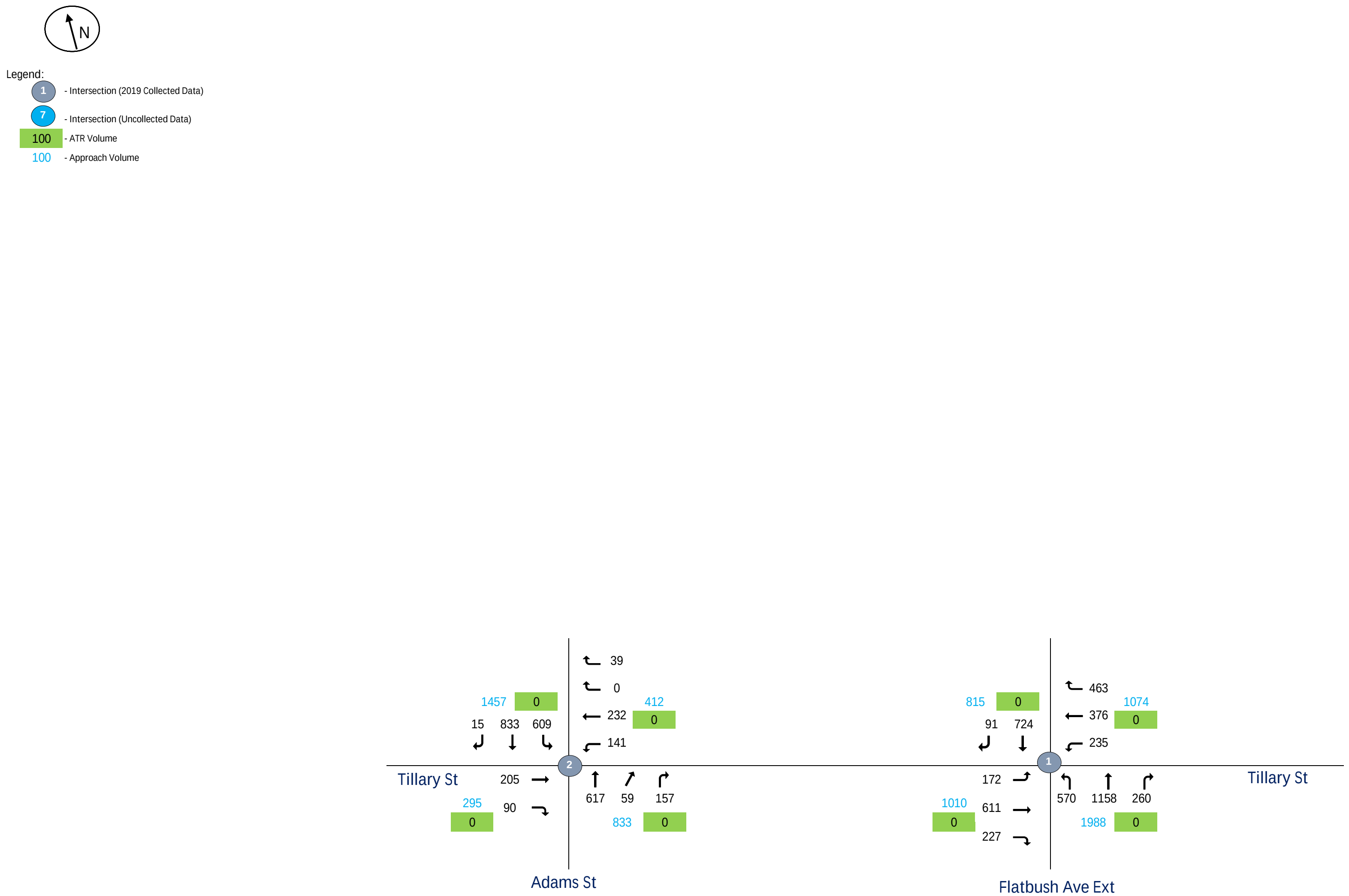
PM No Action



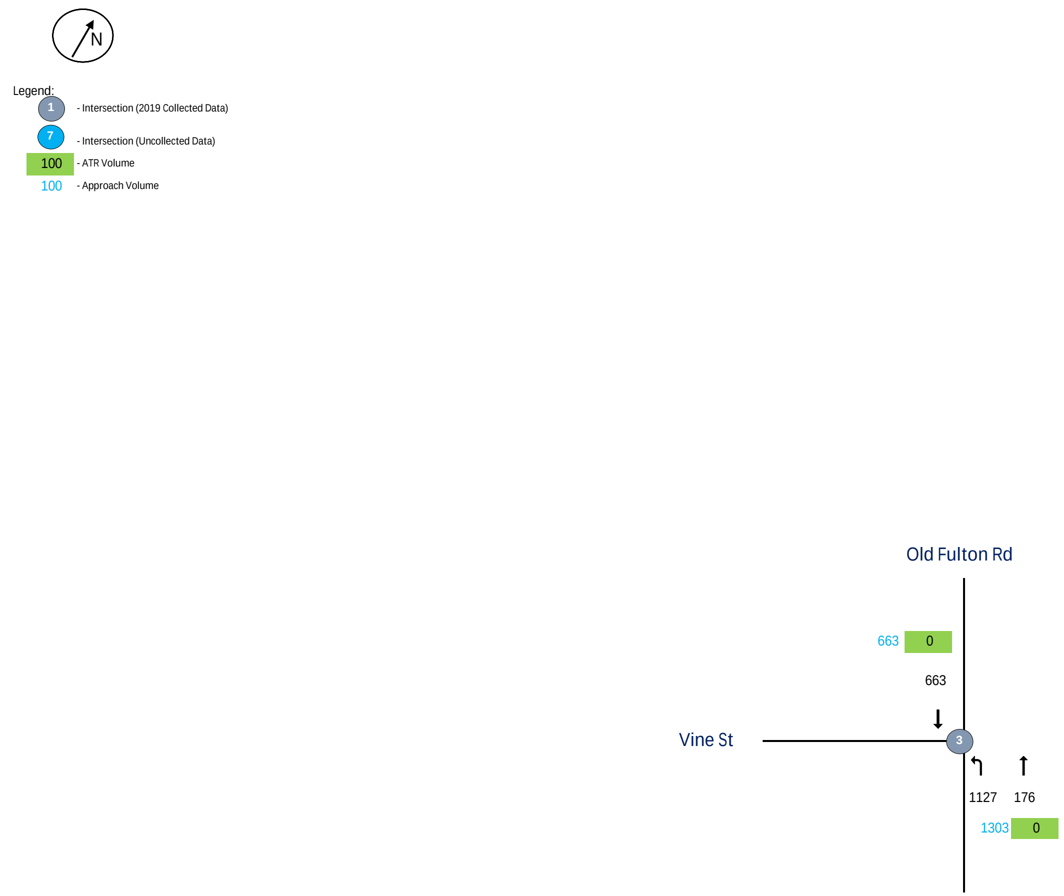
CBD Tolling
9A - Traffic Flowmap
LN No Action



CBD Tolling
Dumbo #1- Traffic Flowmap
AM No Action

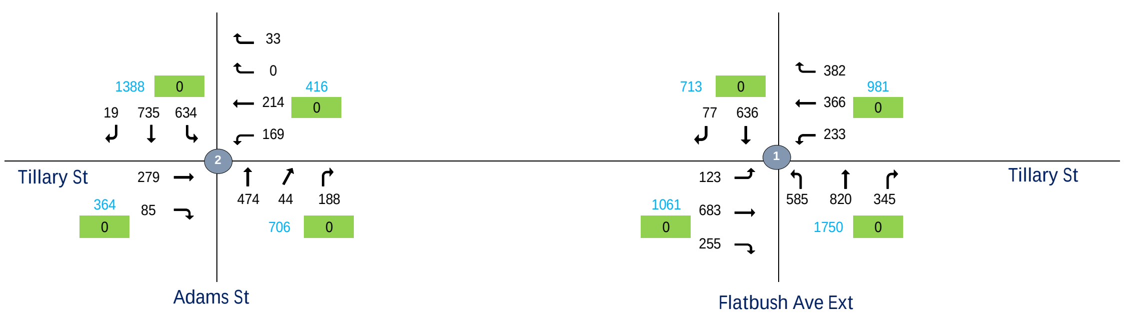


CBD Tolling
Dumbo #2 - Traffic Flowmap
AM No Action

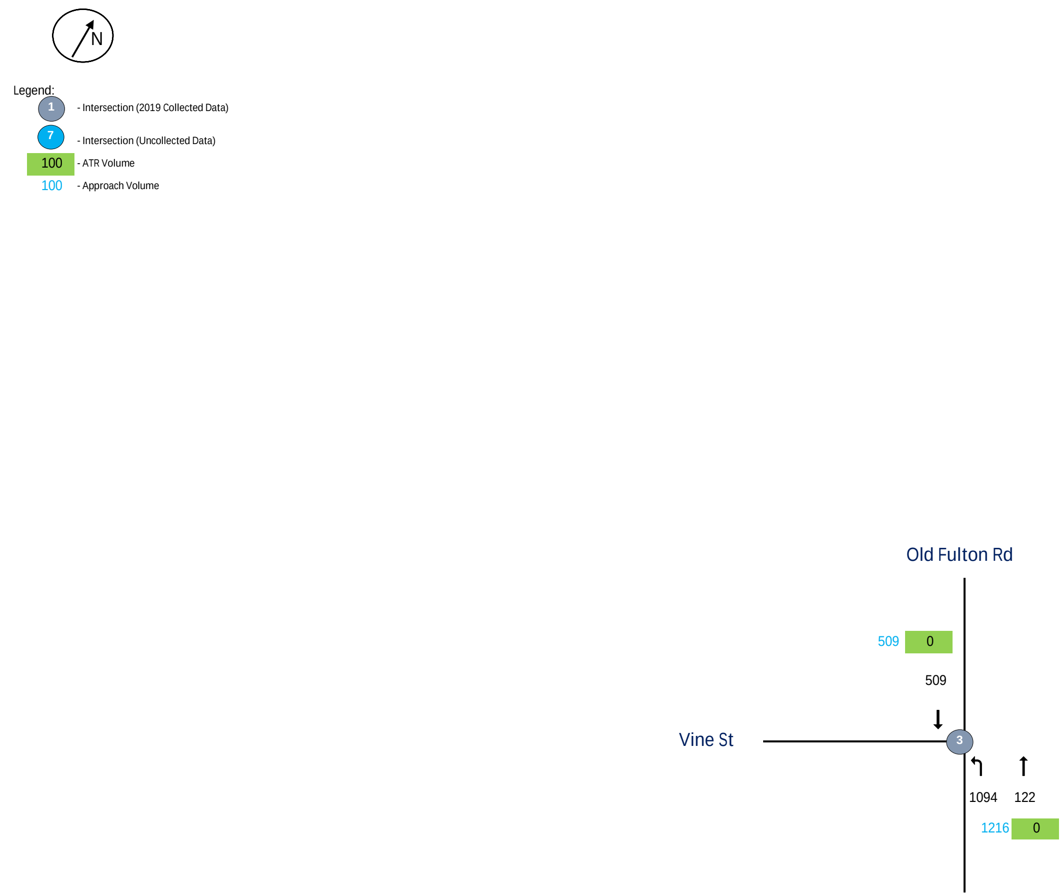


CBD Tolling
Dumbo - Traffic Flowmap
MD No Action

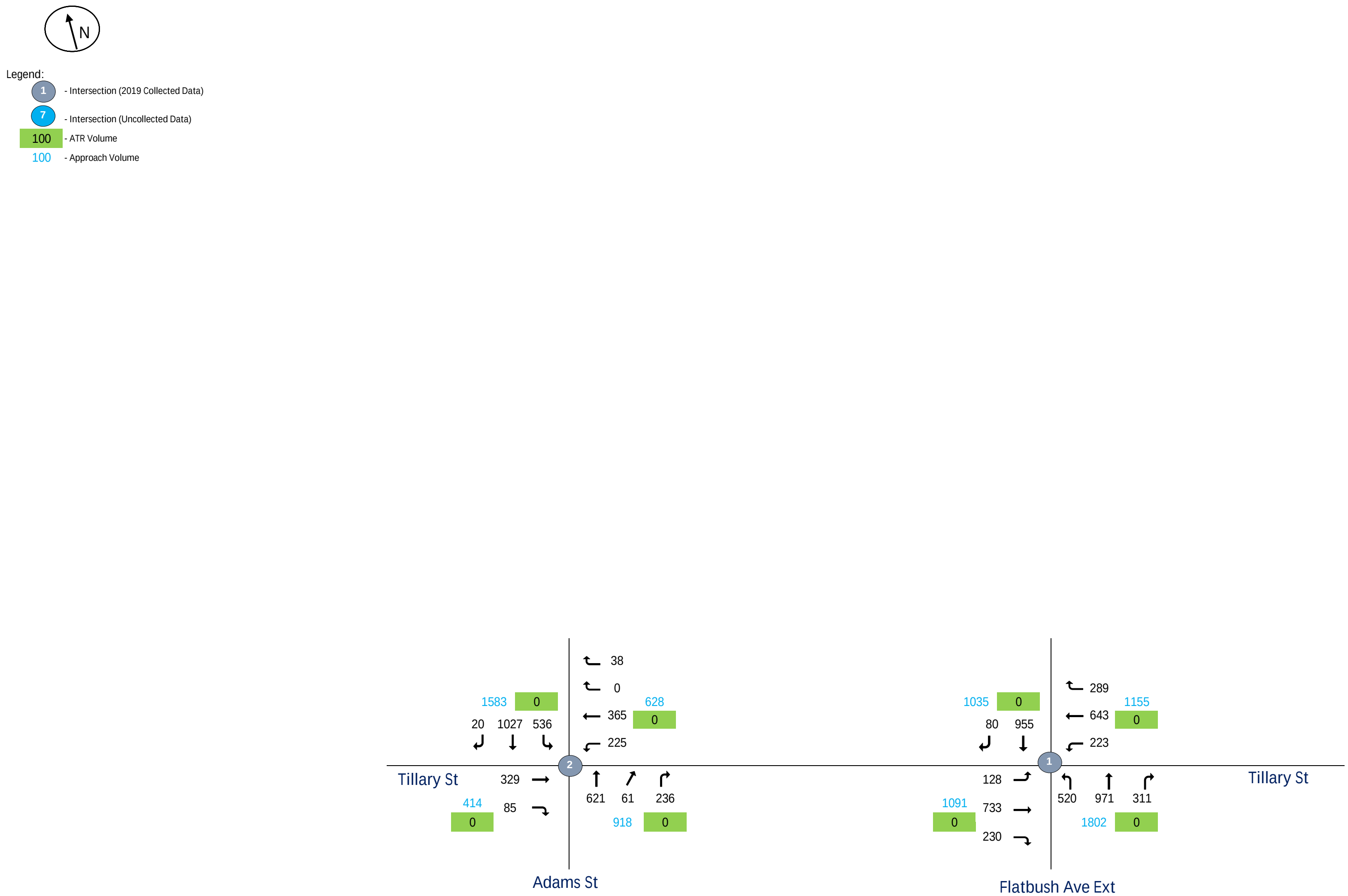
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume



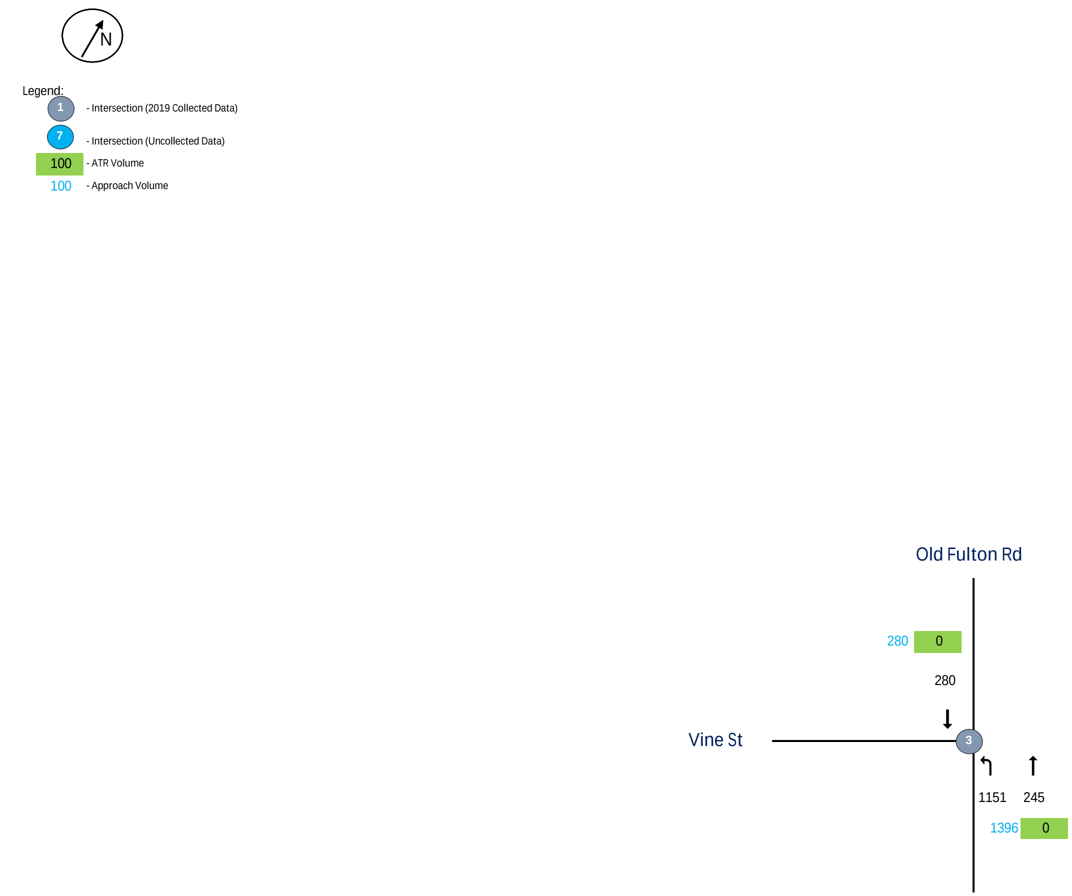
CBD Tolling
Dumbo #2 - Traffic Flowmap
MD No Action



CBD Tolling
Dumbo - Traffic Flowmap
PM No Action



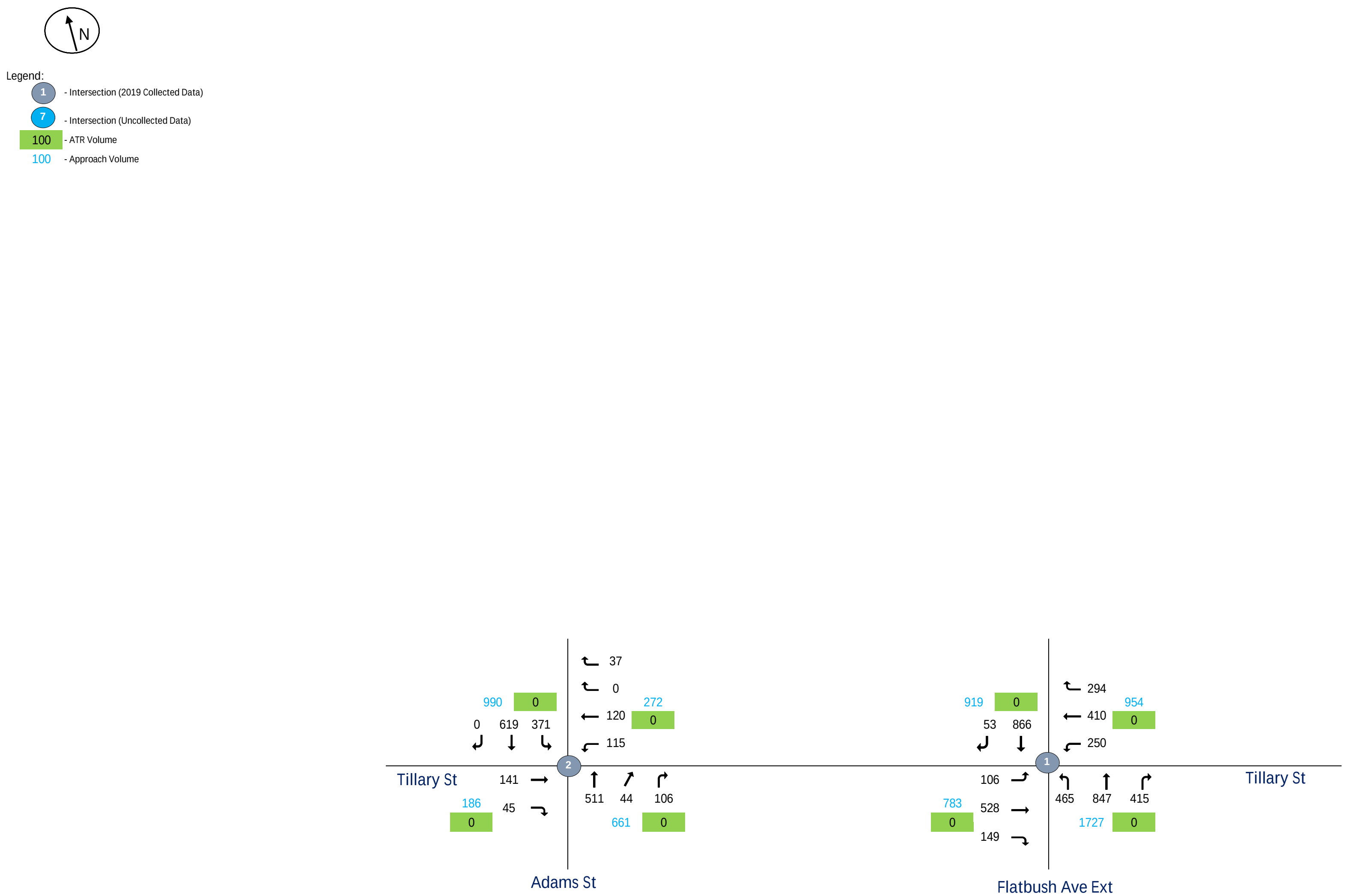
CBD Tolling
Dumbo #2 - Traffic Flowmap
PM No Action



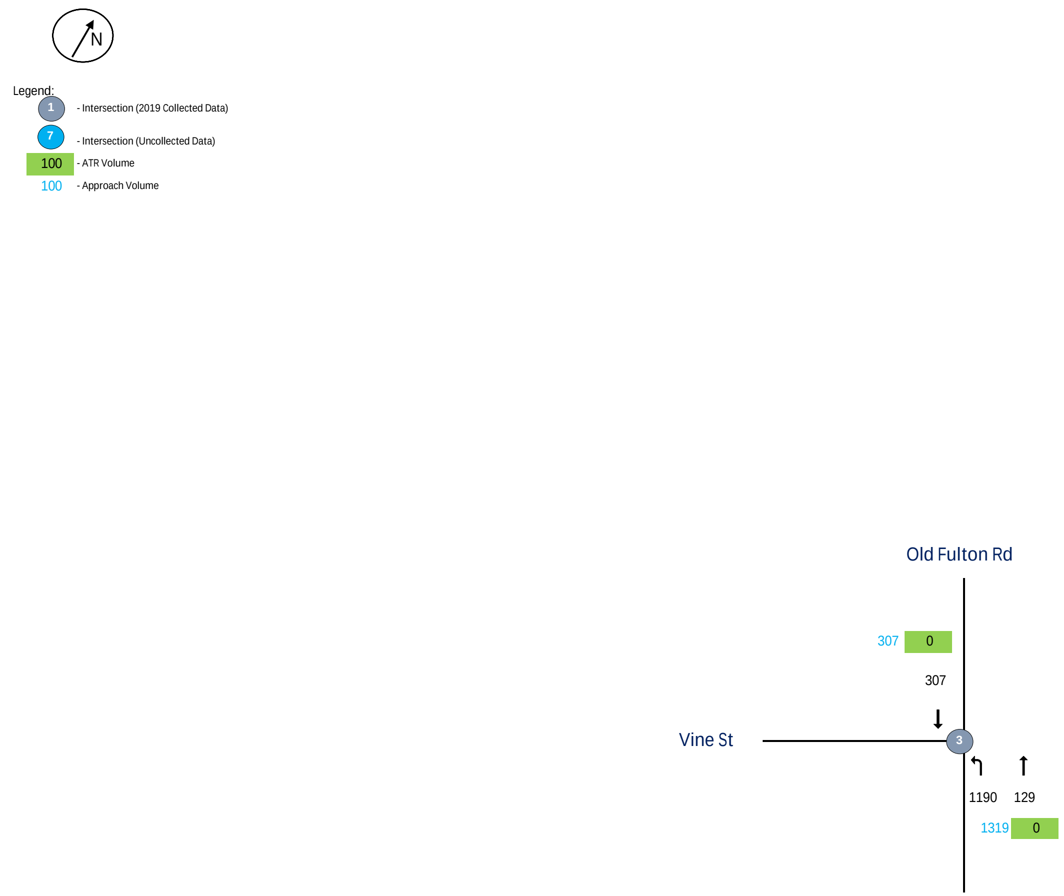
CBD Tolling

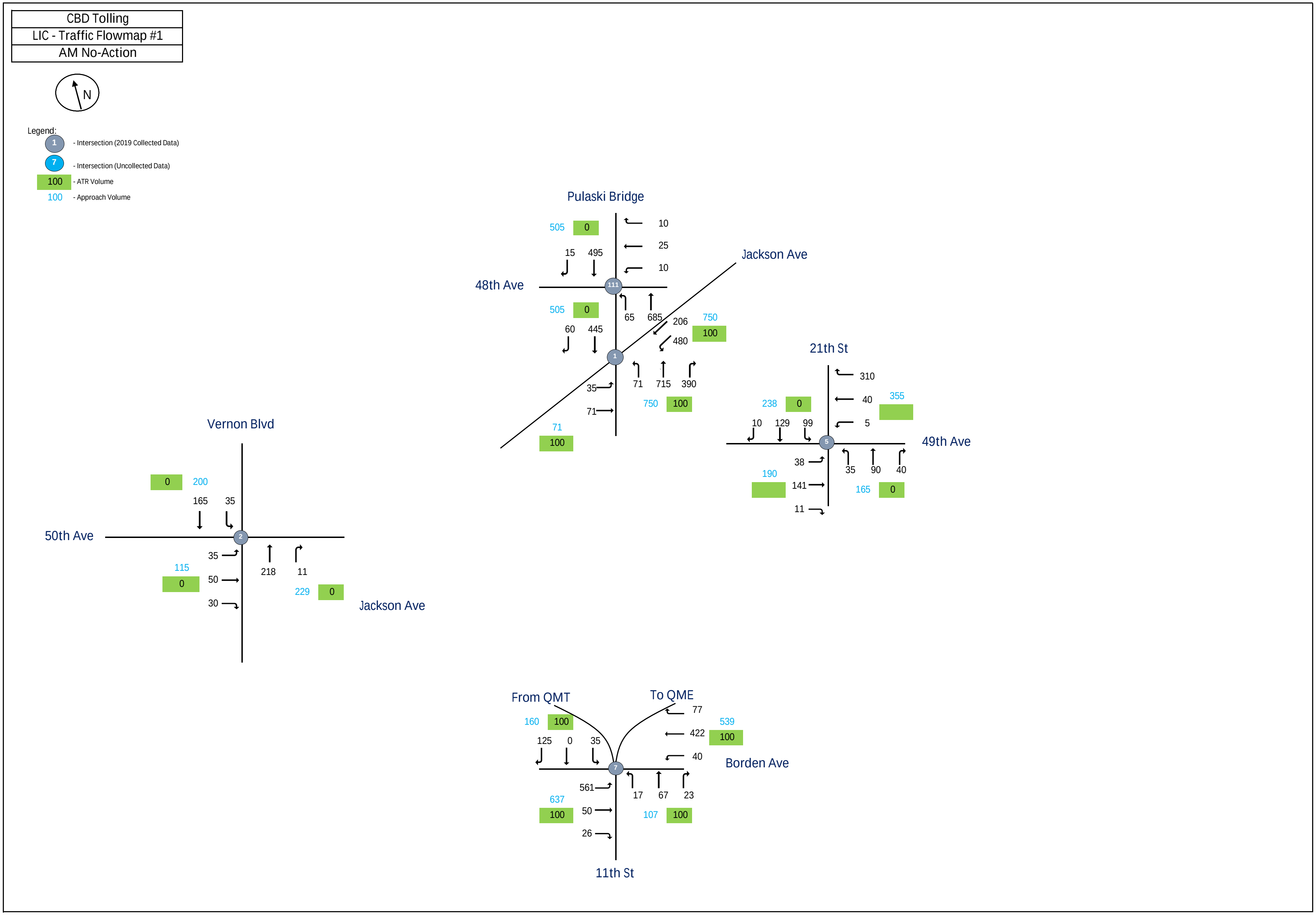
Dumbo - Traffic Flowmap

LN No Action

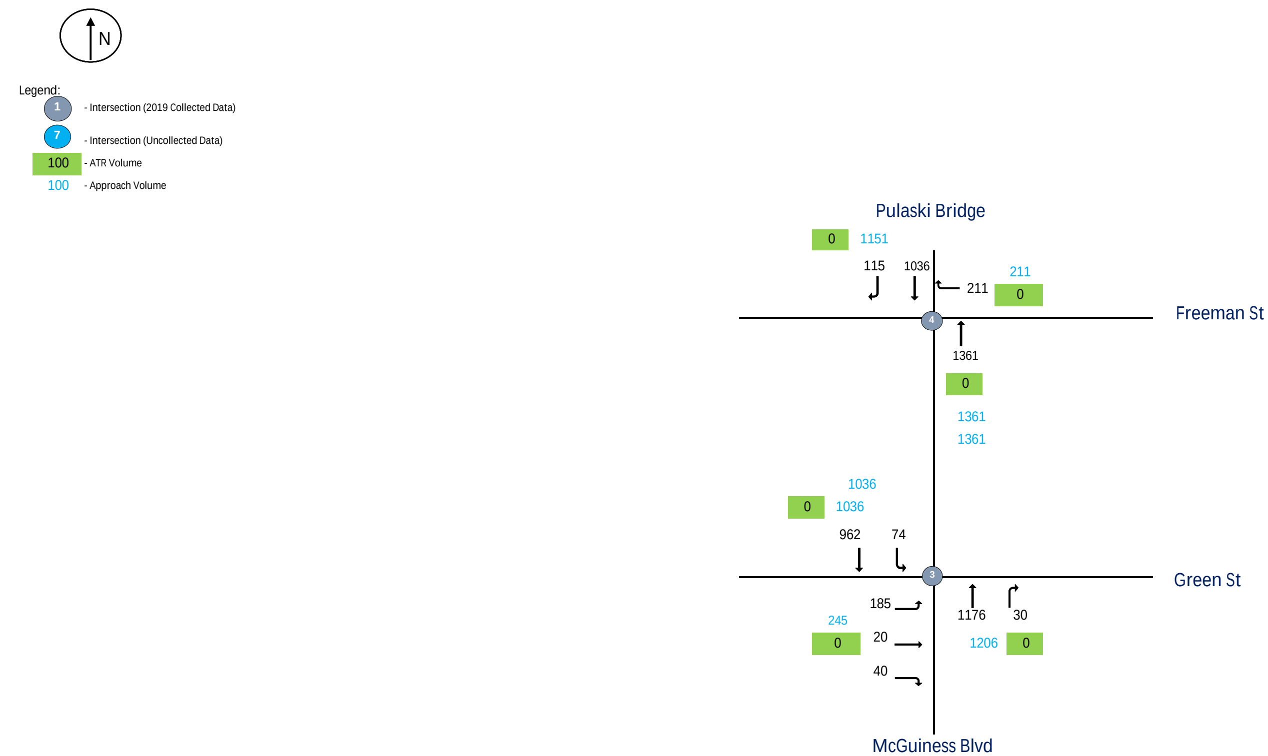


CBD Tolling
Dumbo #2 - Traffic Flowmap
LN No Action

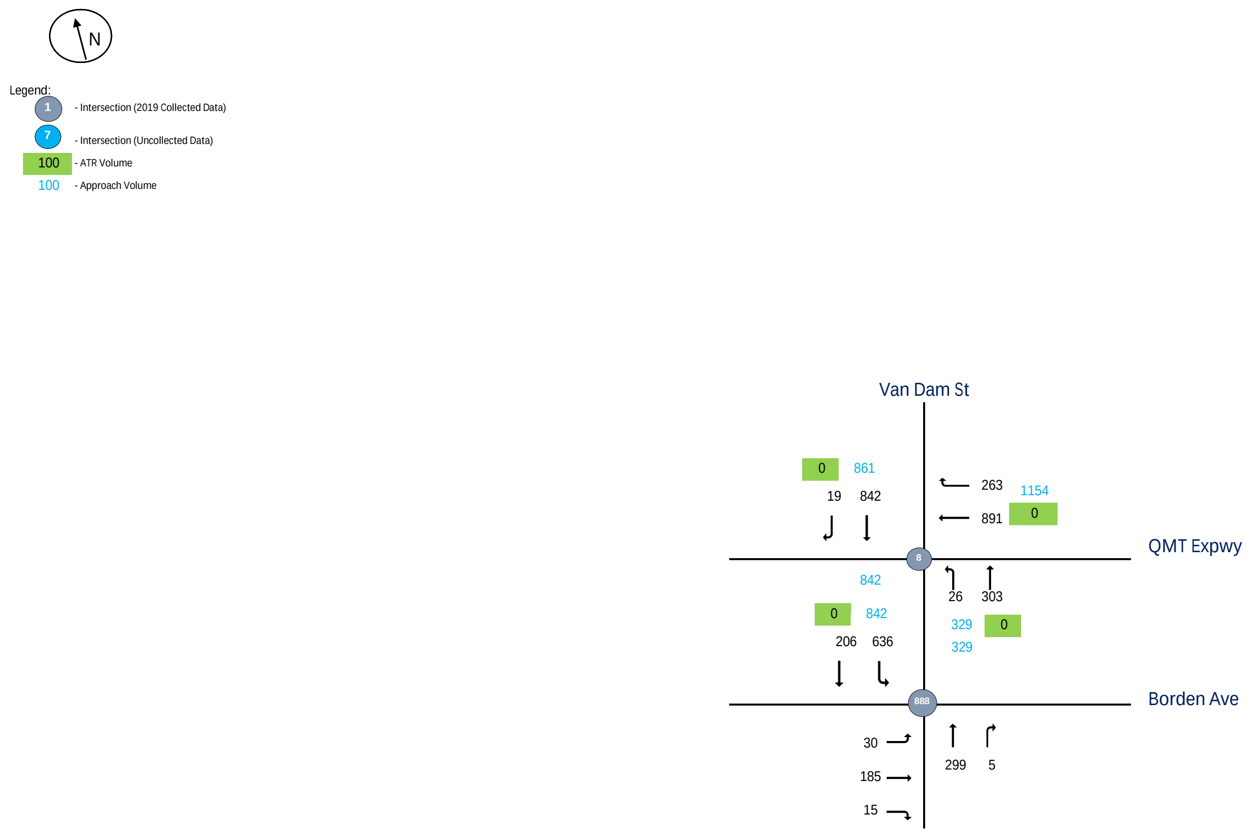



CBD Tolling
LIC - Traffic Flowmap #1
AM No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
48th Ave
Jackson Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St
505
0
15
495
10
25
10
65
685
206
480
750
100
60
445
71
715
390
35
71
750
100
71
100
310
40
5
355
238
0
10
129
99
38
141
11
190
35
90
40
165
0
200
165
35
35
50
30
115
0
218
11
229
0
160
100
125
0
35
77
422
40
539
100
561
50
26
637
100
17
67
23
107
100

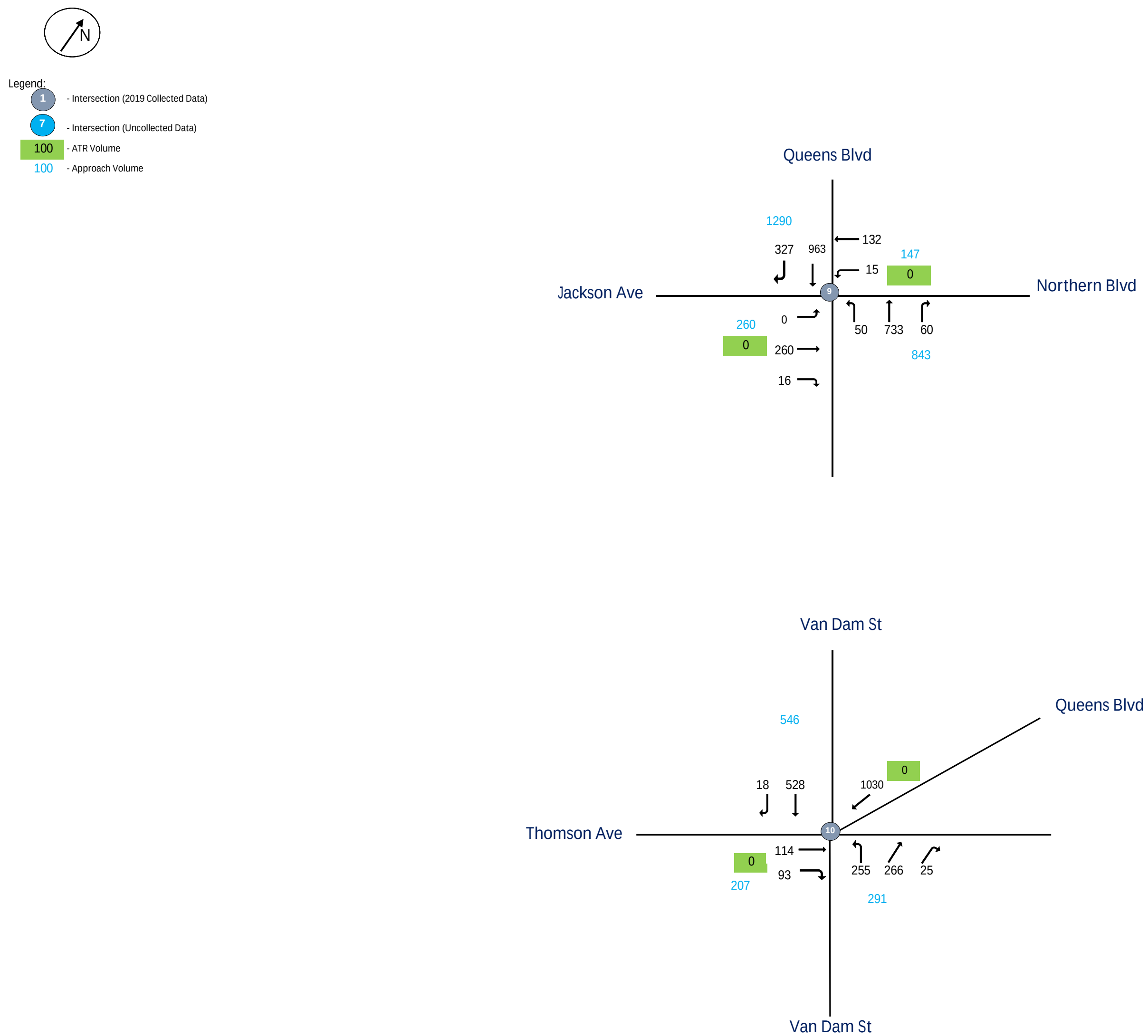
CBD Tolling
LIC - Traffic Flowmap #2
AM No-Action



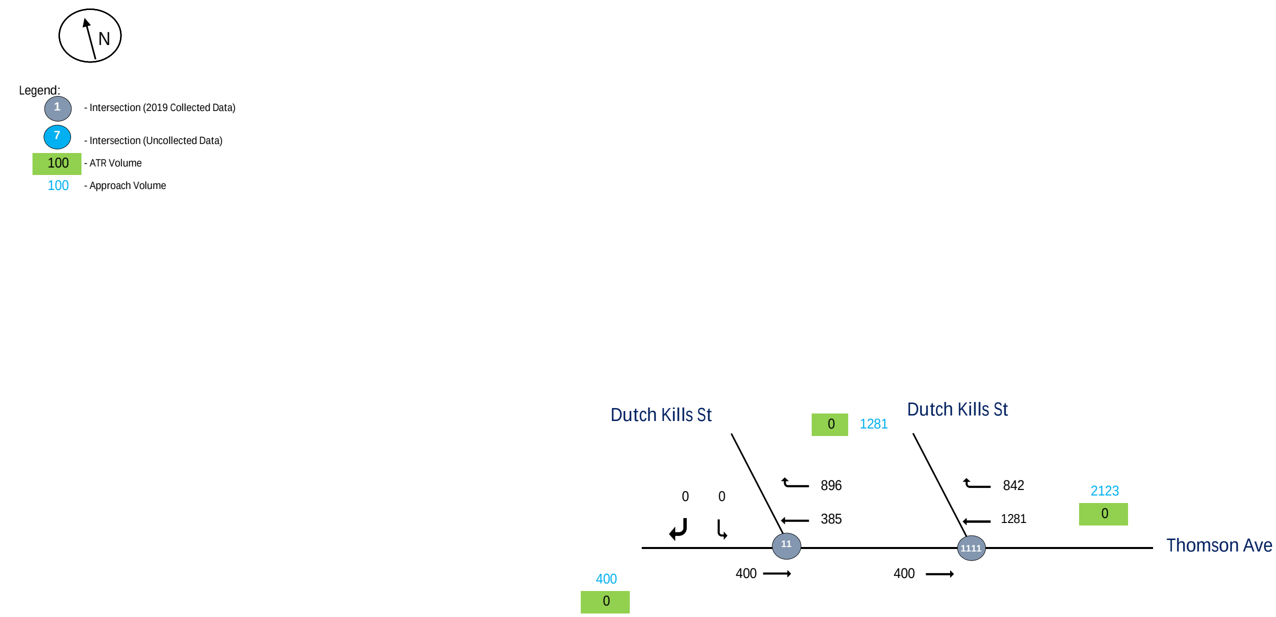
CBD Tolling
LIC - Traffic Flowmap #3
AM No-Action



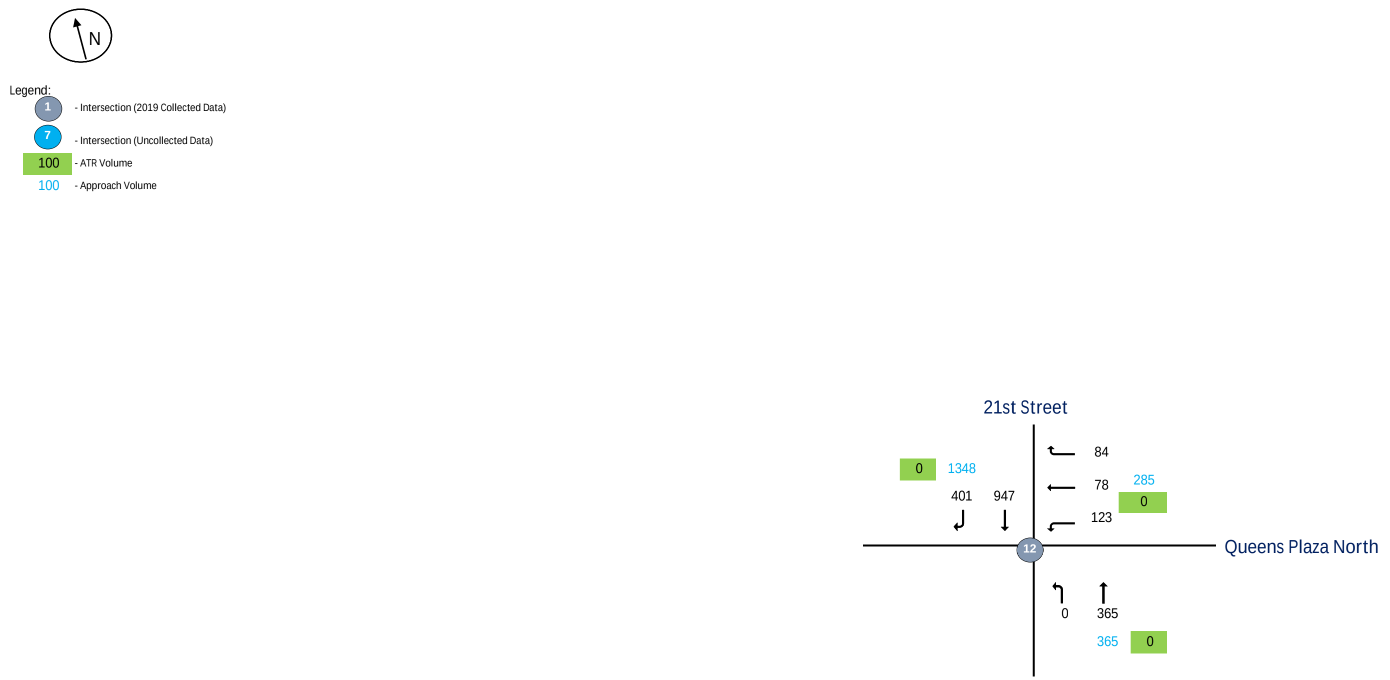
CBD Tolling
LIC - Traffic Flowmap #4
AM No-Action

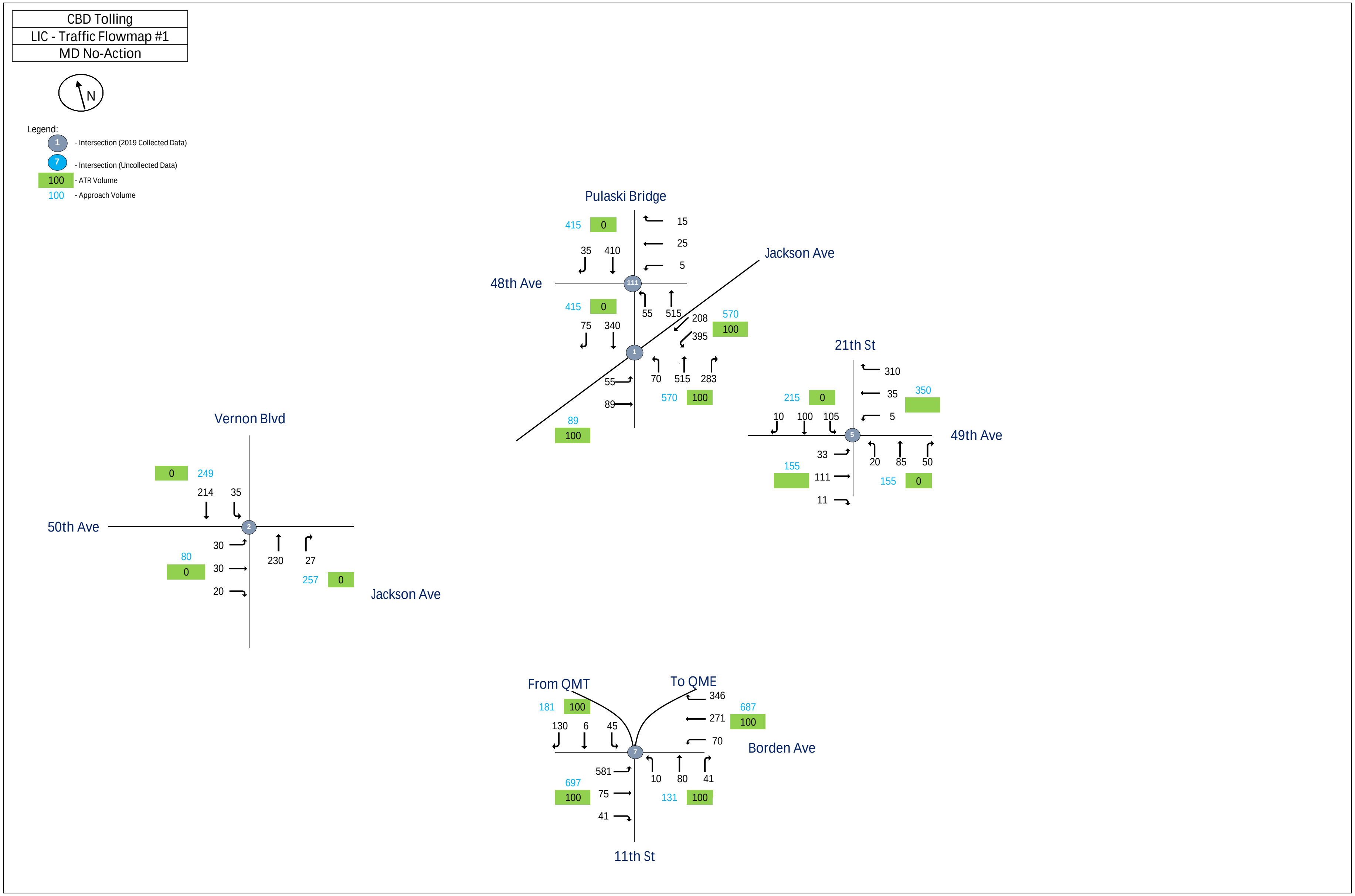


CBD Tolling
LIC - Traffic Flowmap #5
AM No-Action



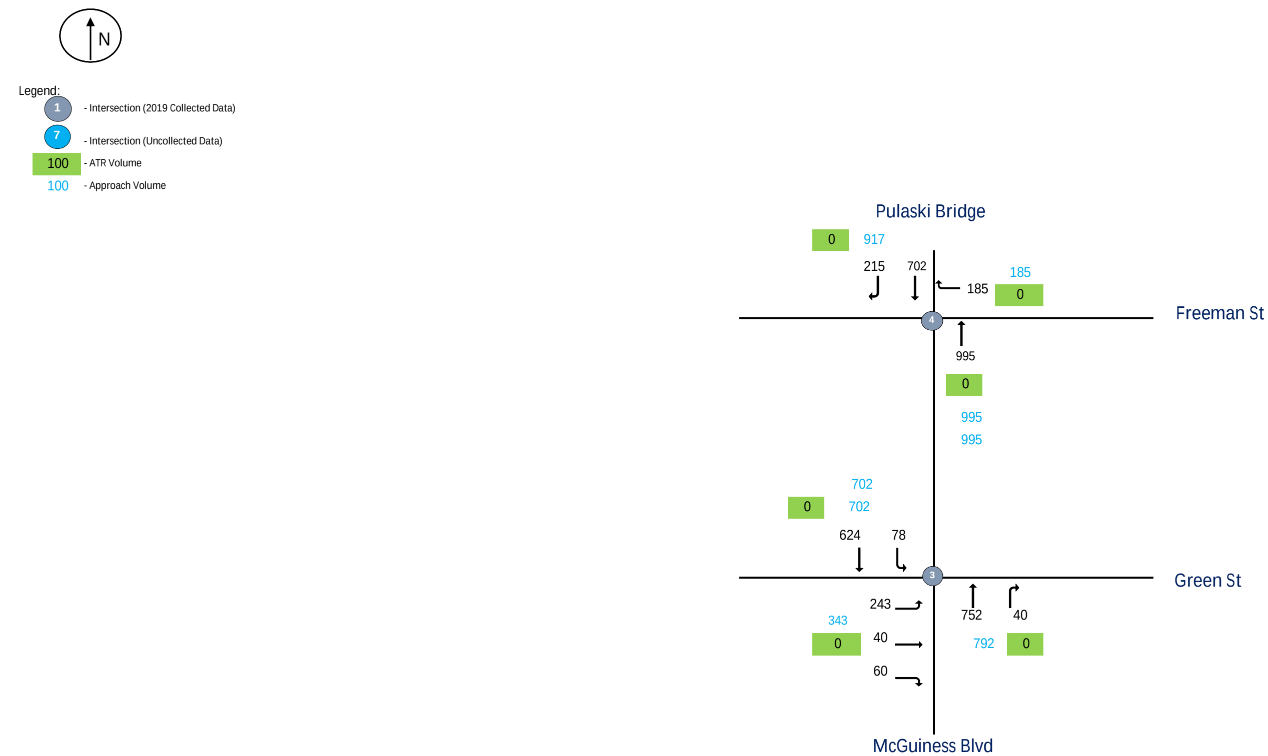
CBD Tolling
LIC - Traffic Flowmap #6
AM No-Action



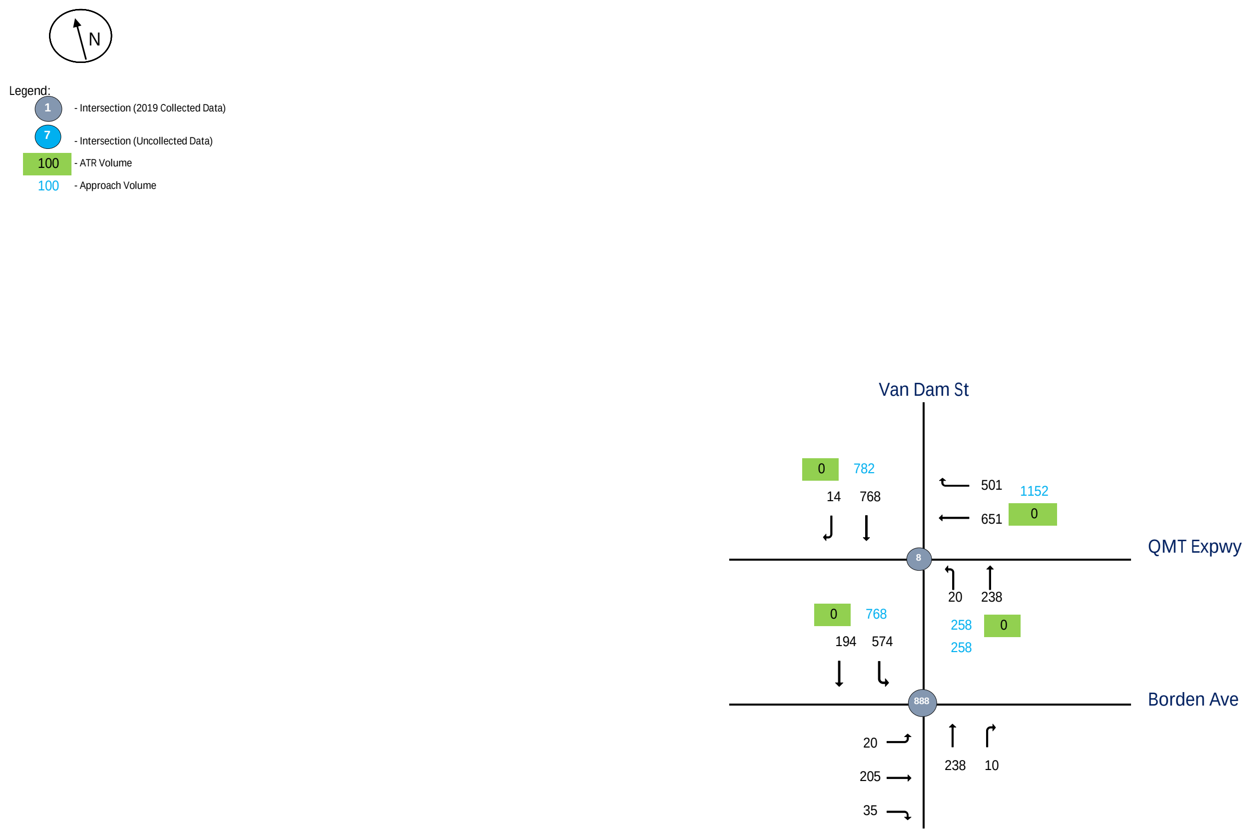


CBD Tolling
LIC - Traffic Flowmap #1
MD No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
Jackson Ave
48th Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St
415
0
35
410
15
25
5
55
515
208
395
570
100
75
340
70
515
283
55
89
570
100
89
100
215
0
10
100
105
310
35
5
350
33
111
11
20
85
50
155
155
0
0
249
214
35
30
30
20
80
0
230
27
257
0
181
100
130
6
45
346
271
70
687
100
581
75
41
697
100
10
80
41
131
100

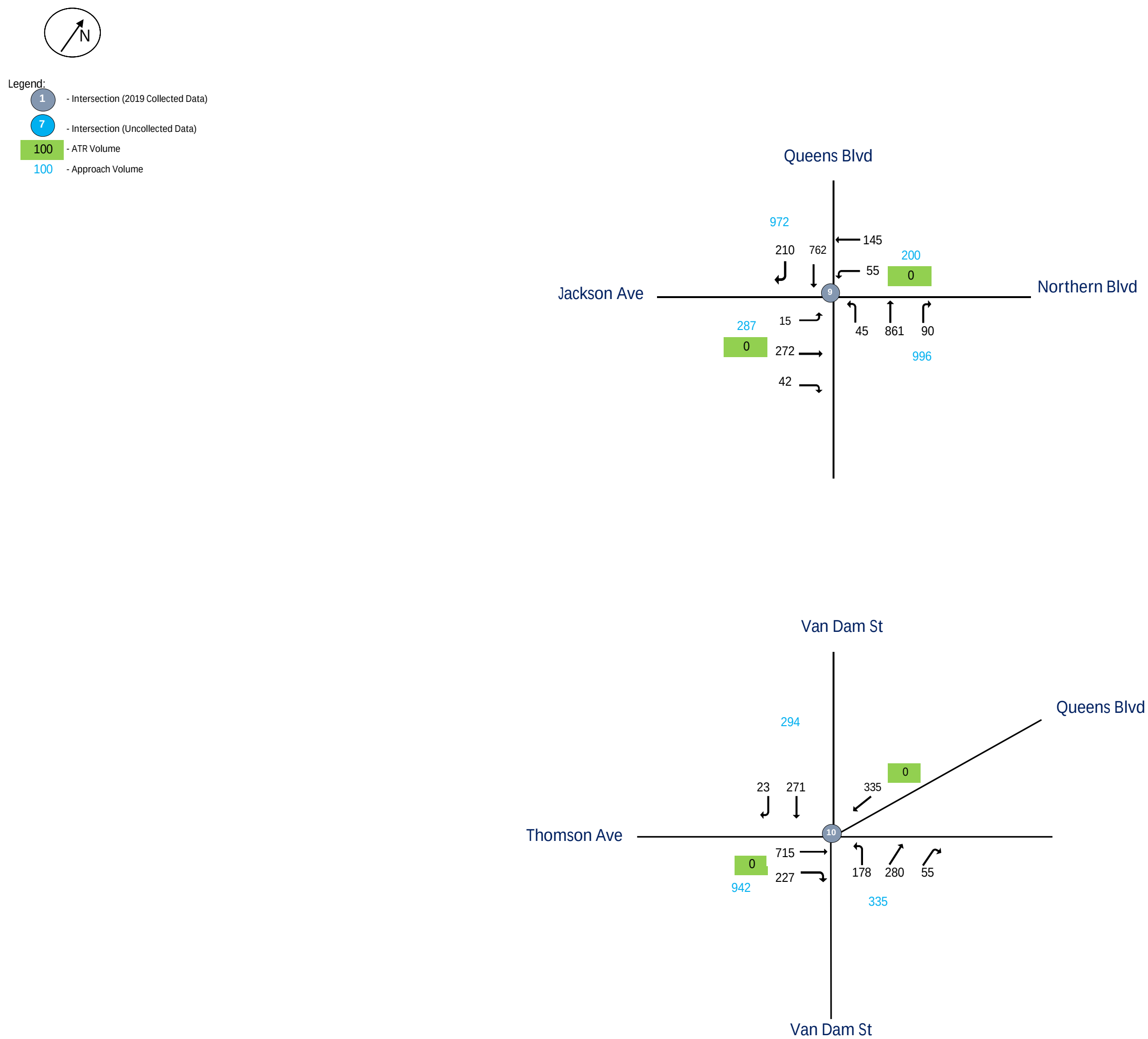
CBD Tolling
LIC - Traffic Flowmap #2
MD No-Action



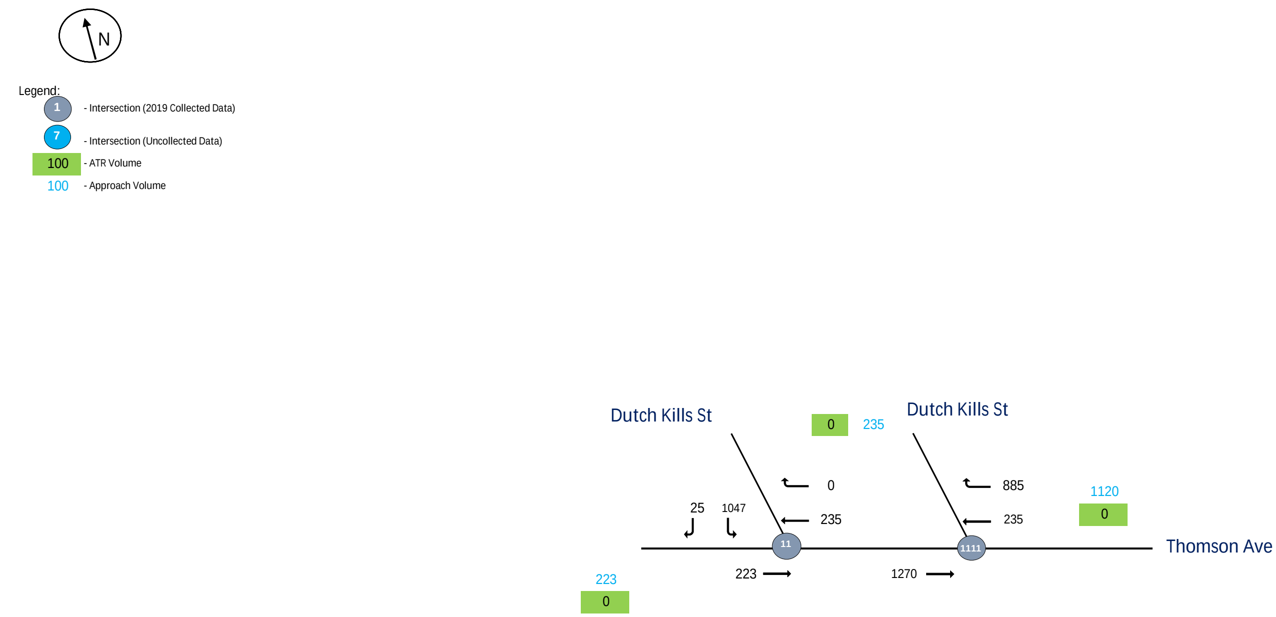
CBD Tolling
LIC - Traffic Flowmap #3
MD No-Action

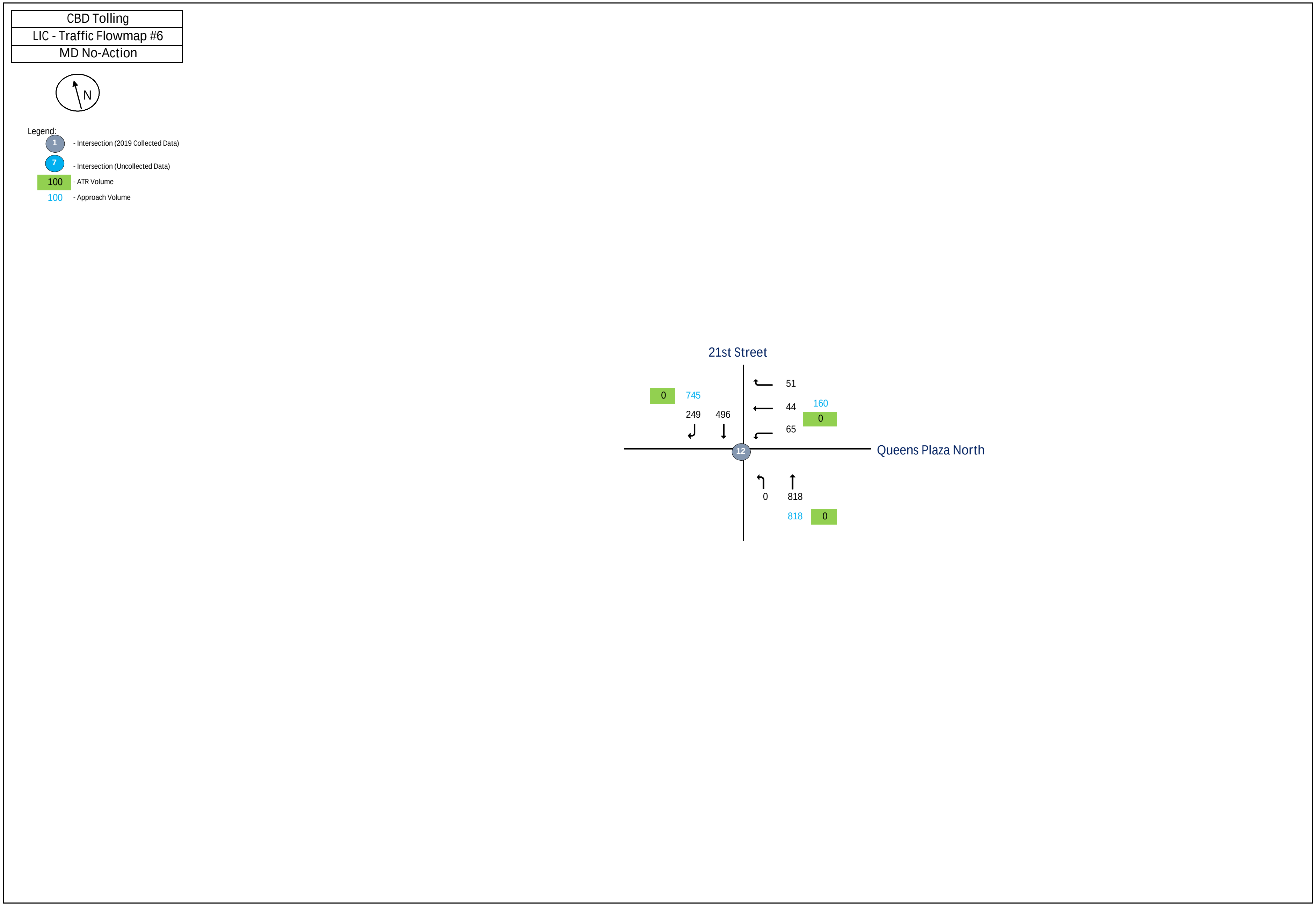


CBD Tolling
LIC - Traffic Flowmap #4
MD No-Action



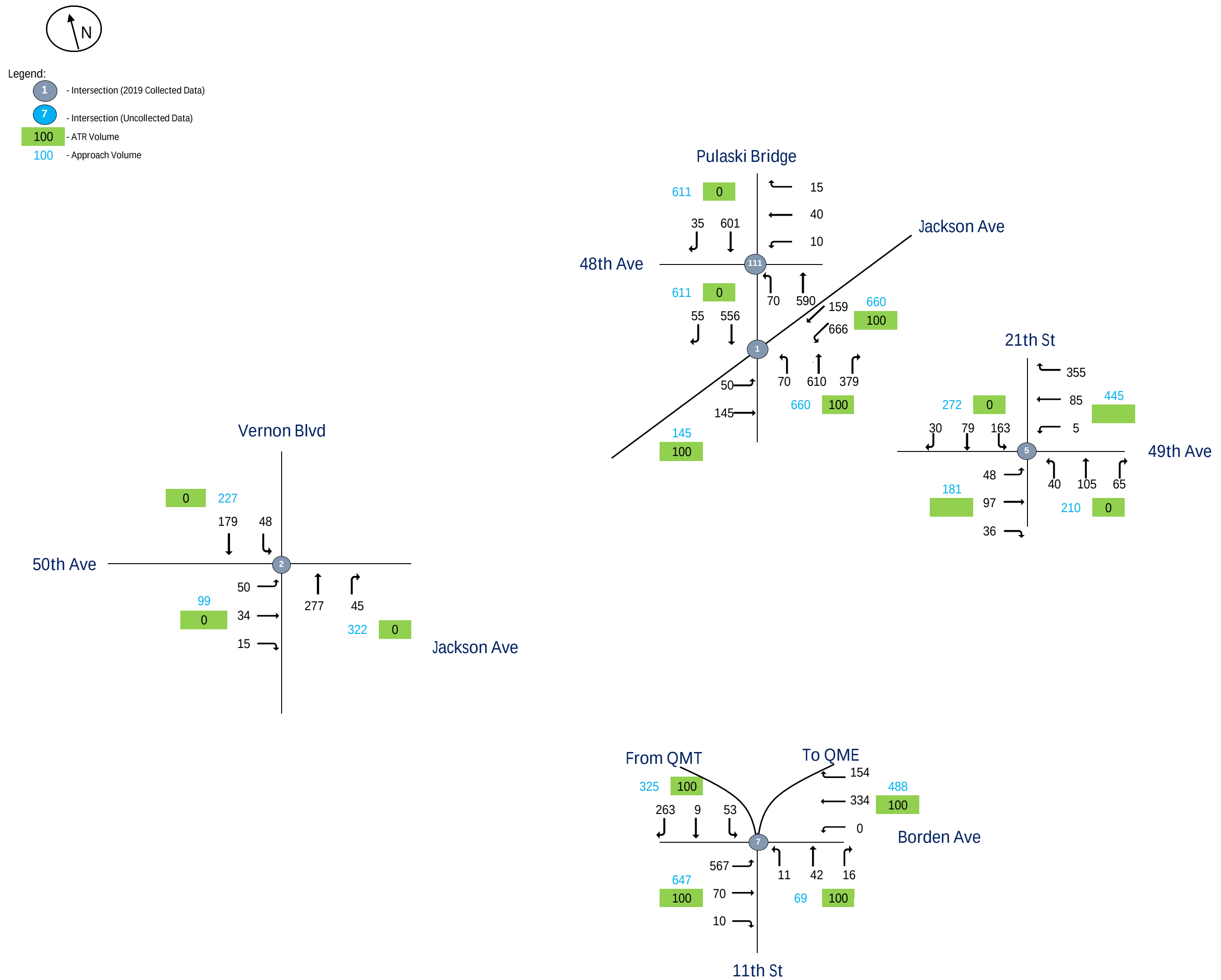
CBD Tolling
LIC - Traffic Flowmap #5
MD No-Action



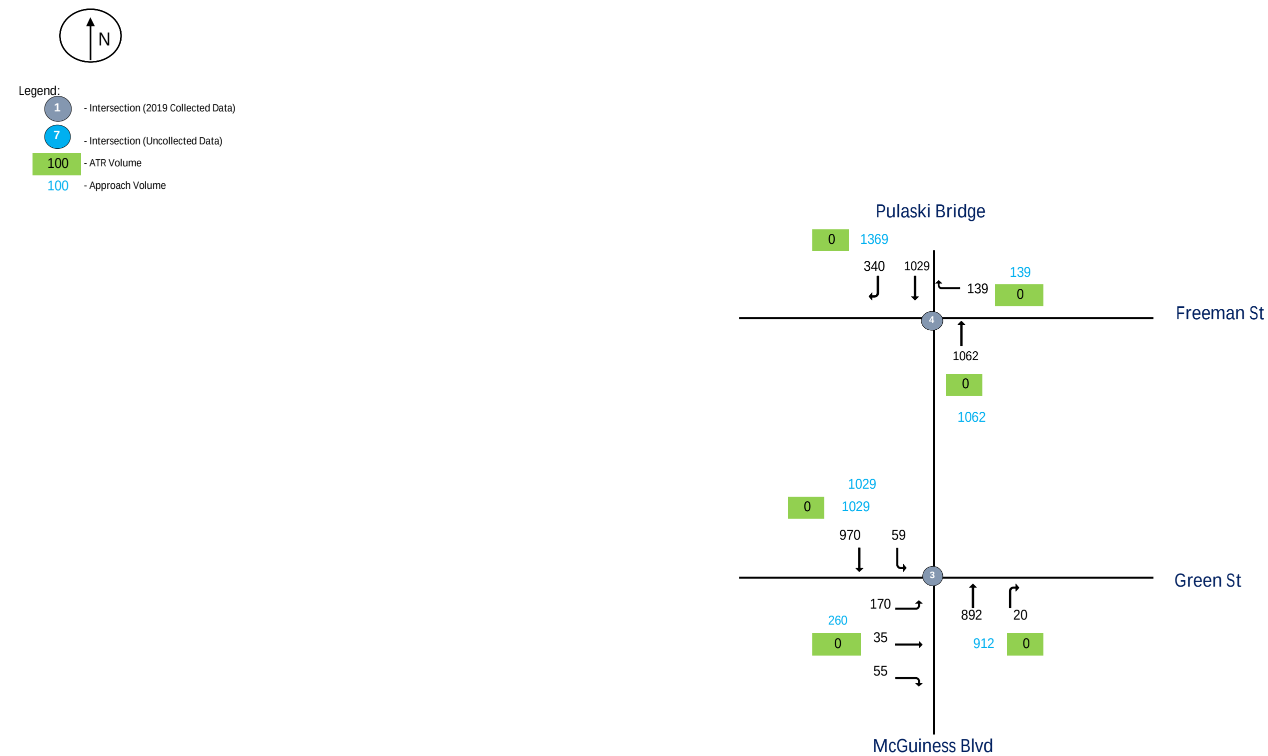


CBD Tolling
LIC - Traffic Flowmap #6
MD No-Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
21st Street
0
745
249
496
51
44
160
0
65
12
Queens Plaza North
0
818
818
0

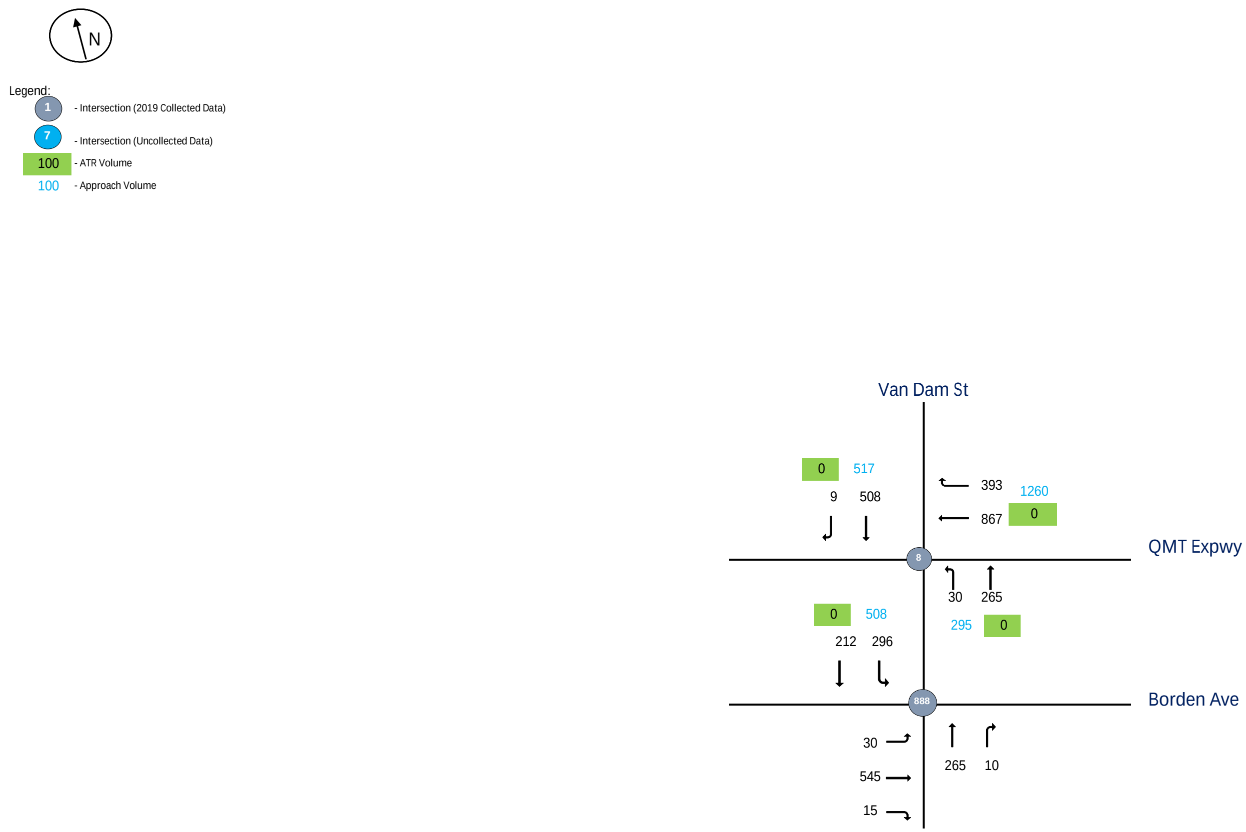
CBD Tolling
LIC - Traffic Flowmap #1
AM No-Action



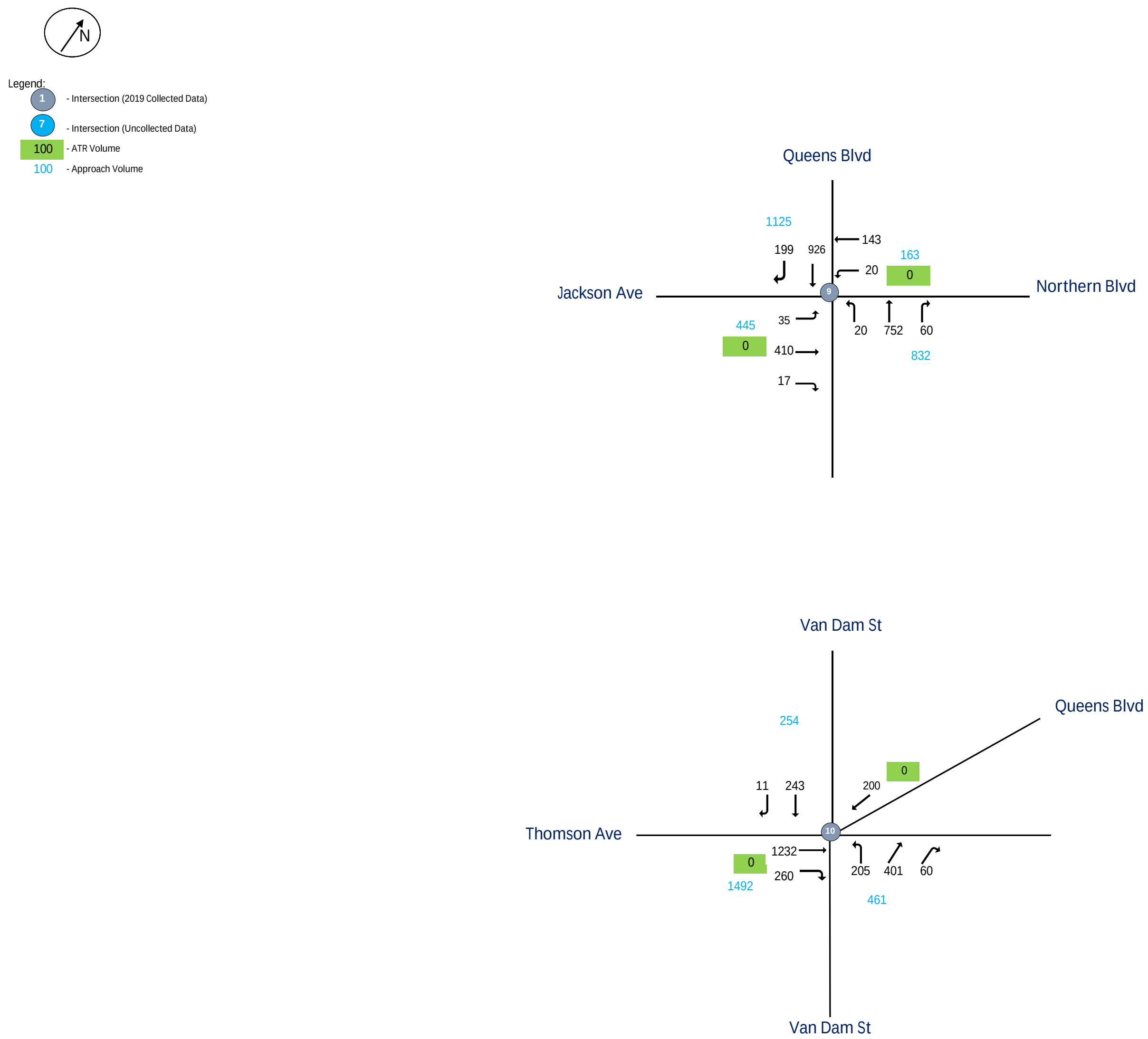
CBD Tolling
LIC - Traffic Flowmap #2
AM No-Action



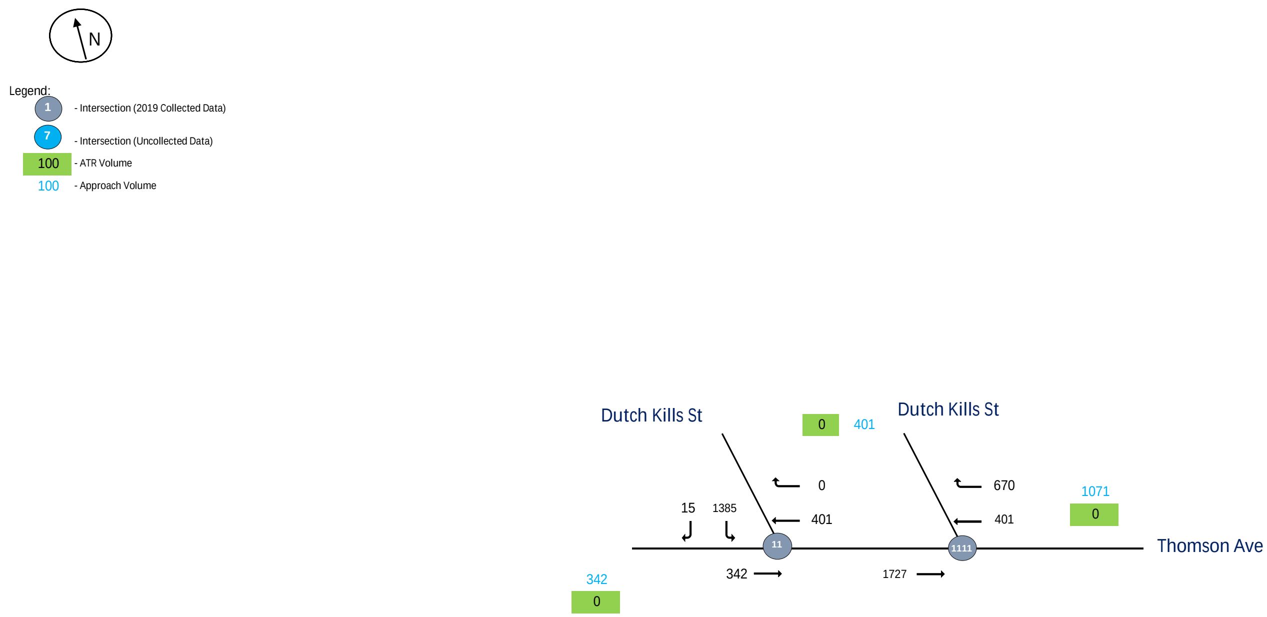
CBD Tolling
LIC - Traffic Flowmap #3
AM No-Action



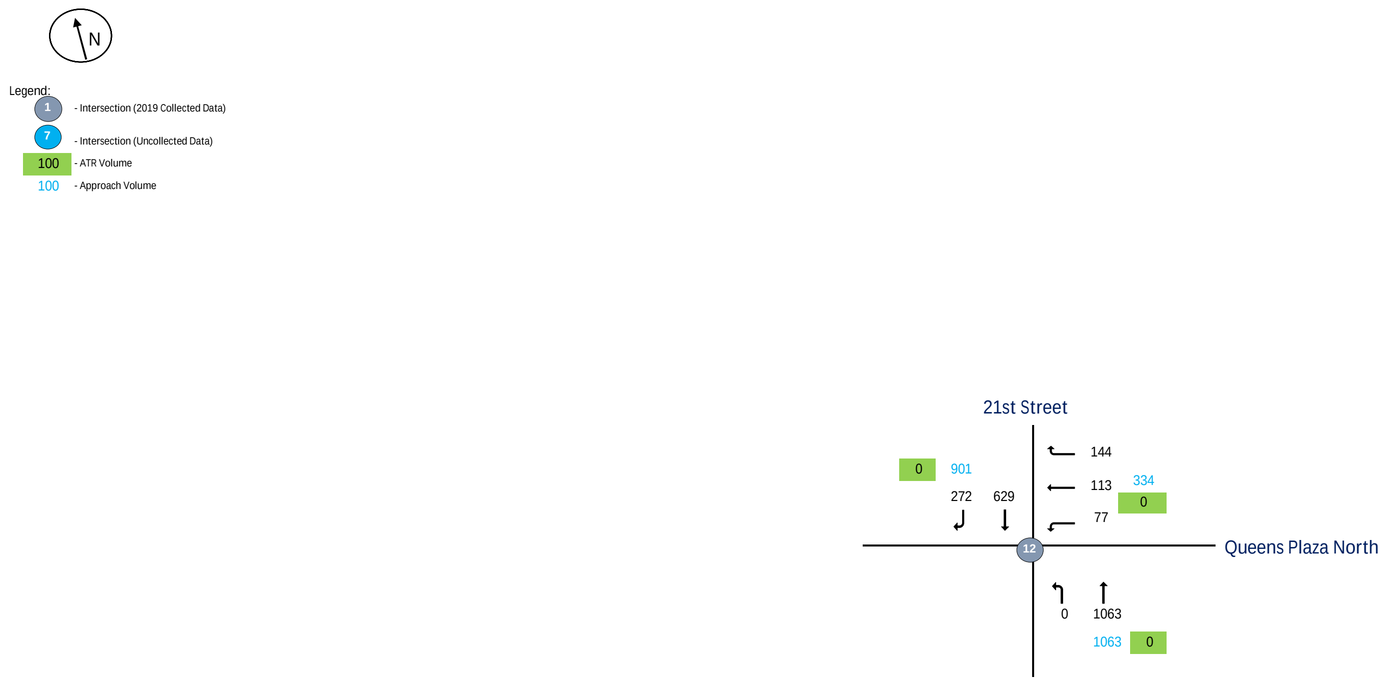
CBD Tolling
LIC - Traffic Flowmap #4
AM No-Action

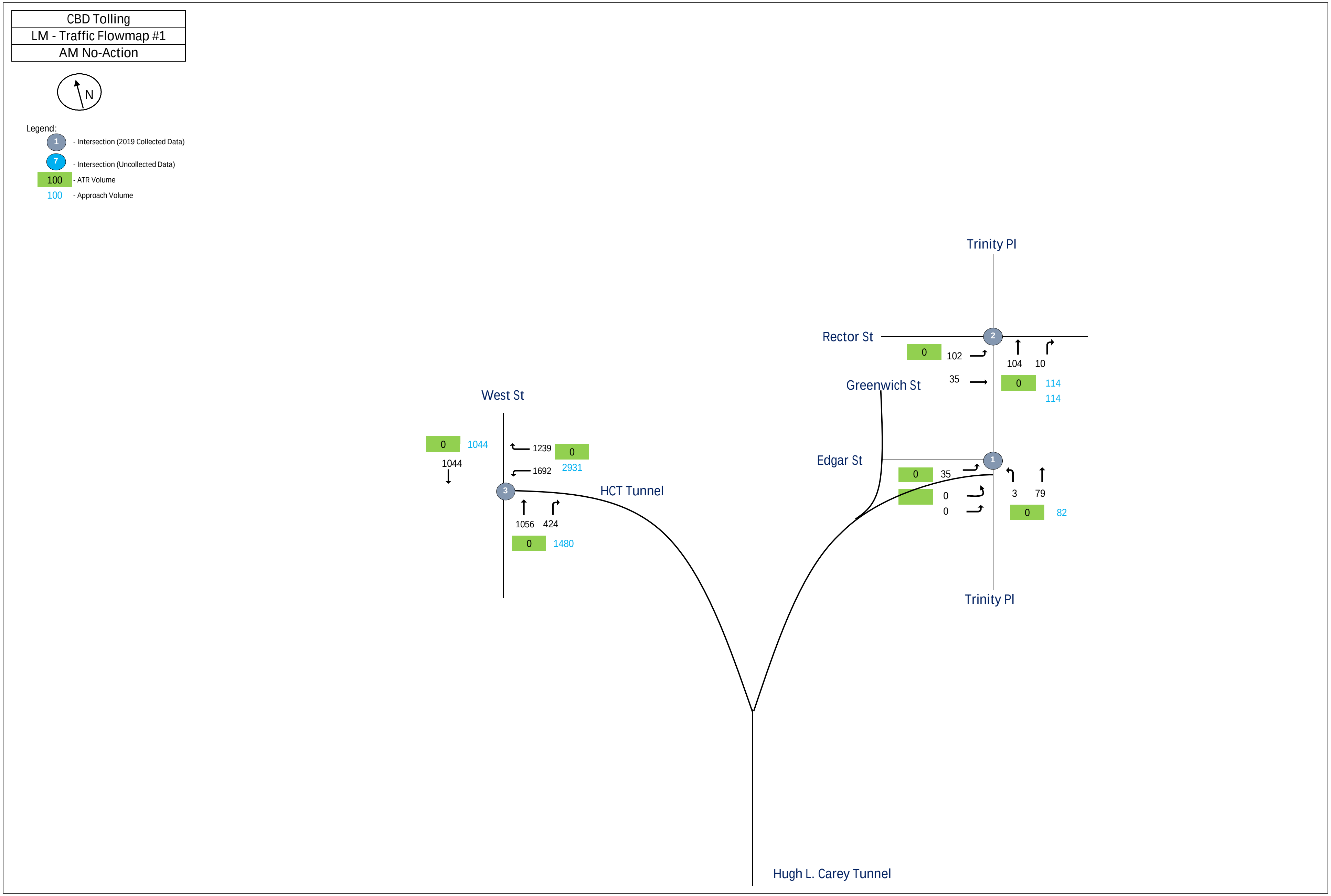


CBD Tolling
LIC - Traffic Flowmap #5
AM No-Action



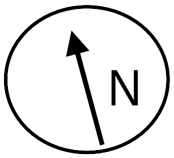
CBD Tolling
LIC - Traffic Flowmap #6
AM No-Action





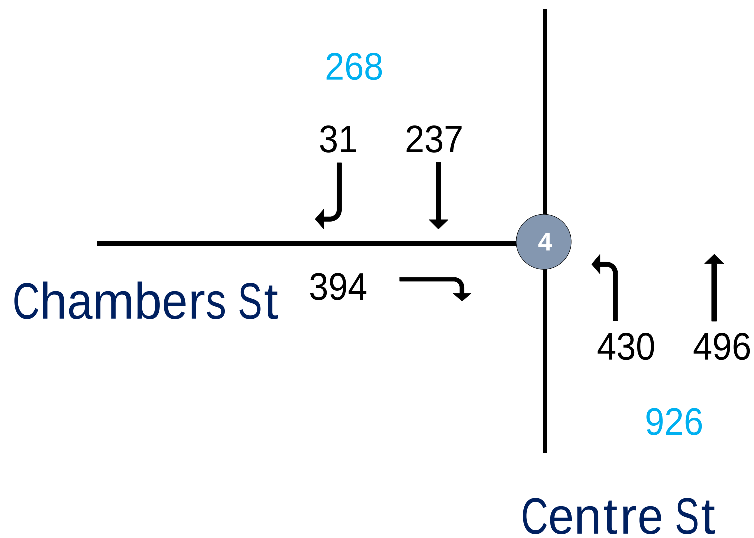
CBD Tolling
LM - Traffic Flowmap #1
AM No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Trinity Pl
Rector St
2
0
102
104
10
35
0
114
114
Greenwich St
West St
0
1044
1239
0
1044
1692
2931
Edgar St
1
0
35
3
79
0
0
0
82
3
HCT Tunnel
1056
424
0
1480
Trinity Pl
Hugh L. Carey Tunnel

CBD Tolling
LM - Traffic Flowmap #2
AM No-Action

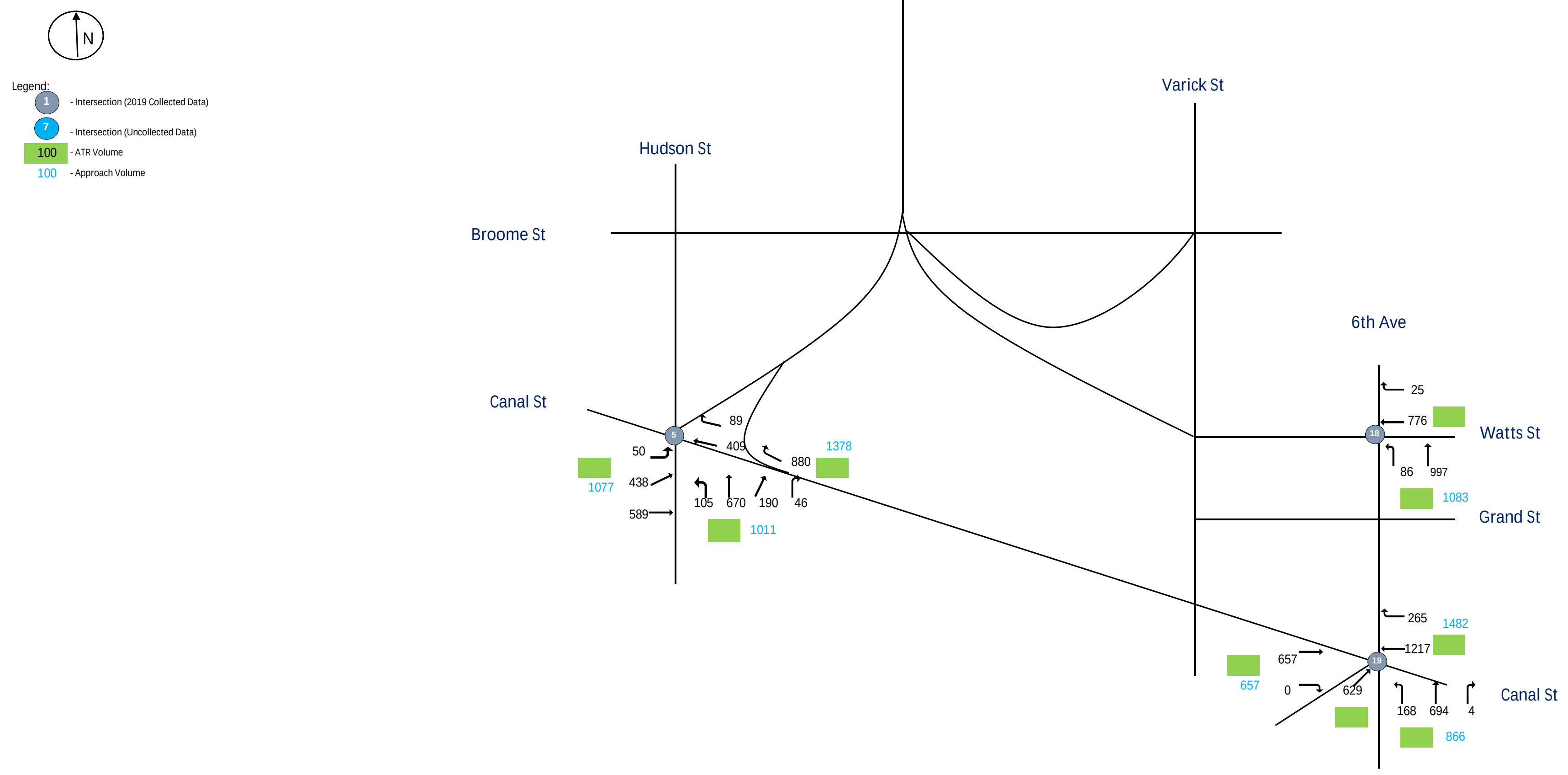


Legend:

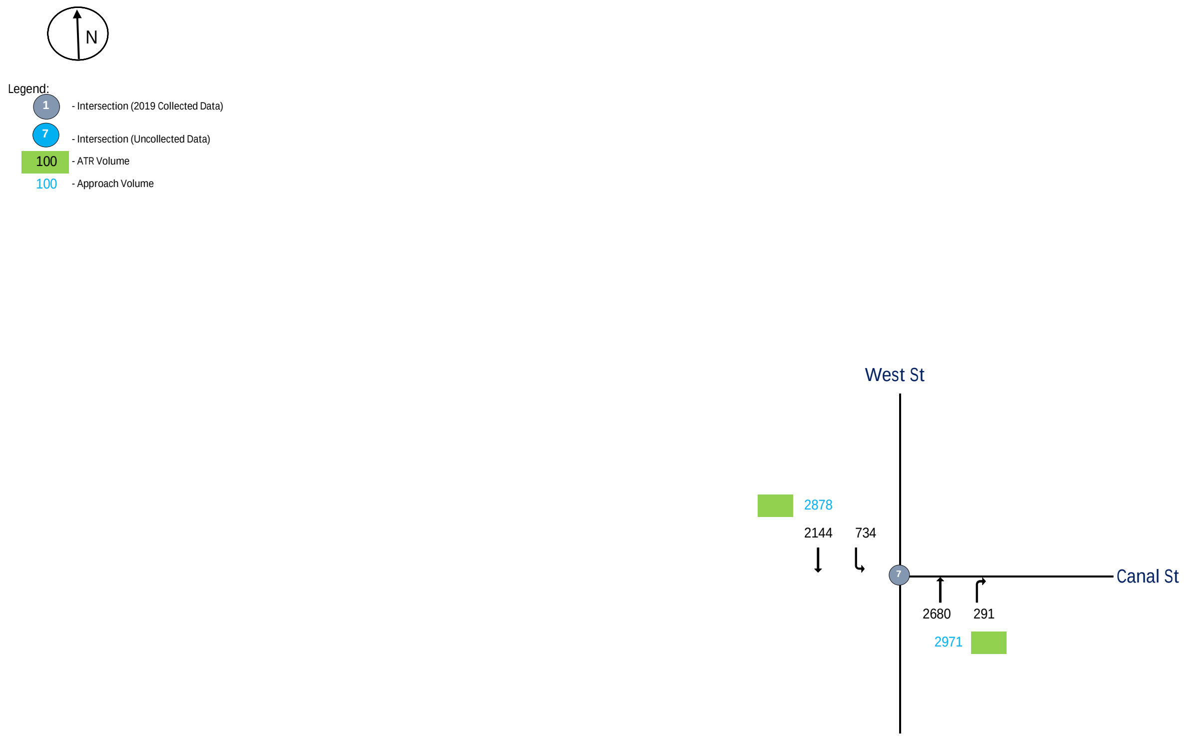
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



CBD Tolling
LM - Traffic Flowmap #3
AM No-Action



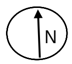
CBD Tolling
LM - Traffic Flowmap #4
AM No-Action



CBD Tolling

LM - Traffic Flowmap #5

AM No-Action



Legend:

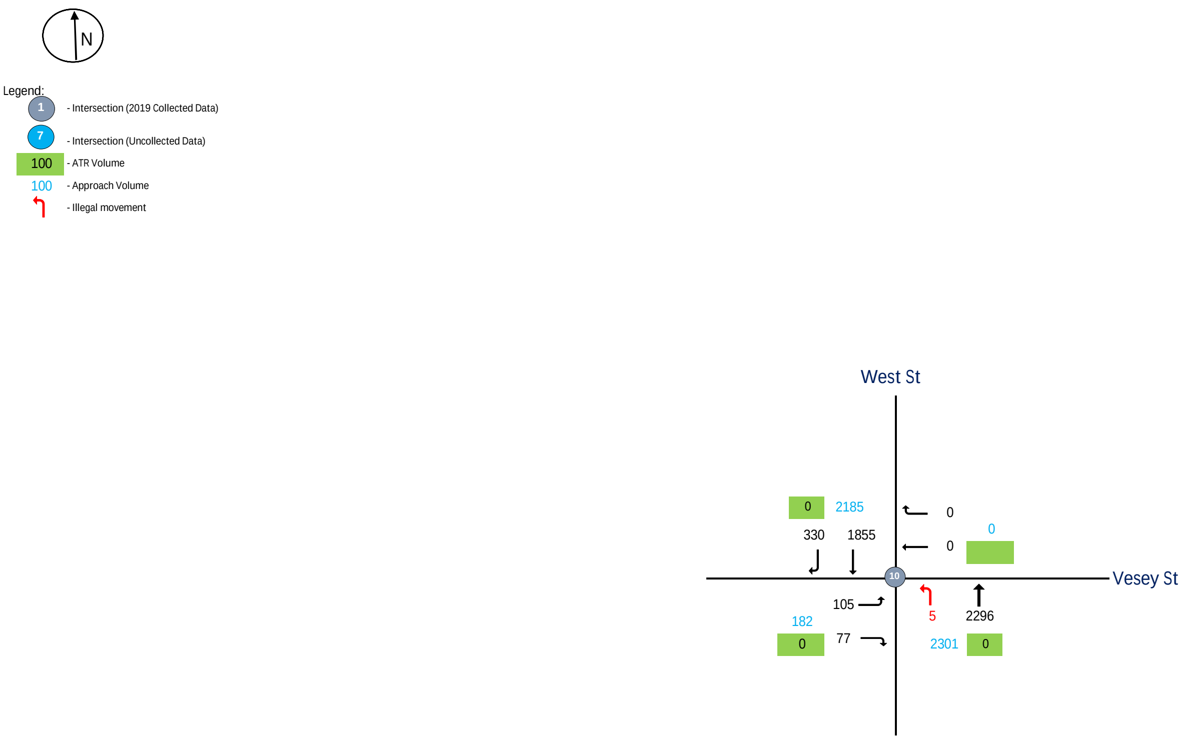
1 - Intersection (2019 Collected Data)

7 - Intersection (Uncollected Data)

100 - ATR Volume

100 - Approach Volume

CBD Tolling
LM - Traffic Flowmap #6
AM No-Action



CBD Tolling

LM - Traffic Flowmap #7

AM No-Action

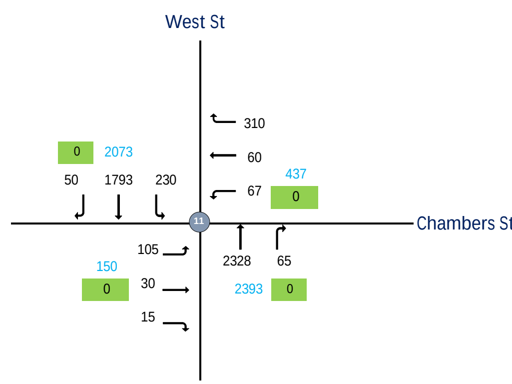
Legend:

1 - Intersection (2019 Collected Data)

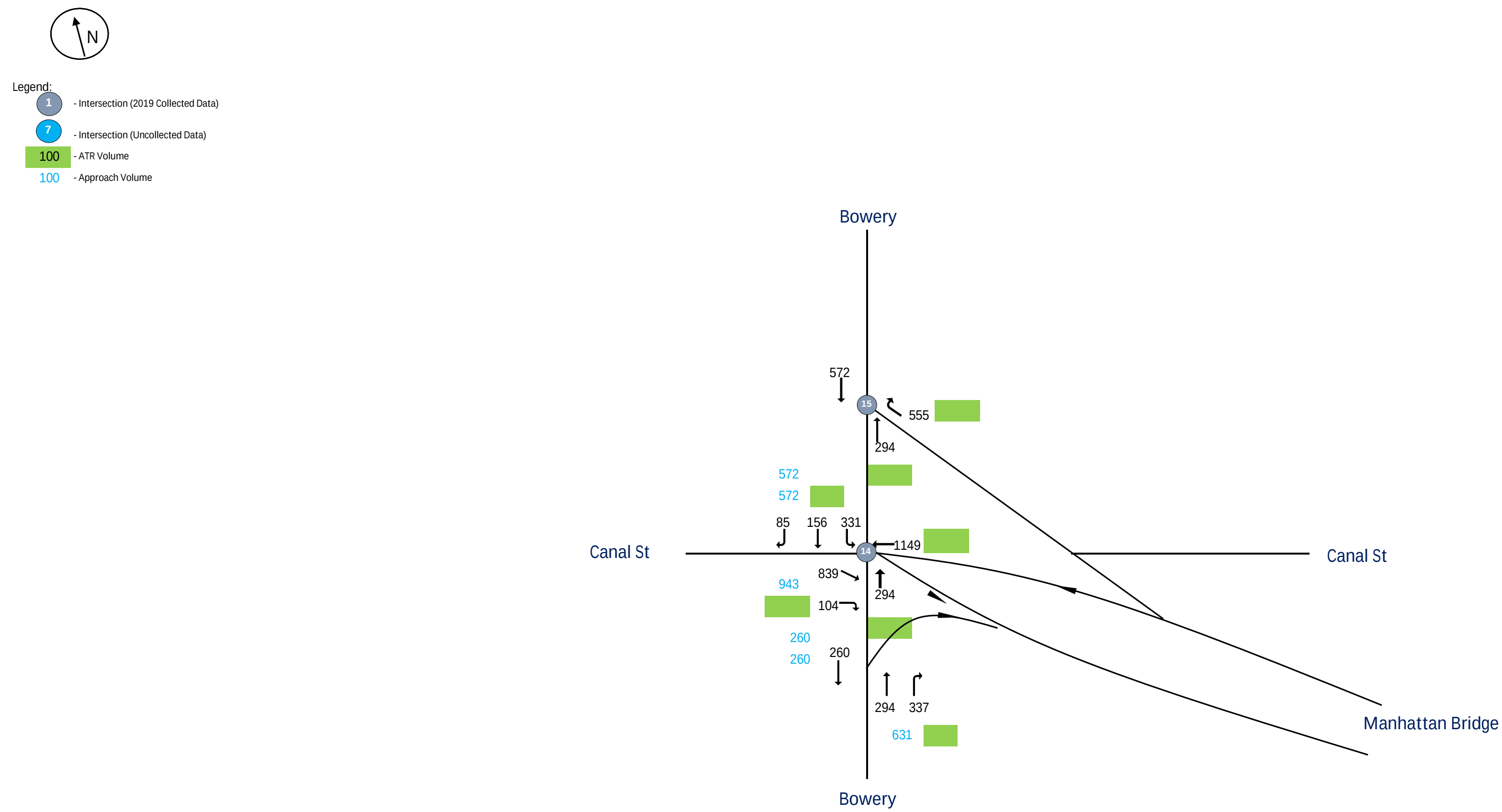
7 - Intersection (Uncollected Data)

100 - ATR Volume

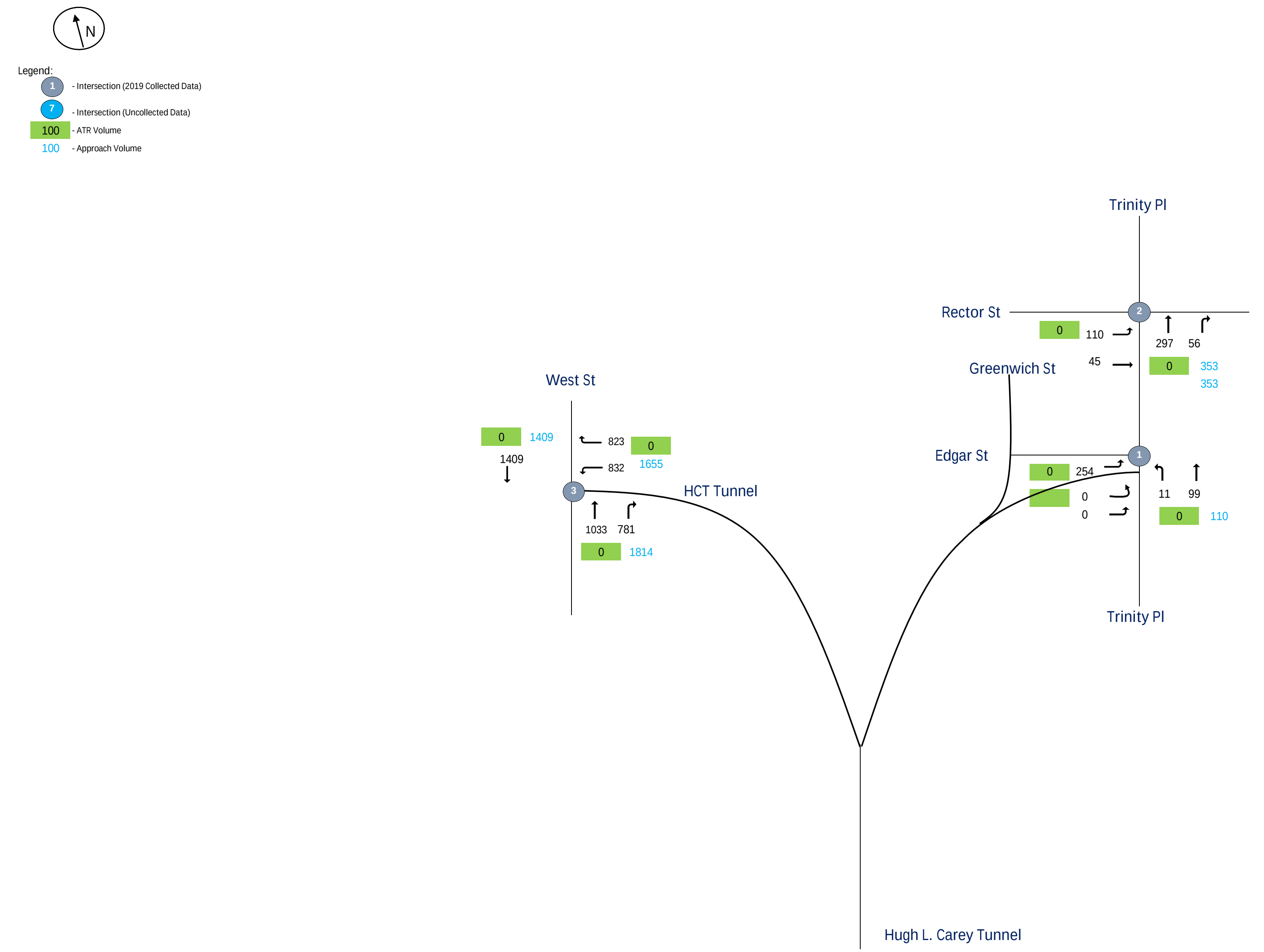
100 - Approach Volume



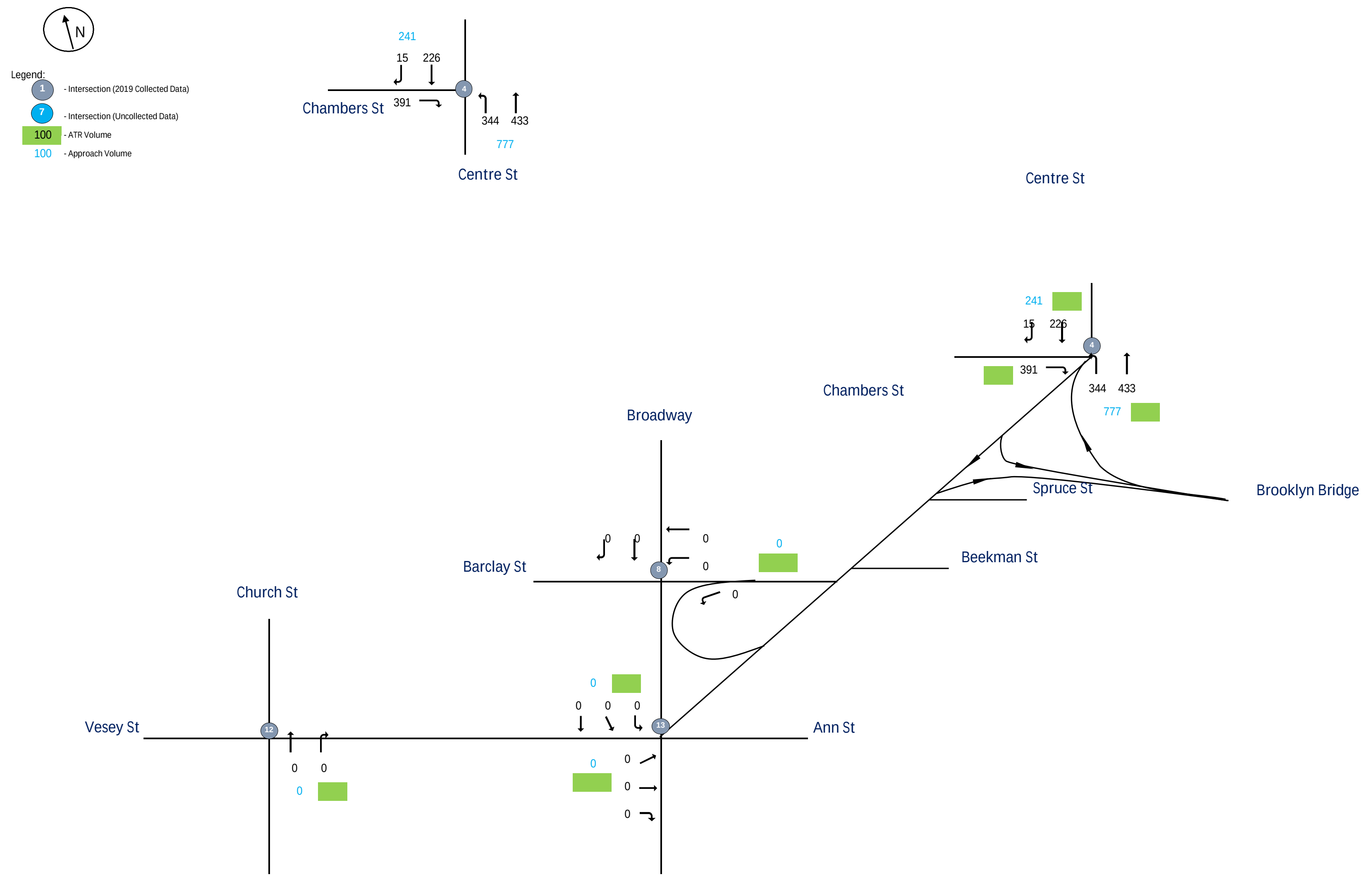
CBD Tolling
LM - Traffic Flowmap #8
AM No-Action

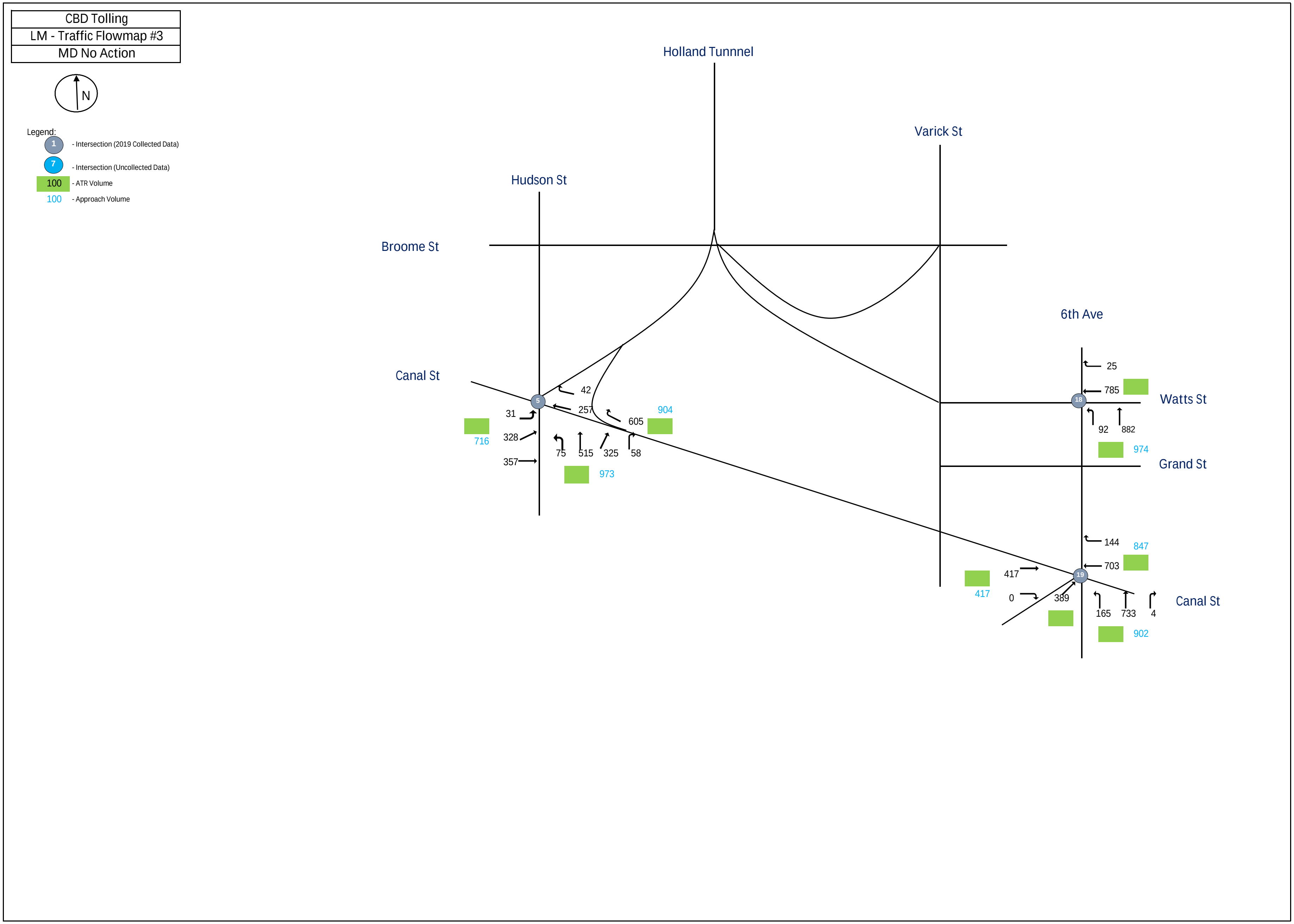


CBD Tolling
LM - Traffic Flowmap #1
MD No Action

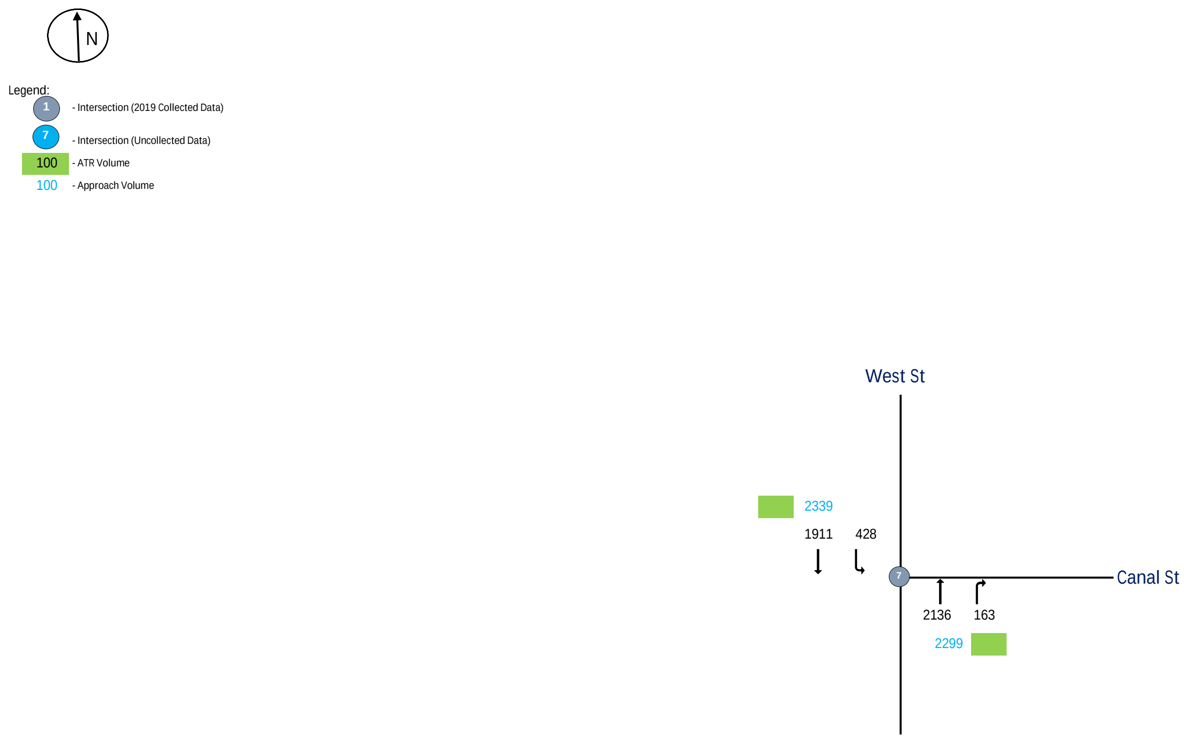


CBD Tolling
LM - Traffic Flowmap #2
MD No Action

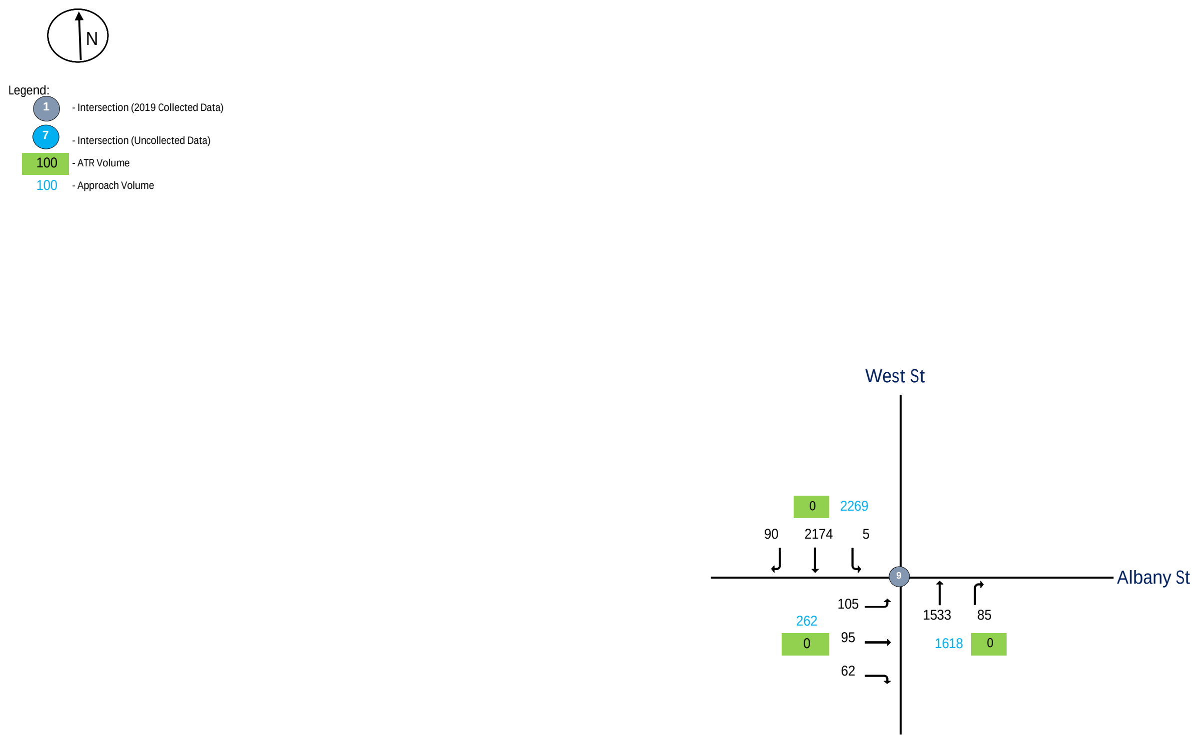



CBD Tolling
LM - Traffic Flowmap #3
MD No Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Holland Tunnel
Varick St
Hudson St
Broome St
6th Ave
Canal St
Watts St
Grand St
Canal St
5
42
257
31
605
904
716
328
75
515
325
58
357
973
25
785
18
92
882
974
144
847
703
417
19
417
0
389
165
733
4
902

CBD Tolling
LM - Traffic Flowmap #4
MD No Action

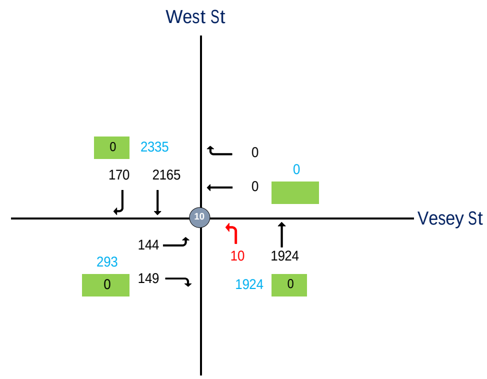


CBD Tolling
LM - Traffic Flowmap #5
MD No Action

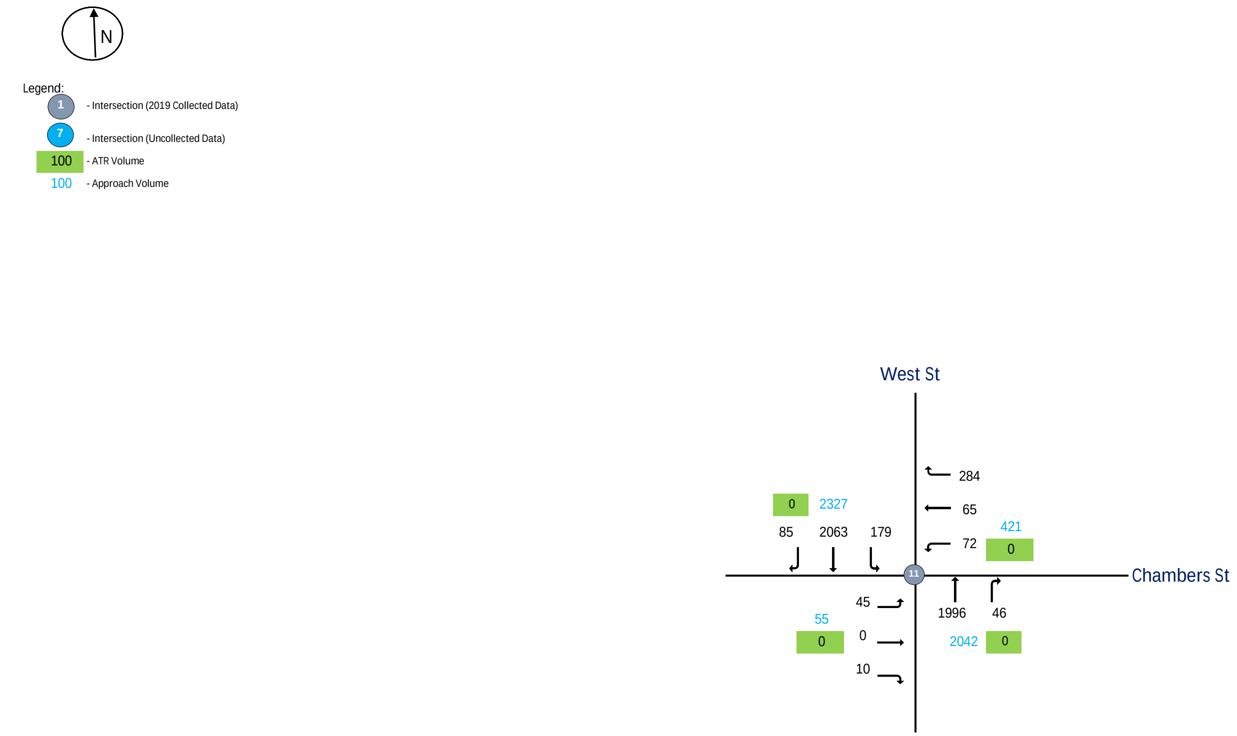


CBD Tolling
LM - Traffic Flowmap #6
MD No Action

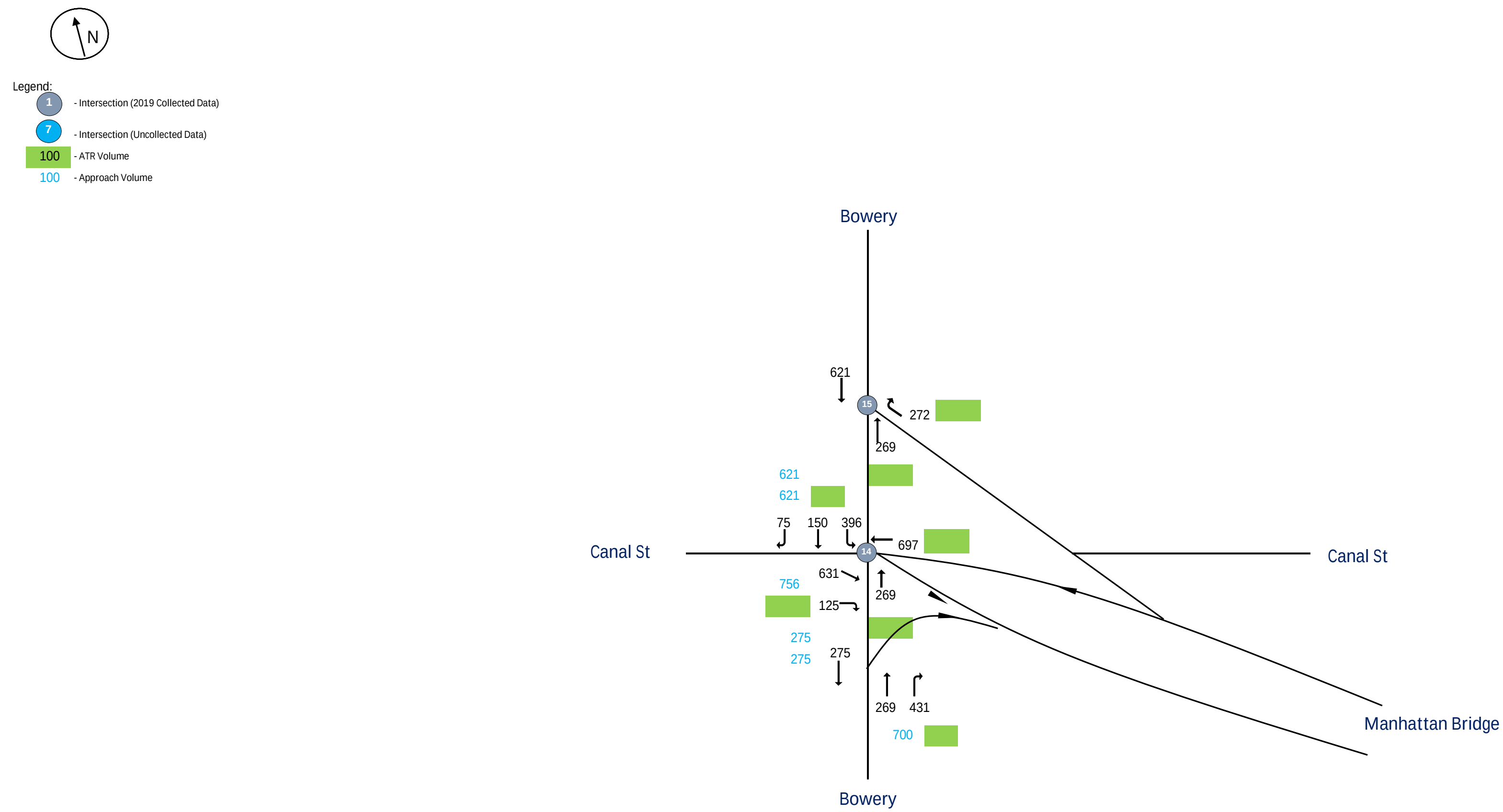
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
- Illegal movement



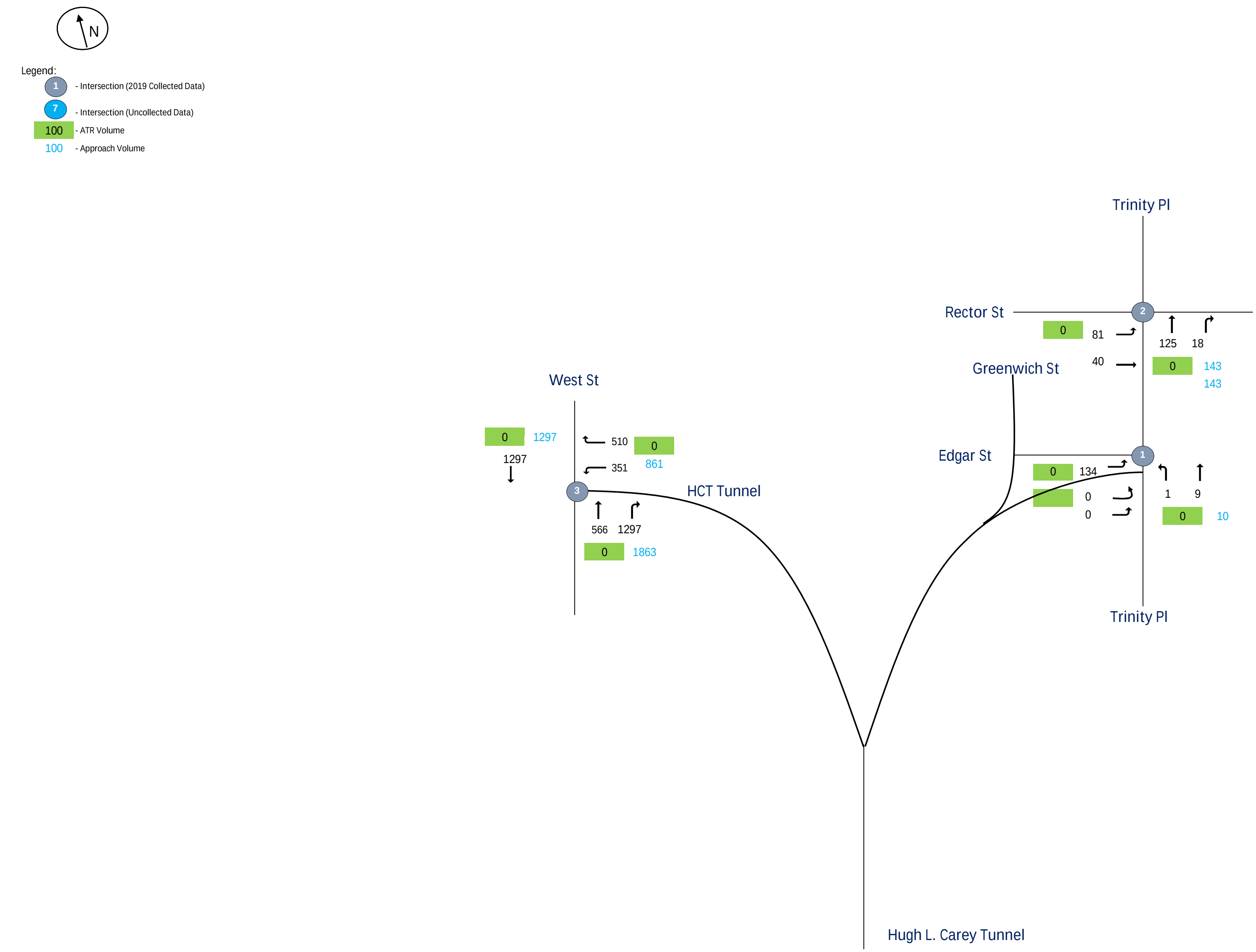
CBD Tolling
LM - Traffic Flowmap #7
MD No Action



CBD Tolling
LM - Traffic Flowmap #8
MD No Action



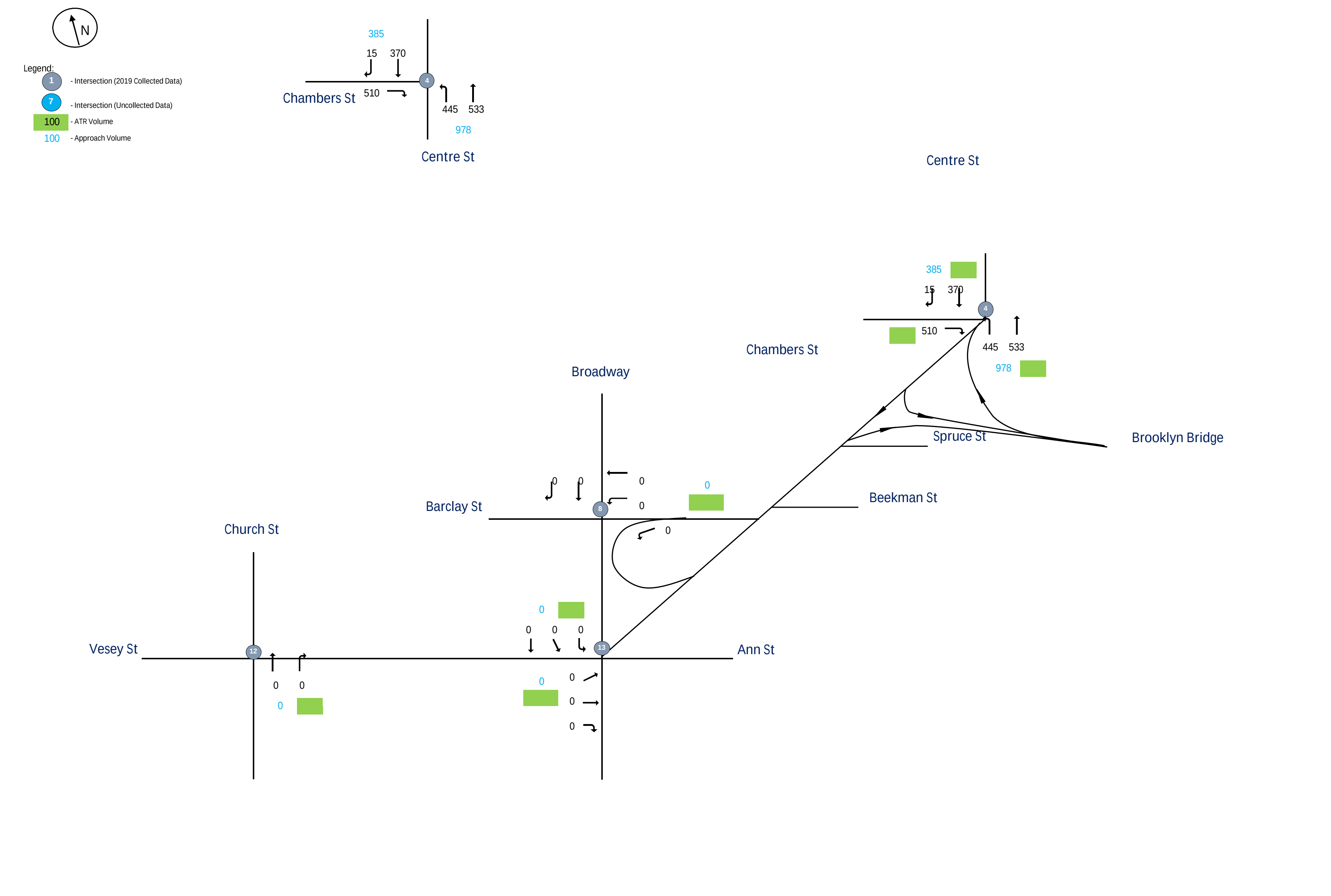
CBD Tolling
LM - Traffic Flowmap #1
PM No-Action



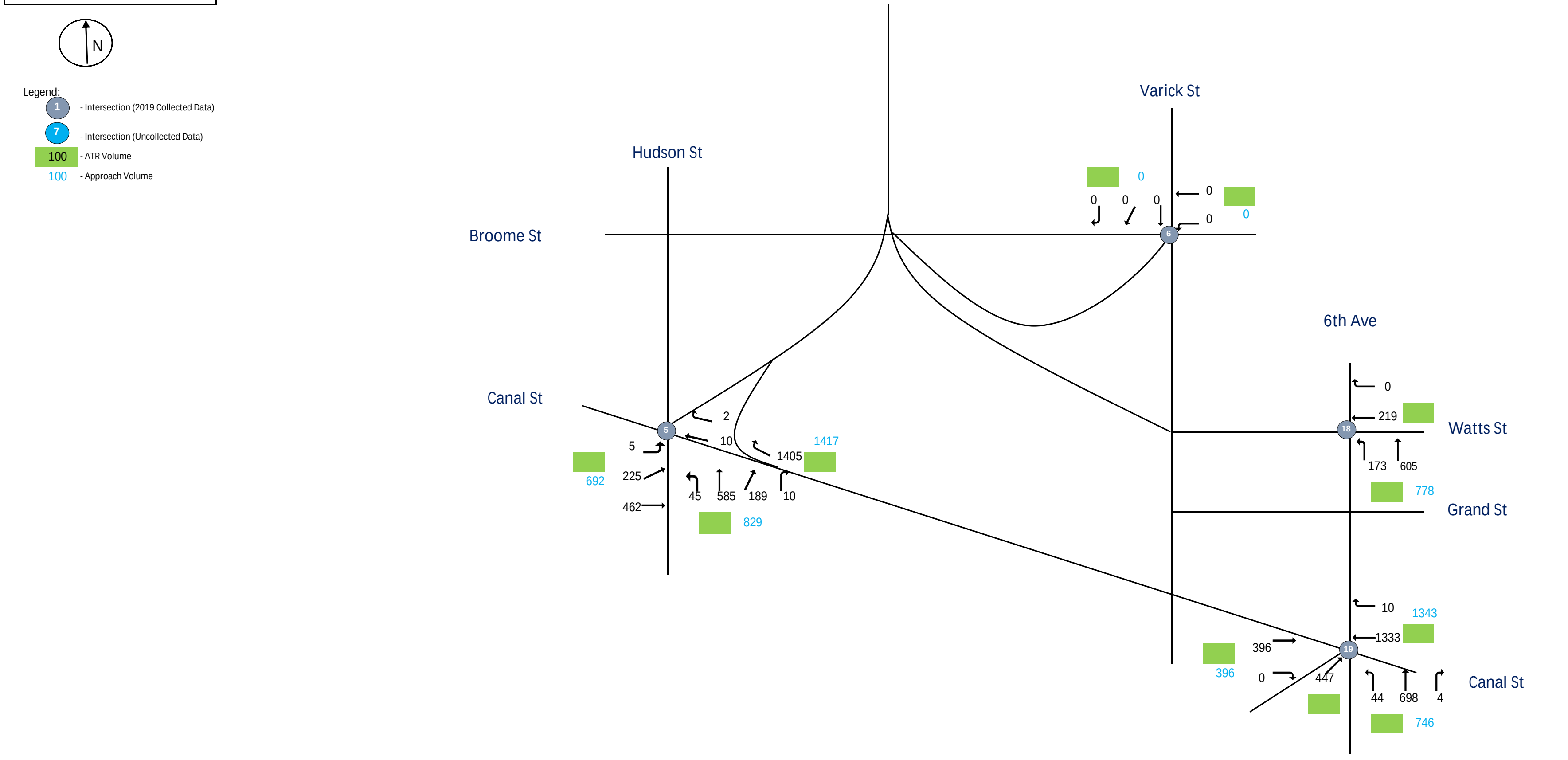
CBD Tolling

LM - Traffic Flowmap #2

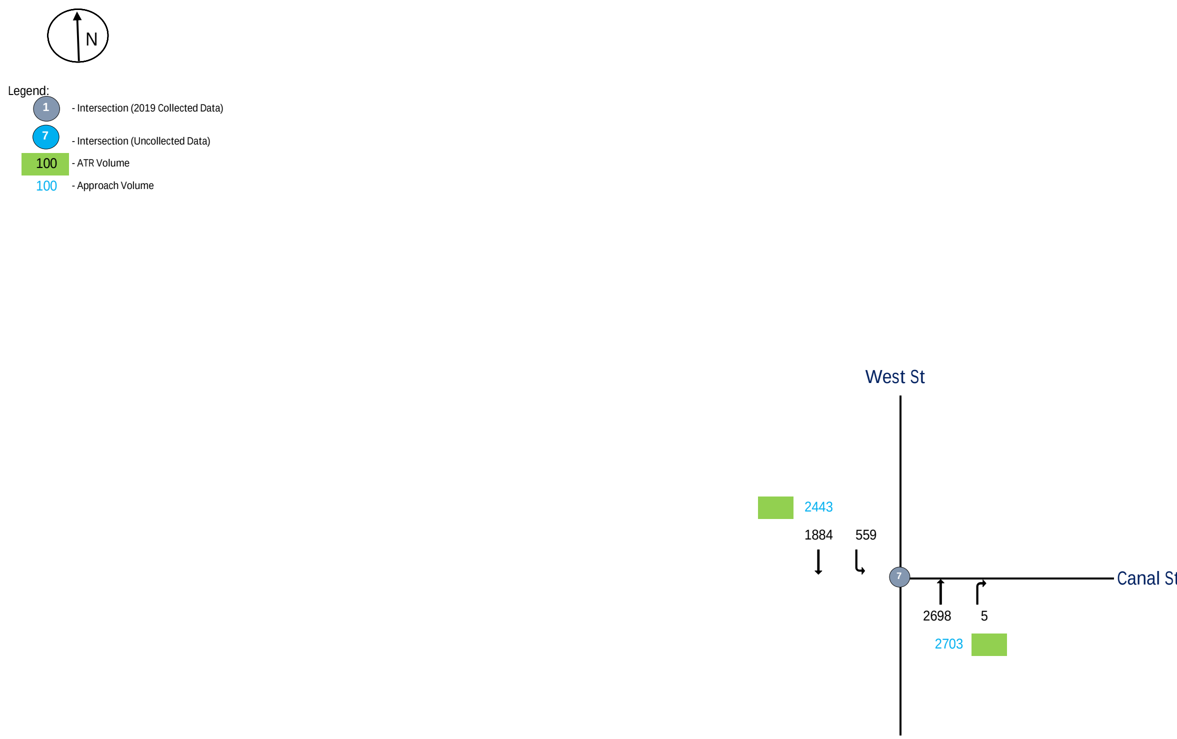
PM No-Action



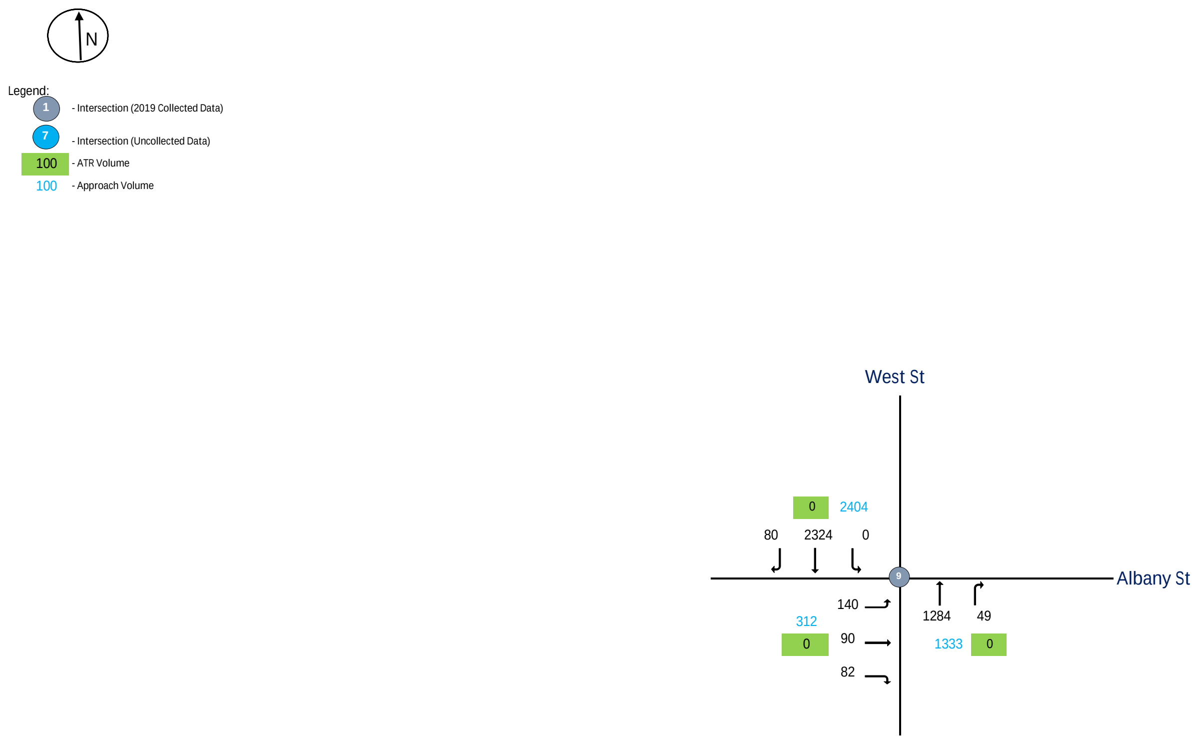
CBD Tolling
LM - Traffic Flowmap #3
PM No-Action



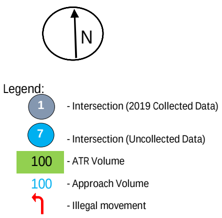
CBD Tolling
LM - Traffic Flowmap #4
PM No-Action

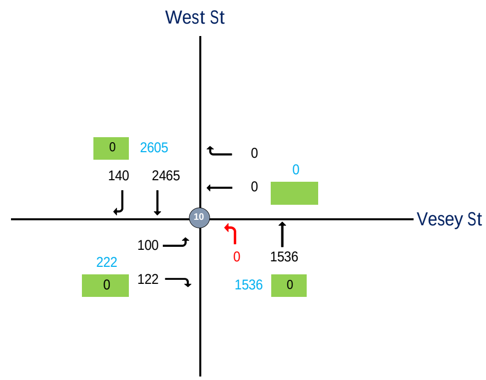


CBD Tolling
LM - Traffic Flowmap #5
PM No-Action

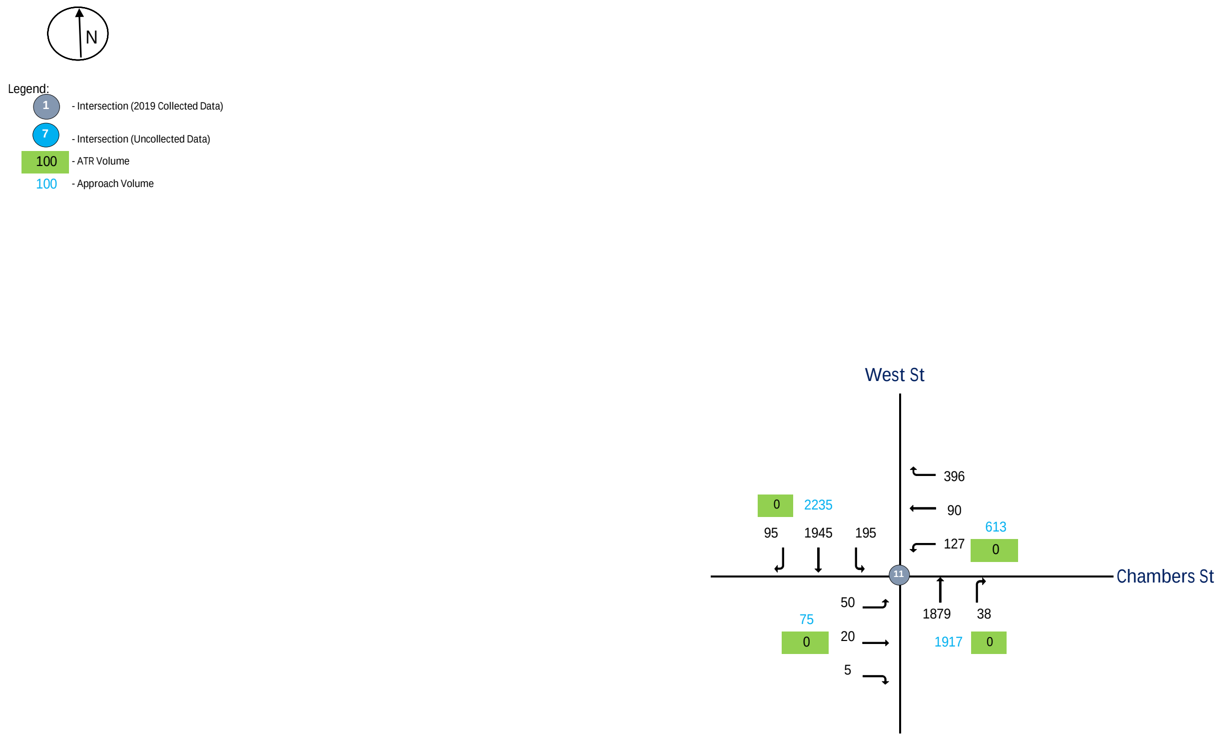


CBD Tolling
LM - Traffic Flowmap #6
PM No-Action

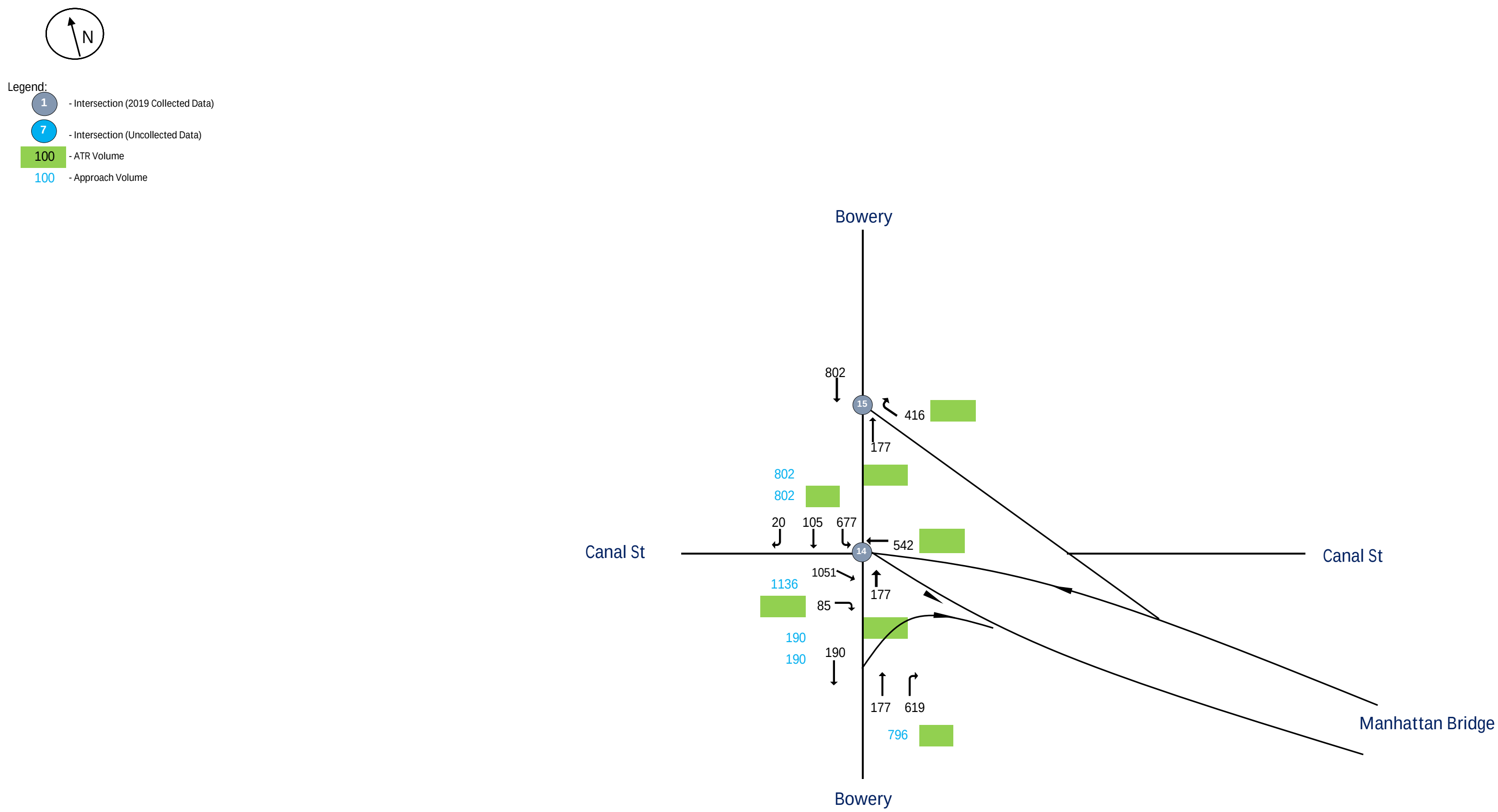




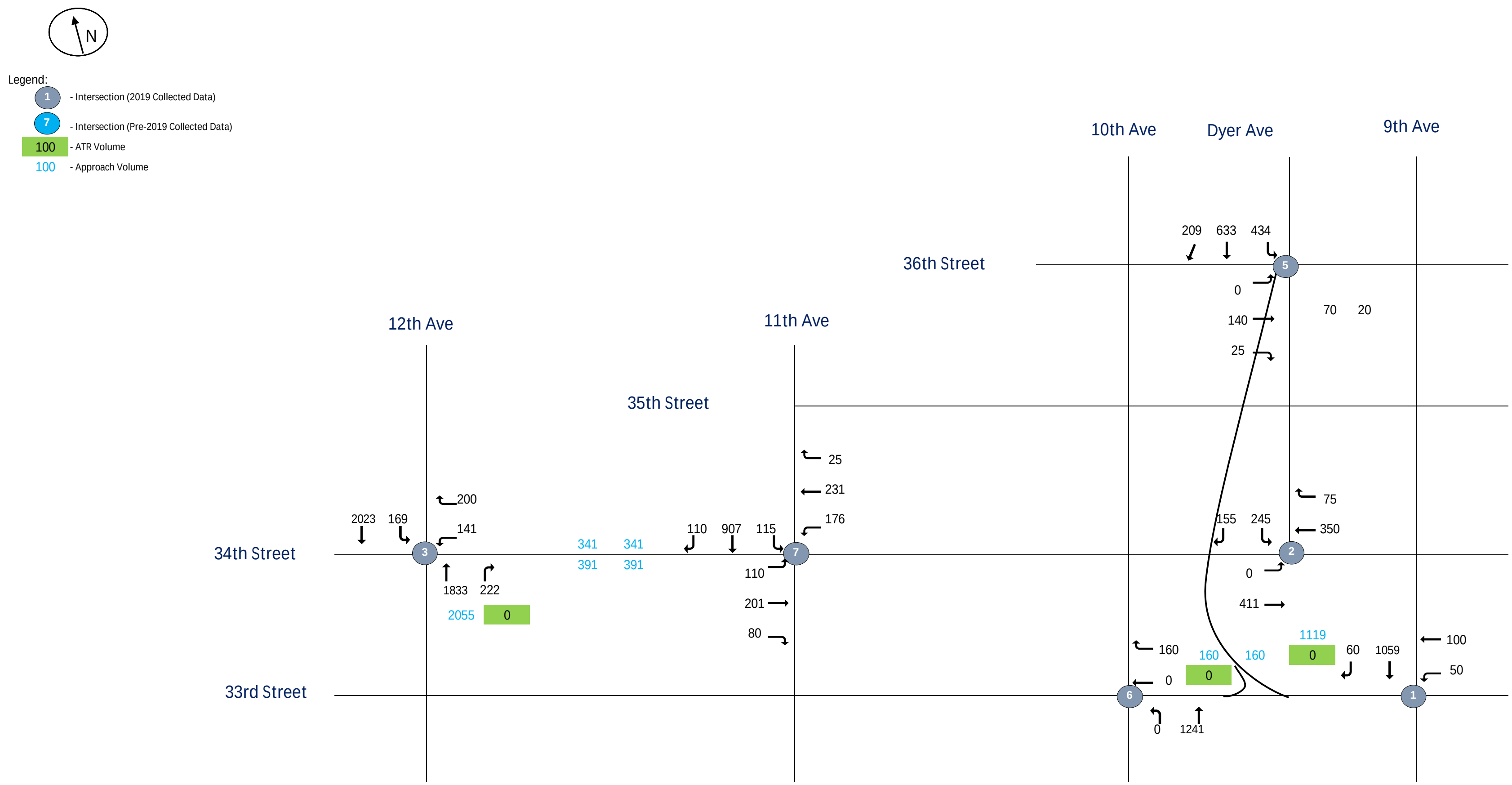
CBD Tolling
LM - Traffic Flowmap #7
PM No-Action



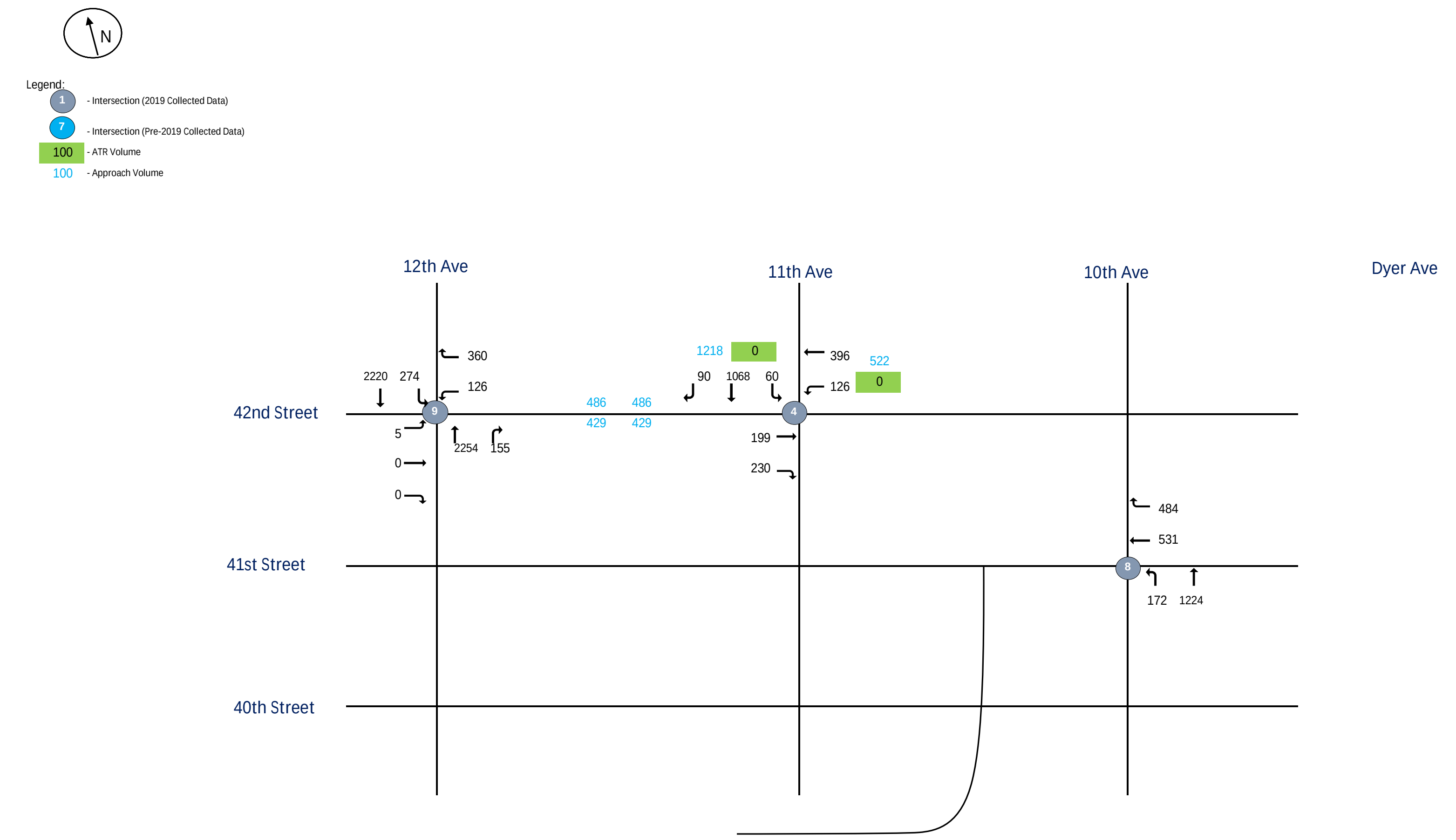
CBD Tolling
LM - Traffic Flowmap #8
PM No-Action

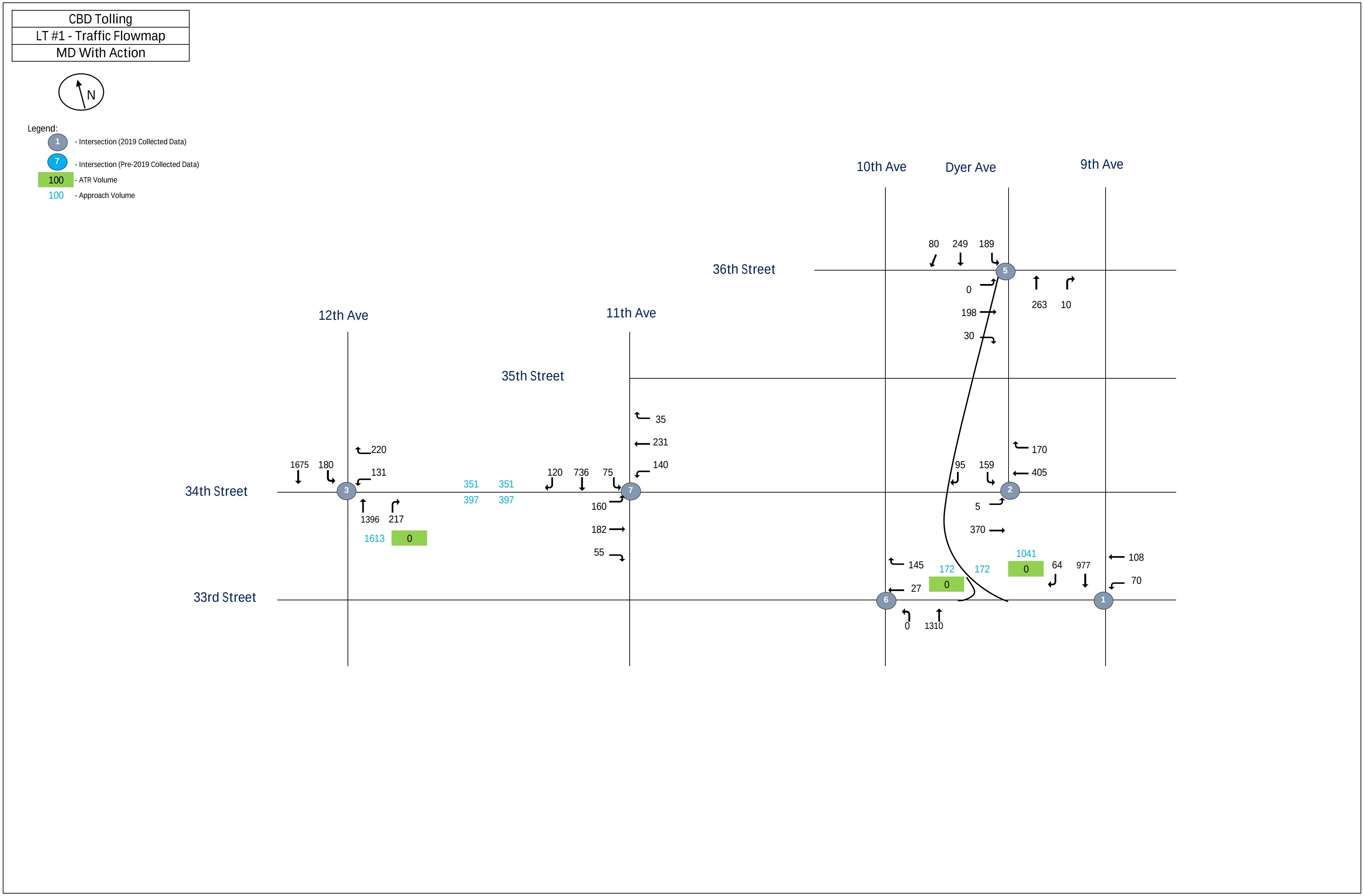


CBD Tolling
LT #1 - Traffic Flowmap
AM No Action

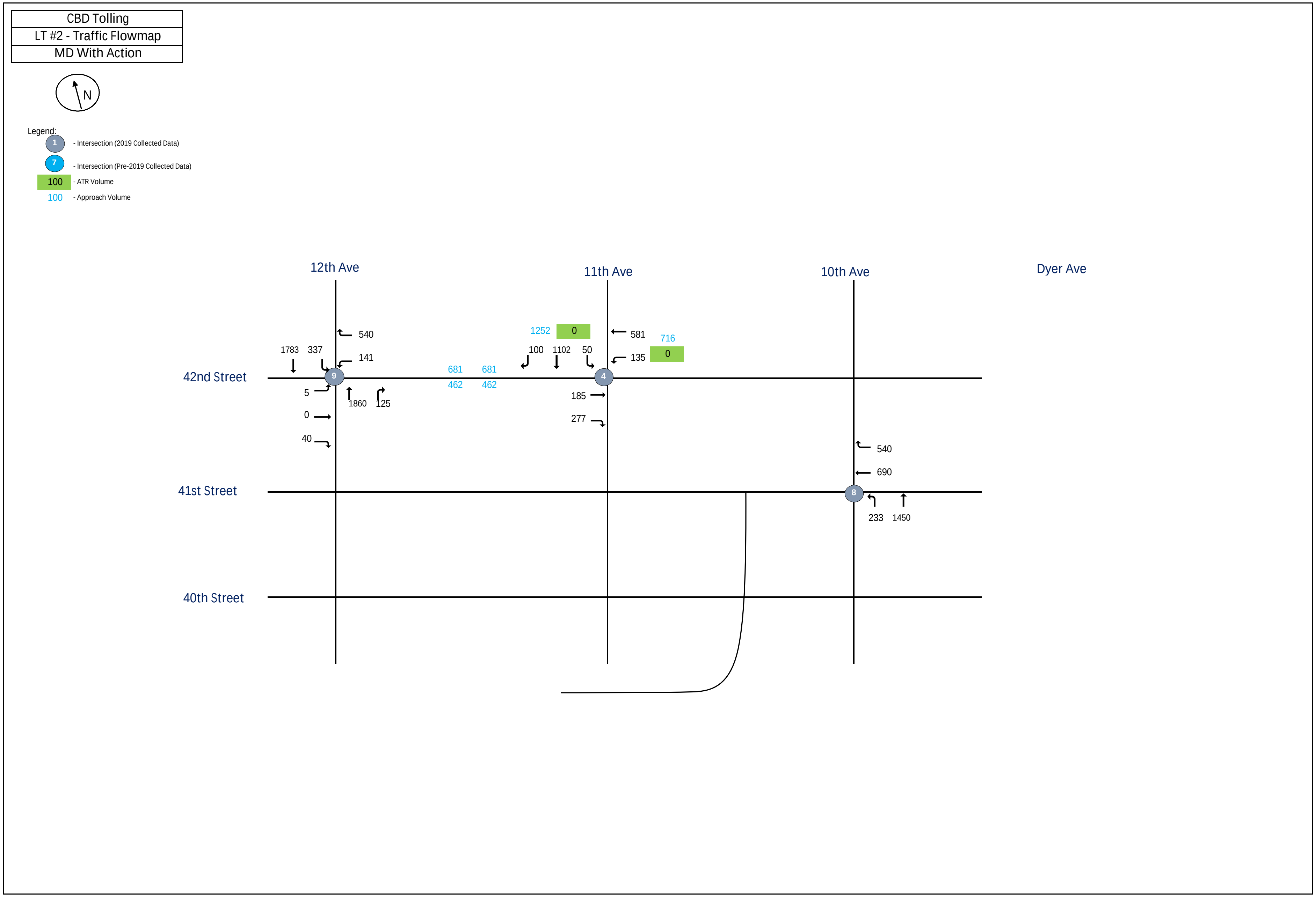


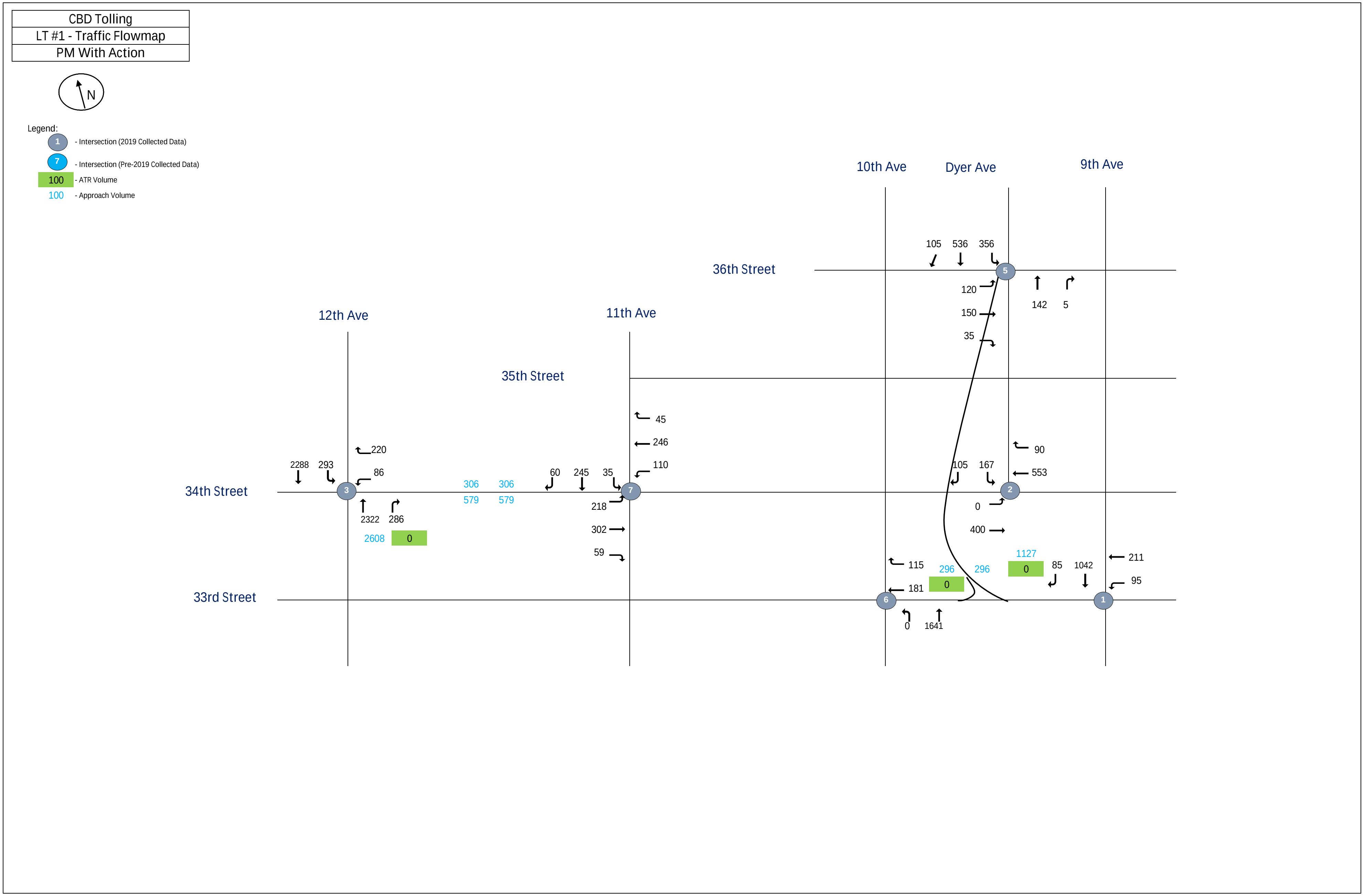
CBD Tolling
LT #2 - Traffic Flowmap
AM No Action



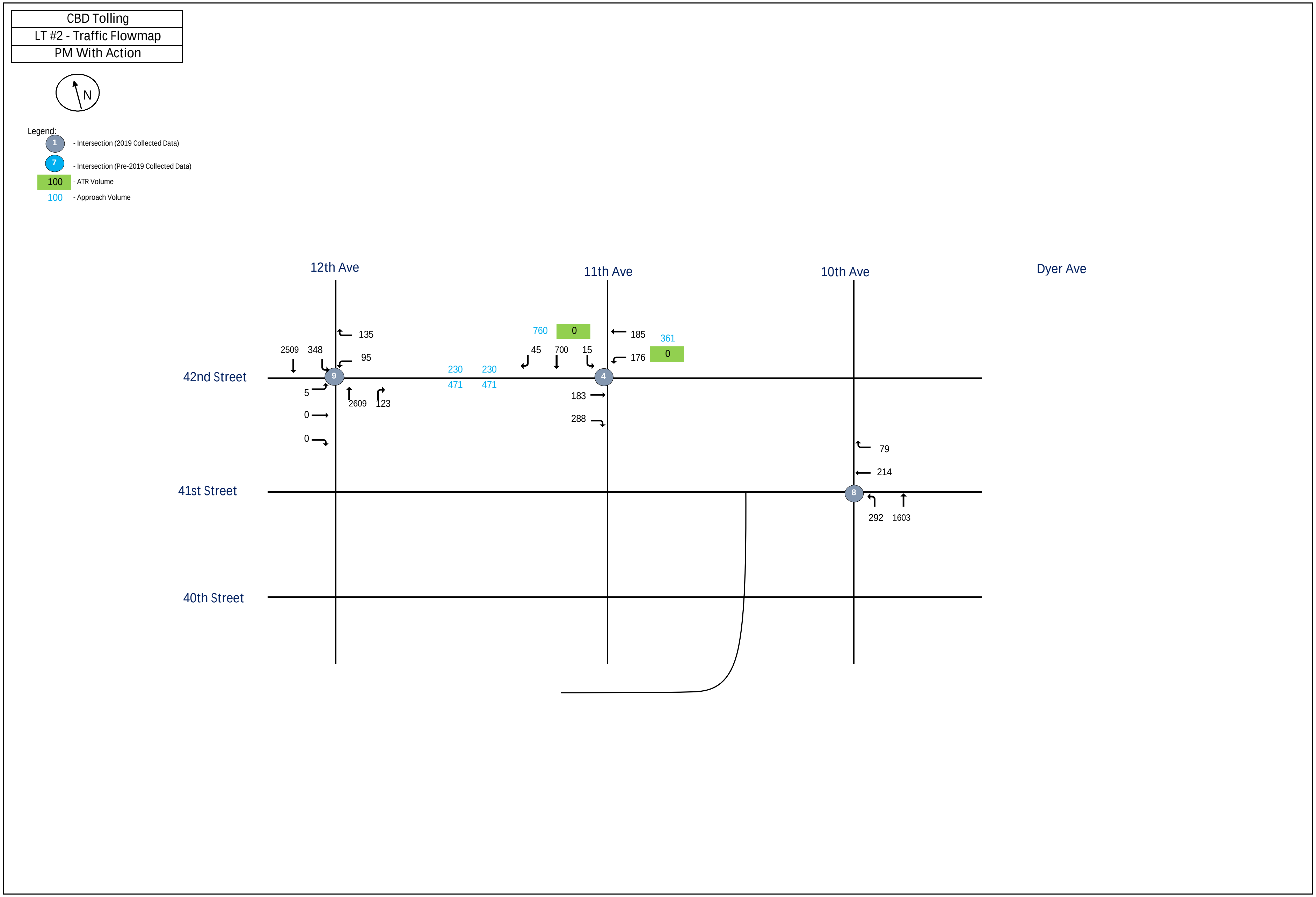


CBD Tolling
LT #1 - Traffic Flowmap
MD With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
36th Street
12th Ave
11th Ave
35th Street
34th Street
33rd Street
80
249
189
0
198
30
263
10
35
231
140
220
131
1675
180
1396
217
1613
0
351
351
397
397
120
736
75
160
182
55
170
405
95
159
5
370
1041
0
64
977
108
70
145
172
172
0
27
0
1310


CBD Tolling
LT #2 - Traffic Flowmap
MD With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
12th Ave
11th Ave
10th Ave
Dyer Ave
42nd Street
41st Street
40th Street
1783
337
540
141
5
0
40
1860
125
681
681
462
462
1252
0
100
1102
50
581
716
135
0
185
277
540
690
233
1450
9
4
8



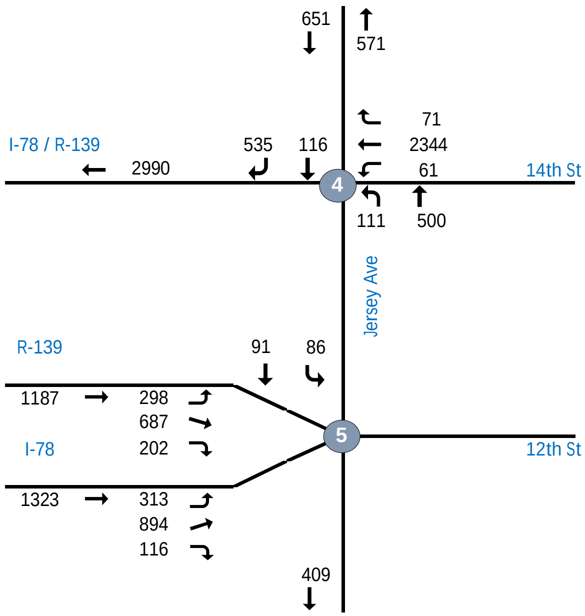
CBD Tolling
LT #1 - Traffic Flowmap
PM With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
12th Ave
11th Ave
36th Street
35th Street
34th Street
33rd Street
105
536
356
120
150
35
142
5
45
246
110
220
2288
293
86
306
306
579
579
60
245
35
218
302
59
2322
286
2608
0
90
553
105
167
0
400
115
181
296
0
296
1127
0
85
1042
211
95
0
1641

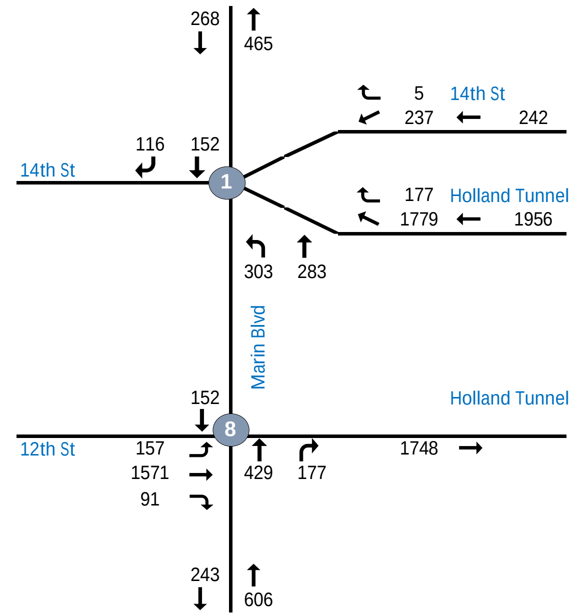


CBD Tolling
LT #2 - Traffic Flowmap
PM With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
12th Ave
11th Ave
10th Ave
Dyer Ave
42nd Street
41st Street
40th Street
135
2509
348
95
5
0
0
2609
123
230
230
471
471
760
0
45
700
15
185
361
176
0
183
288
79
214
292
1603
9
4
8

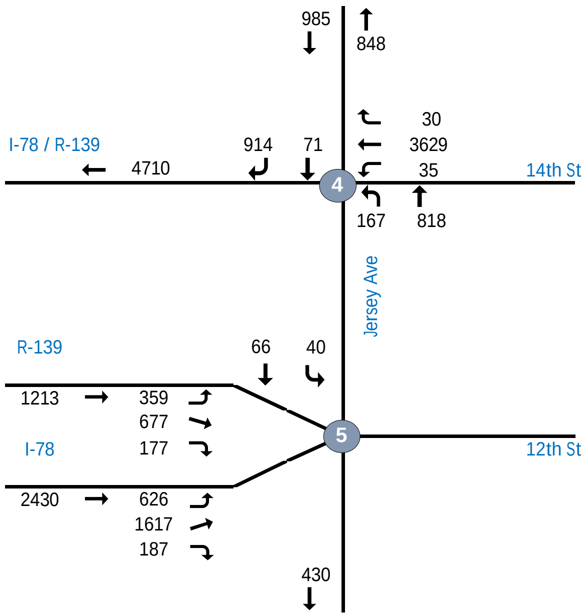
New Jersey
2021 No Action
AM Peak Hour

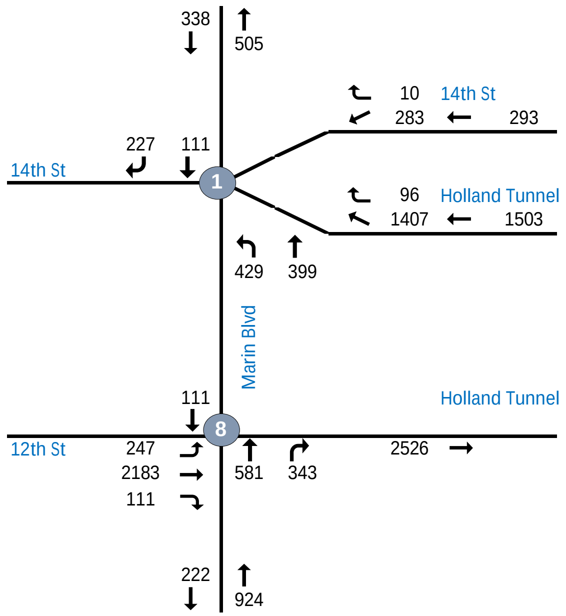
New Jersey
2021 No Action
MD Peak Hour

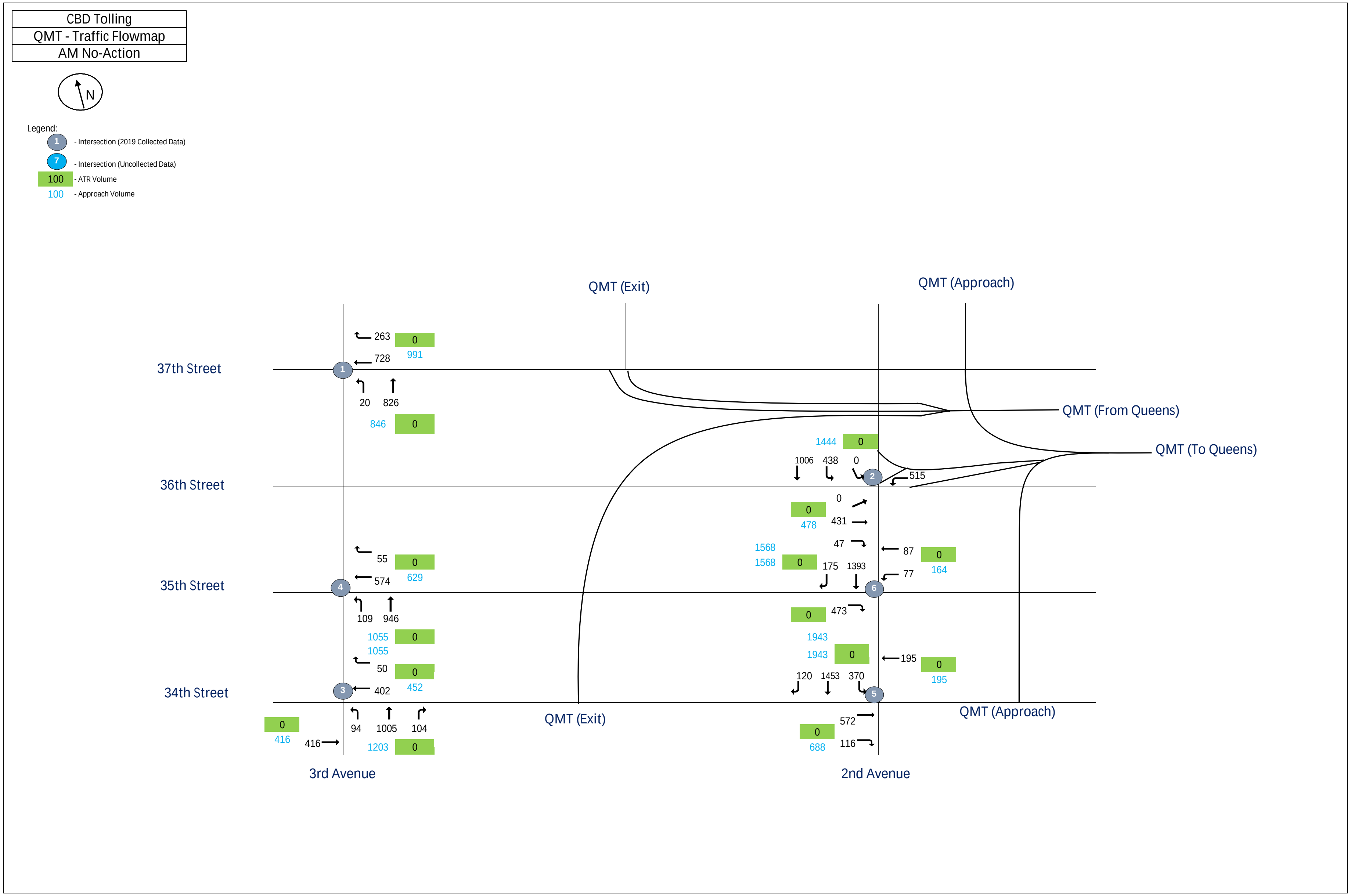


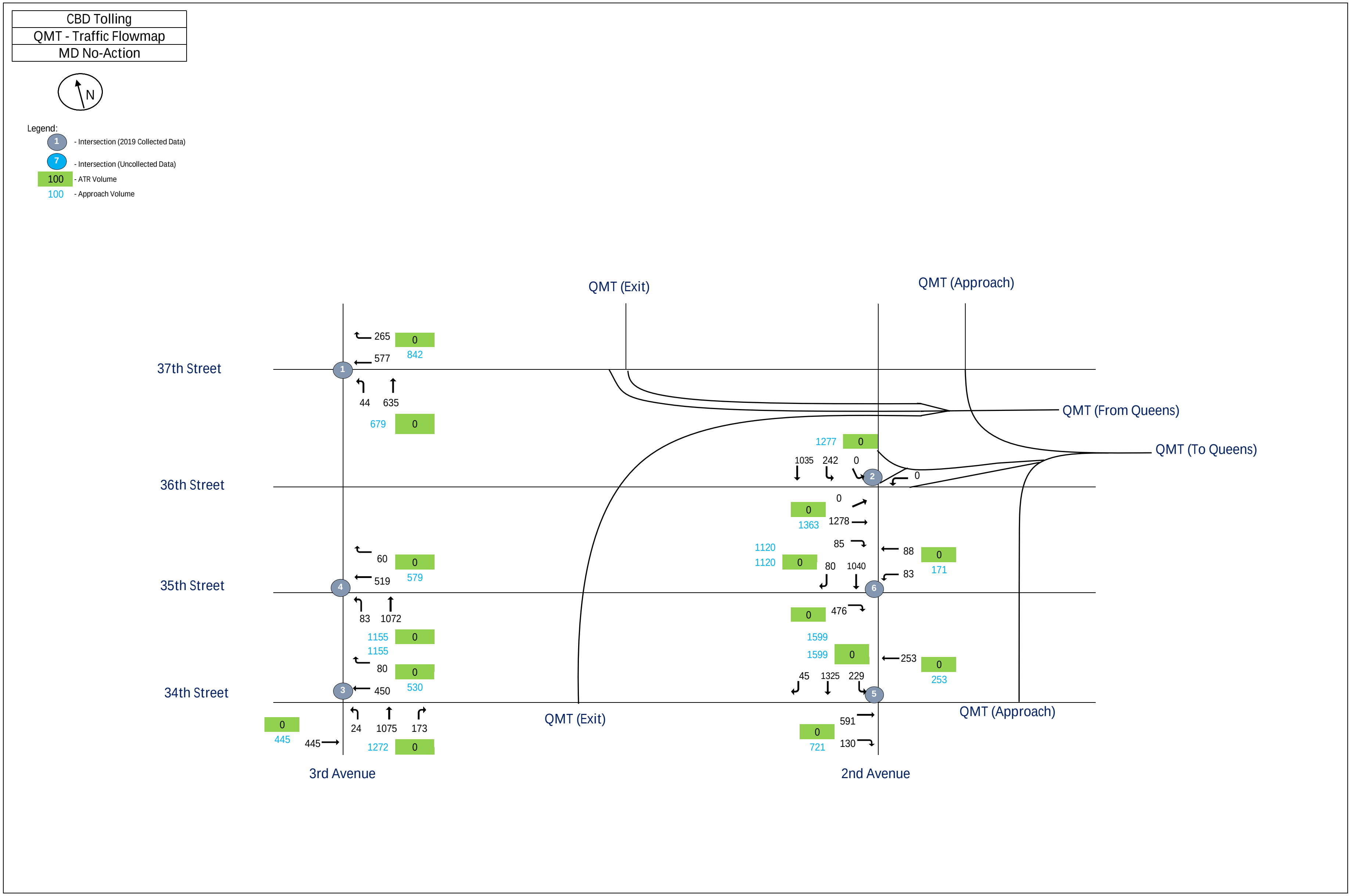


New Jersey
2021 No Action
PM Peak Hour



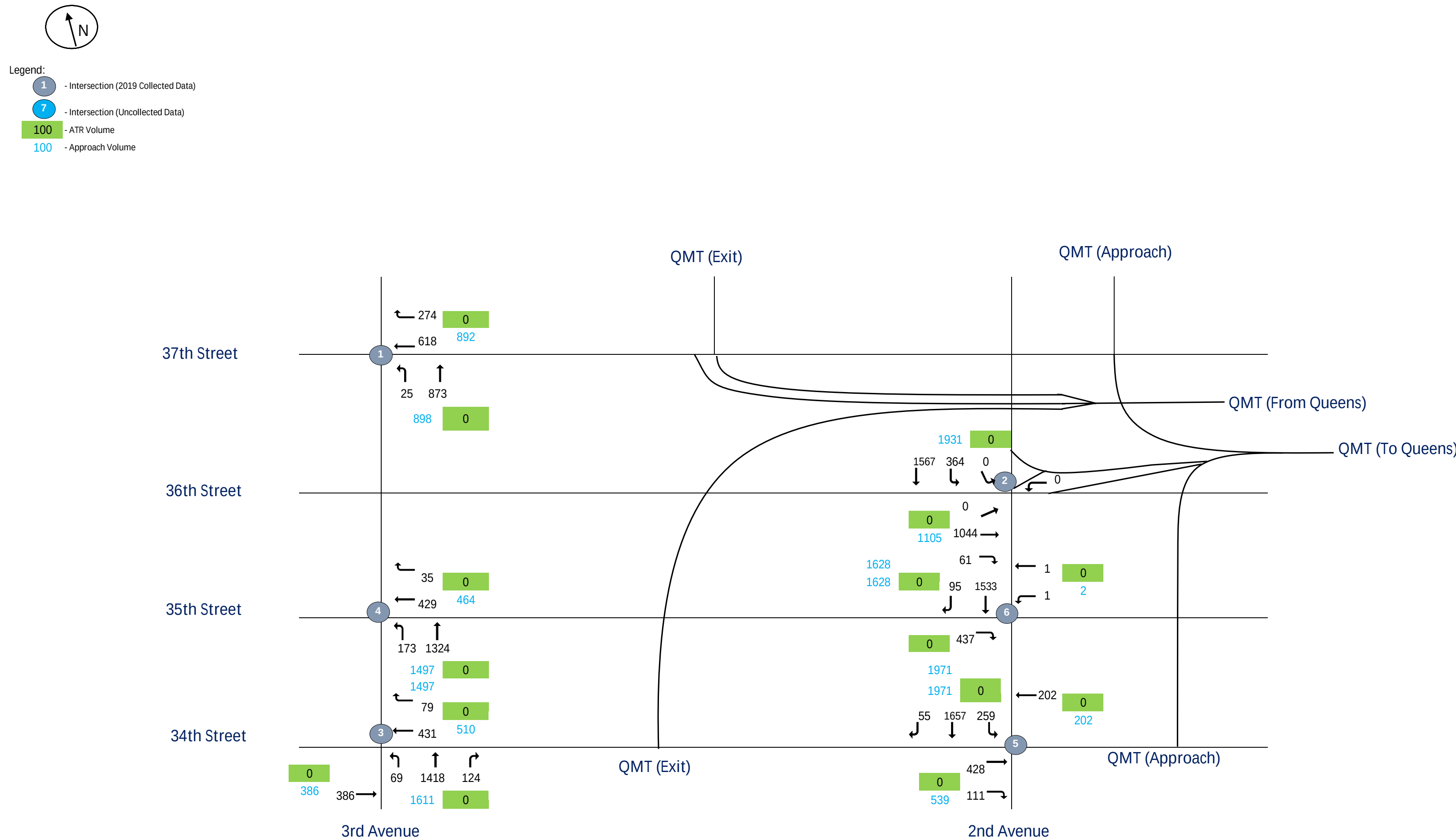



CBD Tolling
QMT - Traffic Flowmap
AM No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
37th Street
36th Street
35th Street
34th Street
QMT (From Queens)
QMT (To Queens)
3rd Avenue
2nd Avenue
QMT (Exit)
QMT (Approach)
263
728
0
991
20
826
846
0
1444
0
1006
438
0
515
0
431
47
0
478
1568
1568
0
175
1393
87
77
0
164
55
574
0
629
109
946
1055
0
1055
50
402
0
452
473
0
1943
1943
0
195
0
195
120
1453
370
94
1005
104
0
416
416
1203
0
572
0
688
116

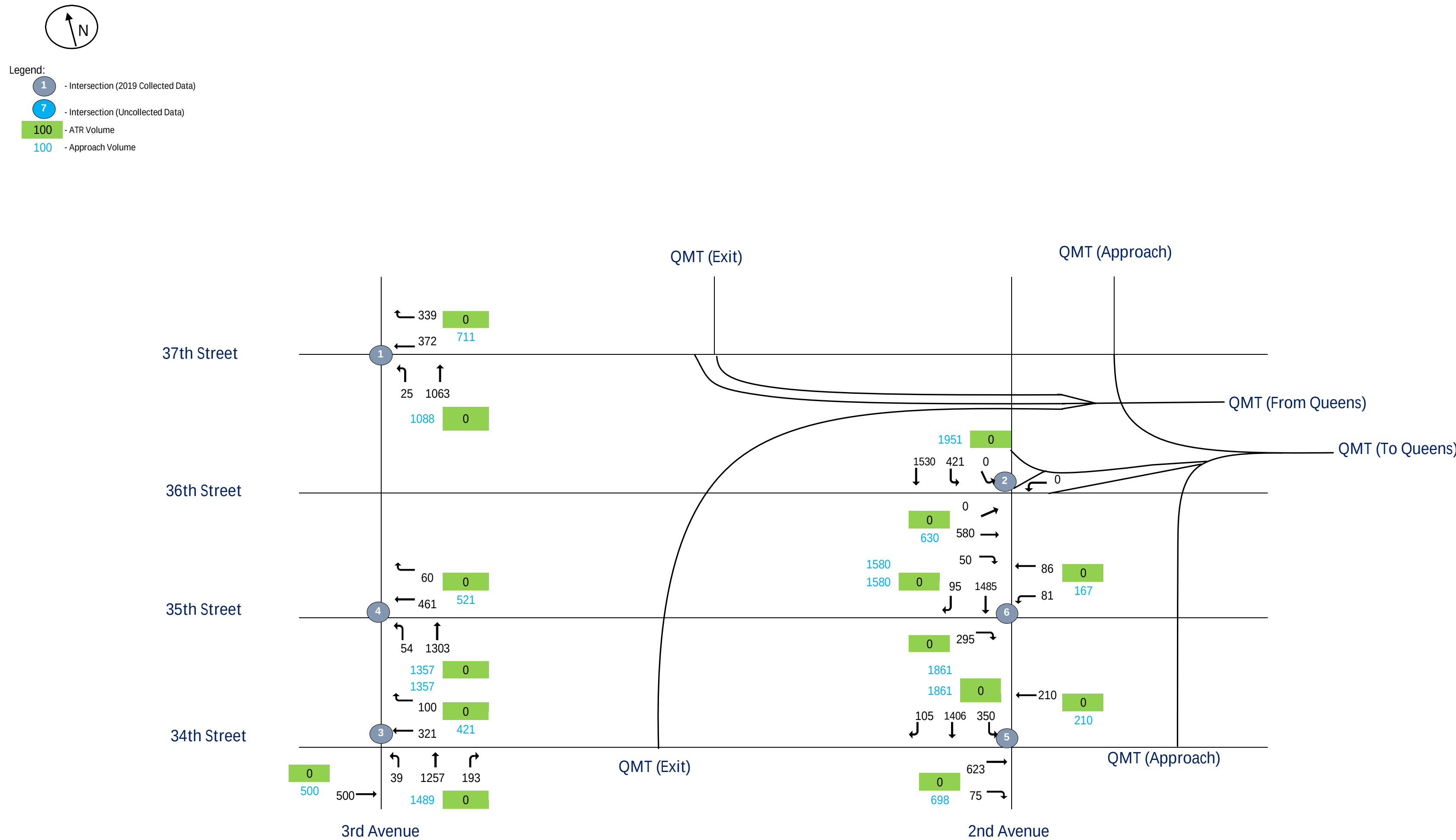


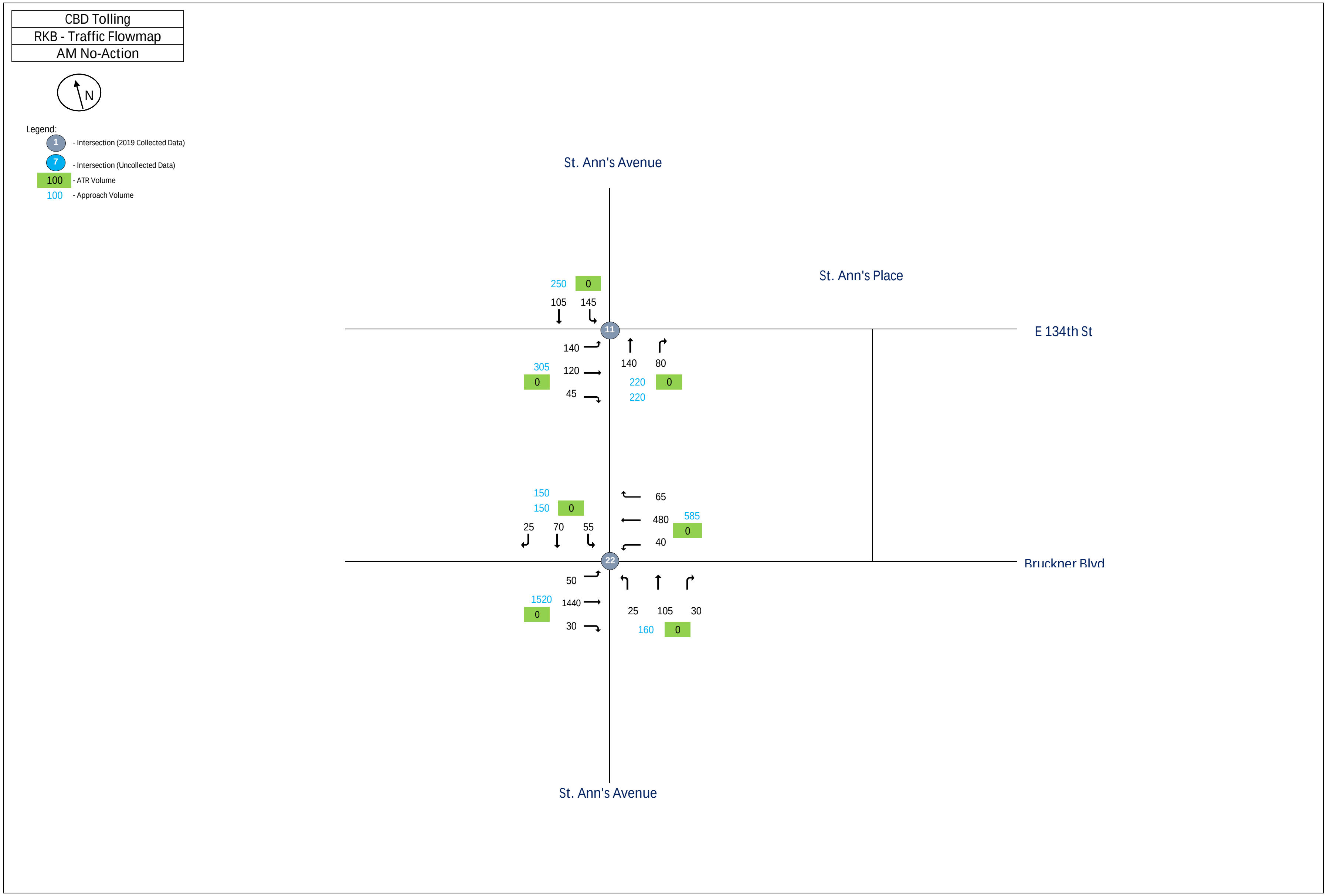
CBD Tolling
QMT - Traffic Flowmap
MD No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
QMT (From Queens)
QMT (To Queens)
37th Street
36th Street
35th Street
34th Street
3rd Avenue
2nd Avenue
265
577
0
842
44
635
679
0
1277
0
1035
242
0
0
0
1363
1278
85
1120
1120
0
80
1040
88
0
83
171
60
0
519
579
83
1072
1155
0
1155
80
0
450
530
476
0
1599
1599
0
253
0
253
45
1325
229
0
445
445
24
1075
173
1272
0
591
0
721
130

CBD Tolling
QMT - Traffic Flowmap
PM No-Action

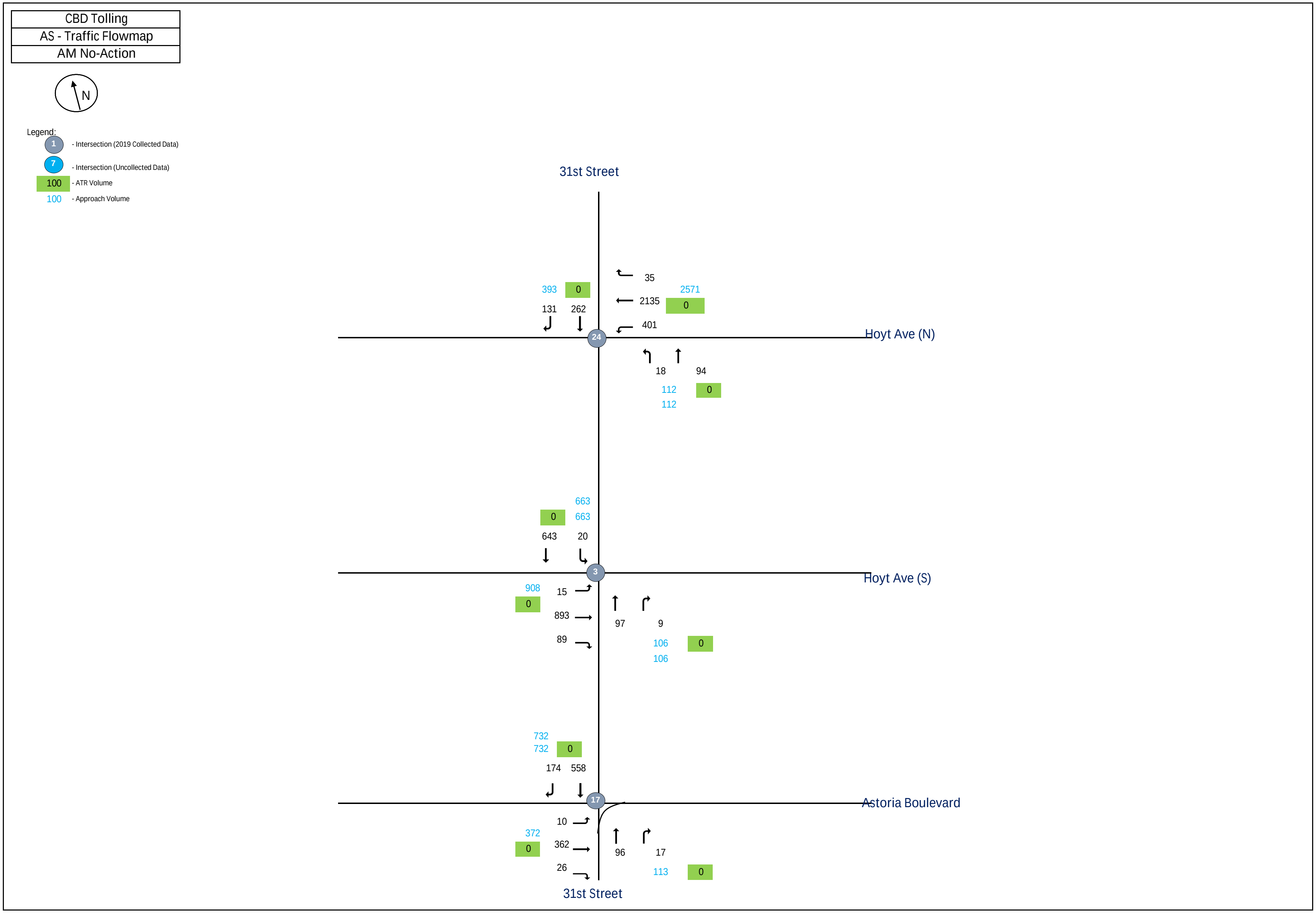


CBD Tolling
QMT - Traffic Flowmap
LN No-Action



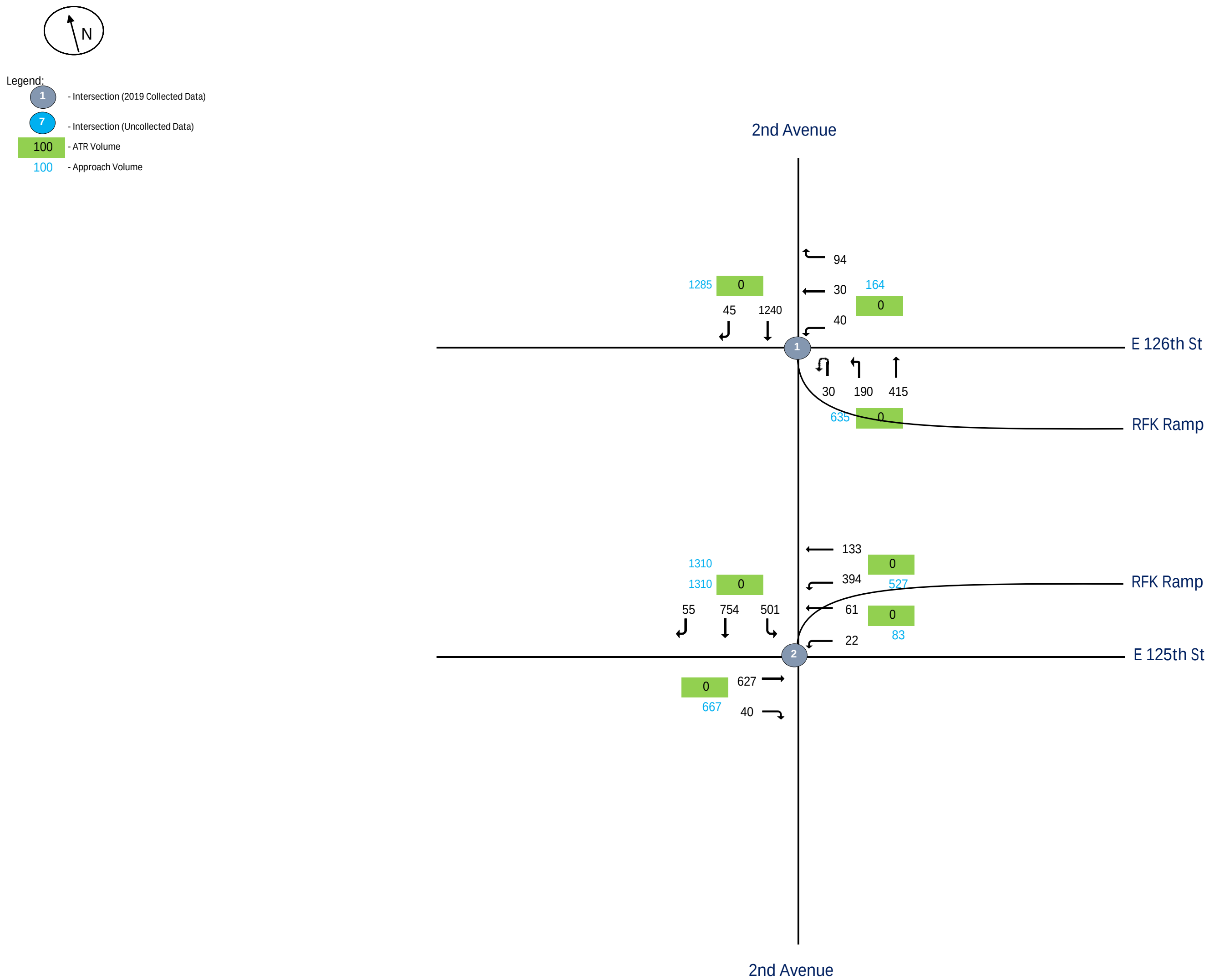


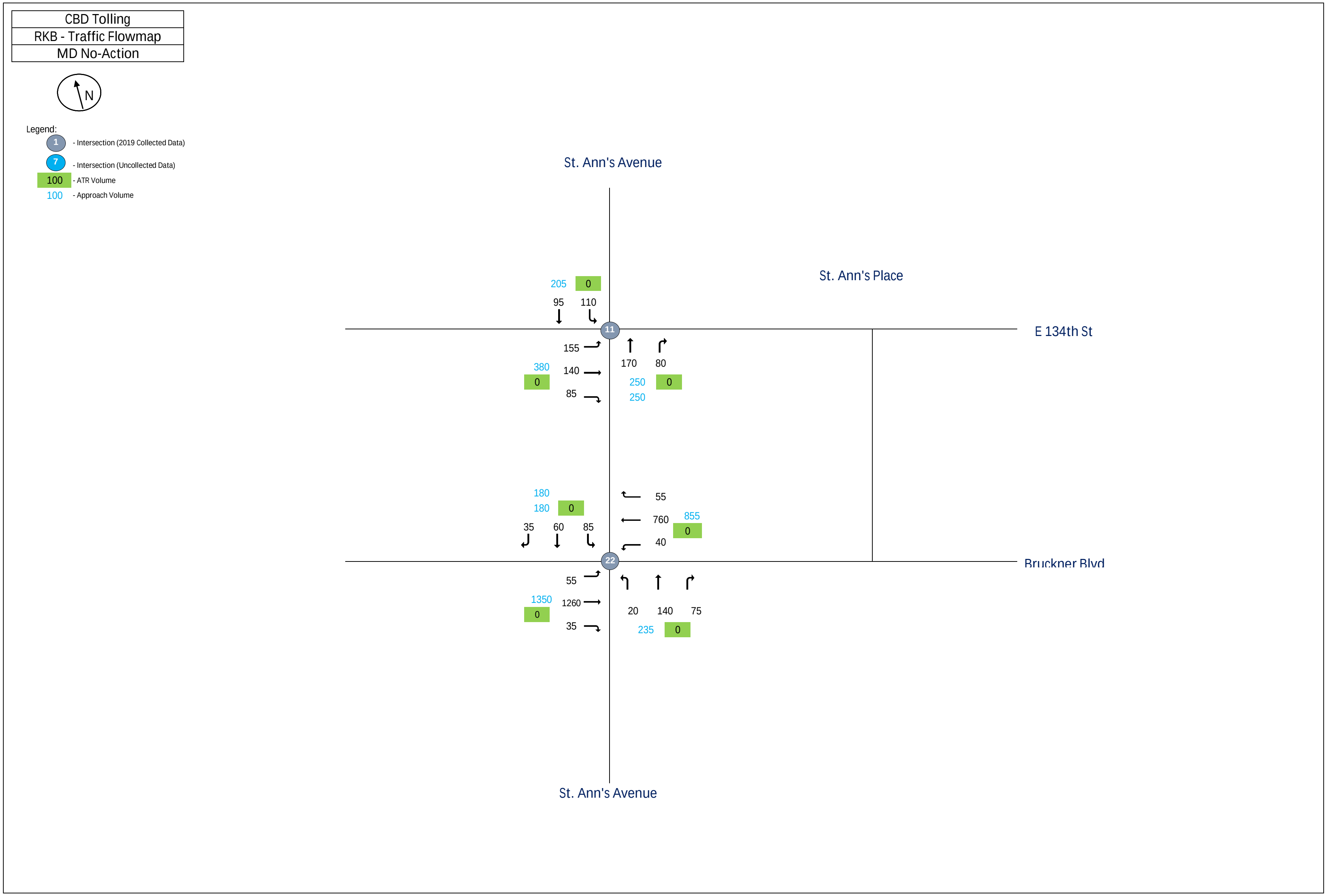
CBD Tolling
RKB - Traffic Flowmap
AM No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
St. Ann's Avenue
St. Ann's Place
E 134th St
Bruckner Blvd
250
0
105
145
11
140
305
0
120
45
140
80
220
0
220
150
150
0
25
70
55
65
480
585
0
40
22
50
1520
0
1440
30
25
105
30
160
0
St. Ann's Avenue



CBD Tolling
AS - Traffic Flowmap
AM No-Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
31st Street
Hoyt Ave (N)
Hoyt Ave (S)
Astoria Boulevard
31st Street
24
393
0
131
262
35
2135
401
2571
0
18
94
112
0
112
3
663
663
0
643
20
908
0
15
893
89
97
9
106
0
106
17
732
732
0
174
558
10
362
26
372
0
96
17
113
0

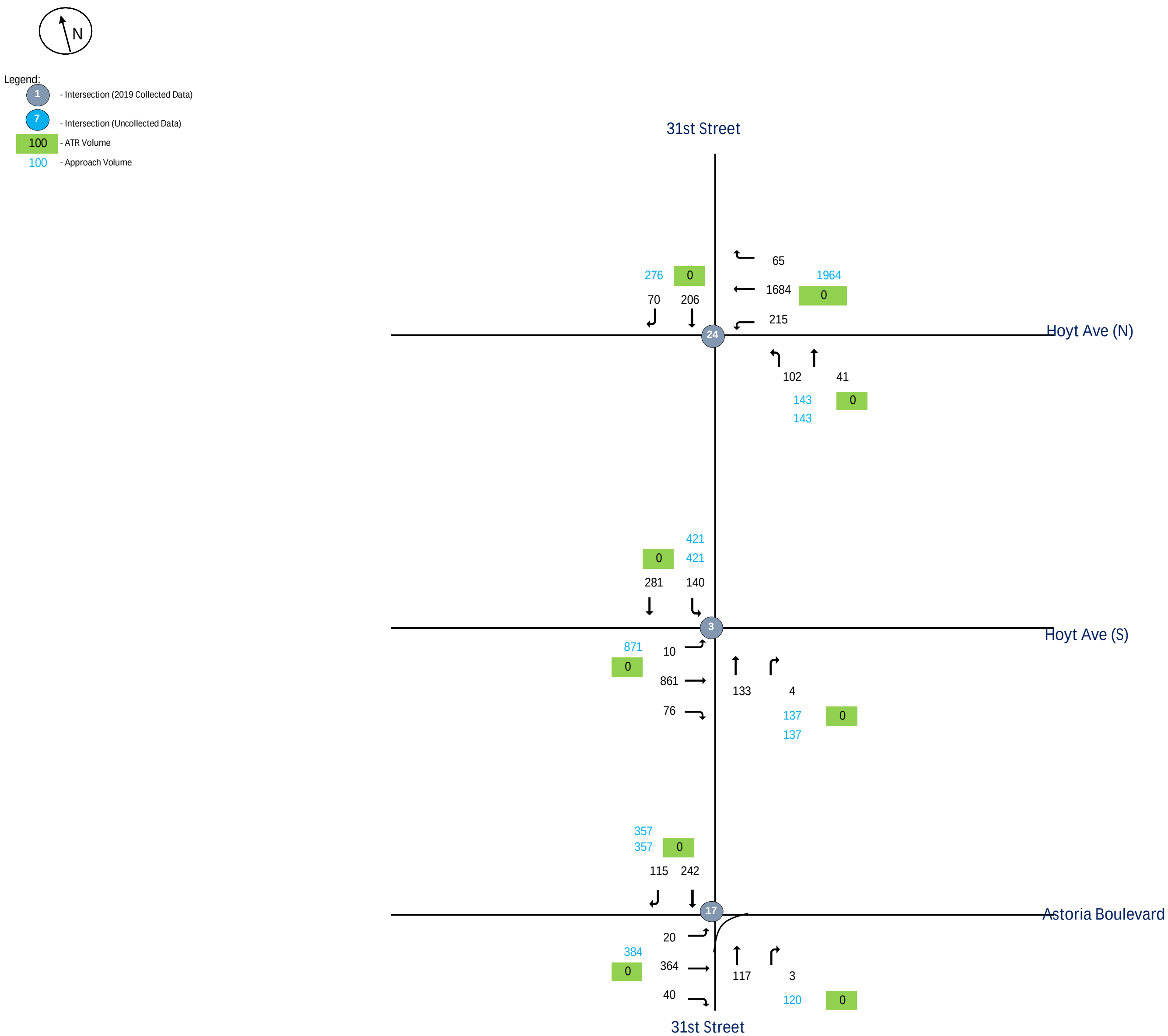
CBD Tolling
RKM - Traffic Flowmap
AM No-Action





CBD Tolling
RKB - Traffic Flowmap
MD No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
St. Ann's Avenue
St. Ann's Place
E 134th St
205
0
95
110
11
155
380
140
0
85
170
80
250
0
250
180
180
0
35
60
85
55
760
855
0
40
22
Bruckner Blvd
55
1350
1260
0
35
20
140
75
235
0
St. Ann's Avenue

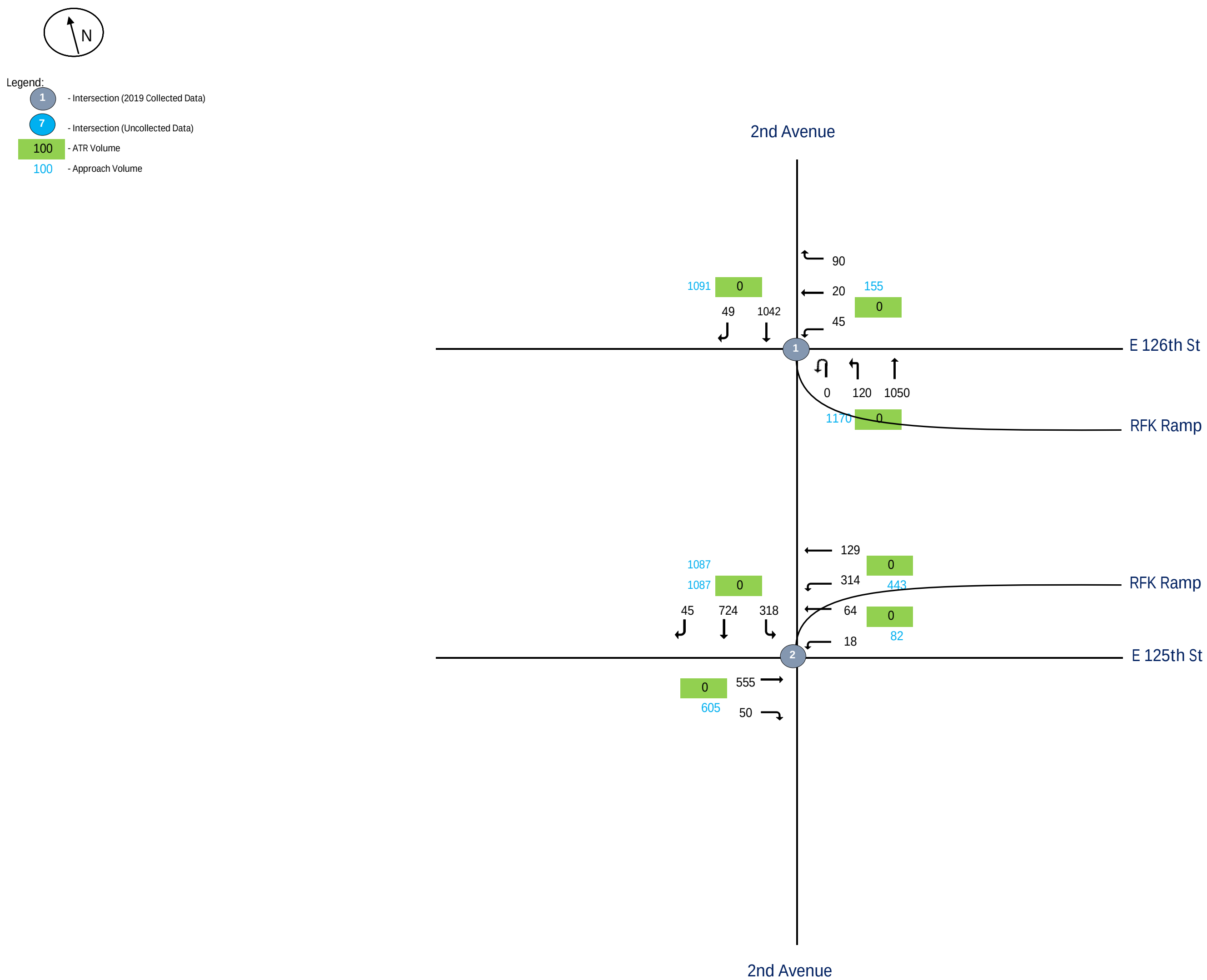
CBD Tolling
AS - Traffic Flowmap
MD No-Action

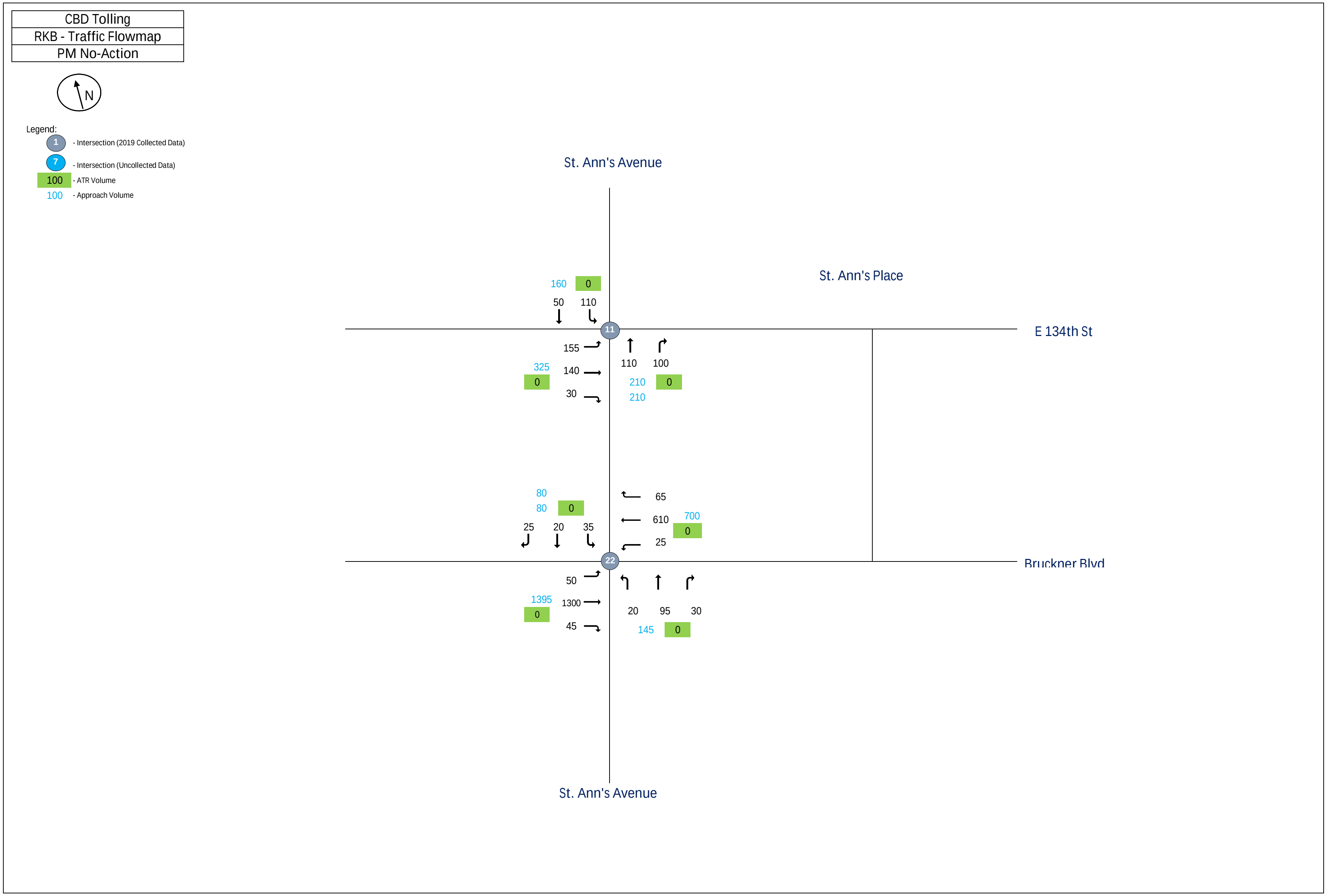


CBD Tolling

RKM - Traffic Flowmap

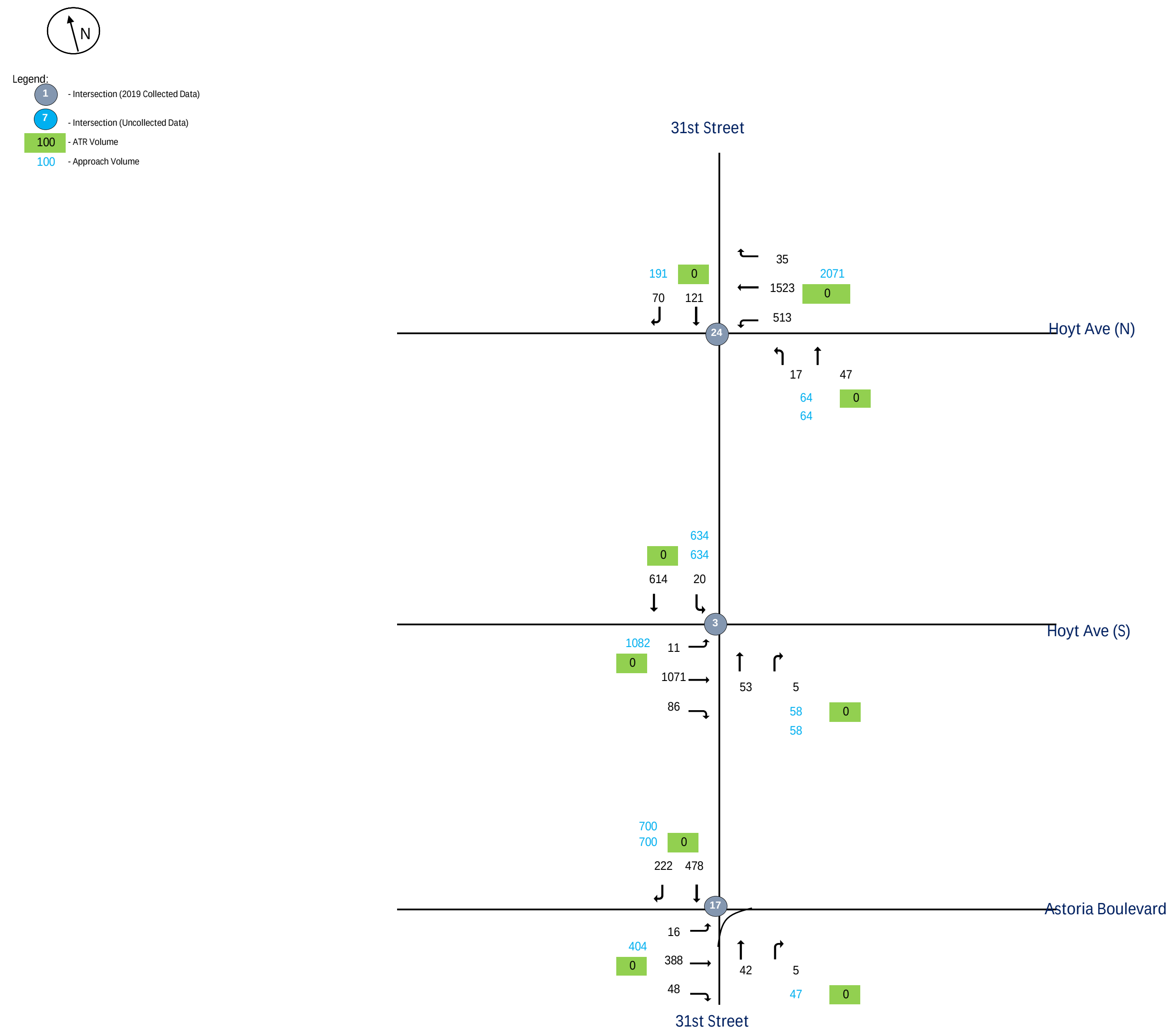
MD No-Action



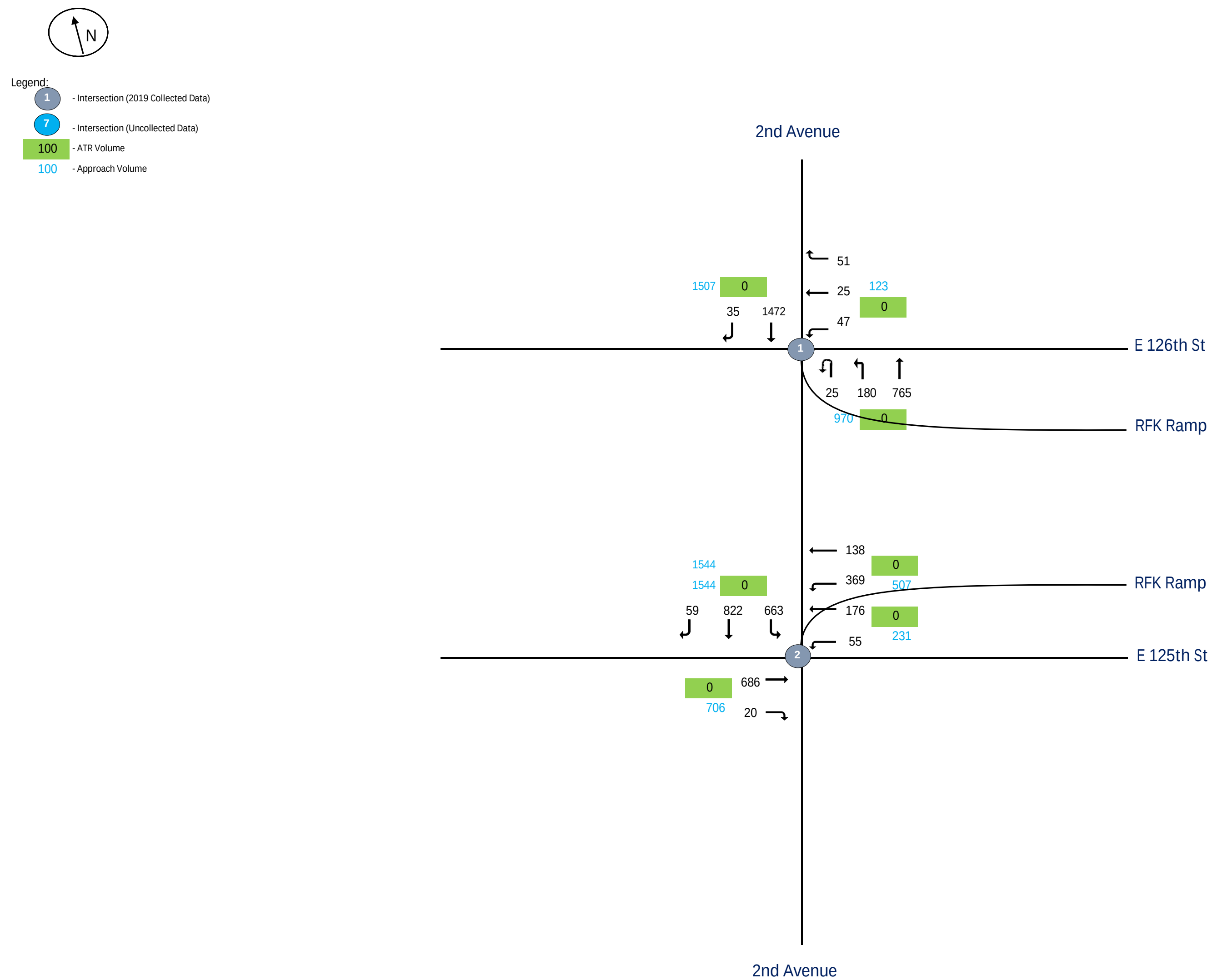


CBD Tolling
RKB - Traffic Flowmap
PM No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
St. Ann's Avenue
St. Ann's Place
E 134th St
Bruckner Blvd
St. Ann's Avenue
11
22
160
0
50
110
155
325
140
0
30
110
100
210
0
210
80
80
0
25
20
35
65
610
700
0
25
50
1395
1300
0
45
20
95
30
145
0

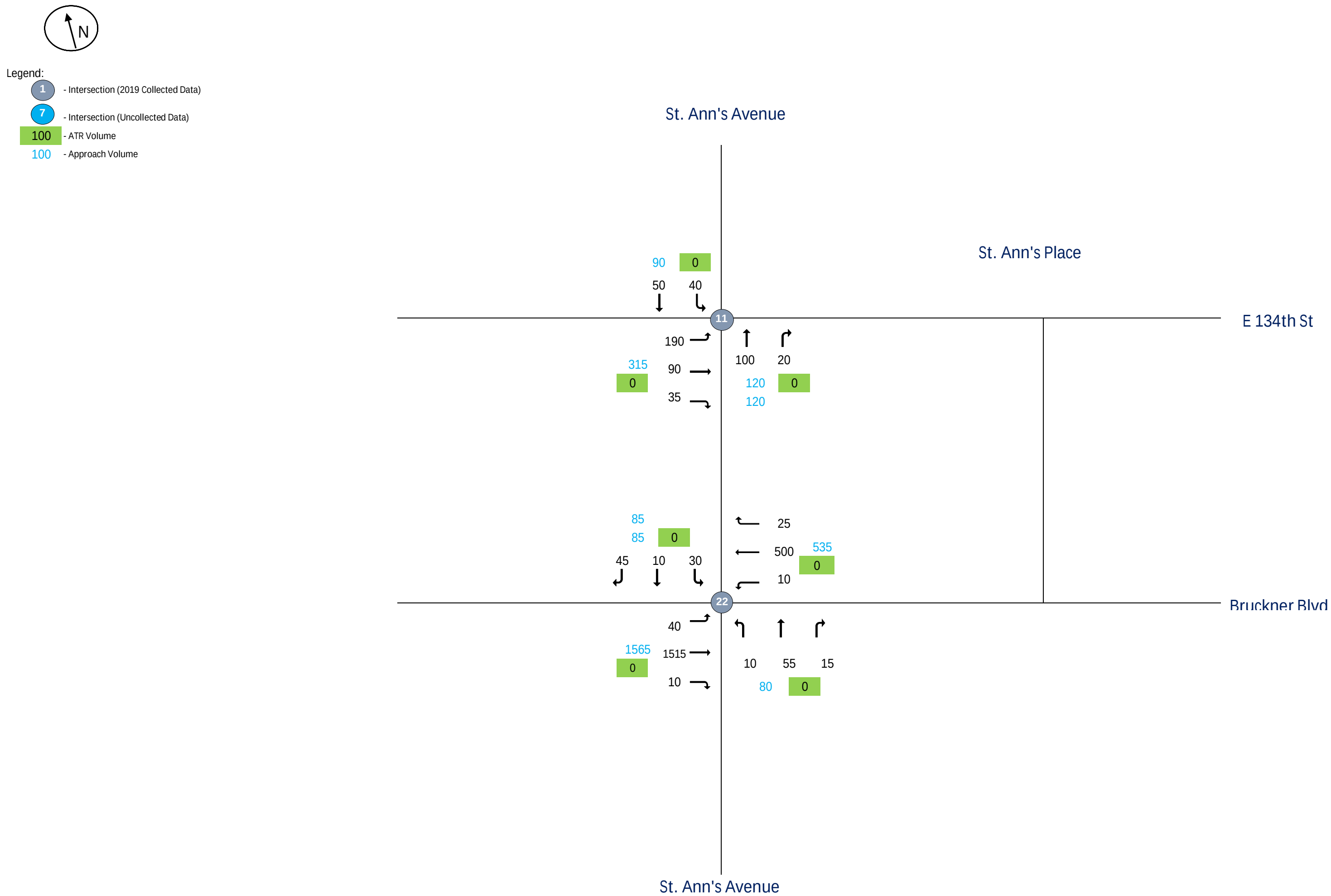
CBD Tolling
AS - Traffic Flowmap
PM No-Action

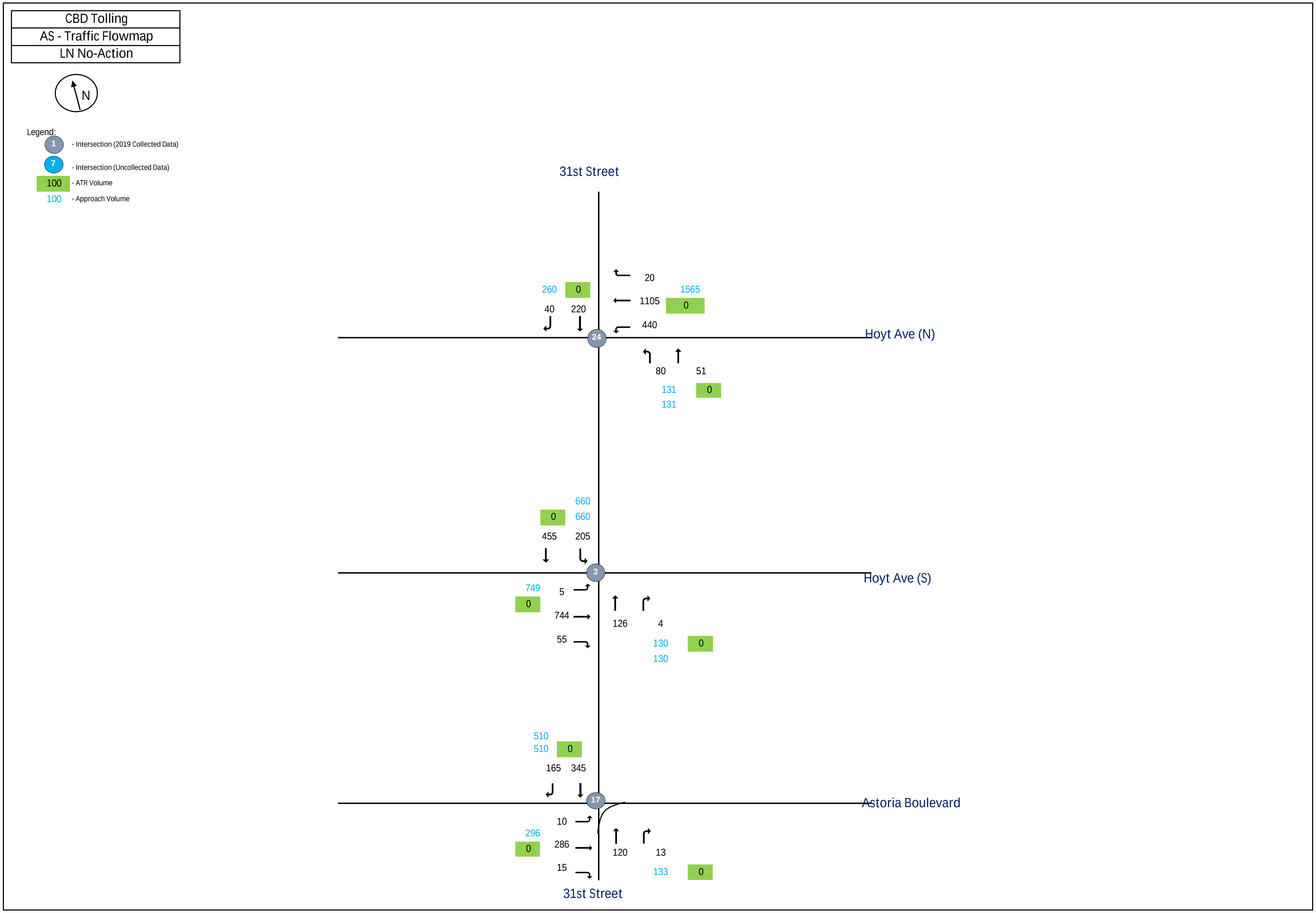


CBD Tolling
RKM - Traffic Flowmap
PM No-Action

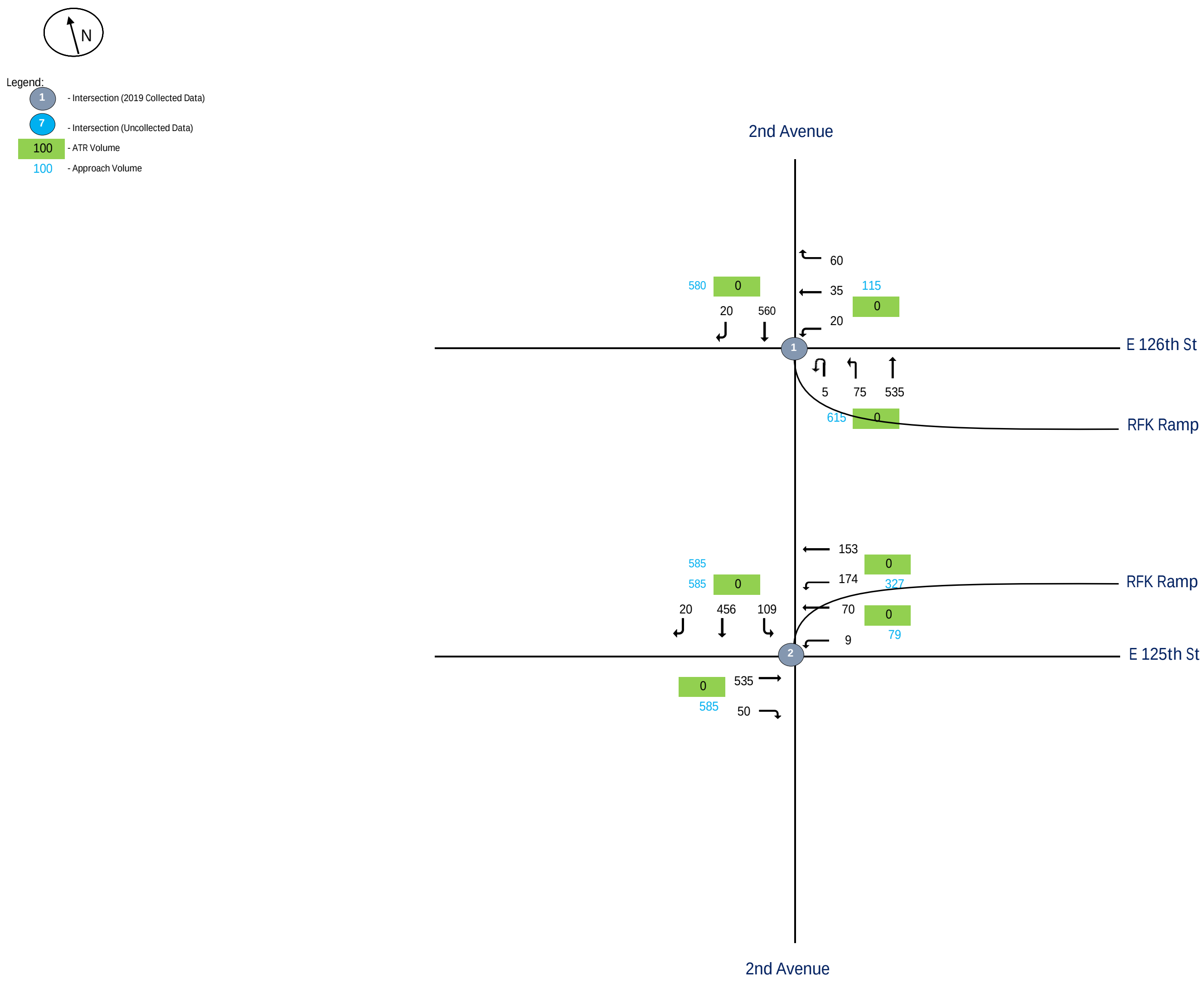


CBD Tolling
RKB - Traffic Flowmap
LN No-Action

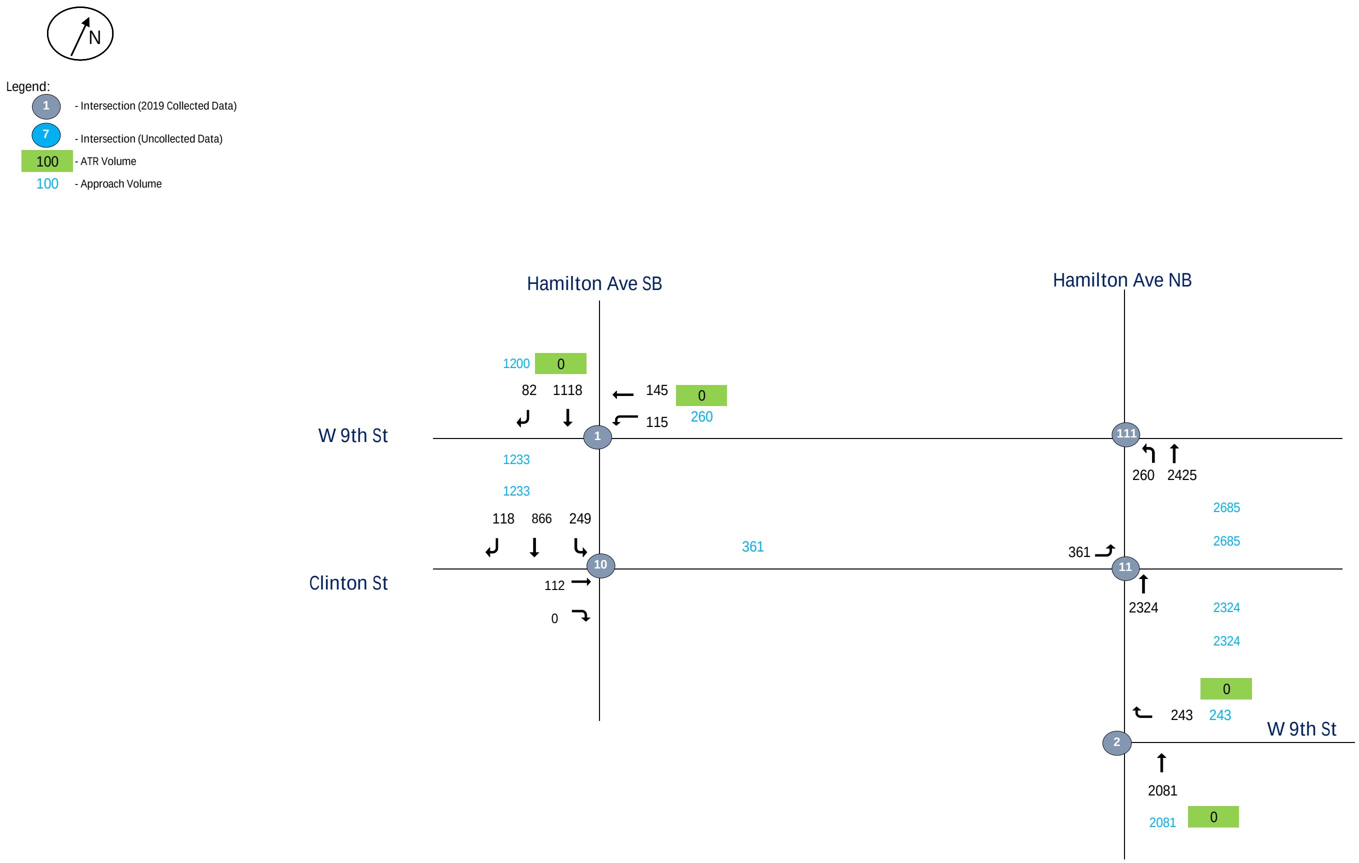


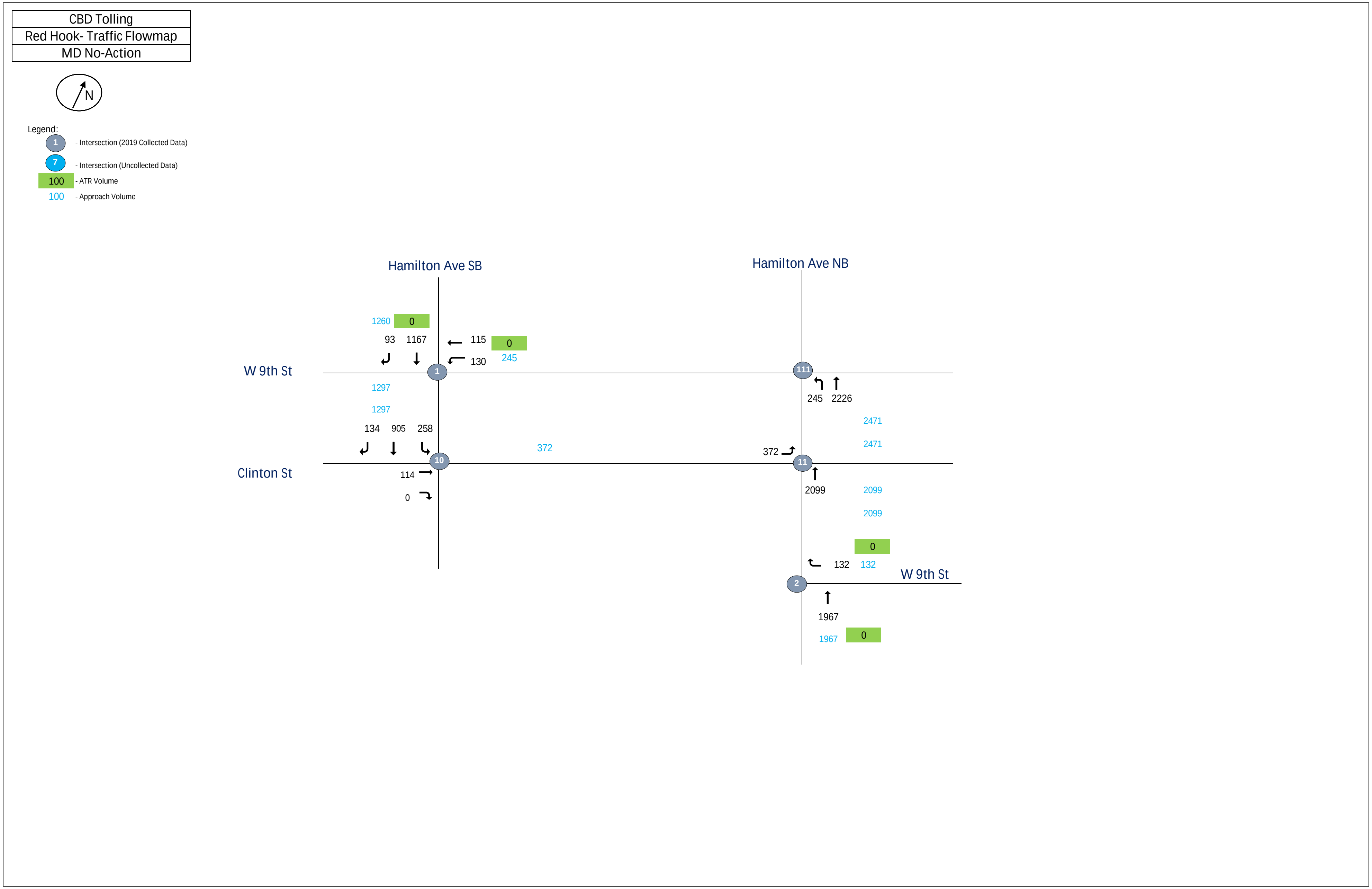

CBD Tolling
AS - Traffic Flowmap
LN No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
260
0
40
220
20
1105
1565
0
440
24
Hoyt Ave (N)
80
51
131
0
131
660
0
660
455
205
3
Hoyt Ave (S)
749
5
0
744
55
126
4
130
0
130
510
510
0
165
345
17
Astoria Boulevard
10
296
286
0
15
120
13
133
0
31st Street

CBD Tolling
RKM - Traffic Flowmap
LN No-Action



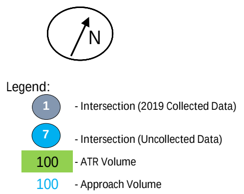
CBD Tolling
Red Hook- Traffic Flowmap
AM No-Action

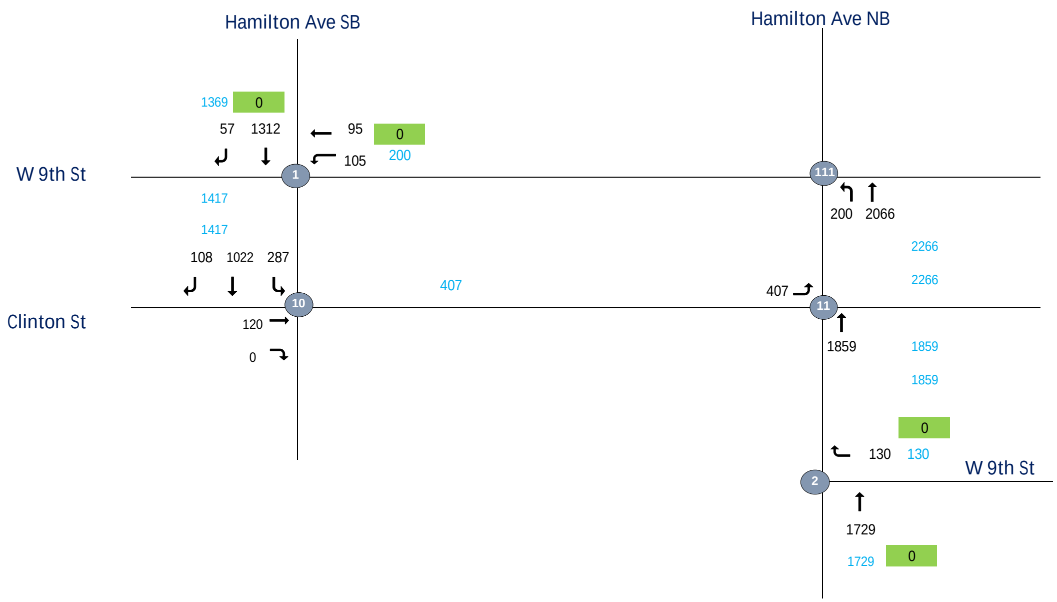




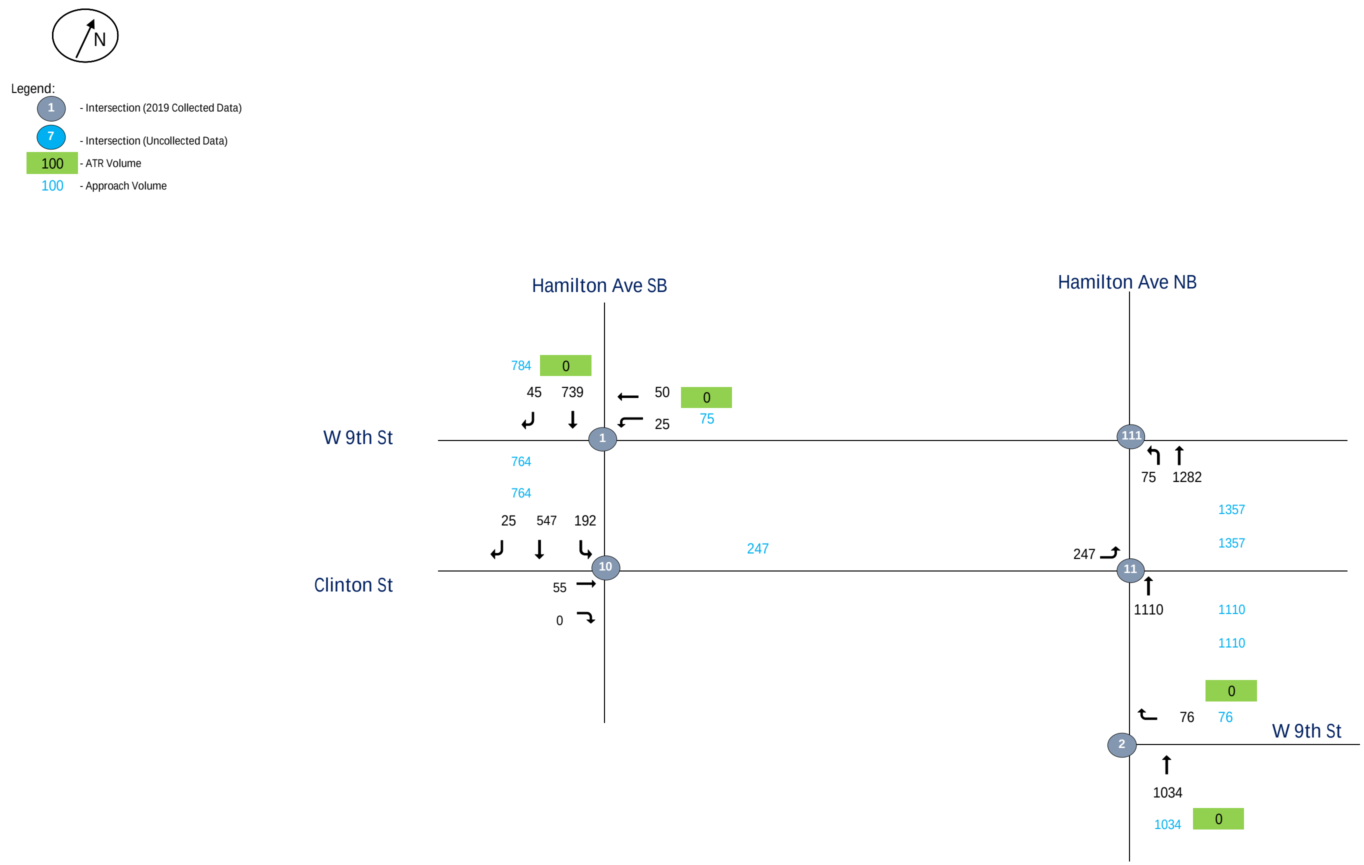
CBD Tolling
Red Hook- Traffic Flowmap
MD No-Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Hamilton Ave SB
Hamilton Ave NB
W 9th St
Clinton St
W 9th St
1260
0
93
1167
115
0
130
245
1
111
245
2226
1297
1297
134
905
258
2471
2471
372
372
10
11
114
0
2099
2099
2099
0
132
132
2
1967
1967
0

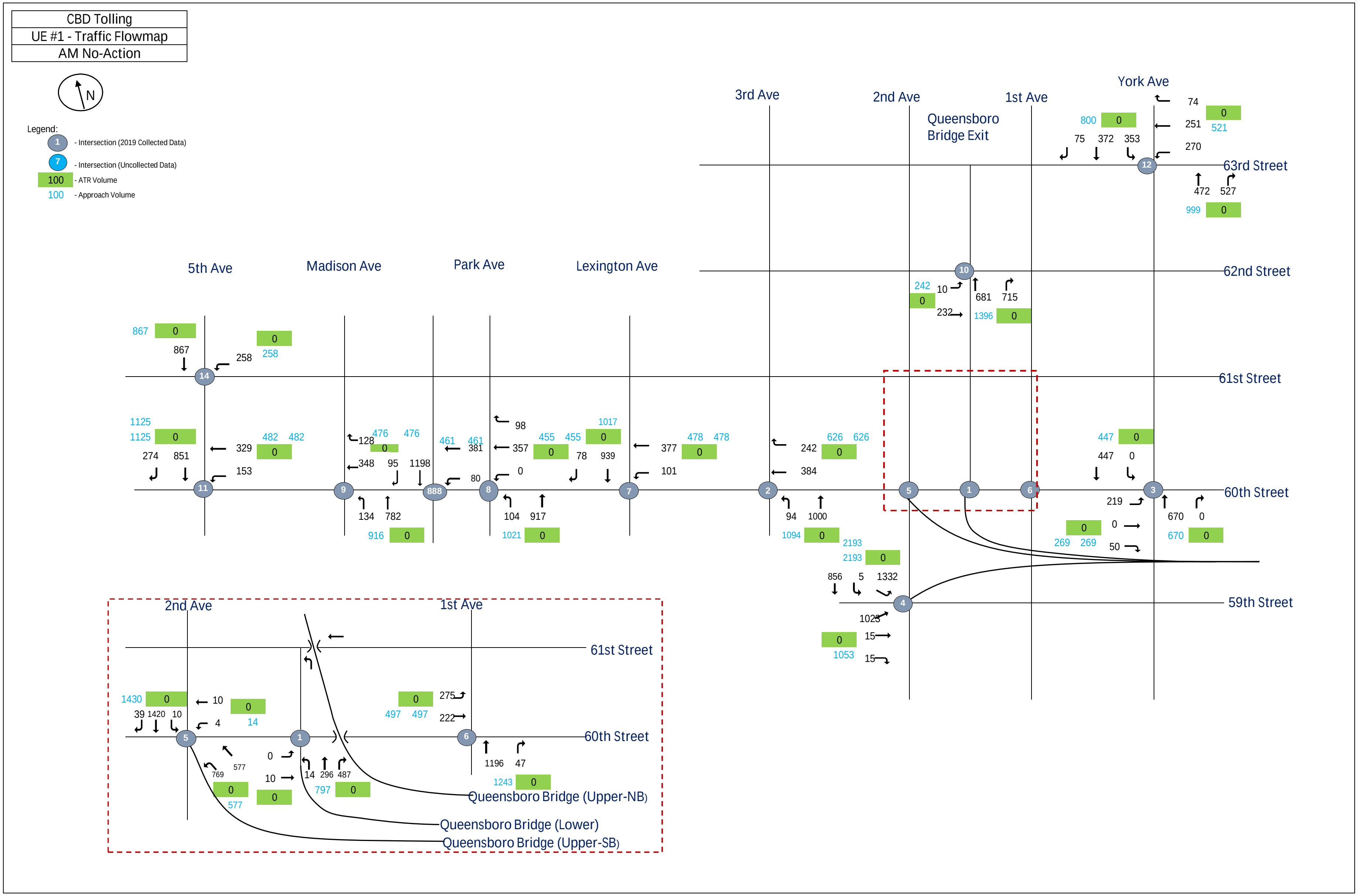
CBD Tolling
Red Hook- Traffic Flowmap
PM No-Action





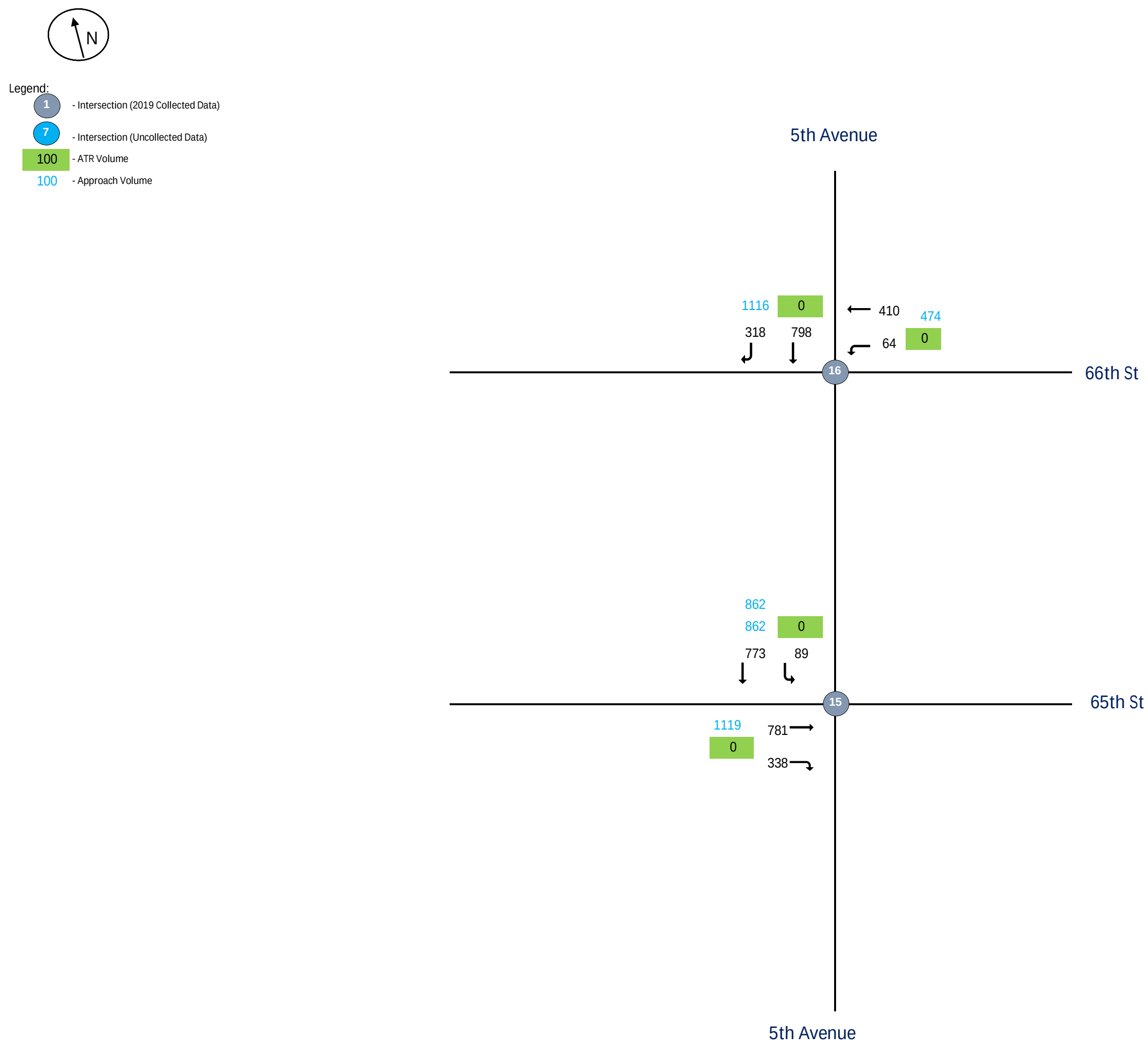
CBD Tolling
Red Hook- Traffic Flowmap
LN No-Action



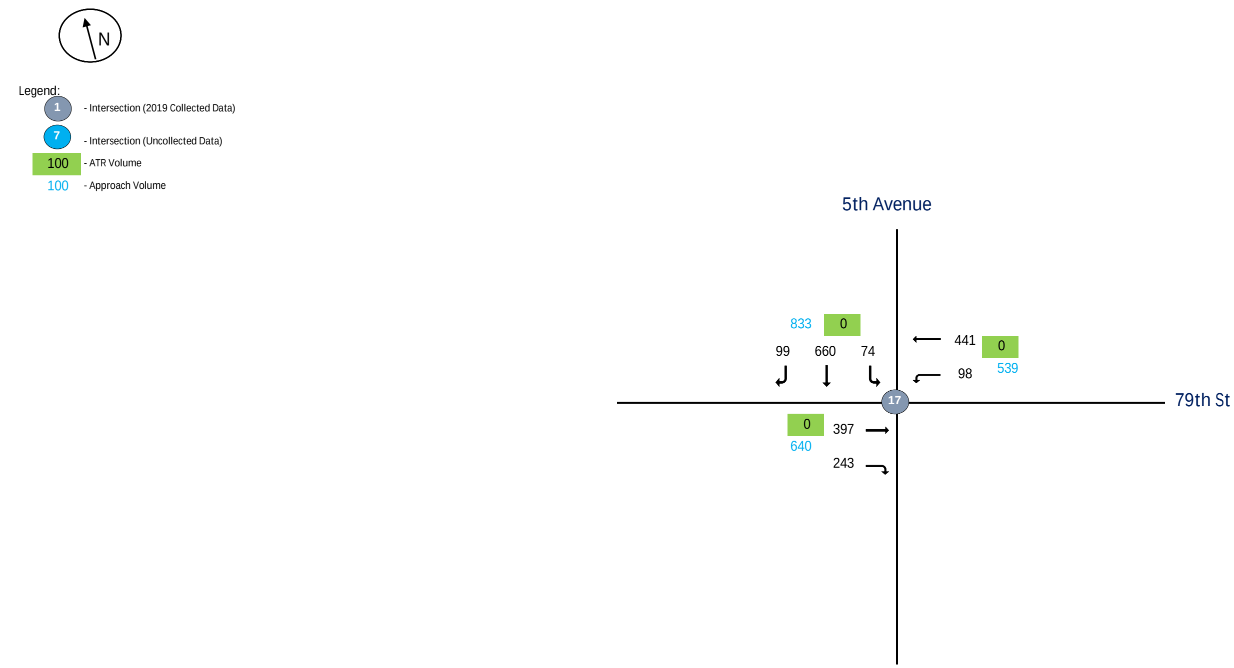

CBD Tolling
UE #1 - Traffic Flowmap
AM No-Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
AM No-Action

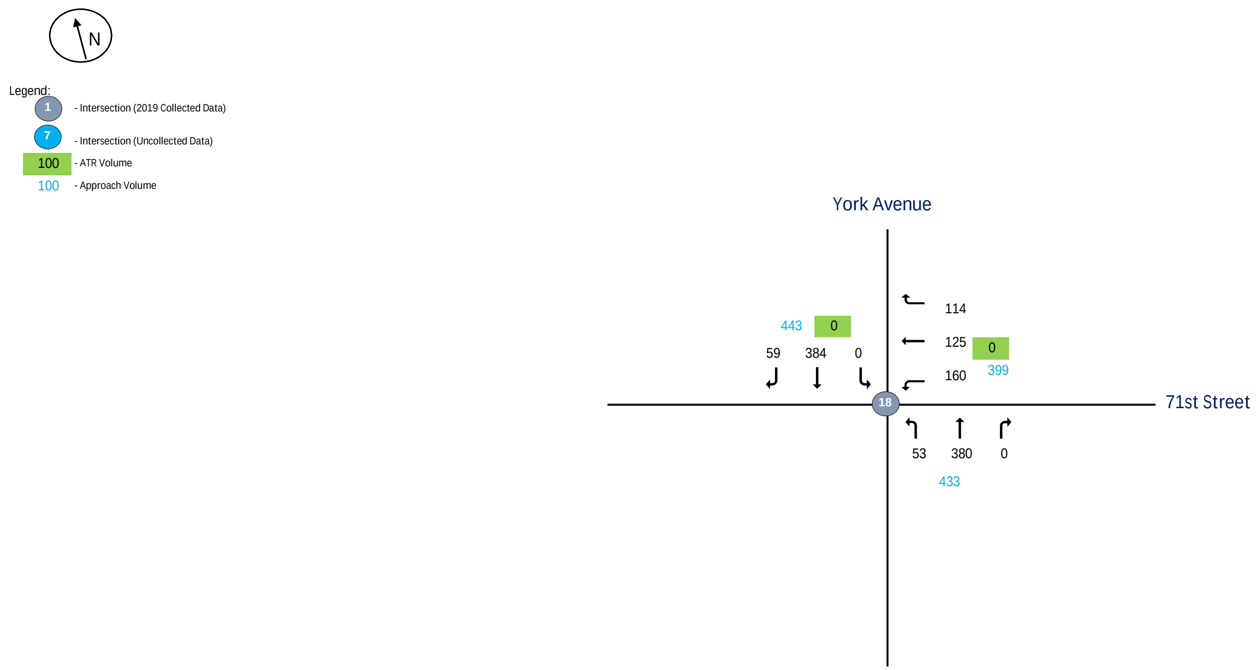
CBD Tolling
UE #3 - Traffic Flowmap
AM No-Action

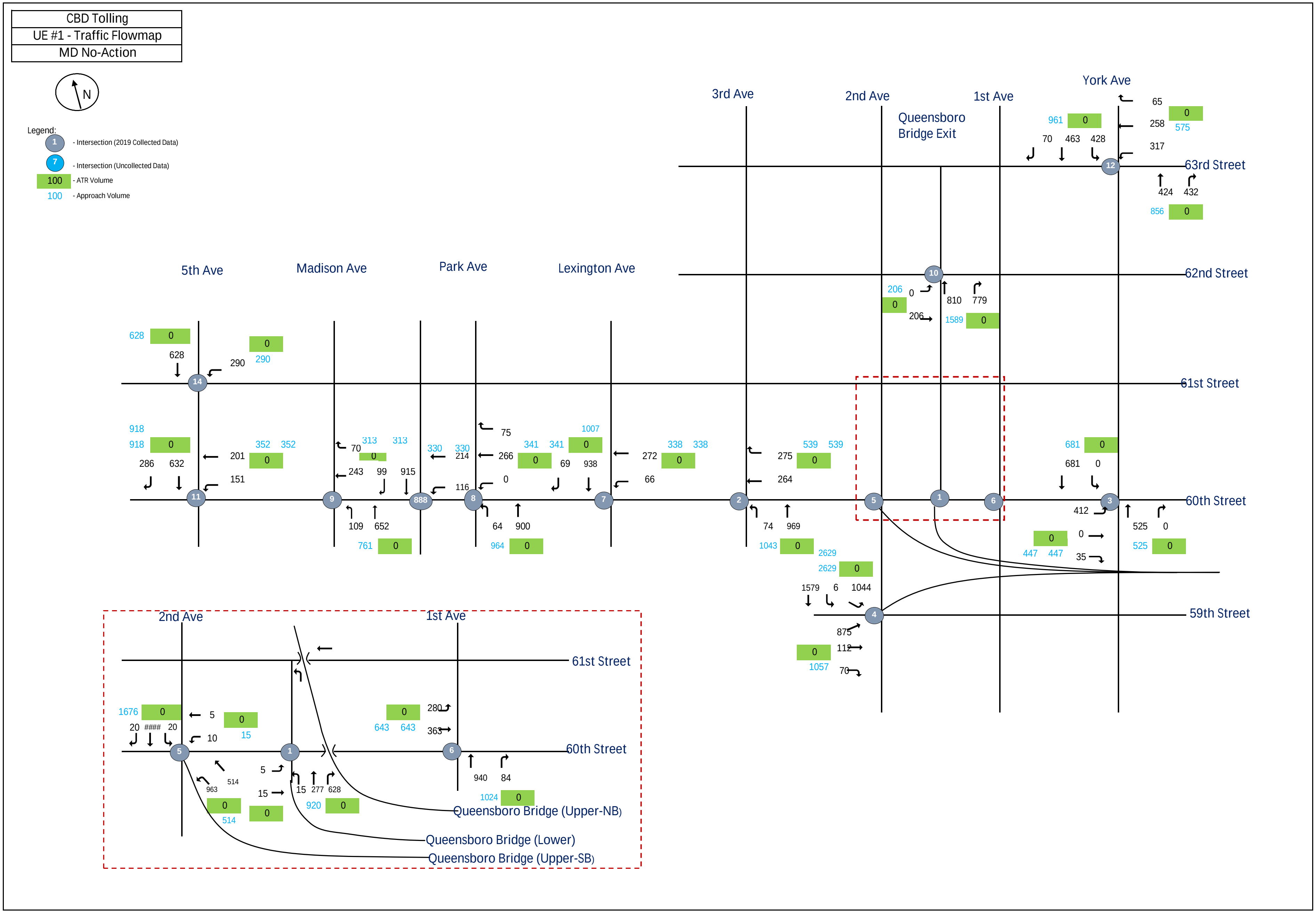


CBD Tolling
UE #3 - Traffic Flowmap
AM No-Action



CBD Tolling
UE #4 - Traffic Flowmap
AM No-Action





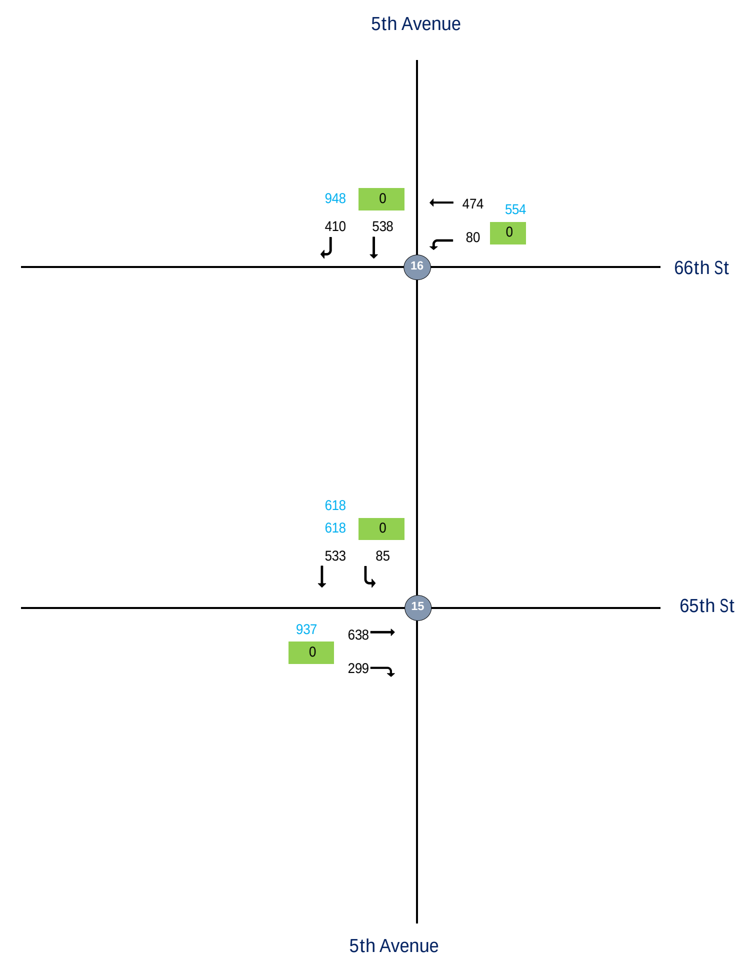
CBD Tolling
UE #1 - Traffic Flowmap
MD No-Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
Queensboro Bridge Exit
1st Ave
York Ave
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
MD No-Action

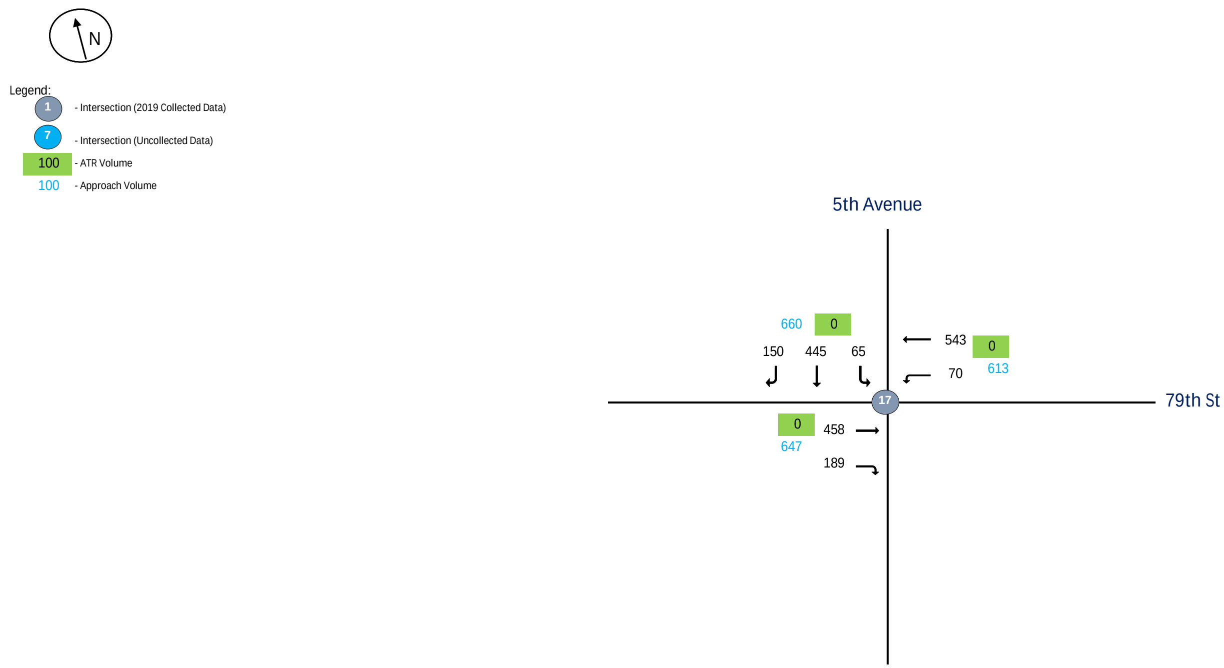
CBD Tolling
UE #3 - Traffic Flowmap
MD No-Action

N

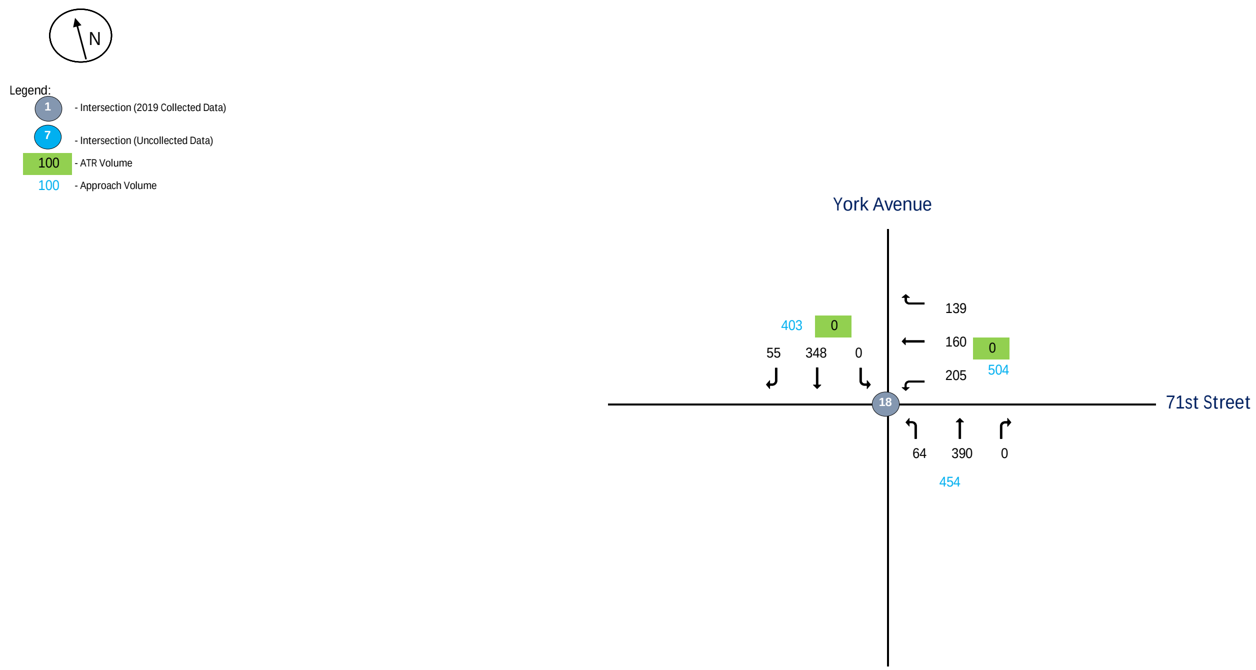
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume

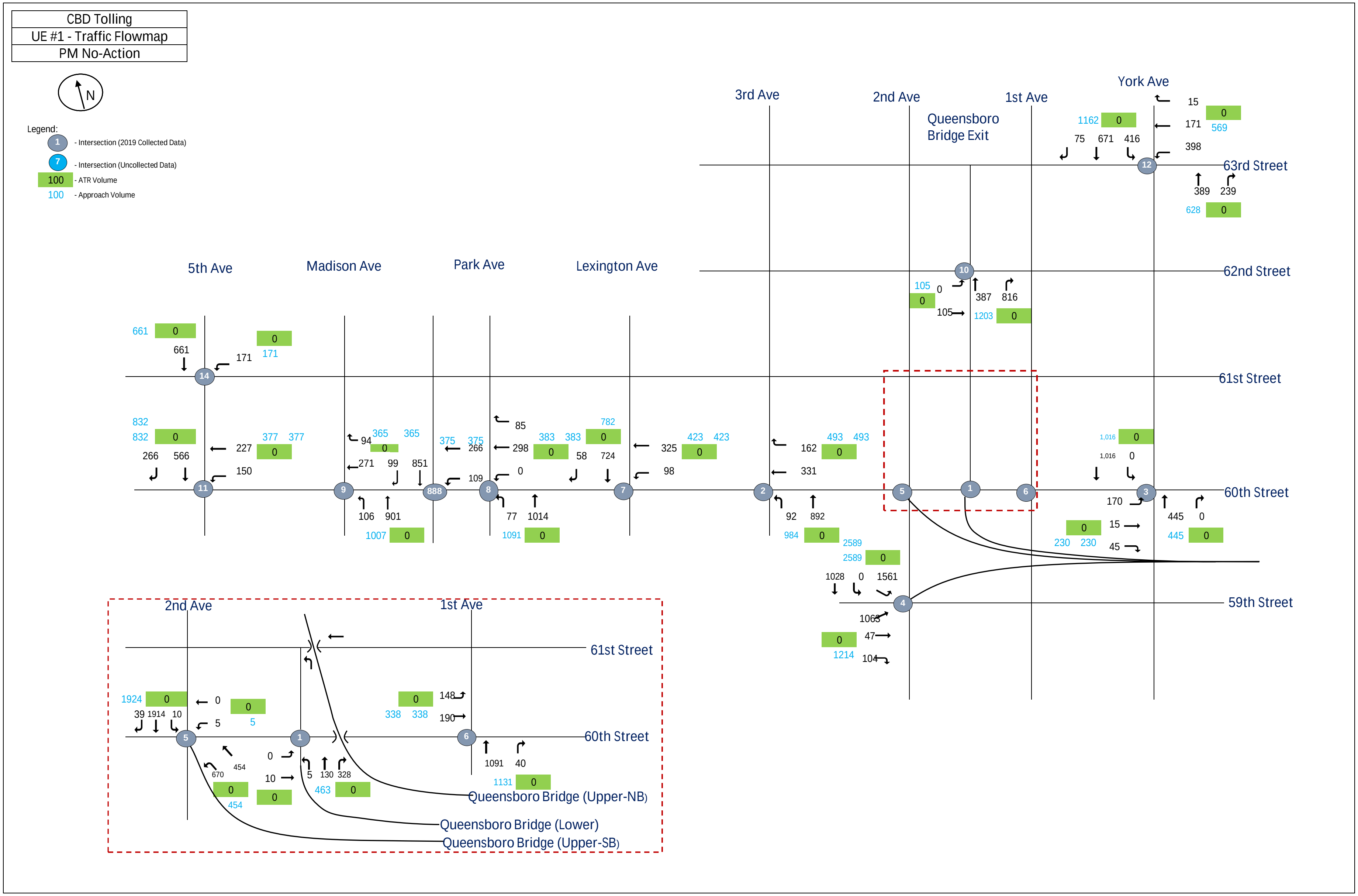


CBD Tolling
UE #3 - Traffic Flowmap
MD No-Action



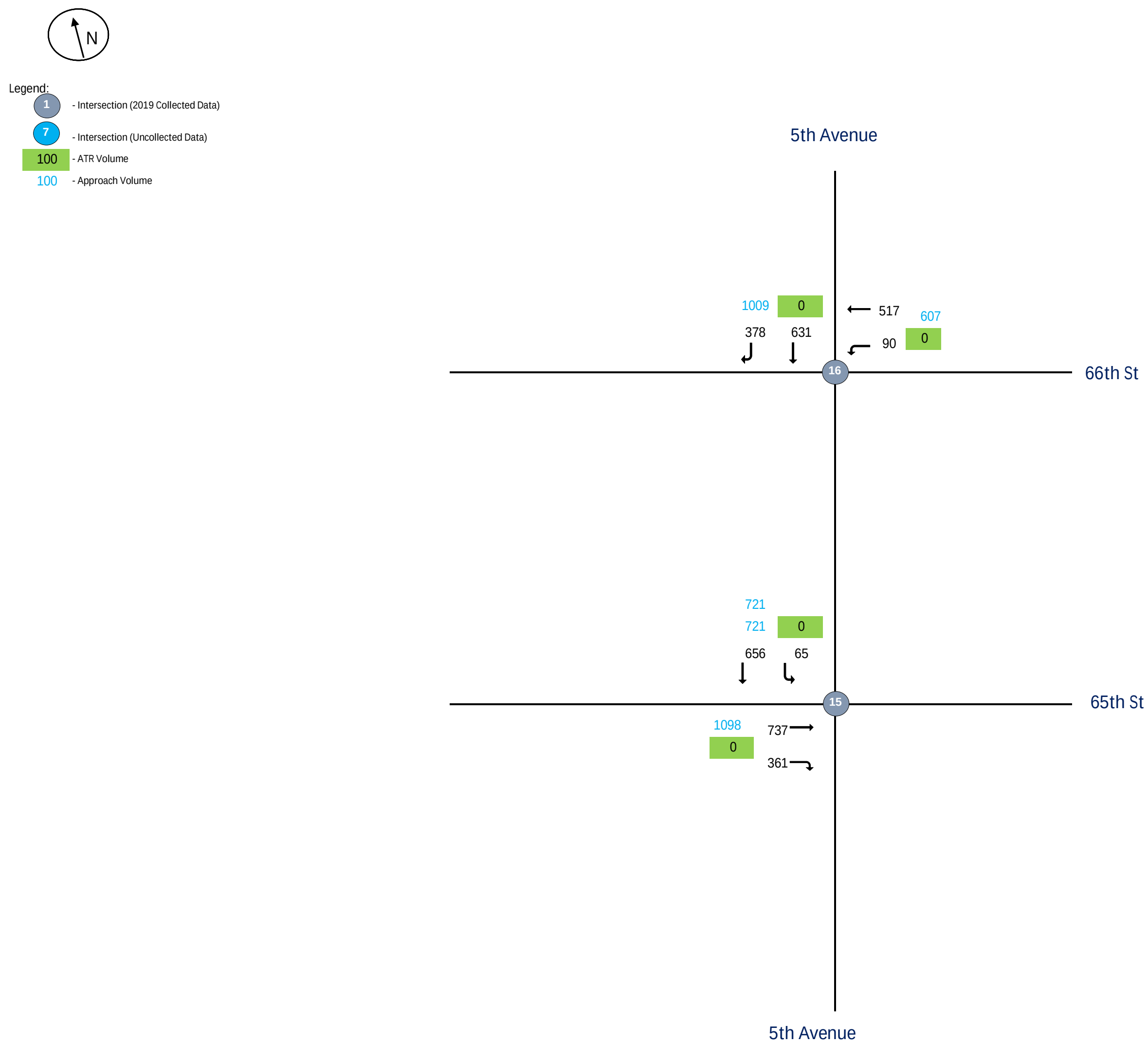
CBD Tolling
UE #4 - Traffic Flowmap
MD No-Action



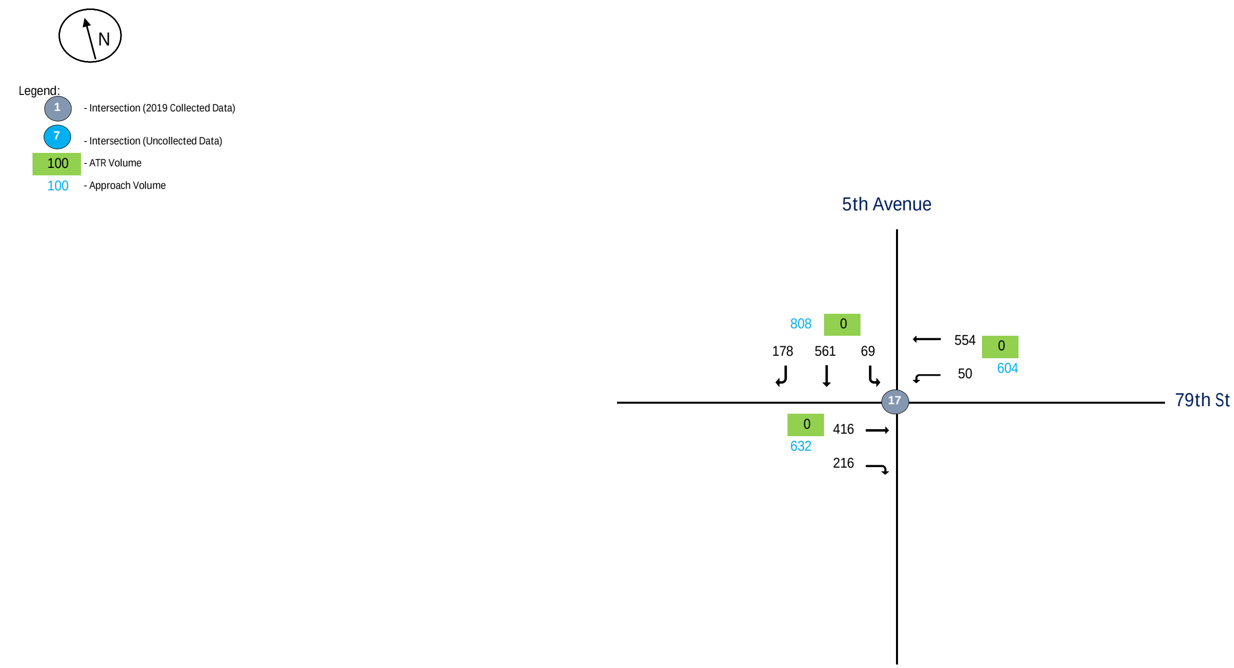

CBD Tolling
UE #1 - Traffic Flowmap
PM No-Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
- ATR Volume
- Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
PM No-Action

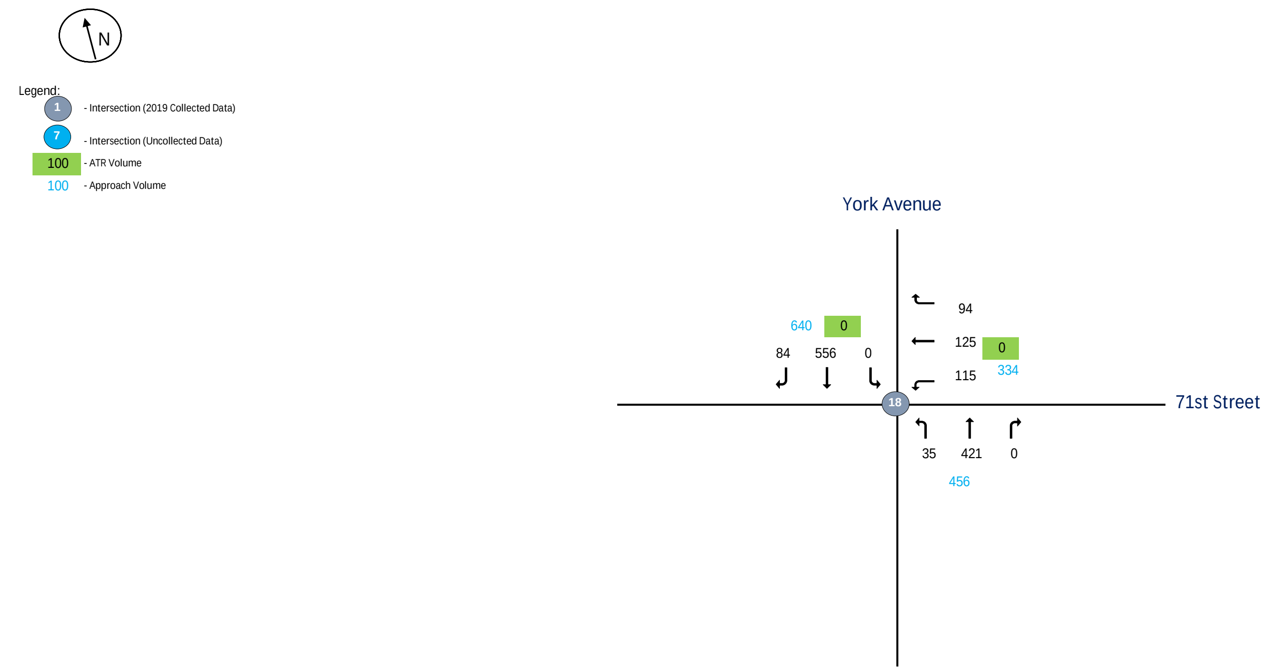
CBD Tolling
UE #3 - Traffic Flowmap
PM No-Action

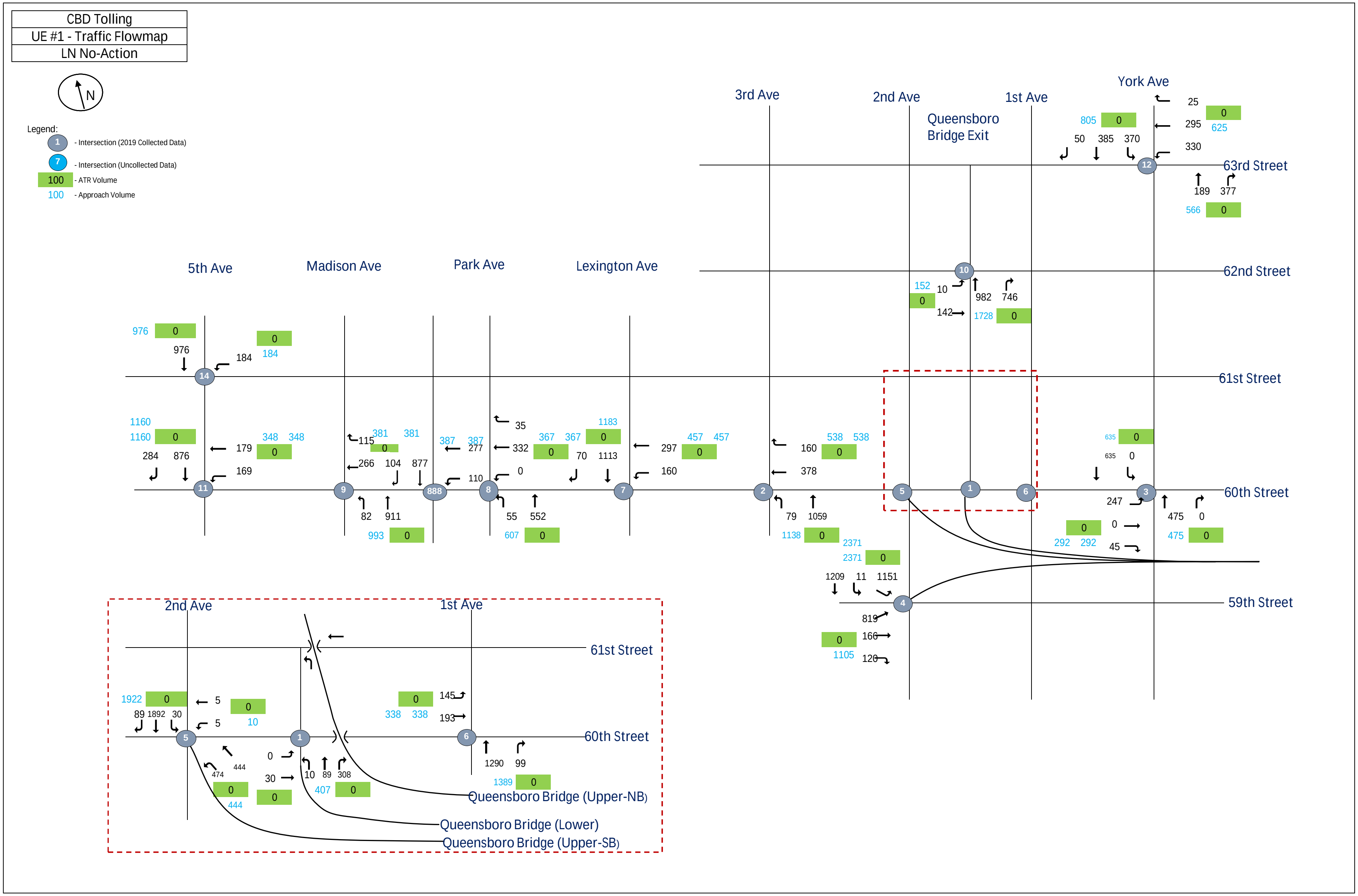


CBD Tolling
UE #3 - Traffic Flowmap
PM No-Action

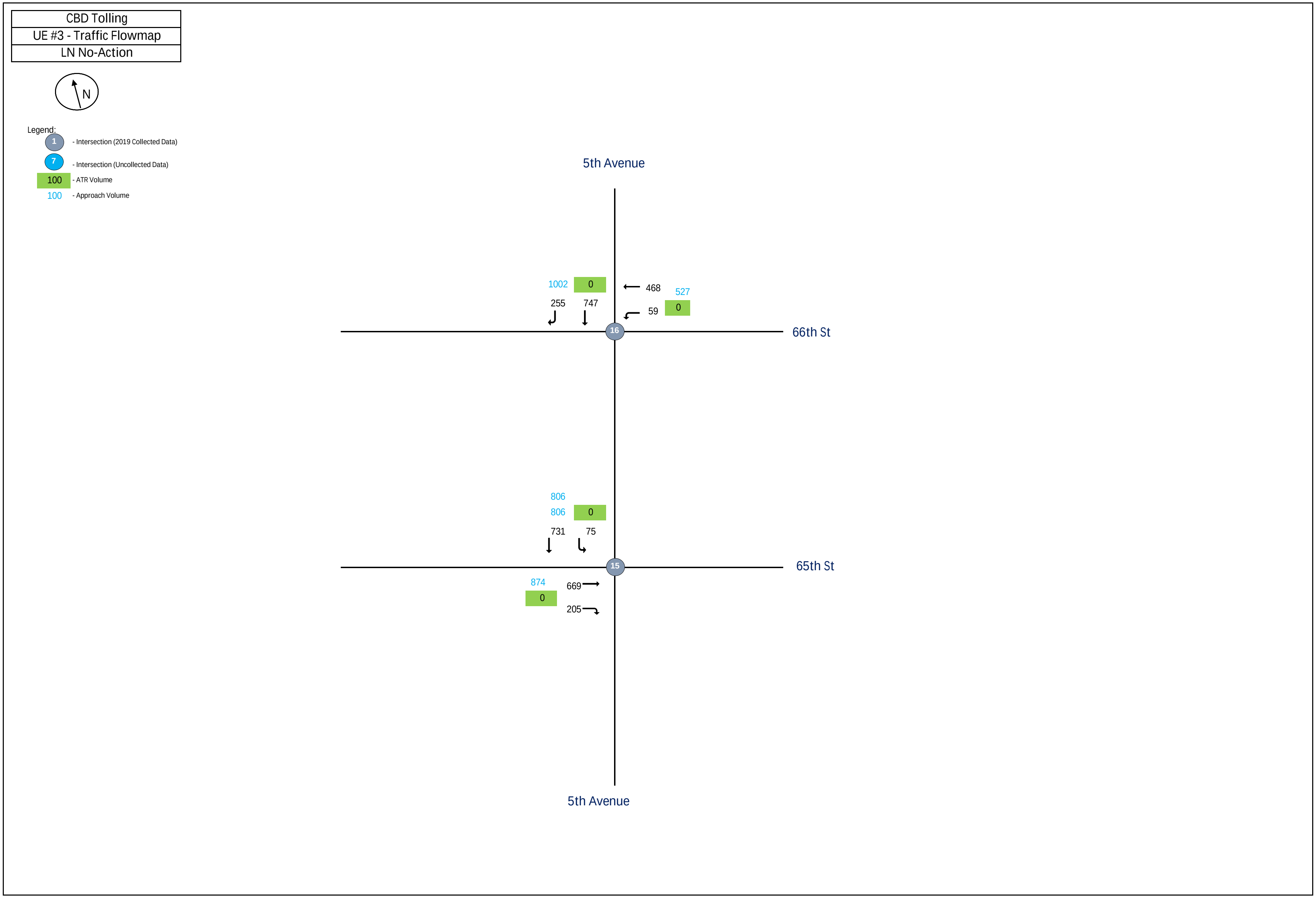


CBD Tolling
UE #4 - Traffic Flowmap
PM No-Action

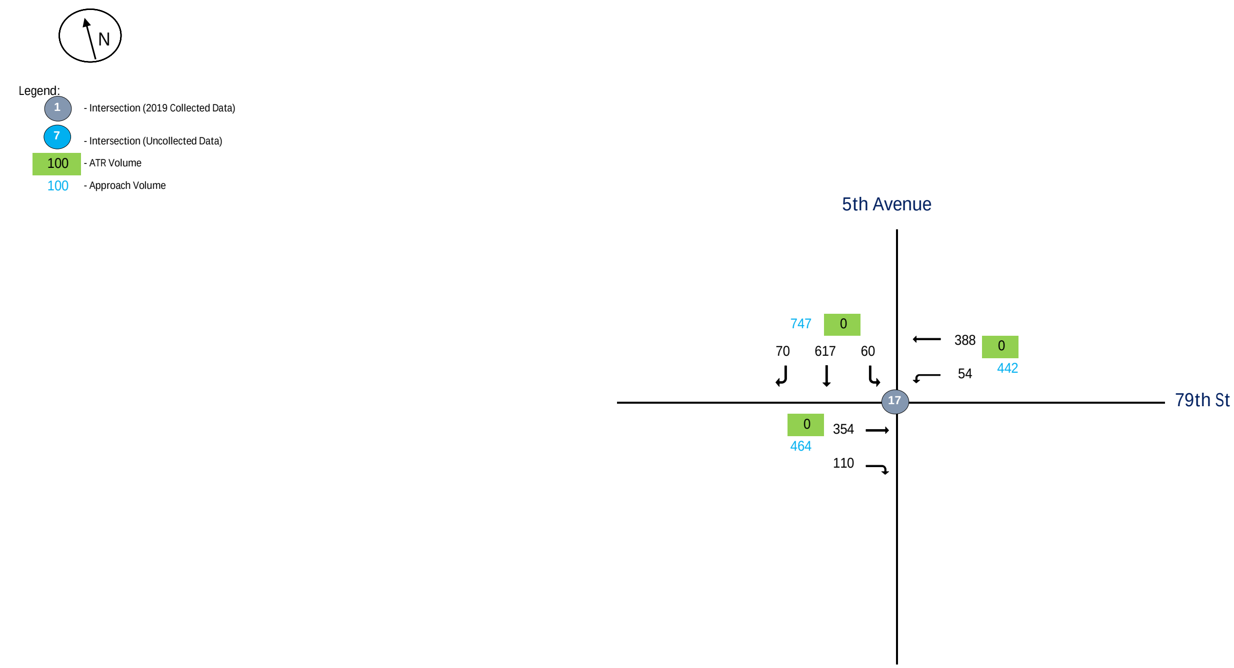



CBD Tolling
UE #1 - Traffic Flowmap
LN No-Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

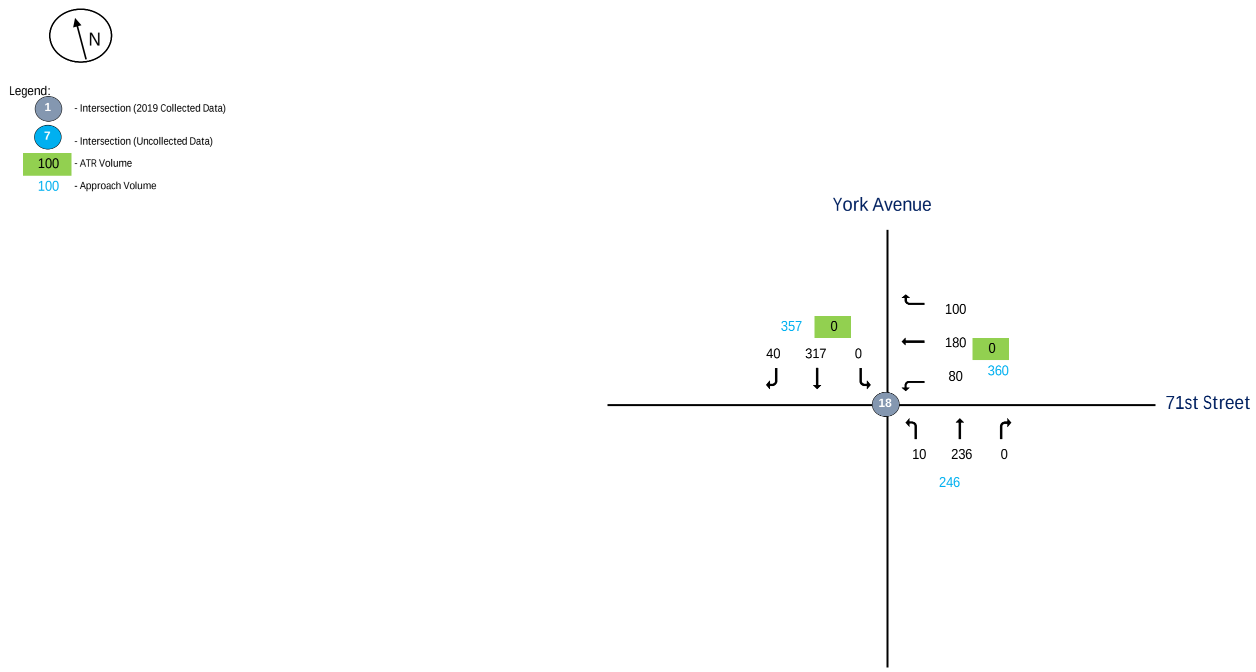
CBD Tolling
UE #2 - Traffic Flowmap
LN No-Action


CBD Tolling
UE #3 - Traffic Flowmap
LN No-Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
5th Avenue
1002
0
255
747
468
527
59
0
16
66th St
806
806
0
731
75
15
65th St
874
0
669
205
5th Avenue

CBD Tolling
UE #3 - Traffic Flowmap
LN No-Action



CBD Tolling
UE #4 - Traffic Flowmap
LN No-Action



CBD Tolling
UW #1 - Traffic Flowmap
AM No-Action

N

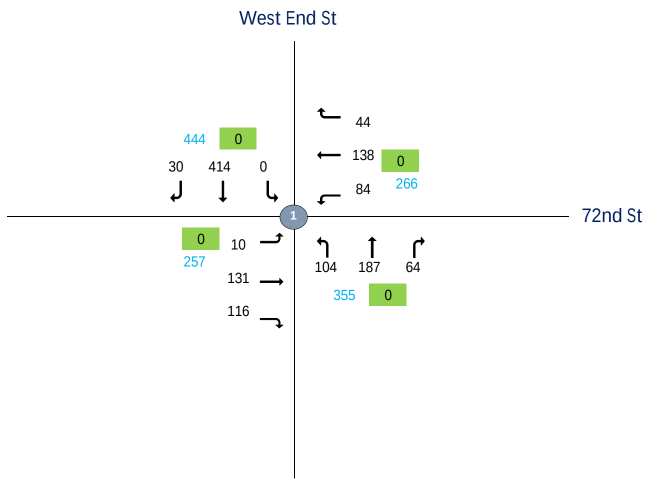
Legend:

1 - Intersection (2019 Collected Data)

7 - Intersection (Uncollected Data)

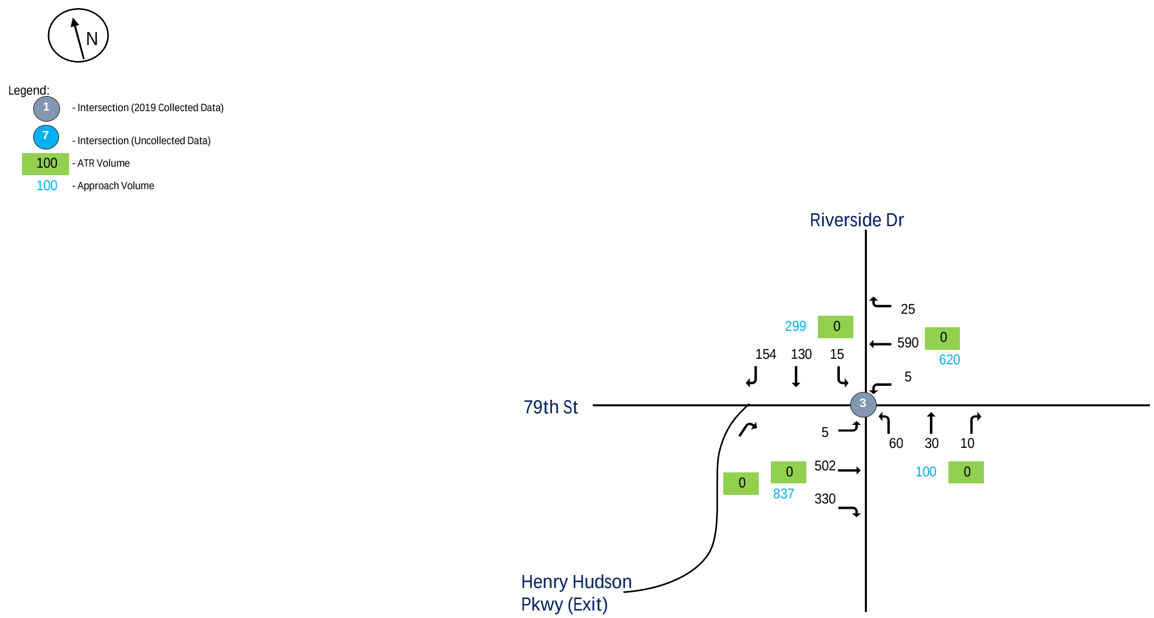
100 - ATR Volume

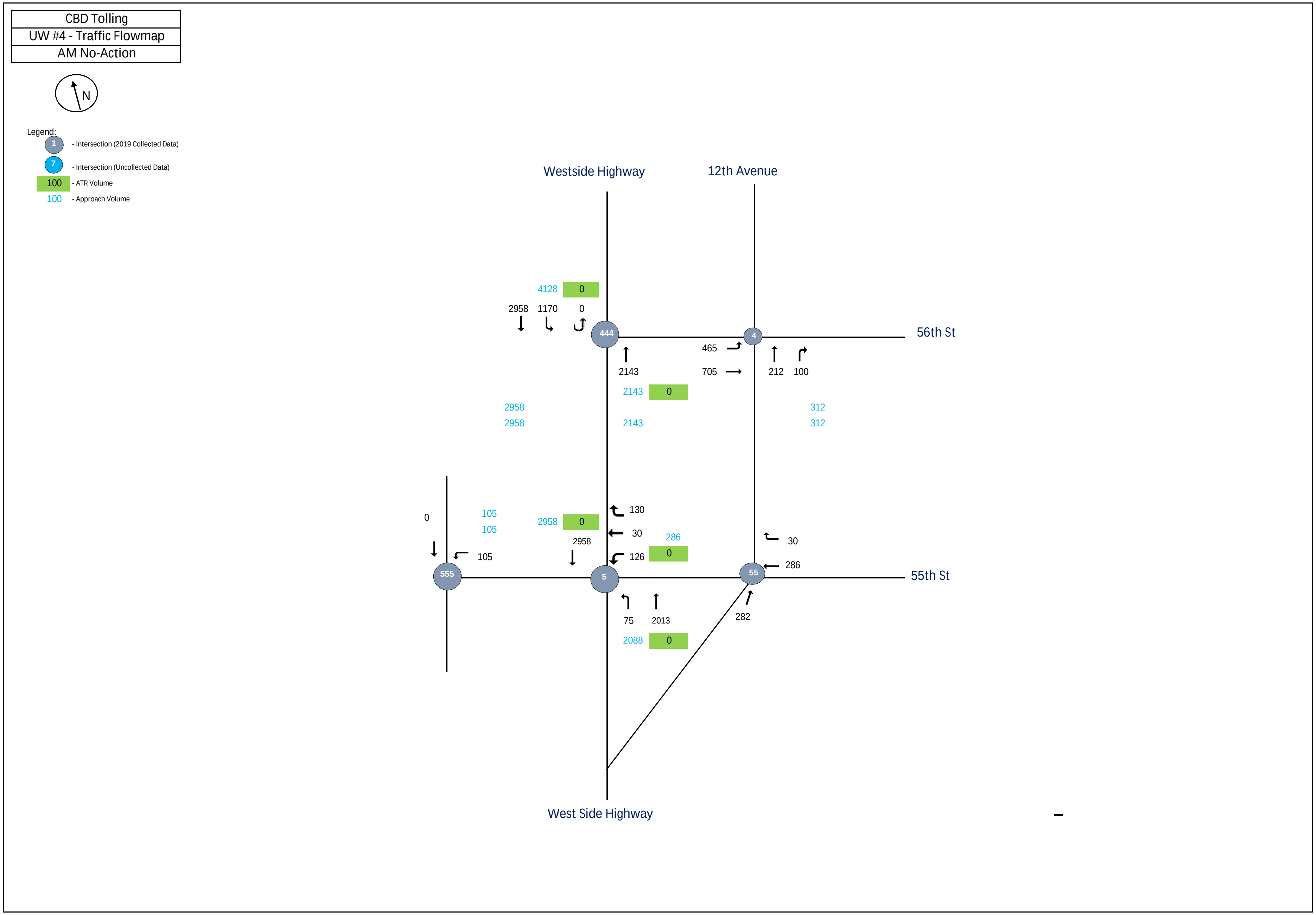
100 - Approach Volume



CBD Tolling
UW #2 - Traffic Flowmap
AM No-Action

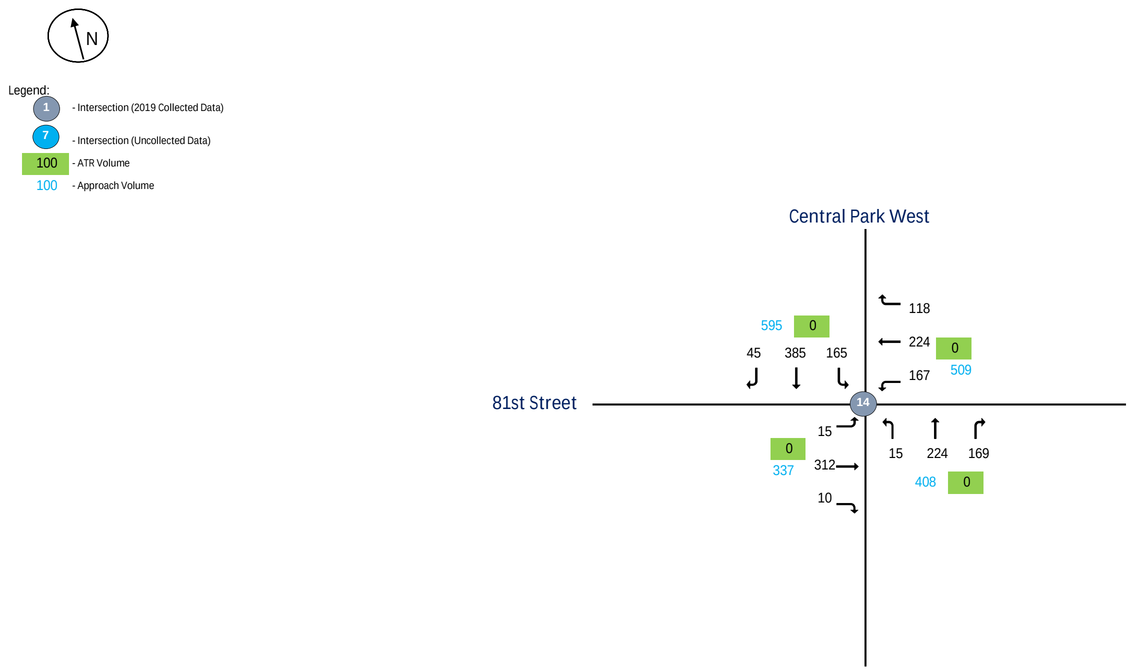
CBD Tolling
UW #3 - Traffic Flowmap
AM No-Action



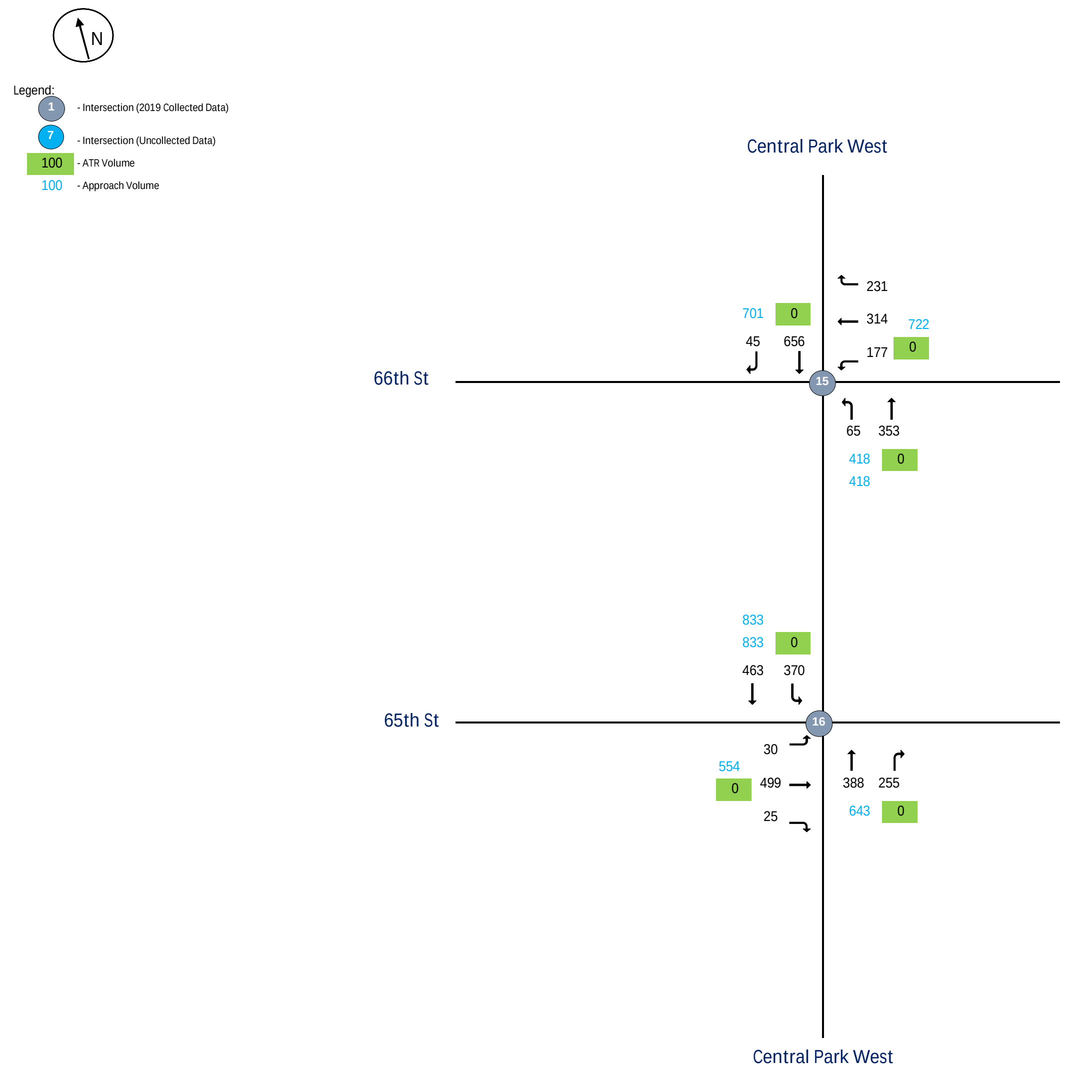


CBD Tolling
UW #4 - Traffic Flowmap
AM No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
4128
0
2958
1170
0
444
4
465
705
2143
212
100
2143
0
2958
2958
2143
312
312
0
105
105
2958
0
130
30
286
0
30
2958
105
126
286
555
5
55
75
2013
282
2088
0

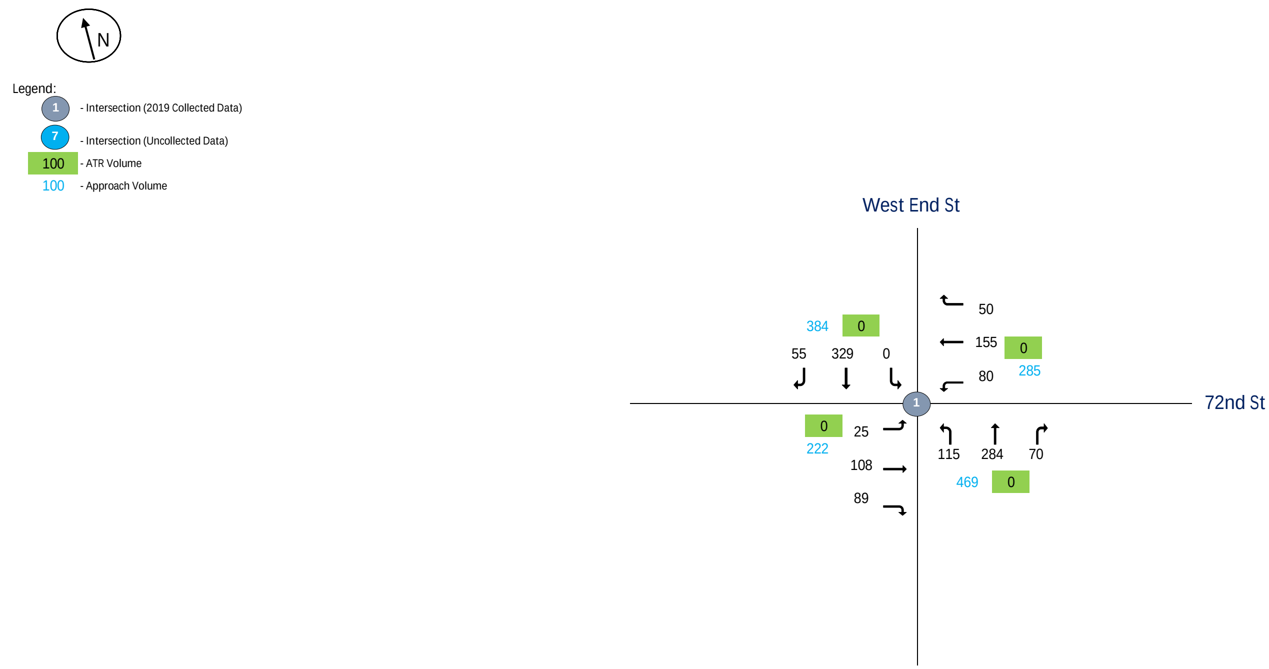
CBD Tolling
UW #5 - Traffic Flowmap
AM No-Action

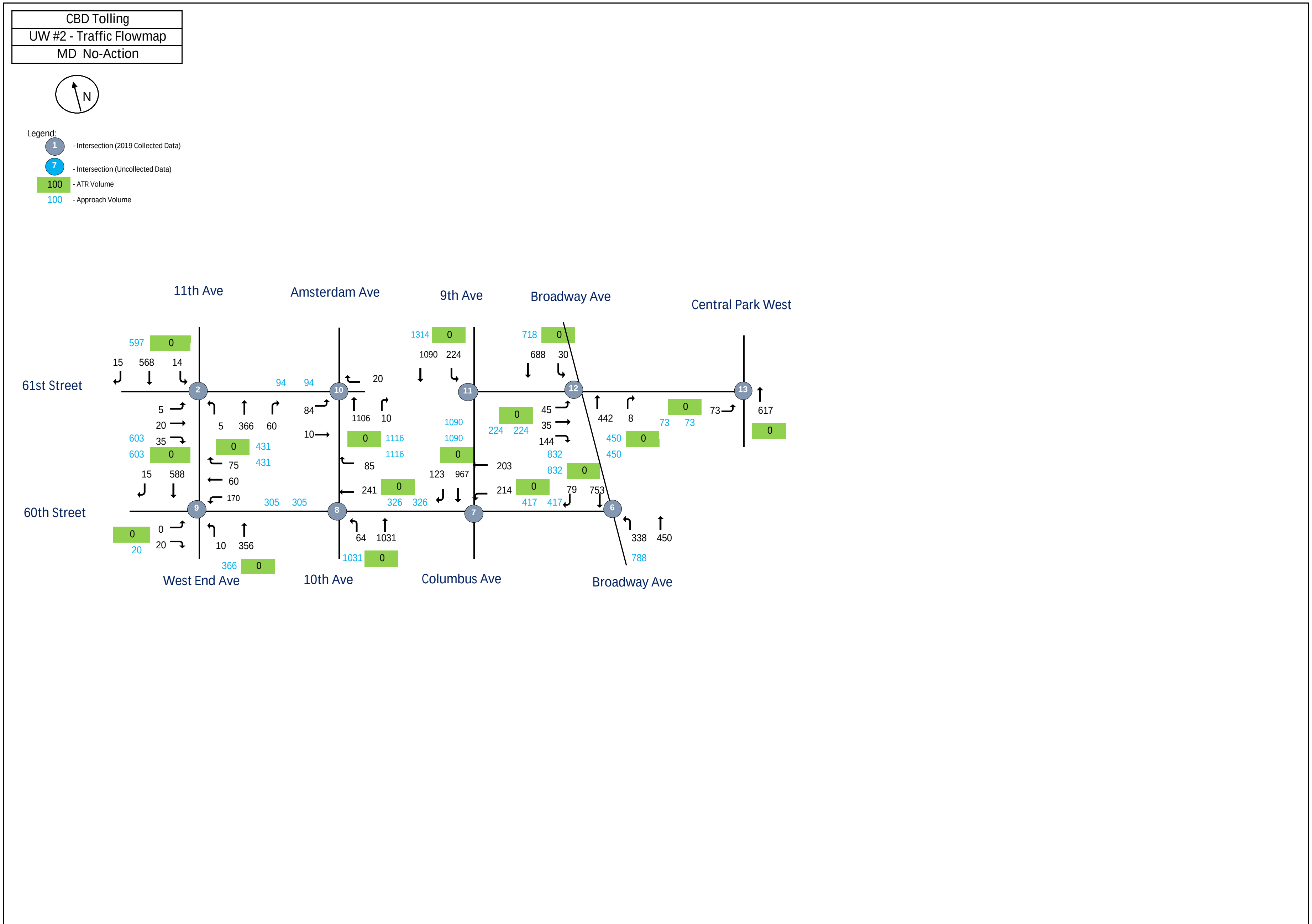


CBD Tolling
UW #6 - Traffic Flowmap
AM No-Action



CBD Tolling
UW #1 - Traffic Flowmap
MD No-Action



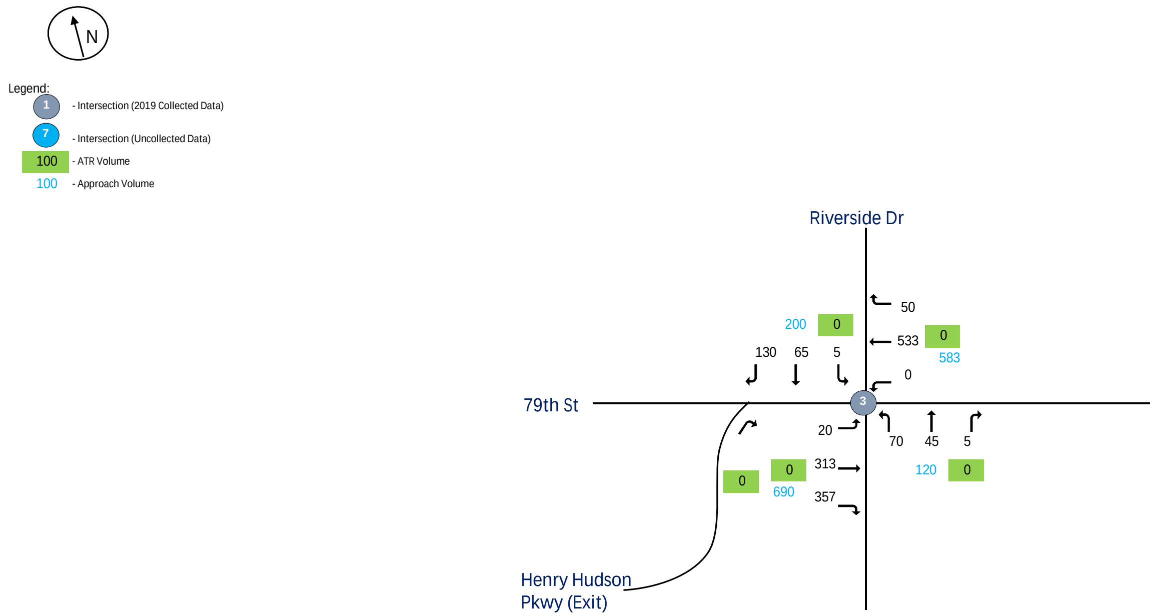


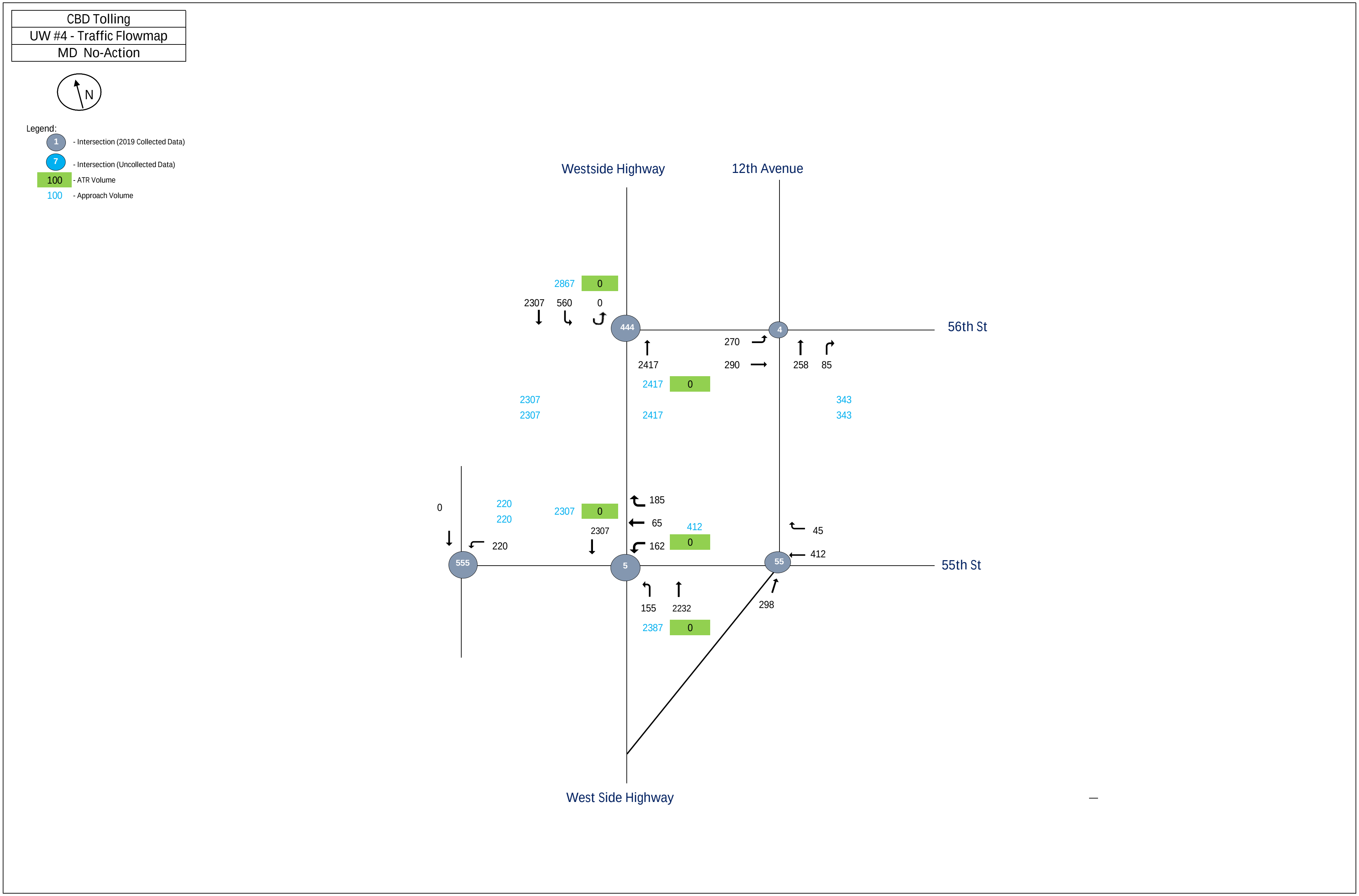
CBD Tolling
UW #2 - Traffic Flowmap
MD No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
11th Ave
Amsterdam Ave
9th Ave
Broadway Ave
Central Park West
61st Street
60th Street
West End Ave
10th Ave
Columbus Ave
Broadway Ave
597
0
15
568
14
5
20
35
603
603
0
0
5
366
60
0
431
431
75
60
170
15
588
94
94
20
84
10
1106
10
0
1116
1116
85
241
0
326
326
305
305
1314
0
1090
224
1090
1090
0
123
967
203
214
0
417
417
718
0
688
30
0
224
224
45
35
144
442
8
450
0
450
832
832
0
79
753
0
73
73
73
617
0
0
20
0
20
10
356
366
0
64
1031
1031
0
338
450
788

CBD Tolling

UW #3 - Traffic Flowmap

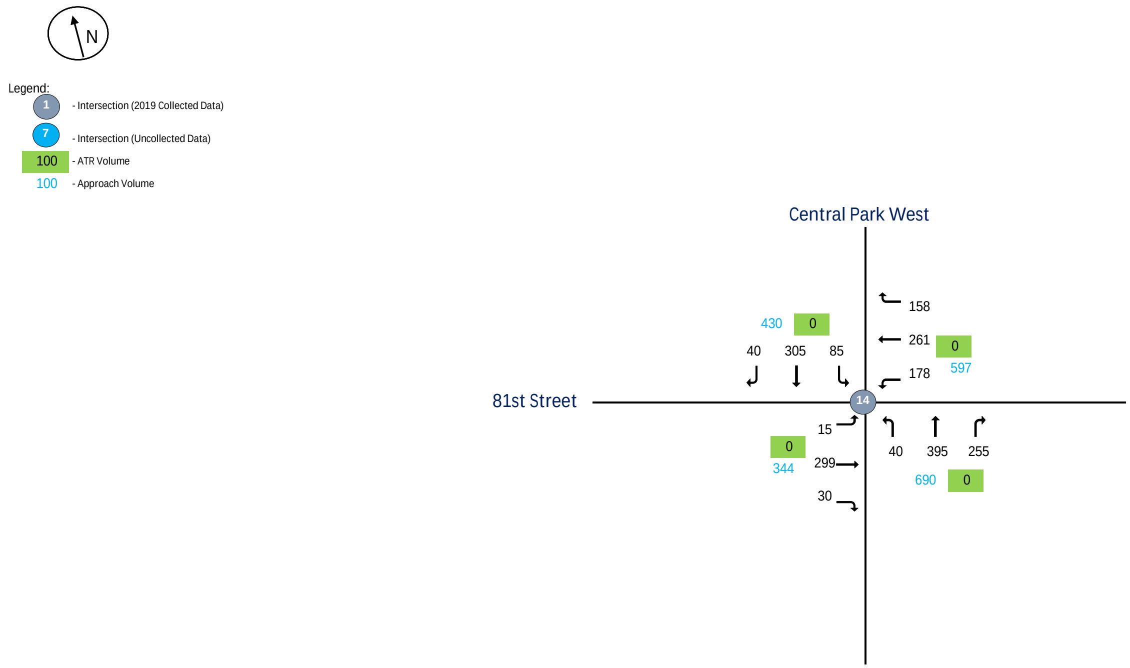
MD No-Action



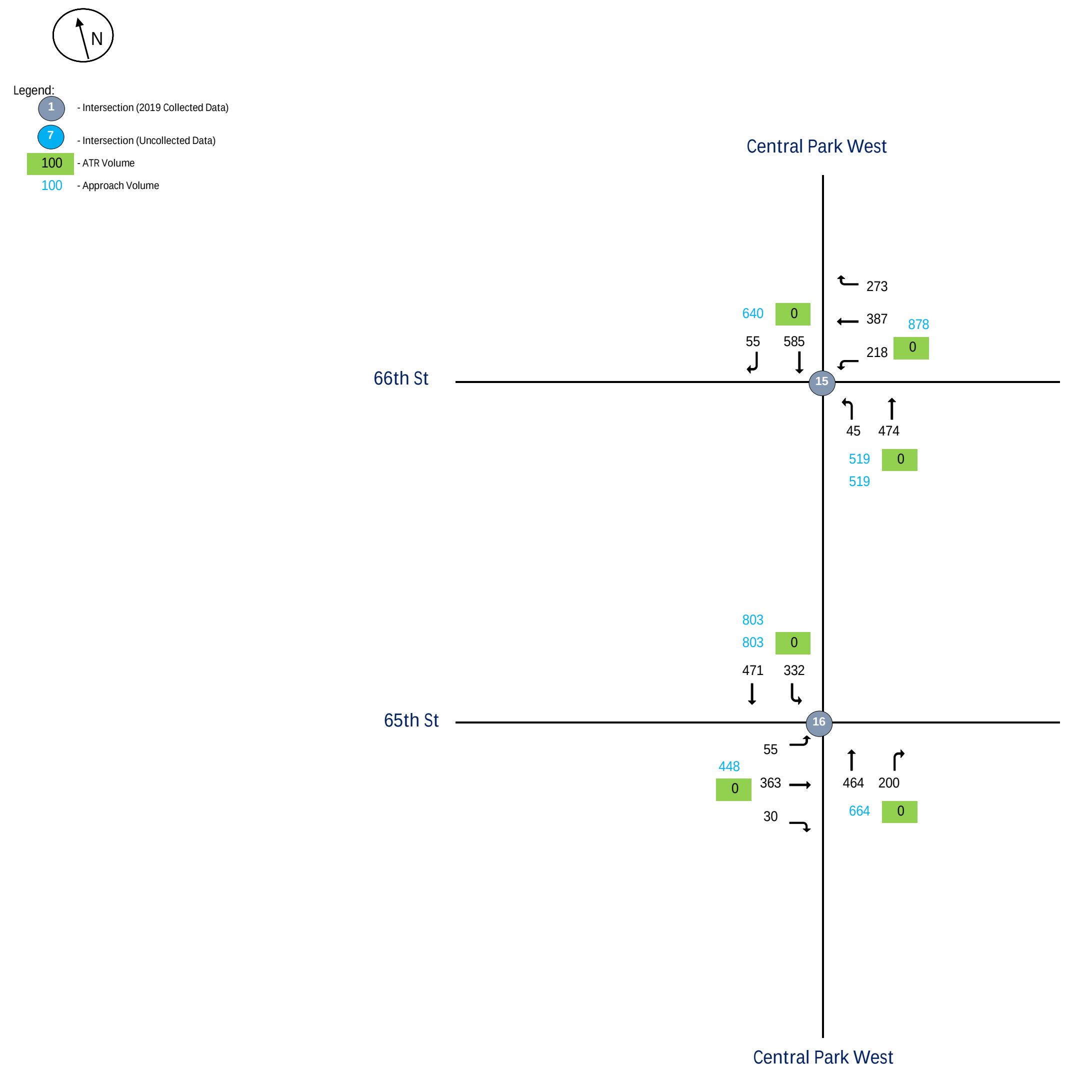


CBD Tolling
UW #4 - Traffic Flowmap
MD No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
444
4
555
5
55
2867
0
2307
560
0
2417
2417
0
270
290
258
85
2307
2307
2417
343
343
0
220
220
2307
0
2307
220
185
65
162
412
0
45
412
155
2232
2387
0
298

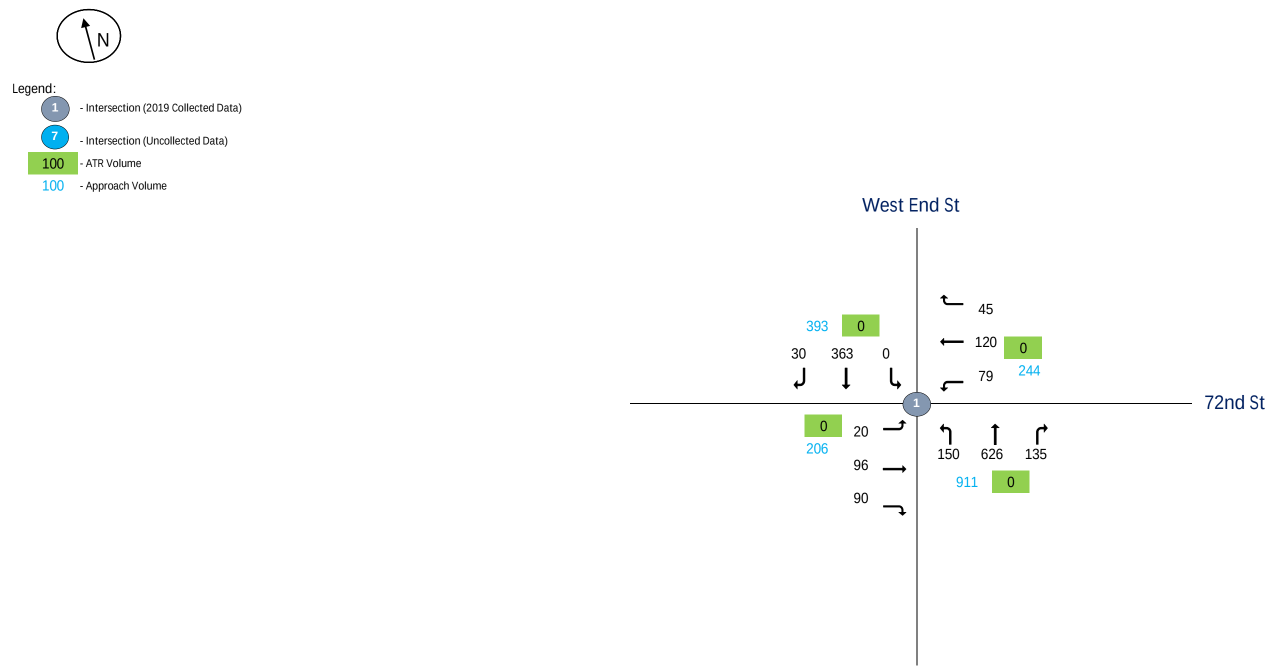
CBD Tolling
UW #5 - Traffic Flowmap
MD No-Action



CBD Tolling
UW #6 - Traffic Flowmap
MD No-Action

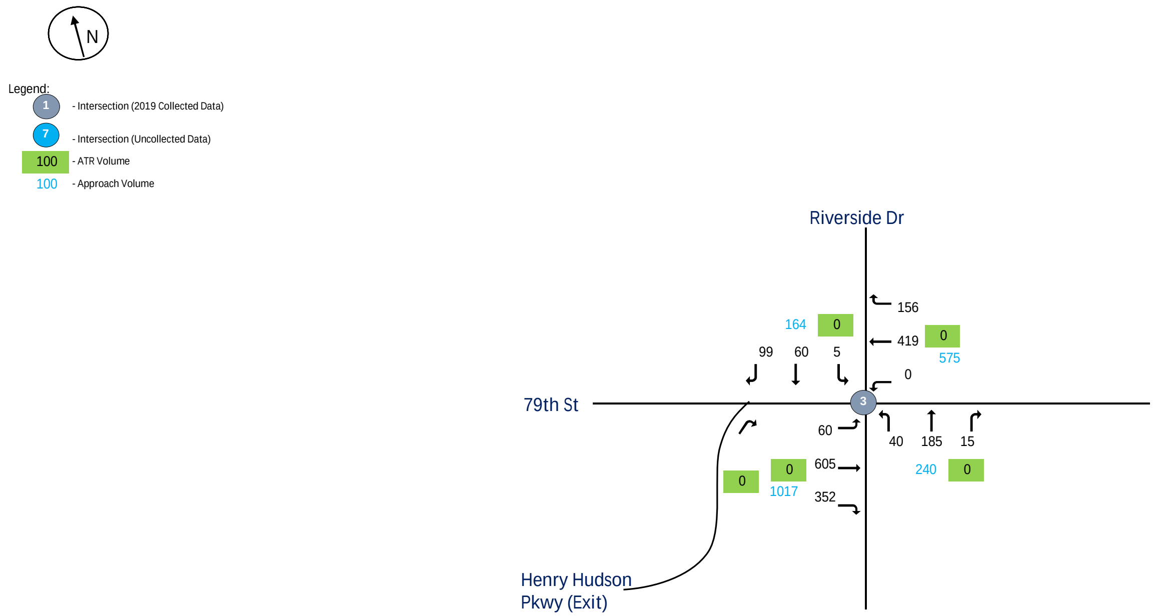


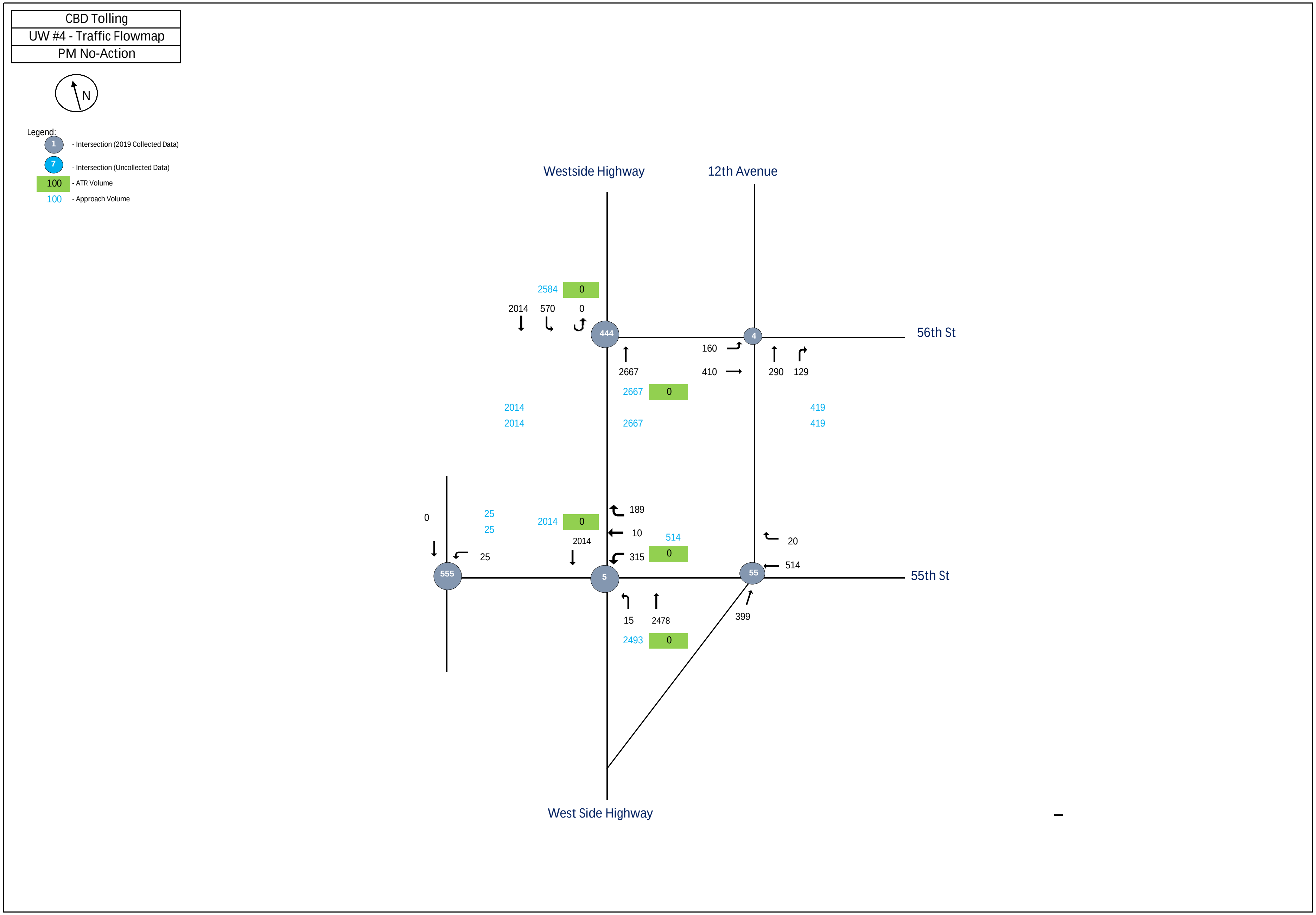
CBD Tolling
UW #1 - Traffic Flowmap
PM No-Action



CBD Tolling
UW #2 - Traffic Flowmap
PM No-Action

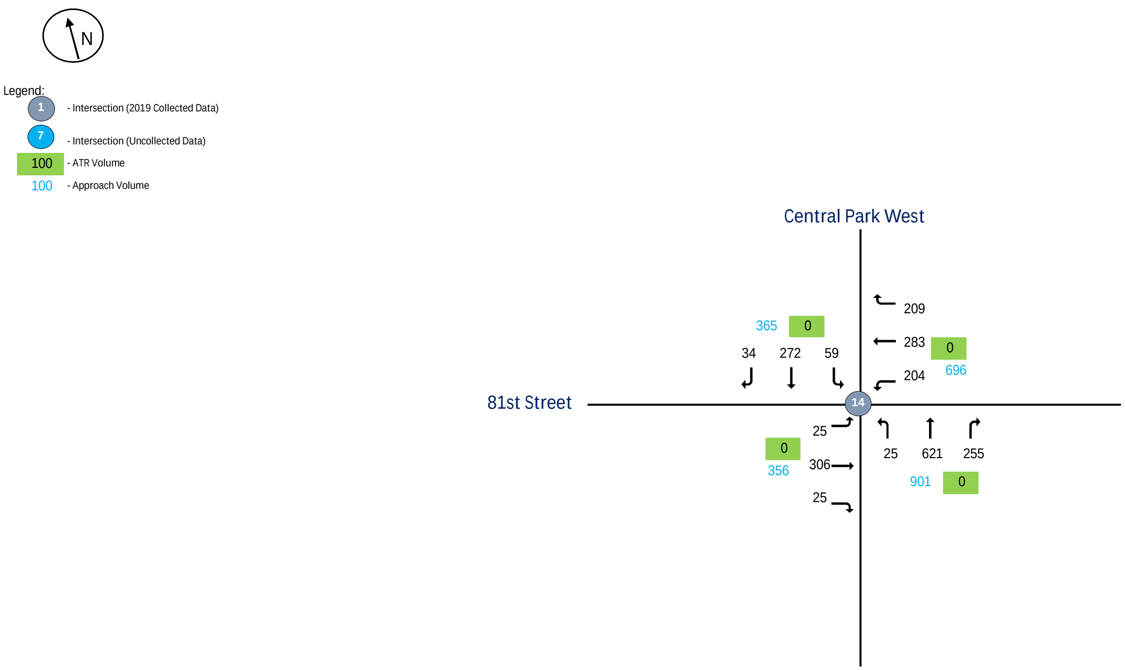
CBD Tolling
UW #3 - Traffic Flowmap
PM No-Action



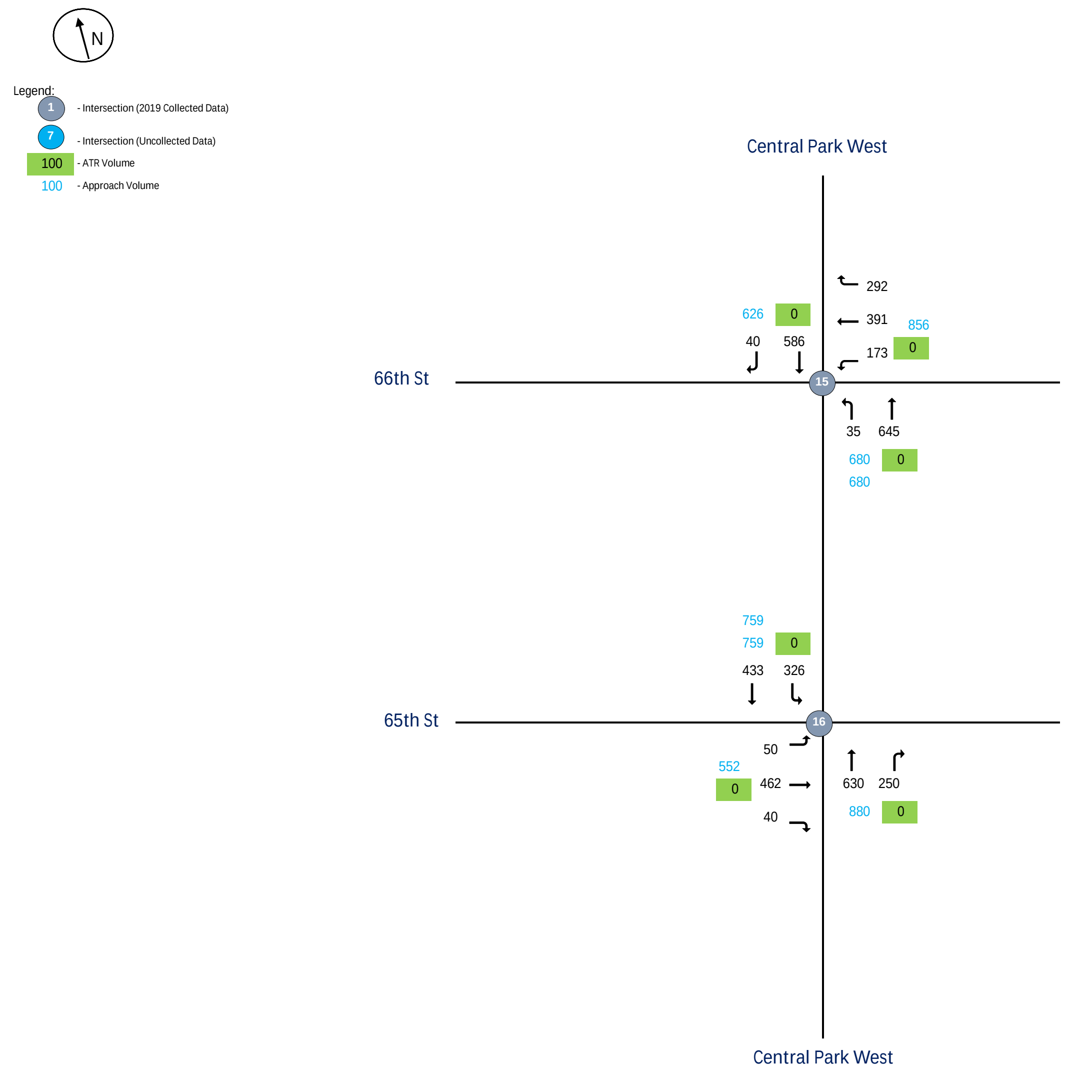


CBD Tolling
UW #4 - Traffic Flowmap
PM No-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
2584
0
2014
570
0
444
4
160
410
290
129
2667
2667
0
2014
2014
2667
419
419
0
25
25
2014
0
189
10
514
0
2014
315
20
514
25
555
5
55
15
2478
399
2493
0

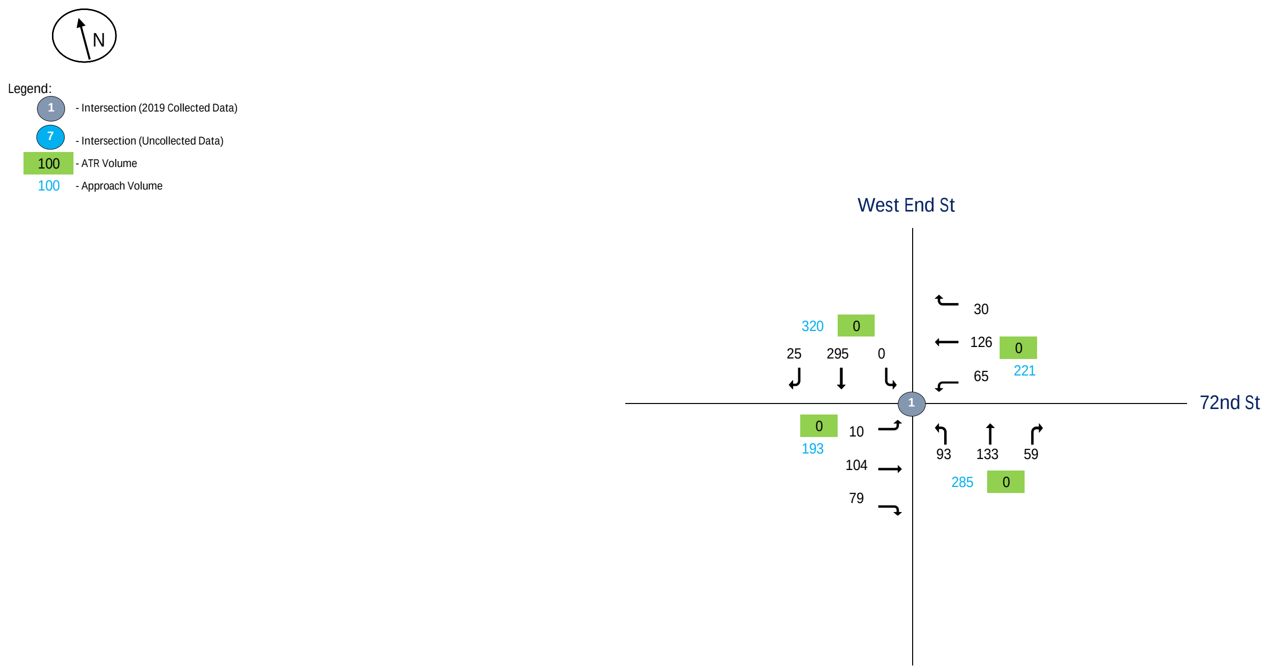
CBD Tolling
UW #5 - Traffic Flowmap
PM No-Action



CBD Tolling
UW #6 - Traffic Flowmap
PM No-Action



CBD Tolling
UW #1 - Traffic Flowmap
LN No-Action

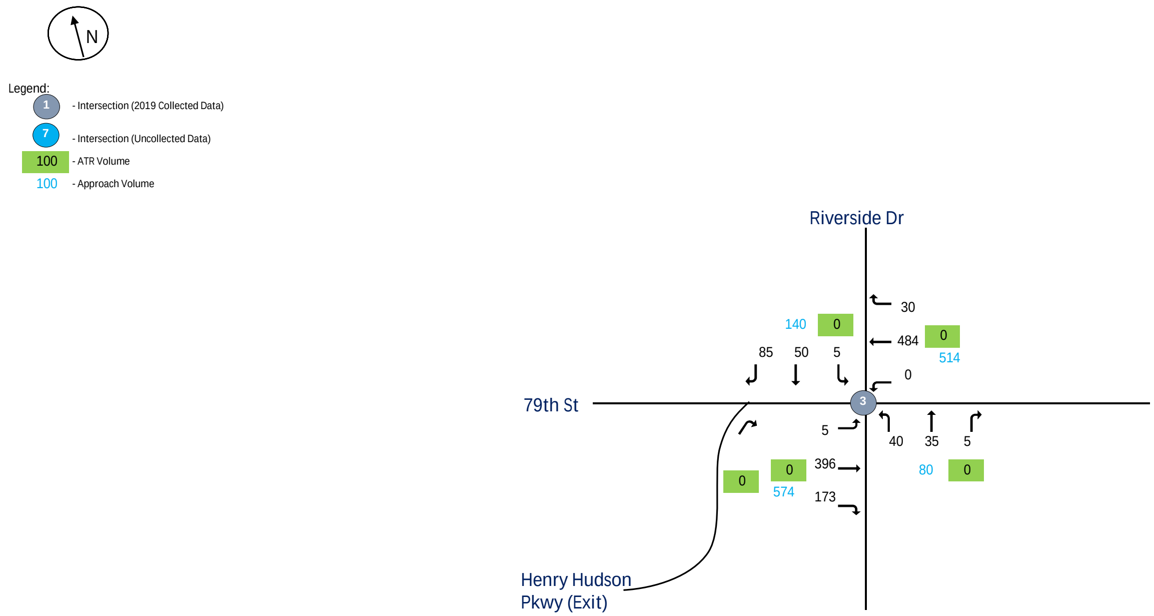


CBD Tolling
UW #2 - Traffic Flowmap
LN No-Action

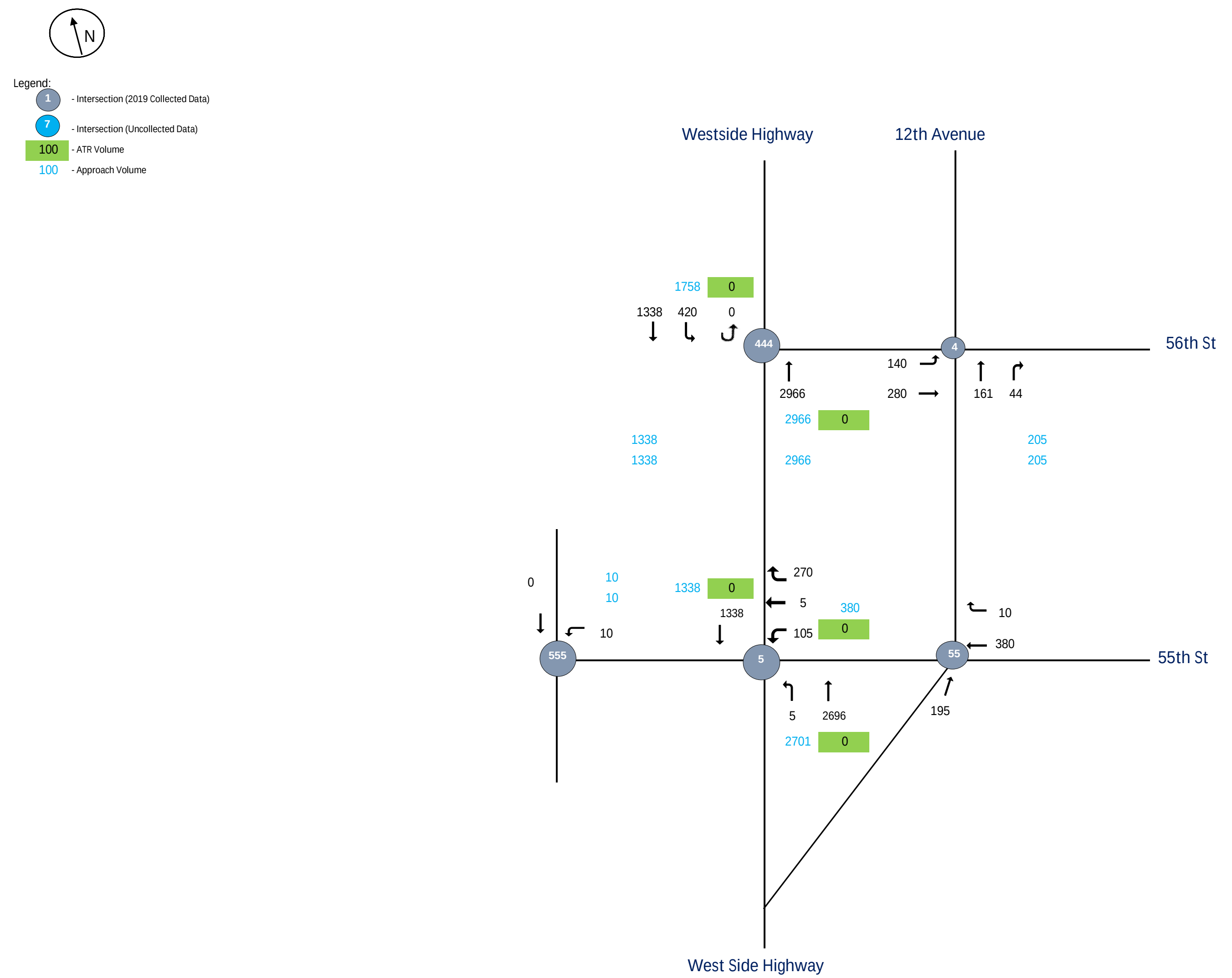
CBD Tolling

UW #3 - Traffic Flowmap

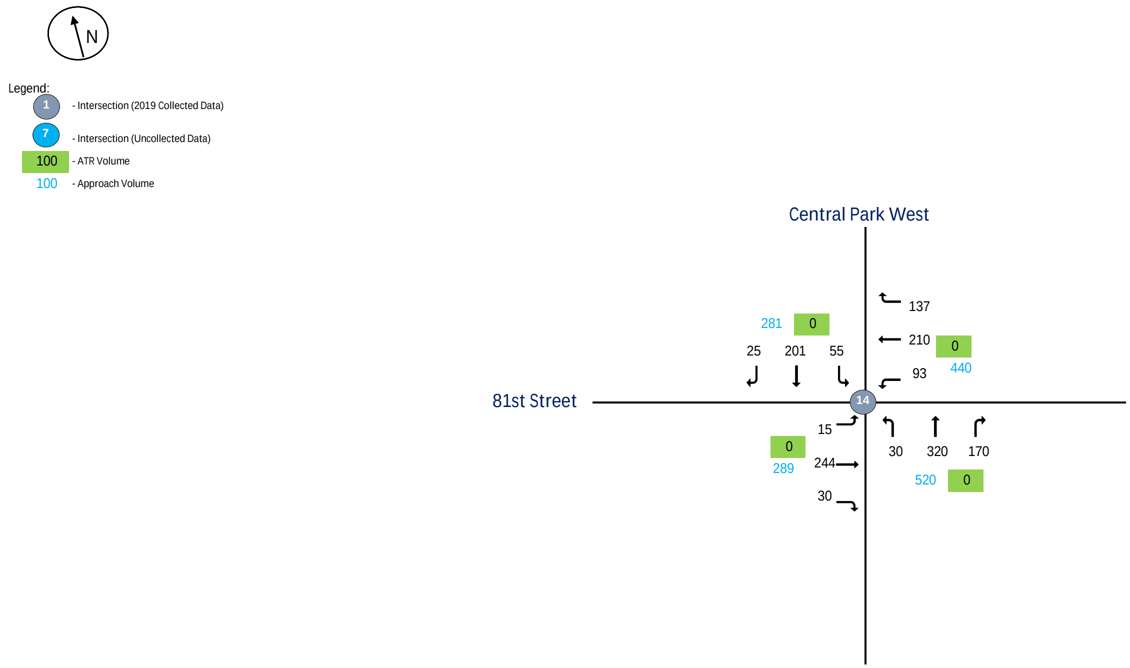
LN No-Action



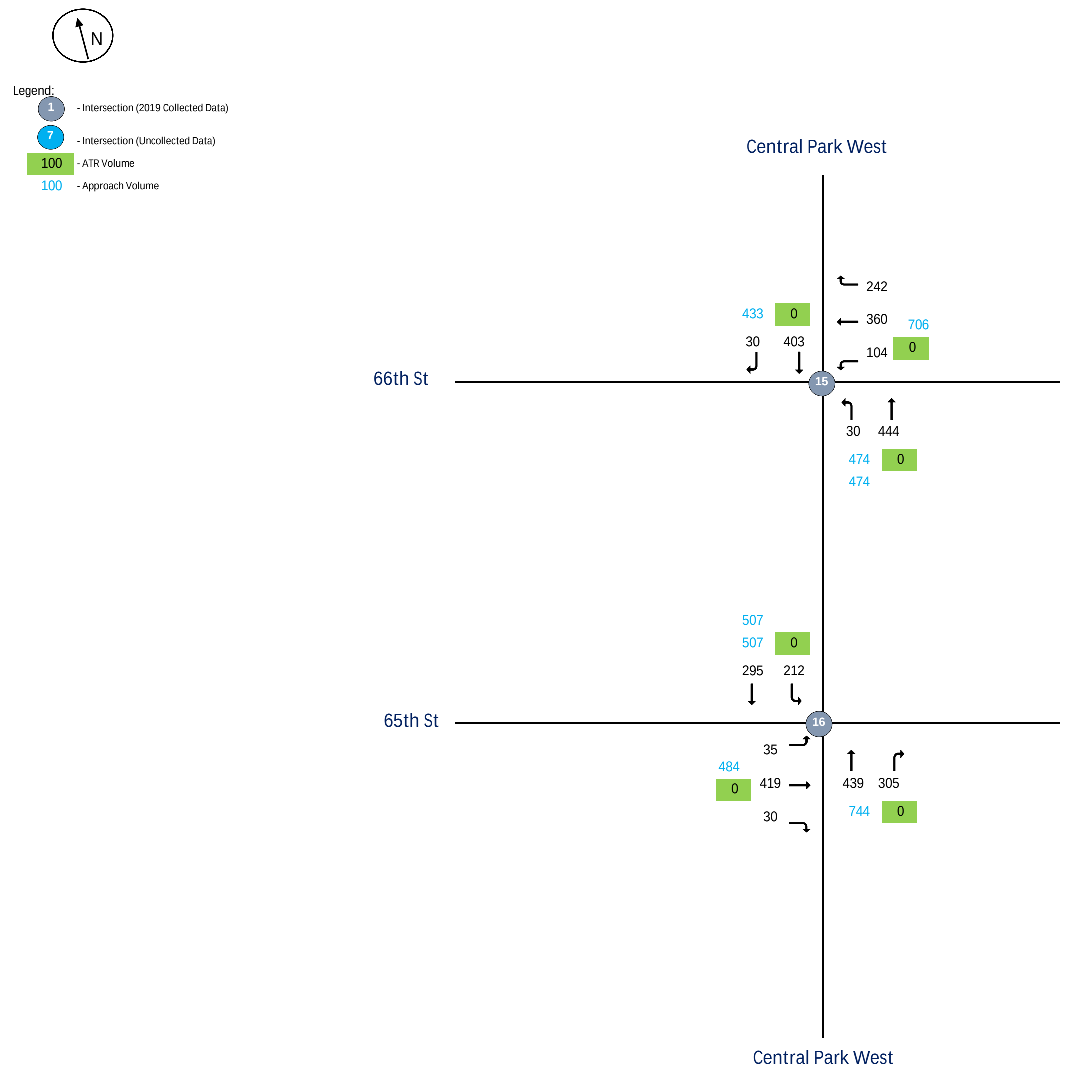
CBD Tolling
UW #4 - Traffic Flowmap
LN No-Action



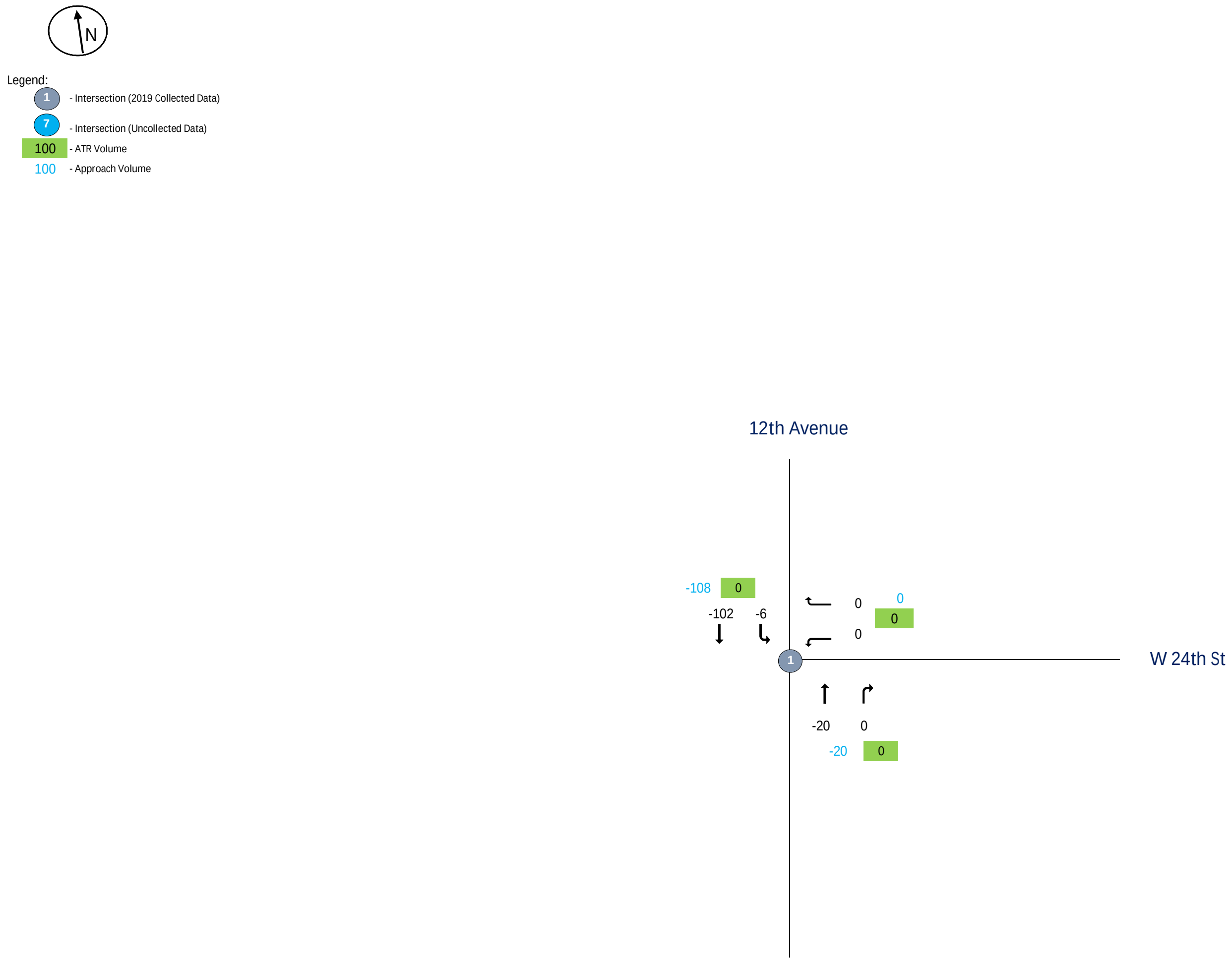
CBD Tolling
UW #5 - Traffic Flowmap
LN No-Action



CBD Tolling
UW #6 - Traffic Flowmap
LN No-Action



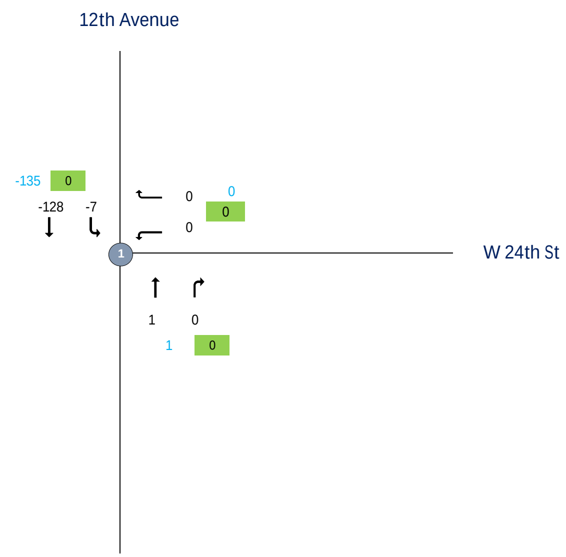
CBD Tolling
9A - Traffic Flowmap
AM Action Increment



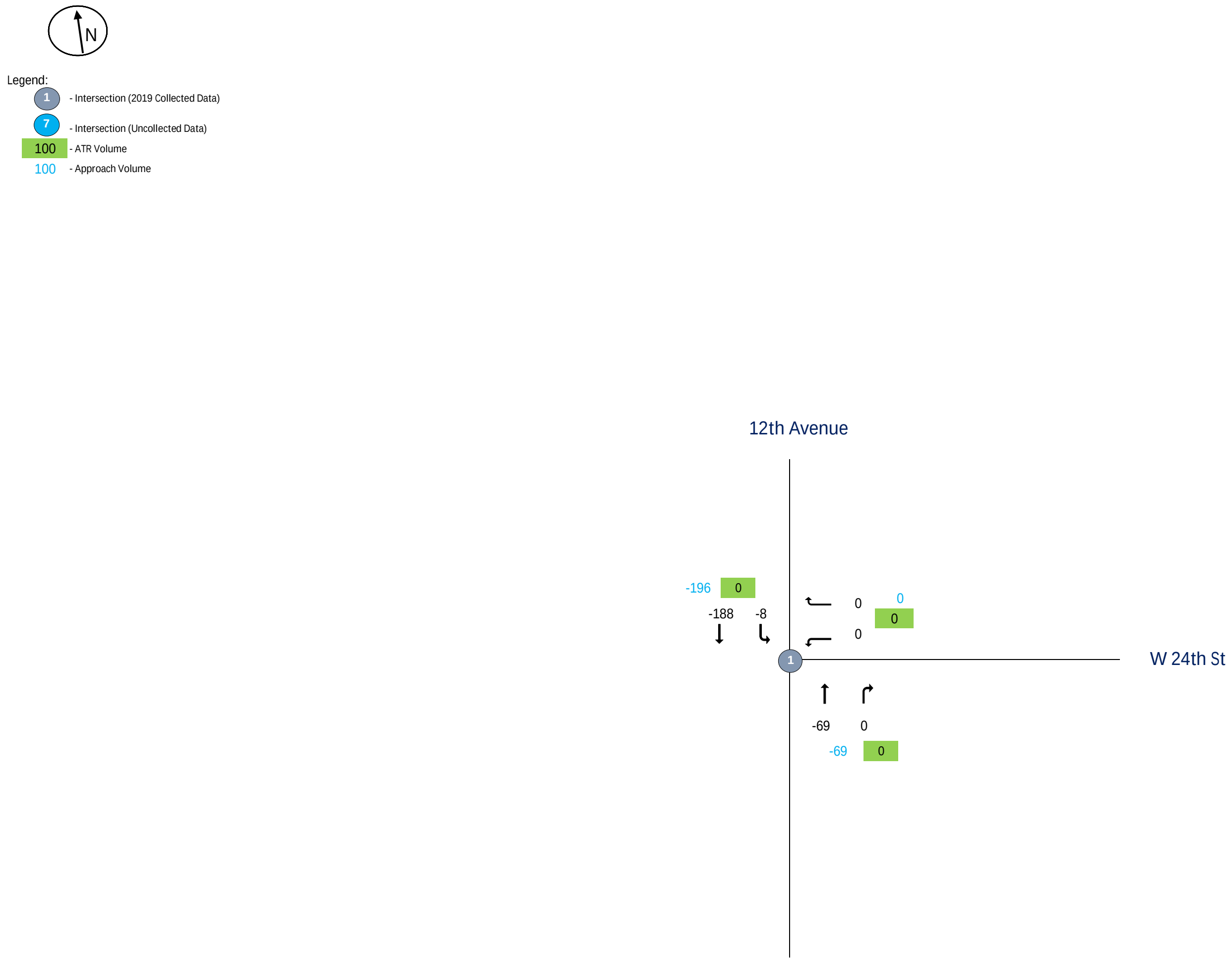
CBD Tolling
9A - Traffic Flowmap
MD Action Increment

N

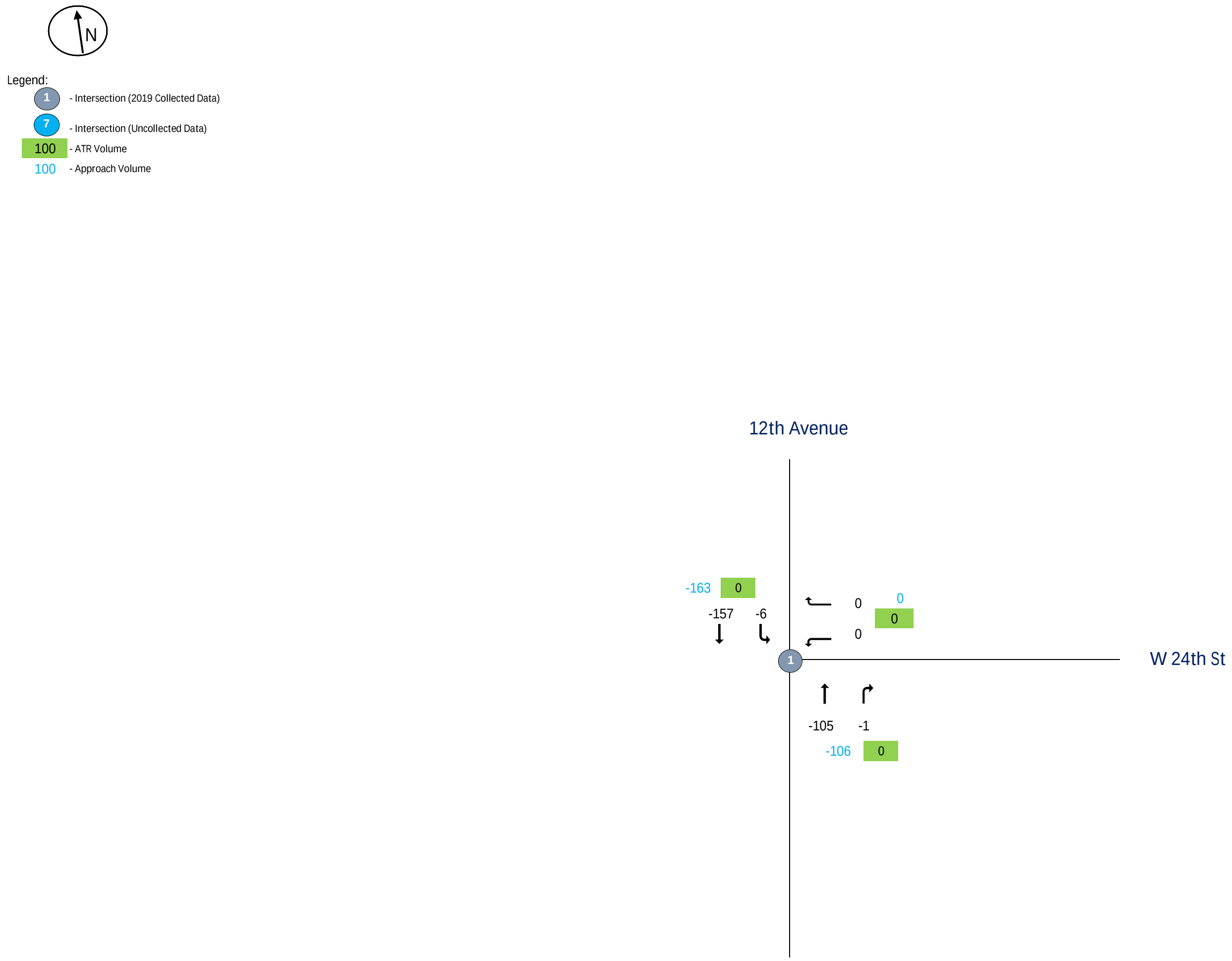
Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



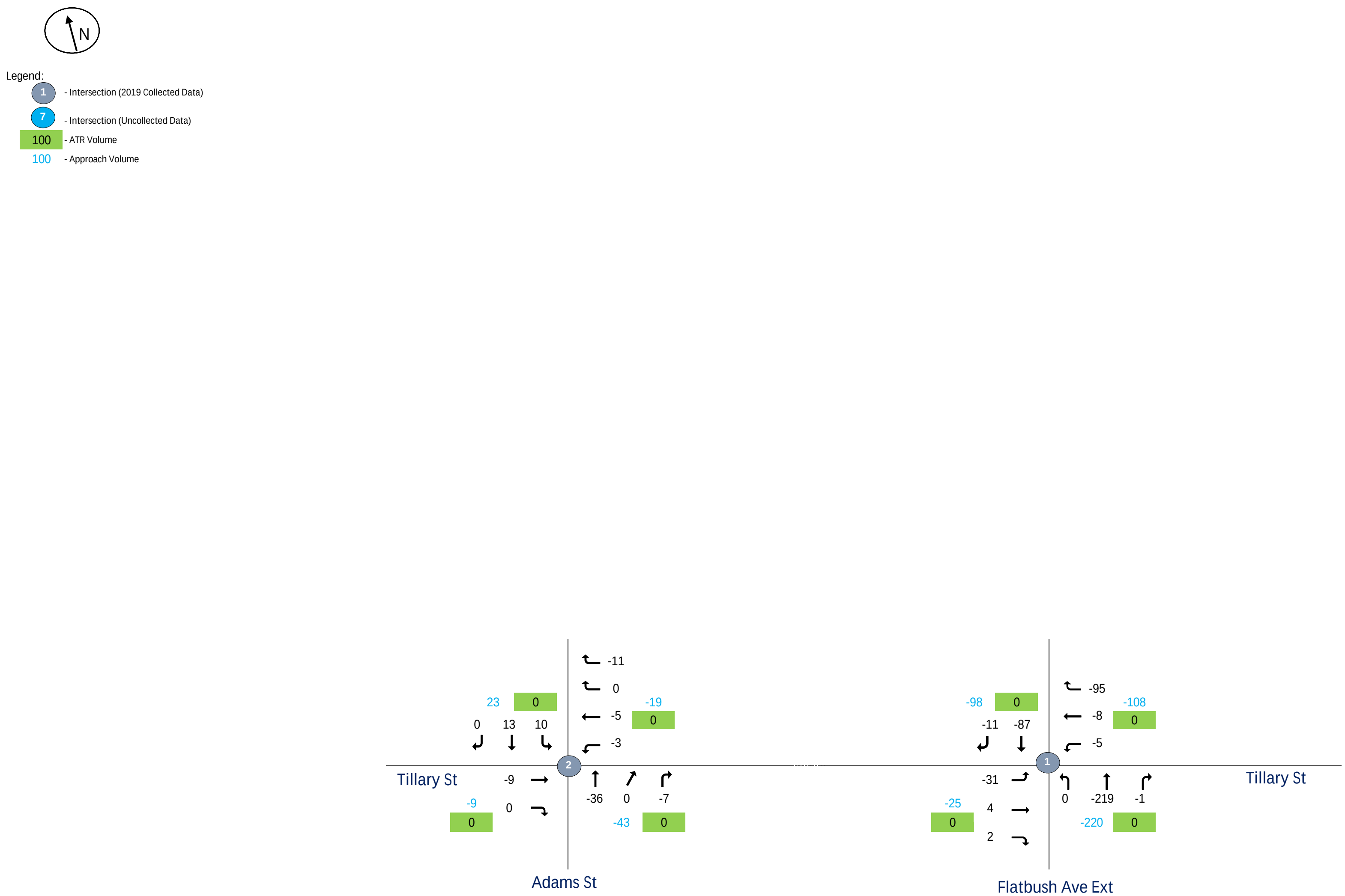
CBD Tolling
9A - Traffic Flowmap
PM Action Increment



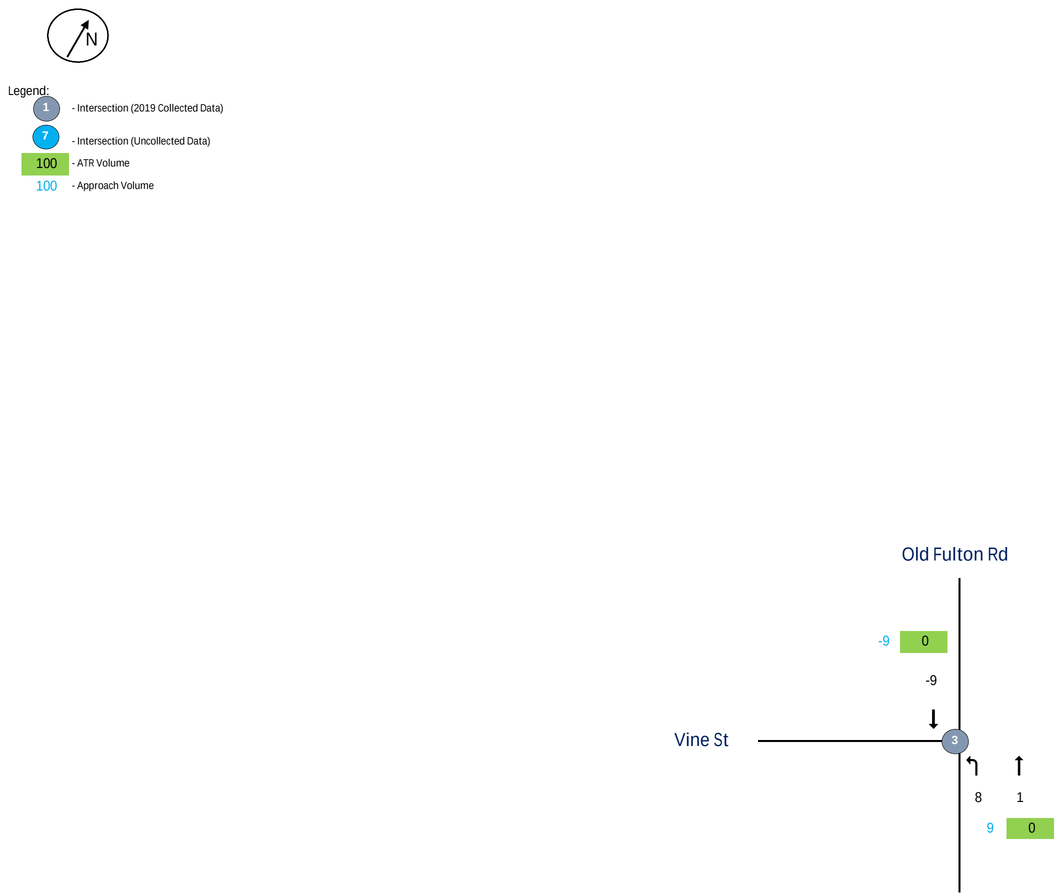
CBD Tolling
9A - Traffic Flowmap
LN Action Increment



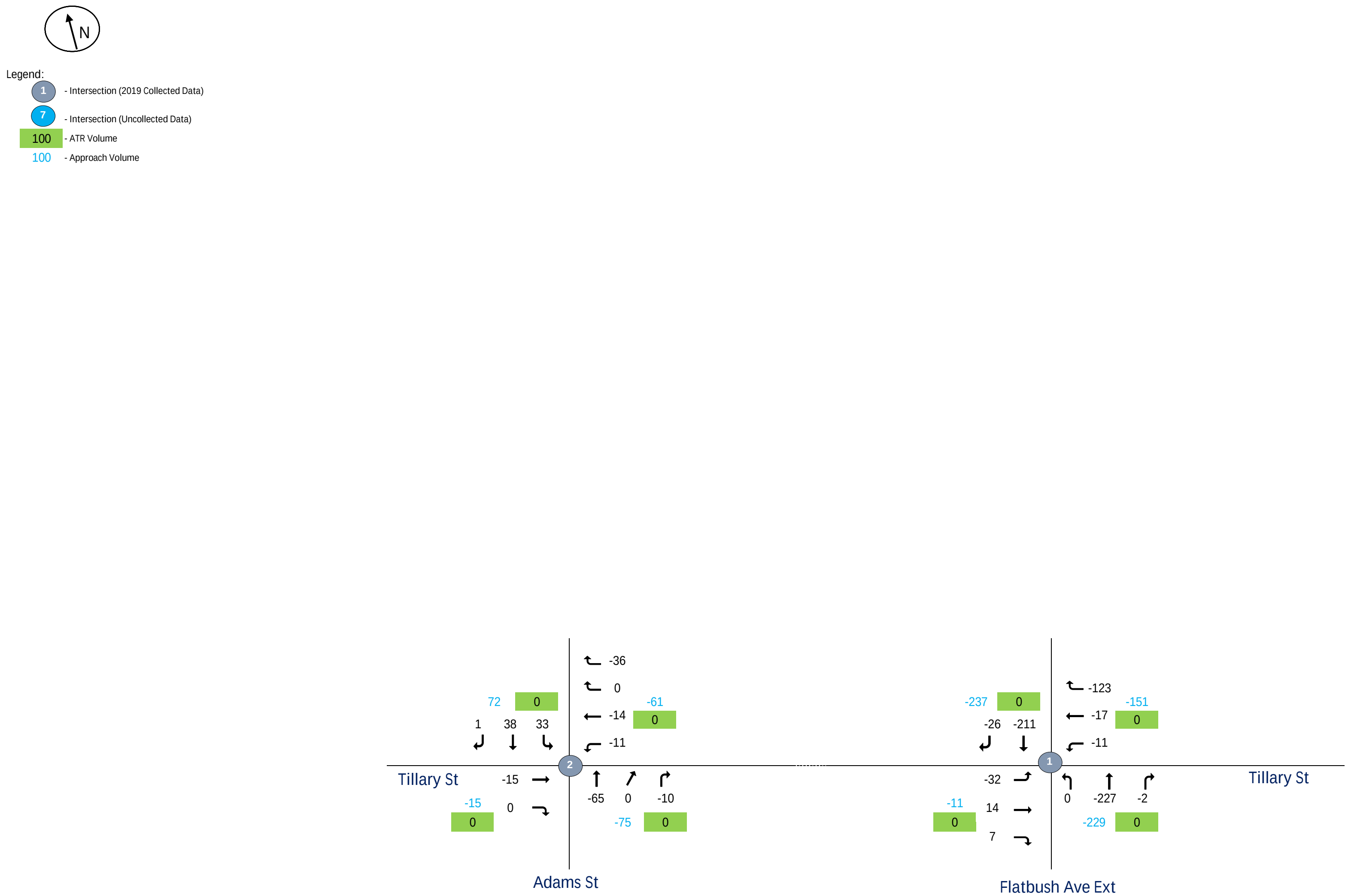
CBD Tolling
Dumbo - Traffic Flowmap
AM Action Increment



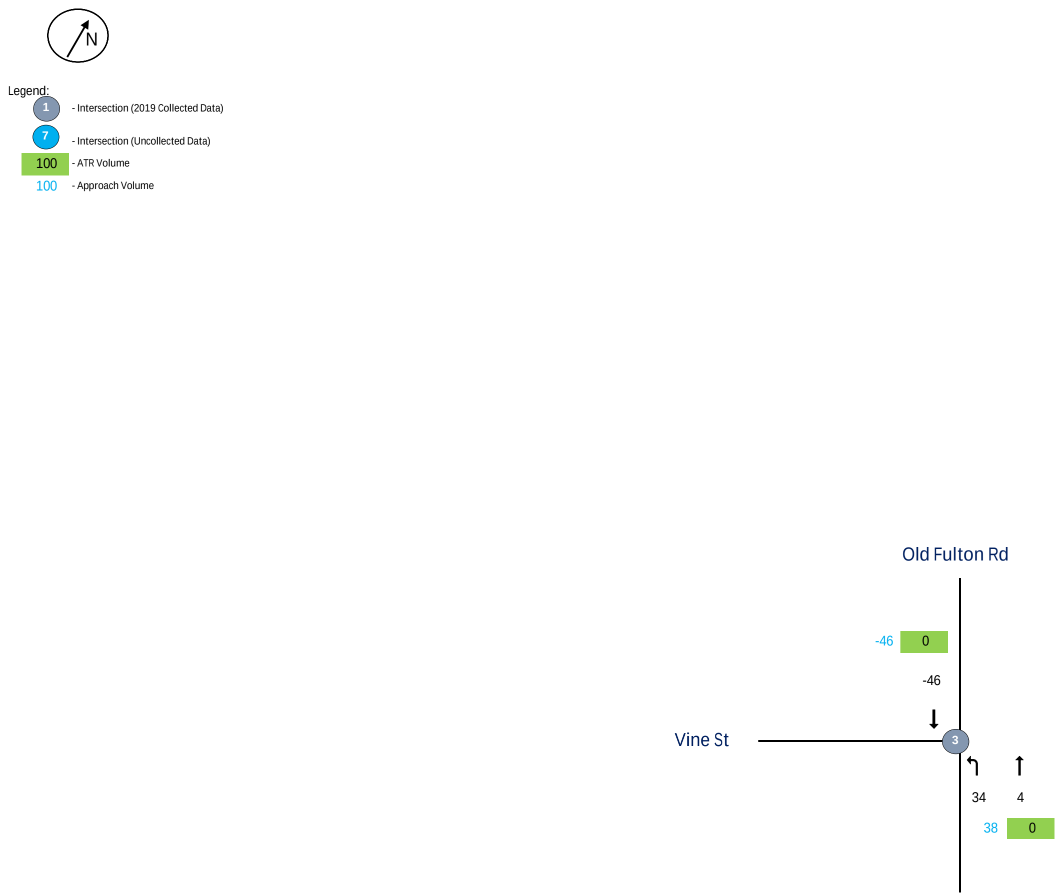
CBD Tolling
Dumbo #2 - Traffic Flowmap
AM Action Increment



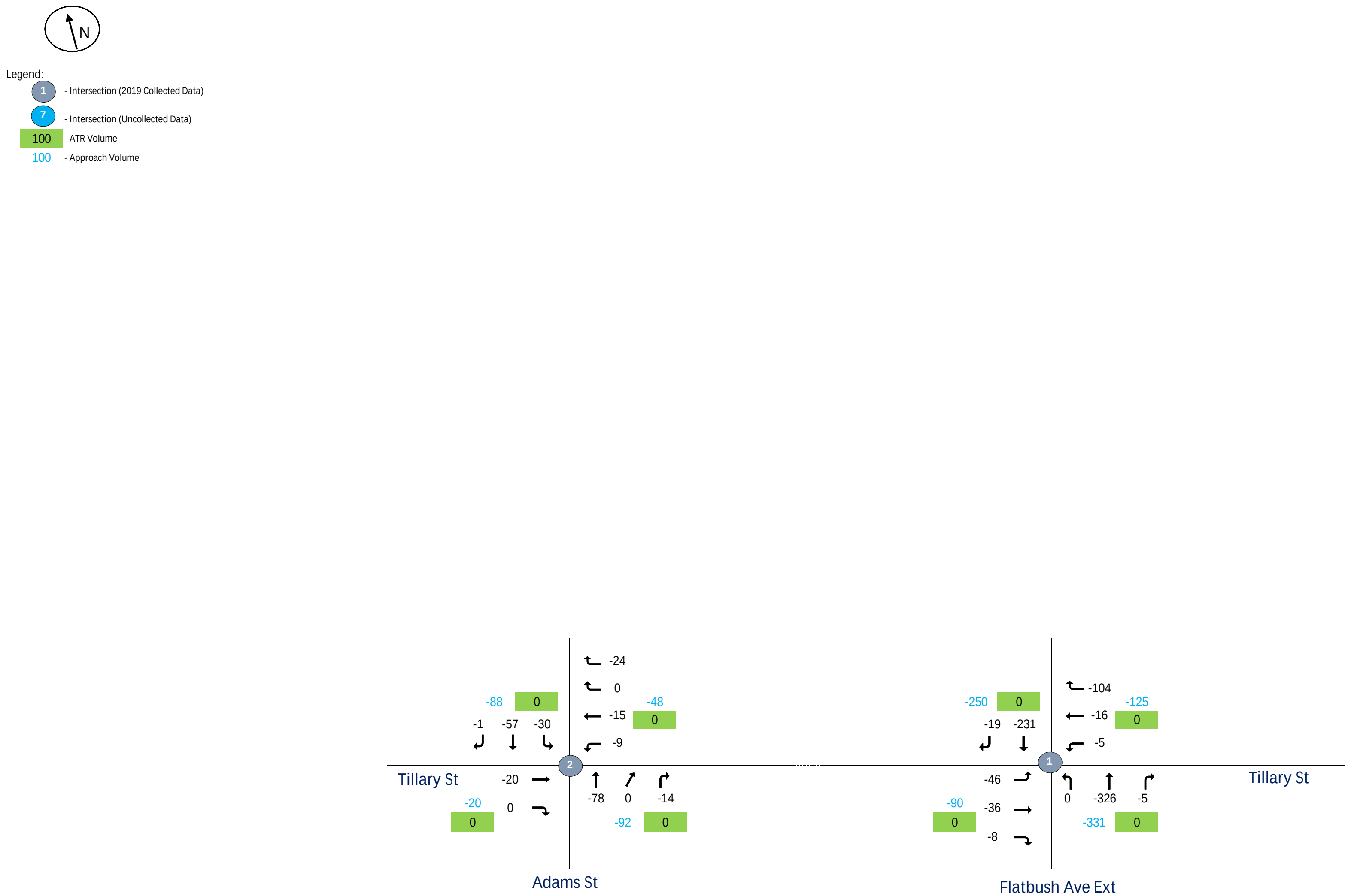
CBD Tolling
Dumbo - Traffic Flowmap
MD Action Increment



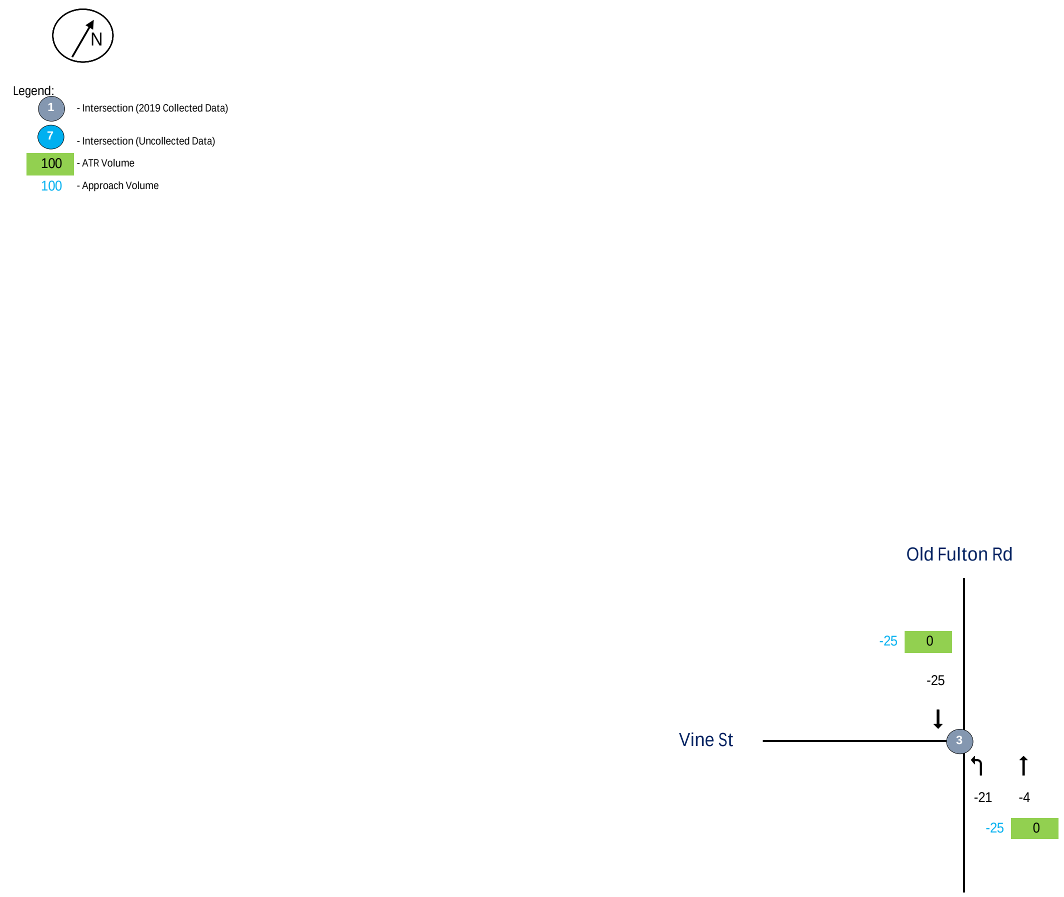
CBD Tolling
Dumbo #2 - Traffic Flowmap
MD Action Increment



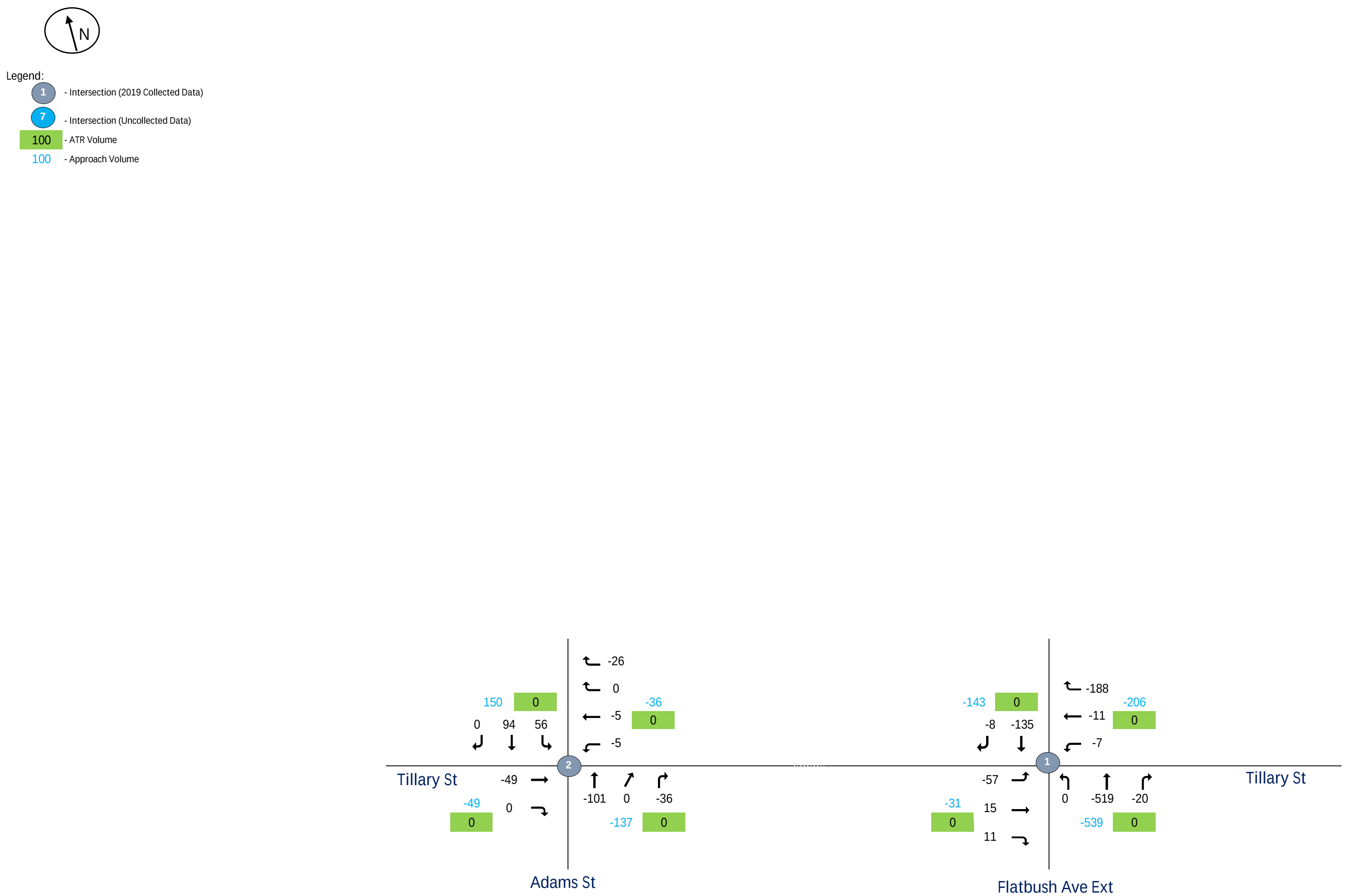
CBD Tolling
Dumbo - Traffic Flowmap
PM Action Increment



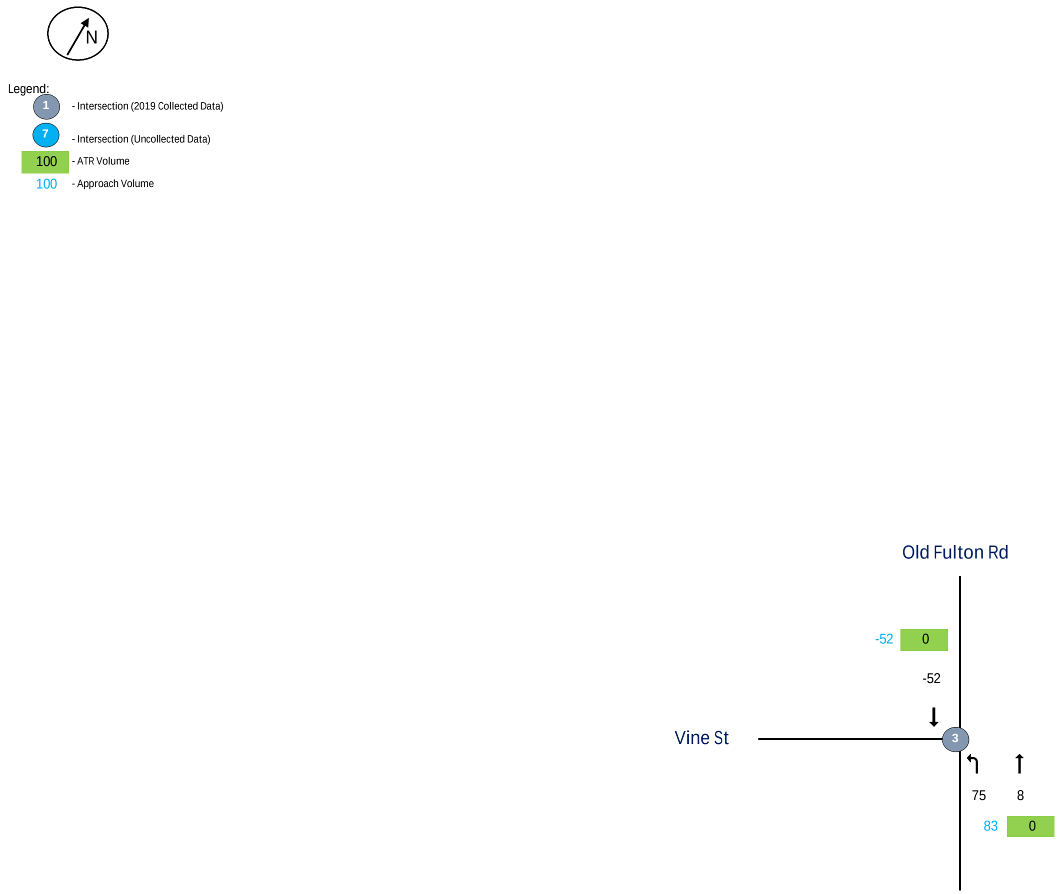
CBD Tolling
Dumbo #2 - Traffic Flowmap
PM Action Increment



CBD Tolling
Dumbo - Traffic Flowmap
LN Action Increment



CBD Tolling
Dumbo #2 - Traffic Flowmap
LN Action Increment



CBD Tolling

Dumbo - Traffic Flowmap

AM Action Increment

N

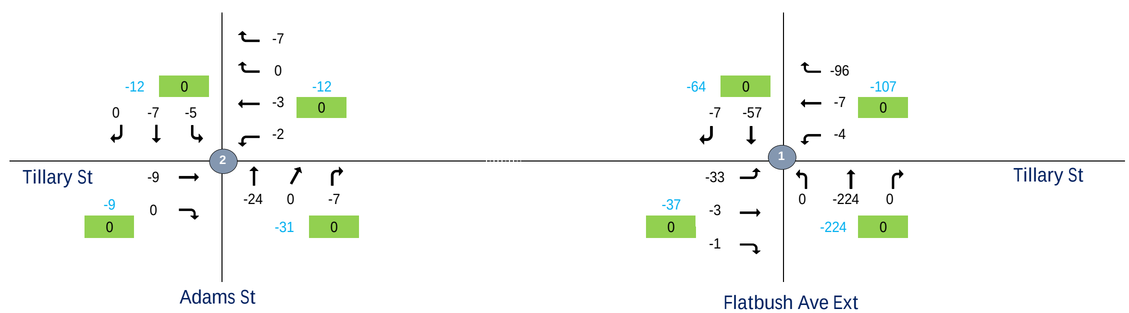
Legend:

1 - Intersection (2019 Collected Data)

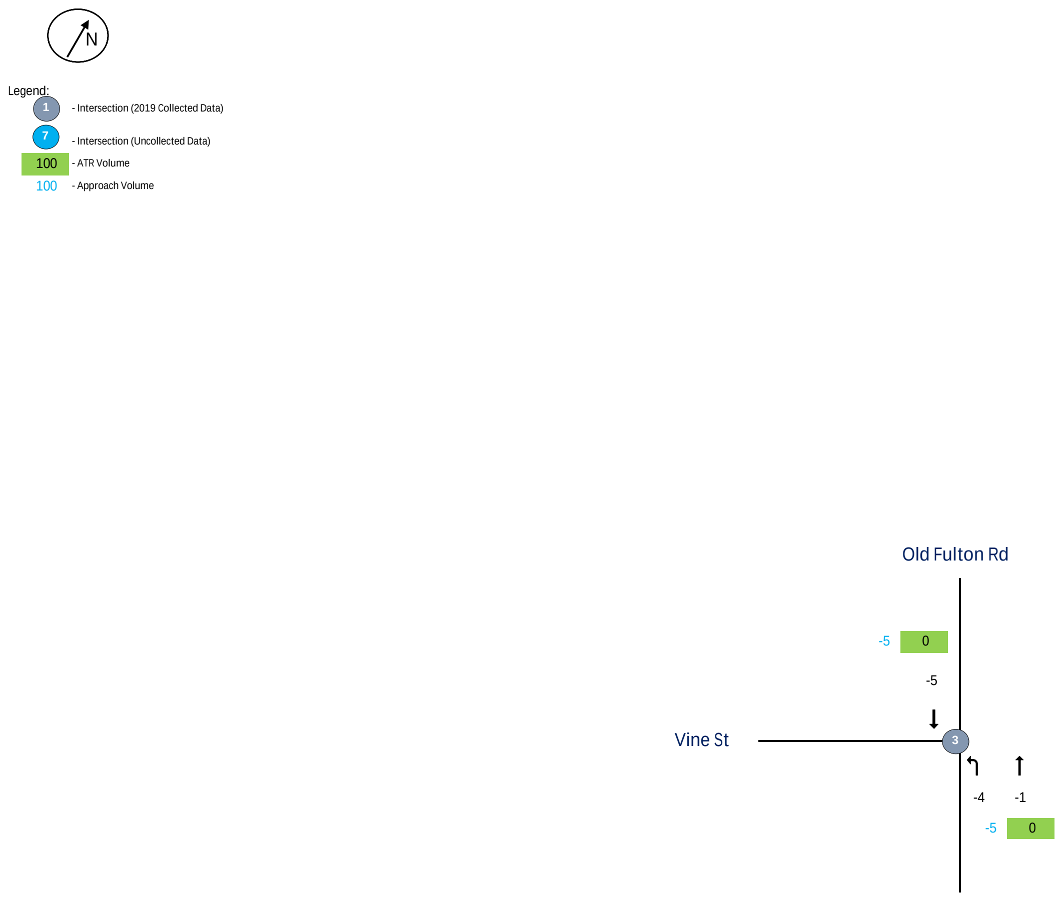
7 - Intersection (Uncollected Data)

100 - ATR Volume

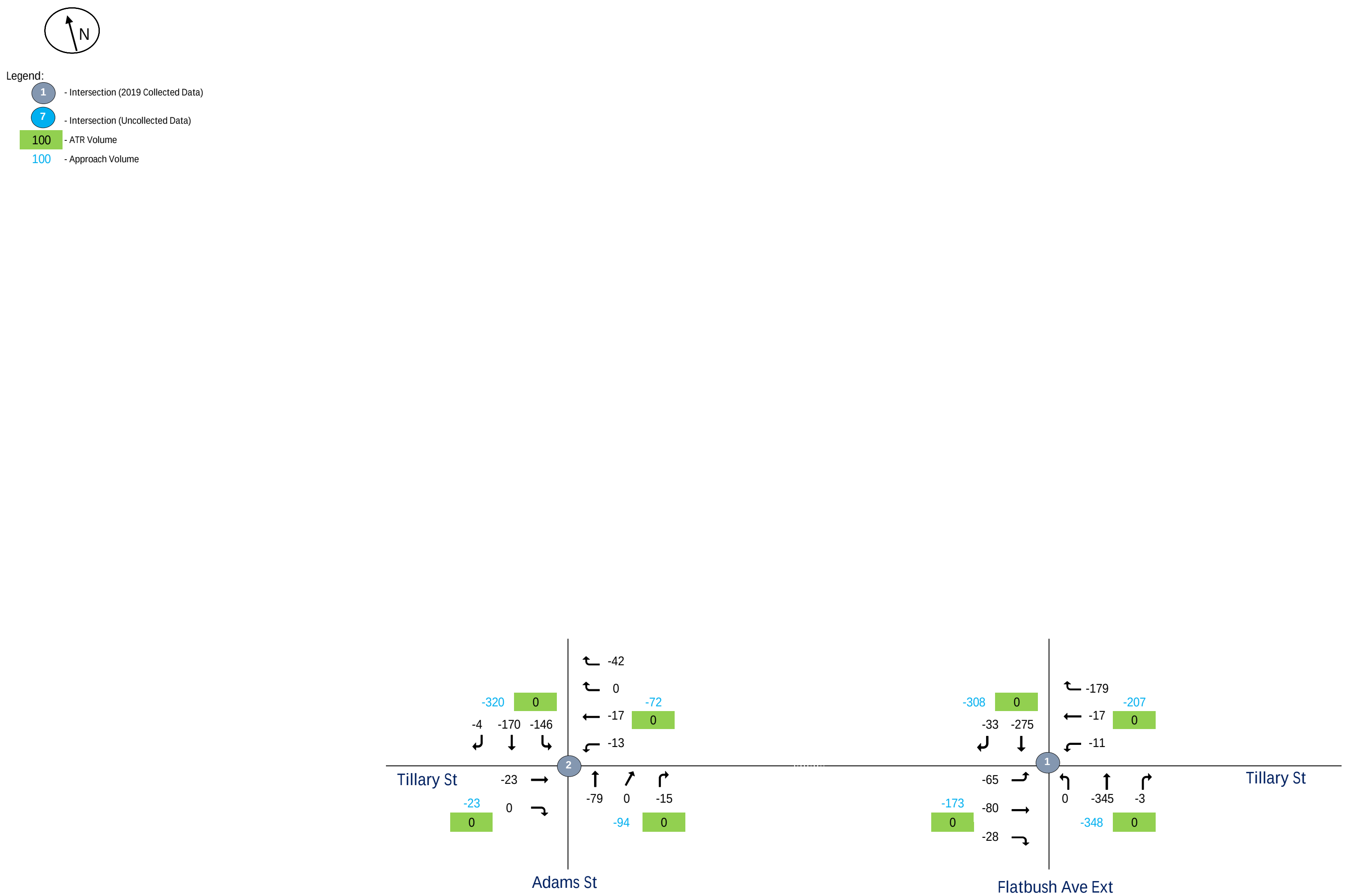
100 - Approach Volume



CBD Tolling
Dumbo #2 - Traffic Flowmap
AM Increment



CBD Tolling
Dumbo - Traffic Flowmap
MD Action Increment



CBD Tolling

Dumbo #2 - Traffic Flowmap

MD Action Increment

N

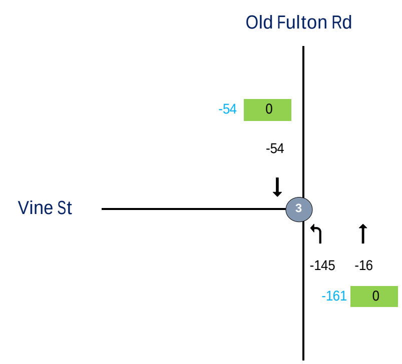
Legend:

1 - Intersection (2019 Collected Data)

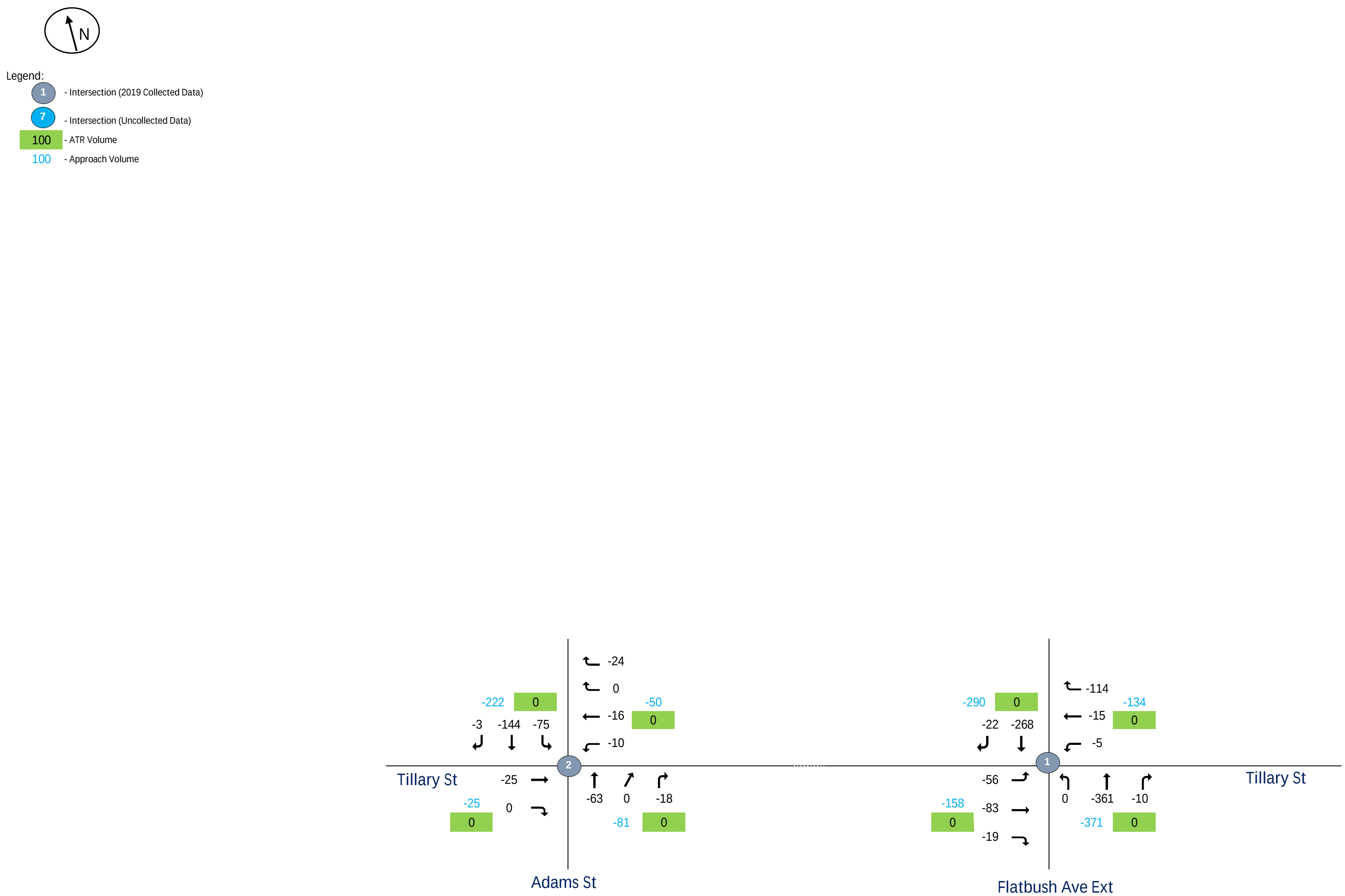
7 - Intersection (Uncollected Data)

100 - ATR Volume

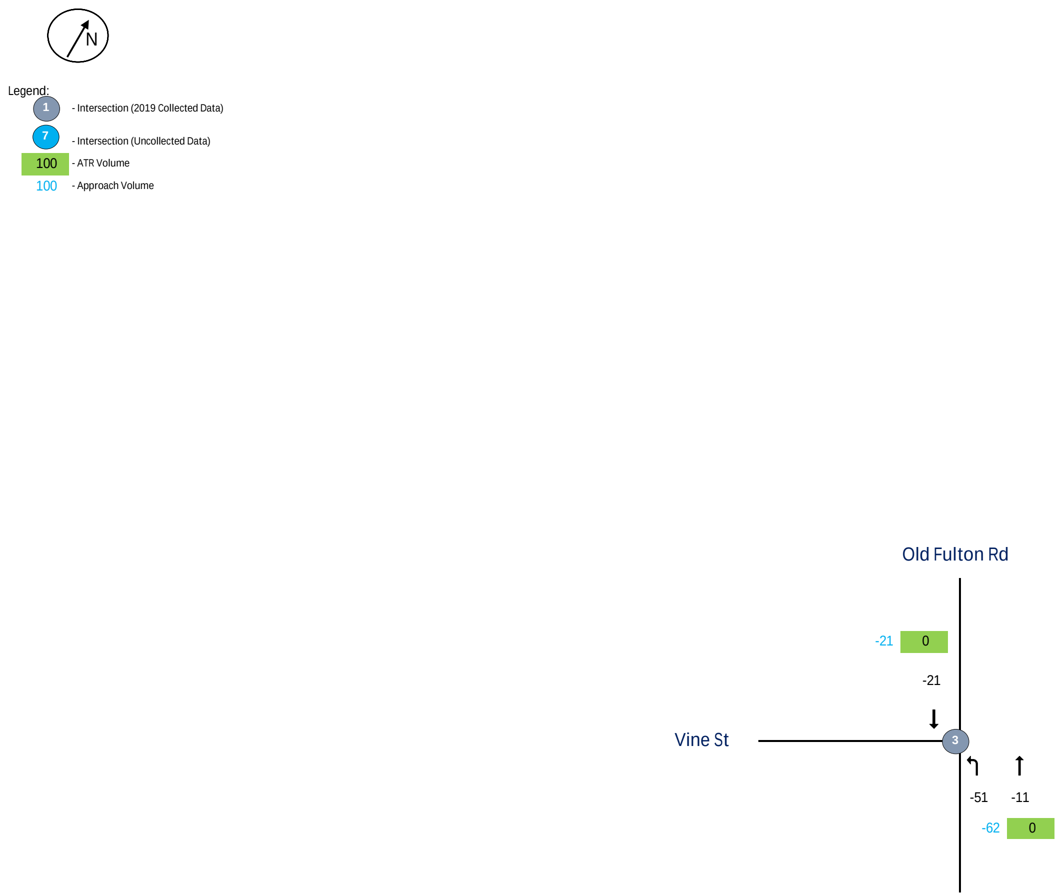
100 - Approach Volume



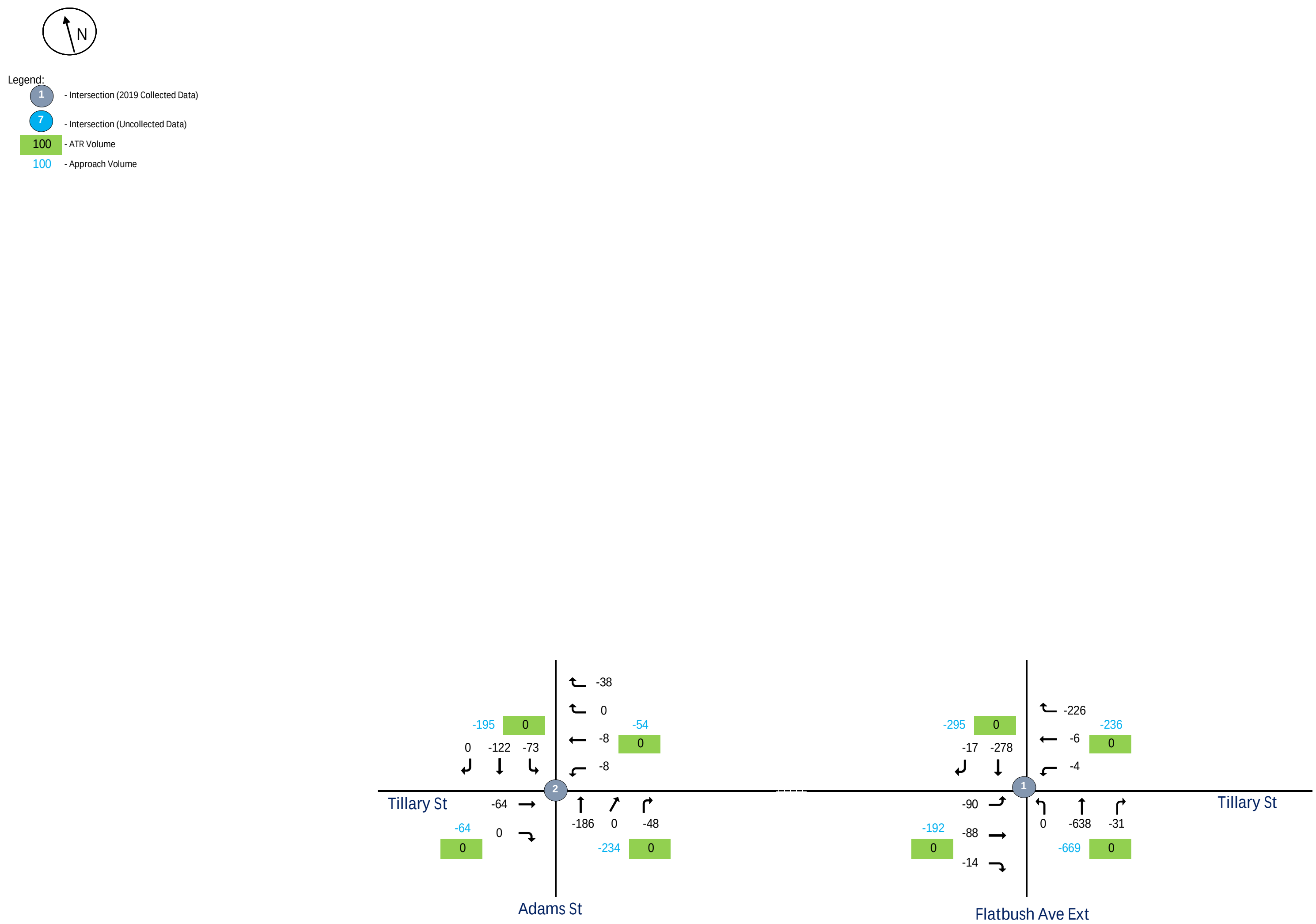
CBD Tolling
Dumbo - Traffic Flowmap
PM Action Increment



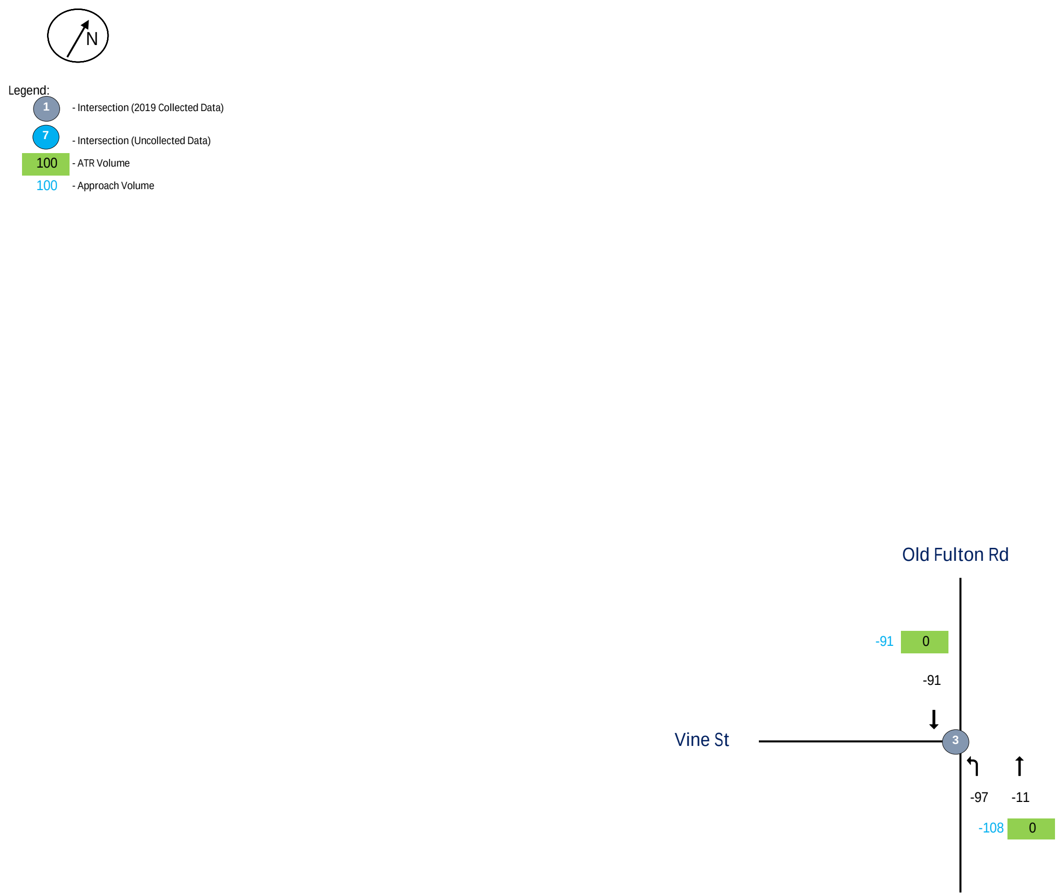
CBD Tolling
Dumbo #2 - Traffic Flowmap
PM Action Increment



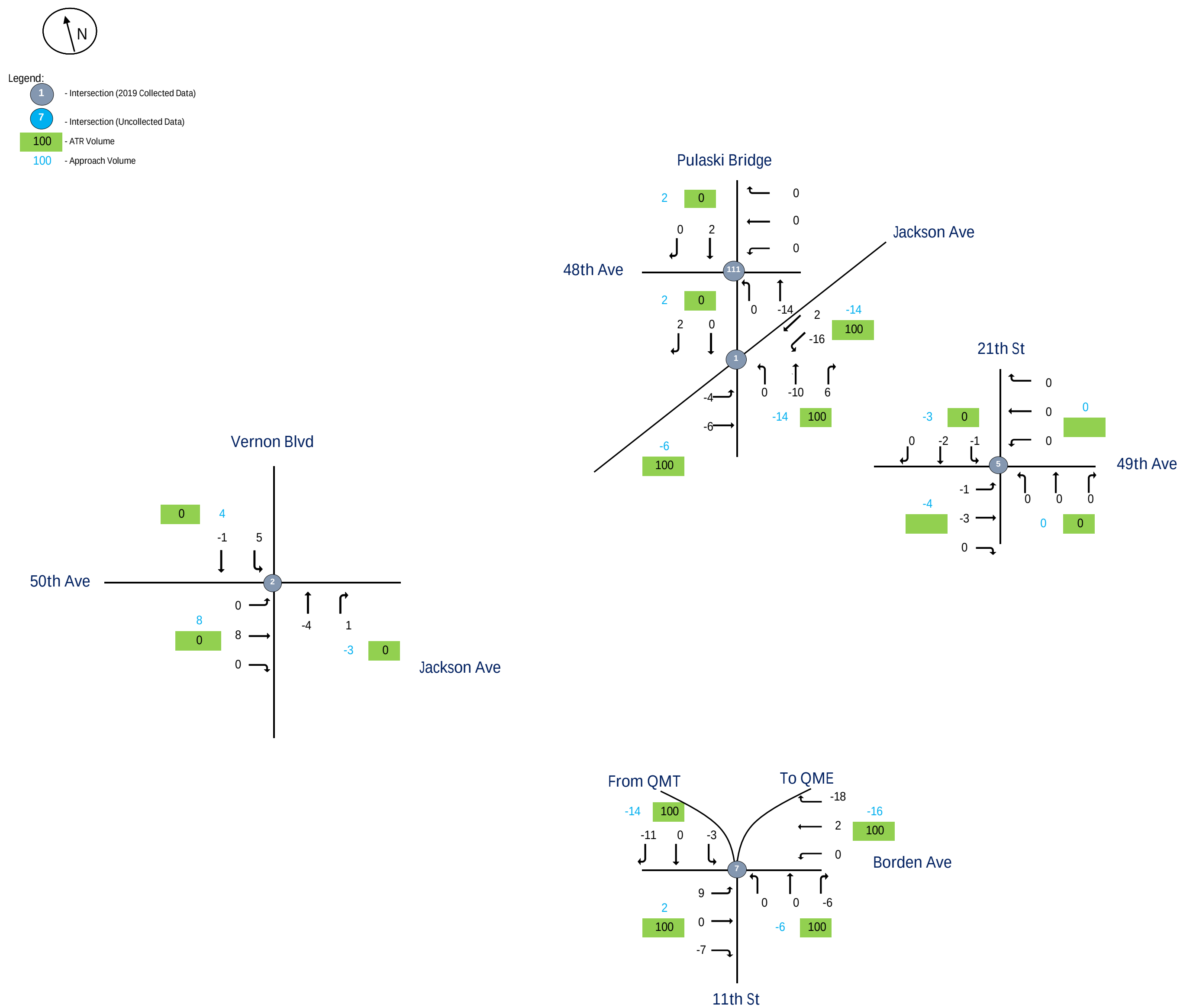
CBD Tolling
Dumbo - Traffic Flowmap
LN Action Increment



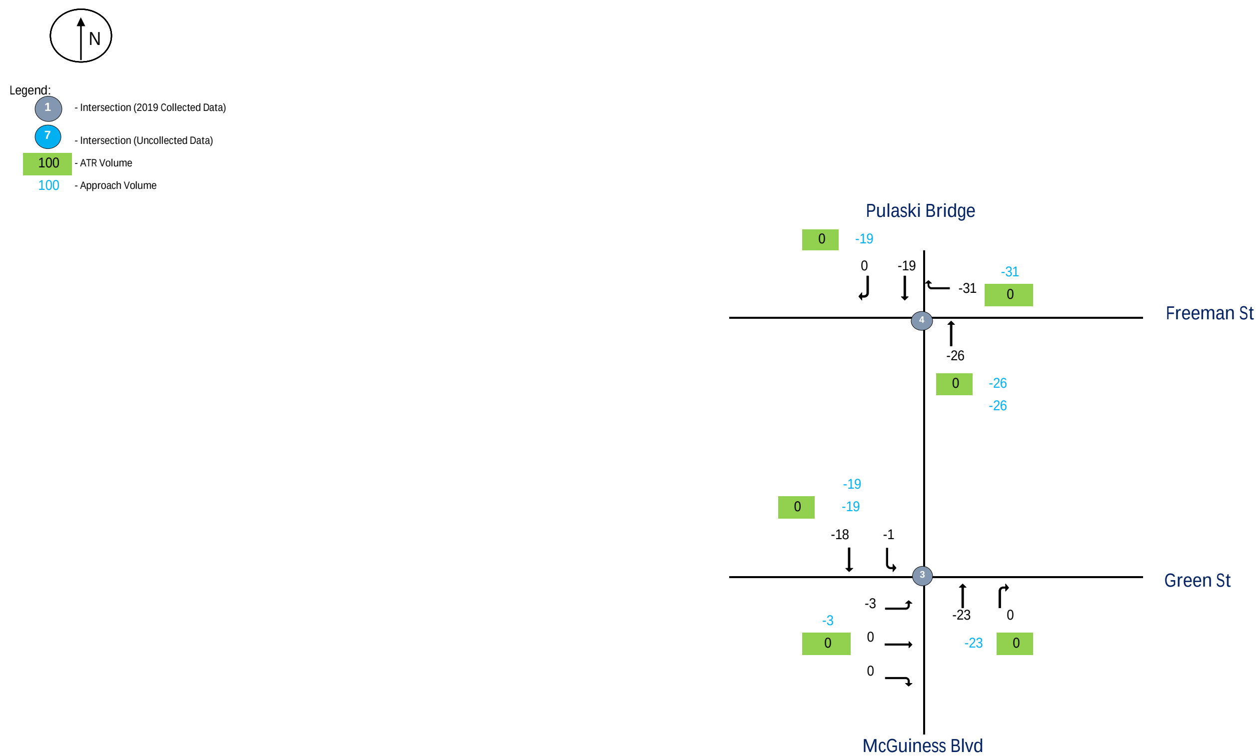
CBD Tolling
Dumbo #2 - Traffic Flowmap
LN Action Increment



CBD Tolling
LIC - Traffic Flowmap #1
AM Action Increment



CBD Tolling
LIC - Traffic Flowmap #2
AM Action Increment

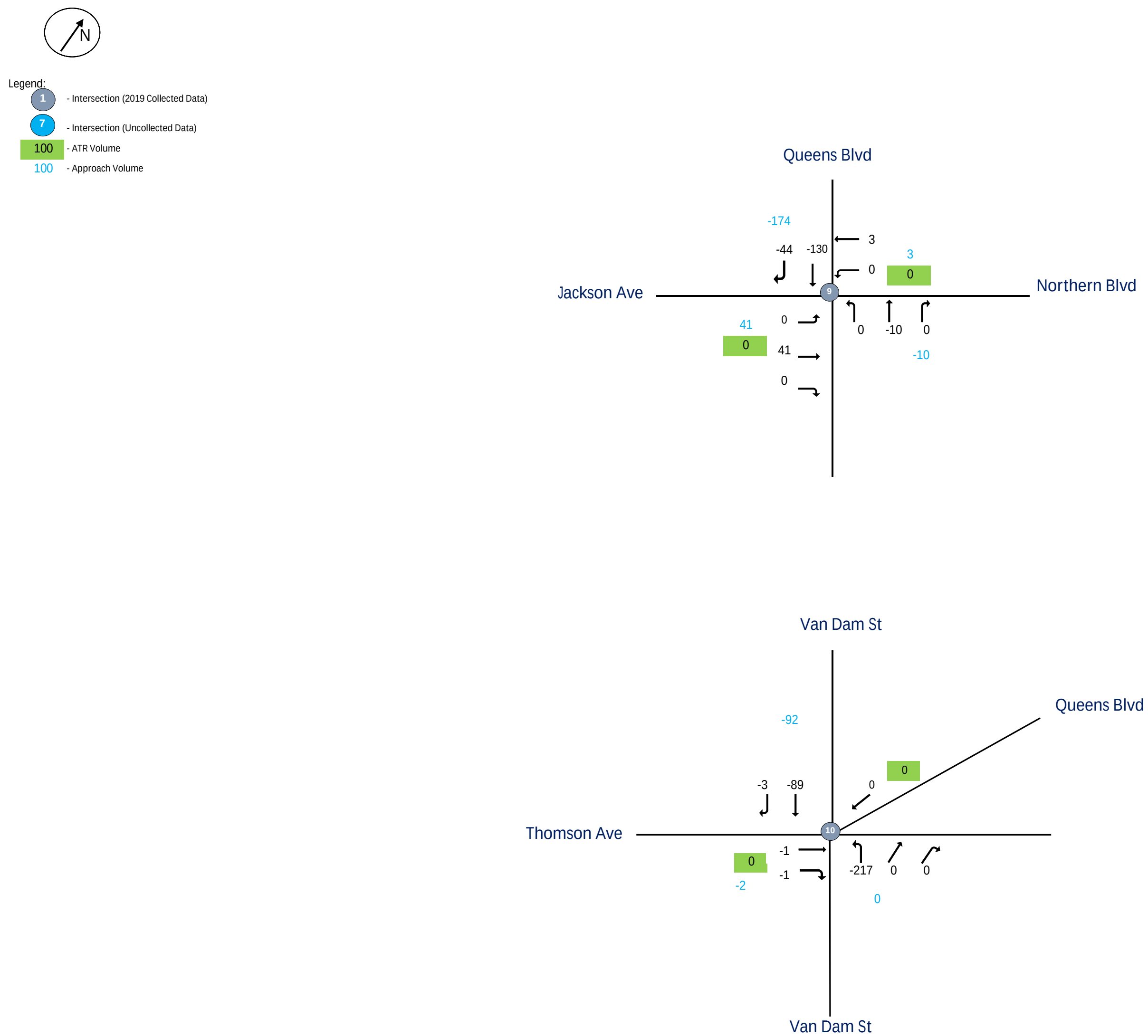


CBD Tolling

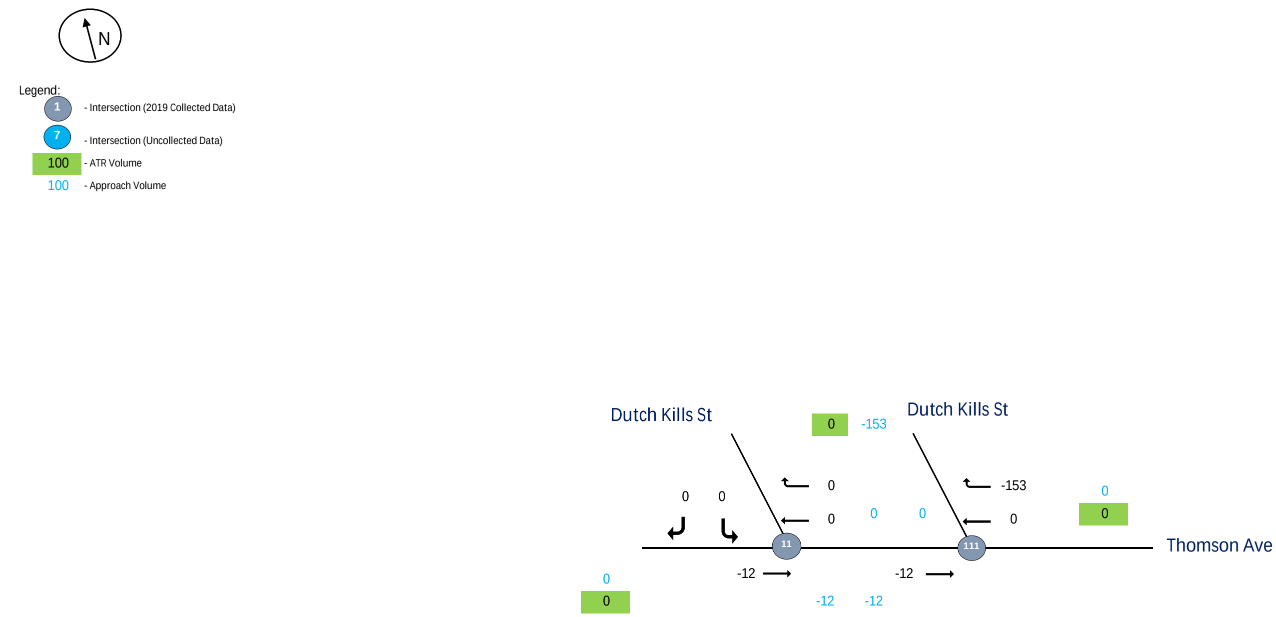
LIC - Traffic Flowmap #3

AM Action Increment

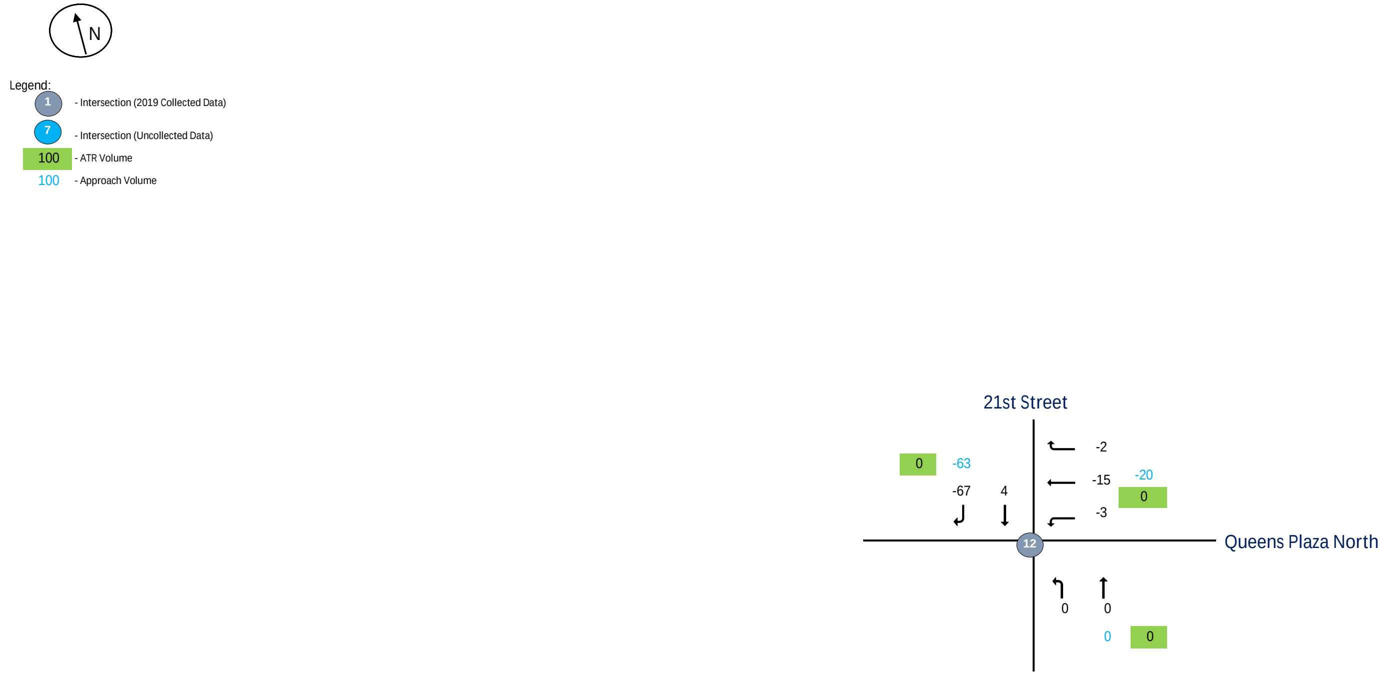
CBD Tolling
LIC - Traffic Flowmap #4
AM Action Increment



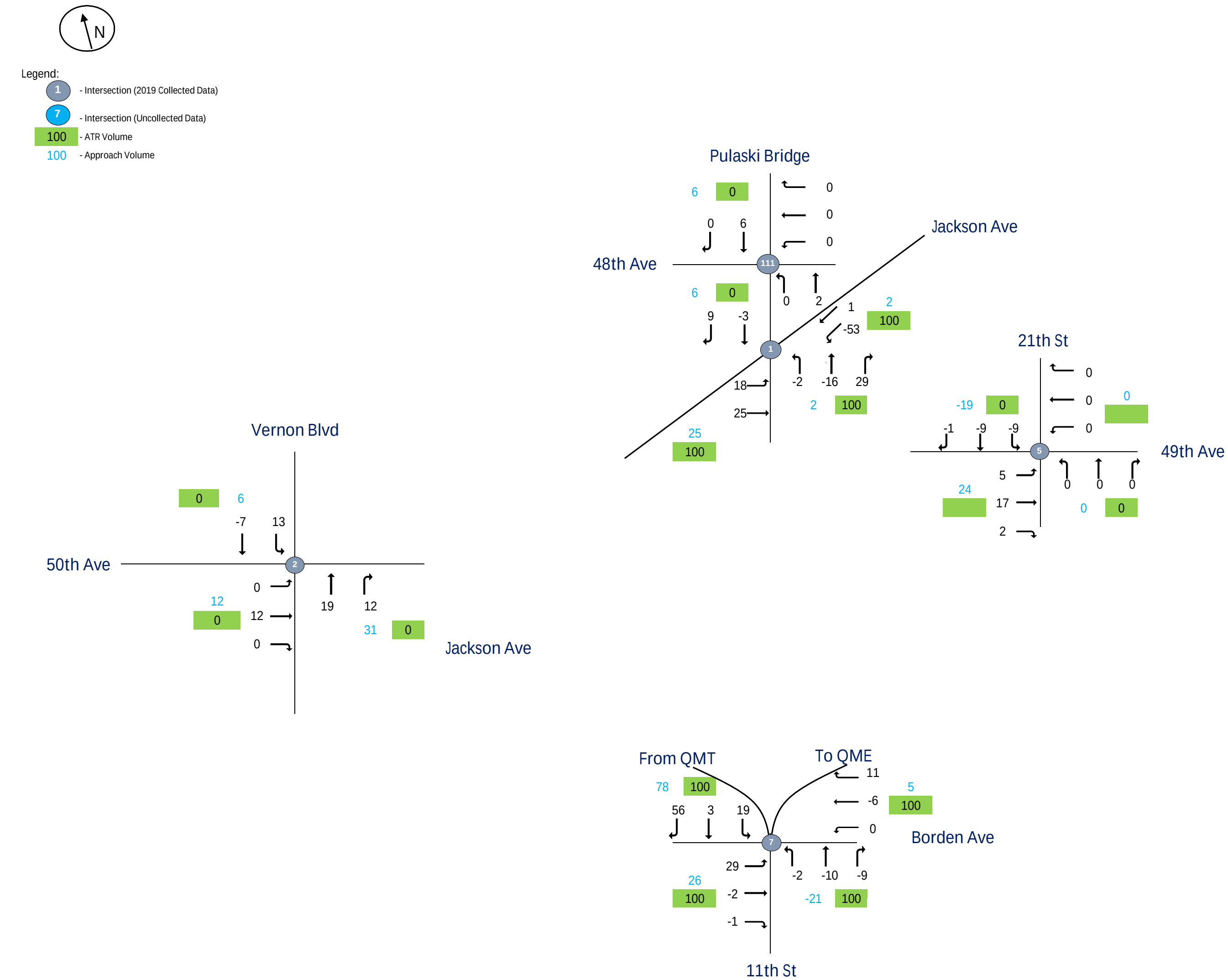
CBD Tolling
LIC - Traffic Flowmap #5
AM Action Increment



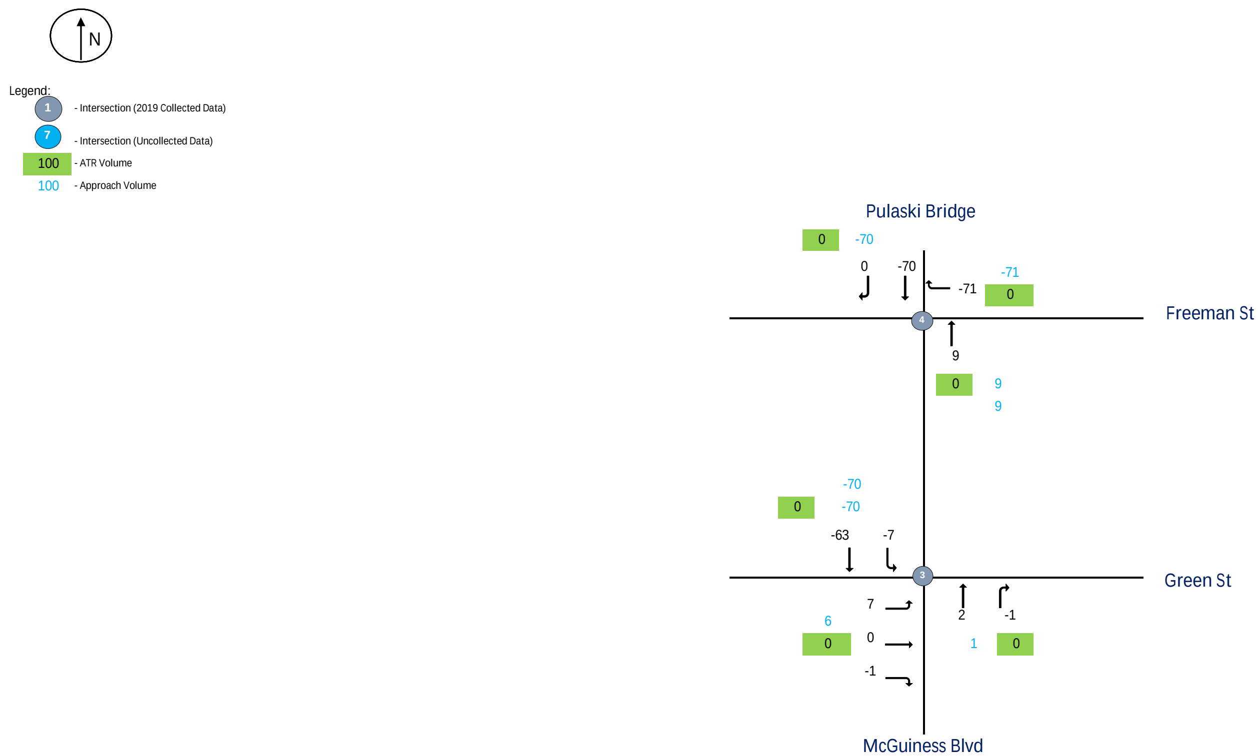
CBD Tolling
LIC - Traffic Flowmap #6
AM Action Increment



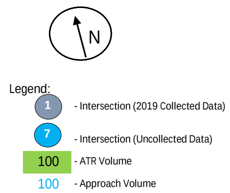
CBD Tolling
LIC - Traffic Flowmap #1
MD Action Increment

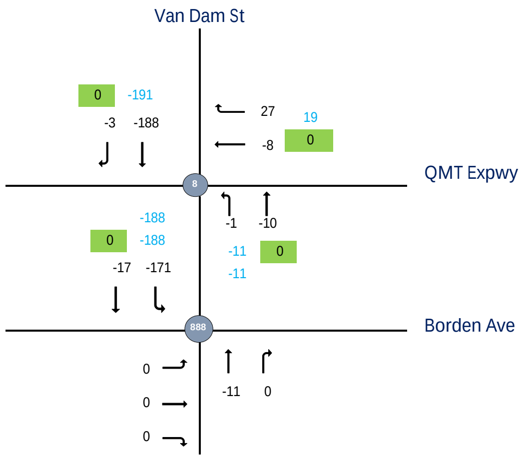


CBD Tolling
LIC - Traffic Flowmap #2
MD Action Increment

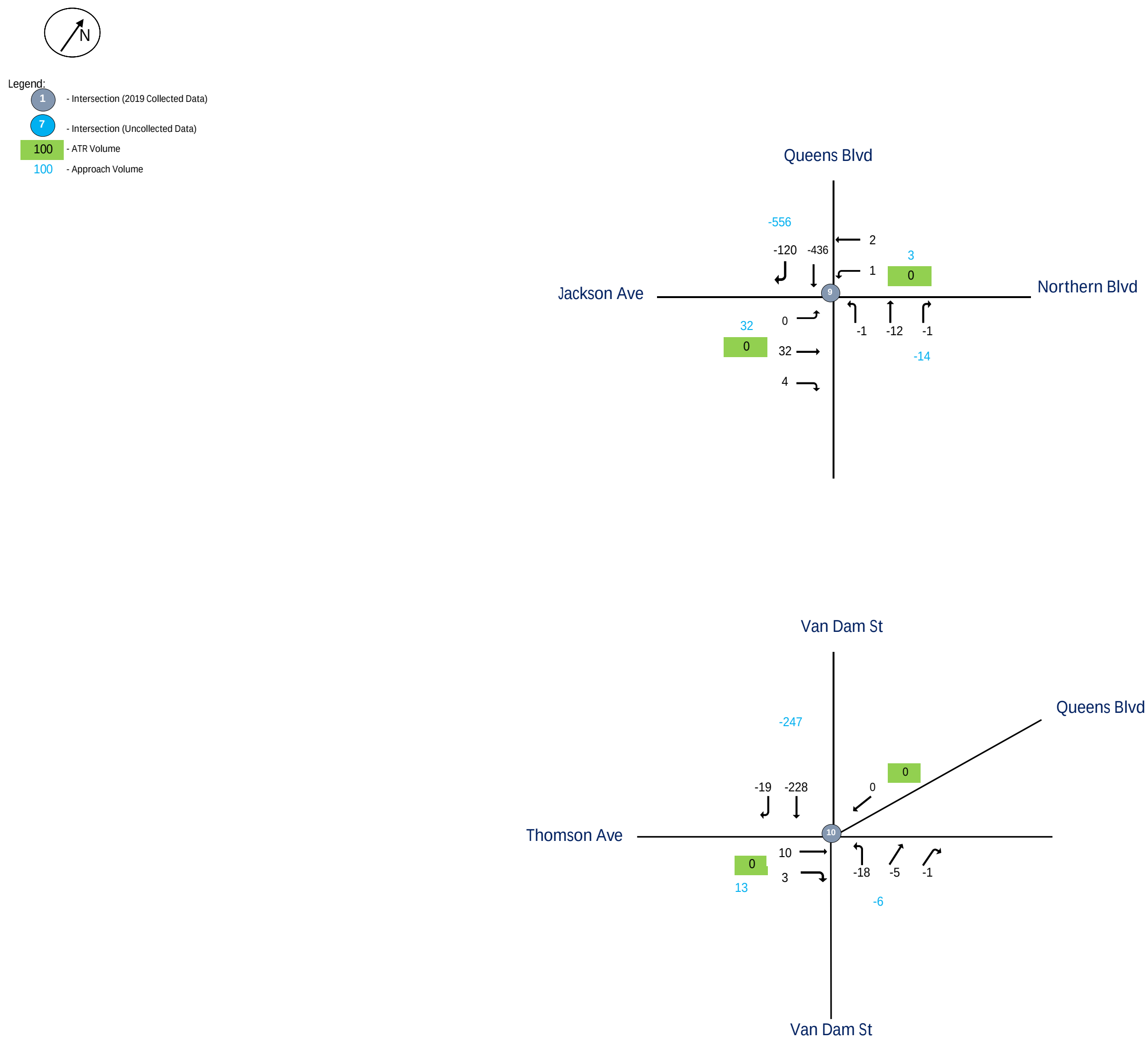


CBD Tolling
LIC - Traffic Flowmap #3
MD Action Increment

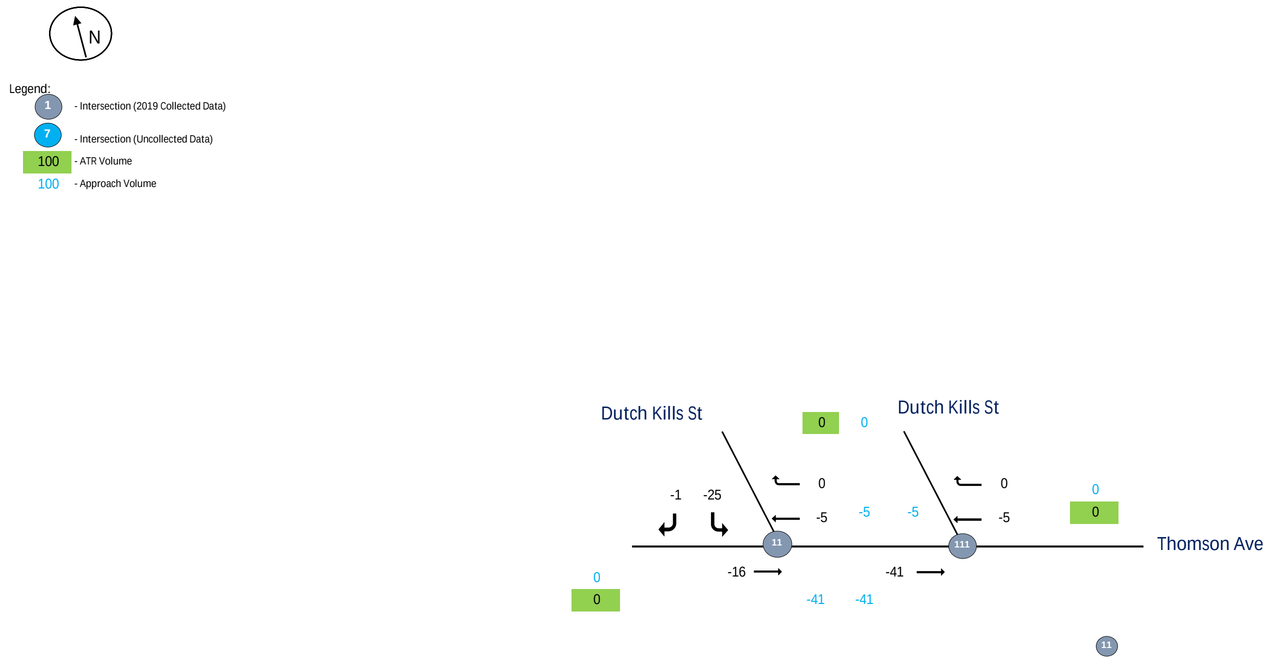




CBD Tolling
LIC - Traffic Flowmap #4
MD Action Increment



CBD Tolling
LIC - Traffic Flowmap #5
MD Action Increment



CBD Tolling
LIC - Traffic Flowmap #6
MD Action Increment

N

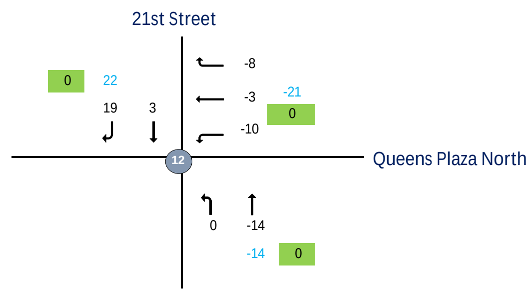
Legend:

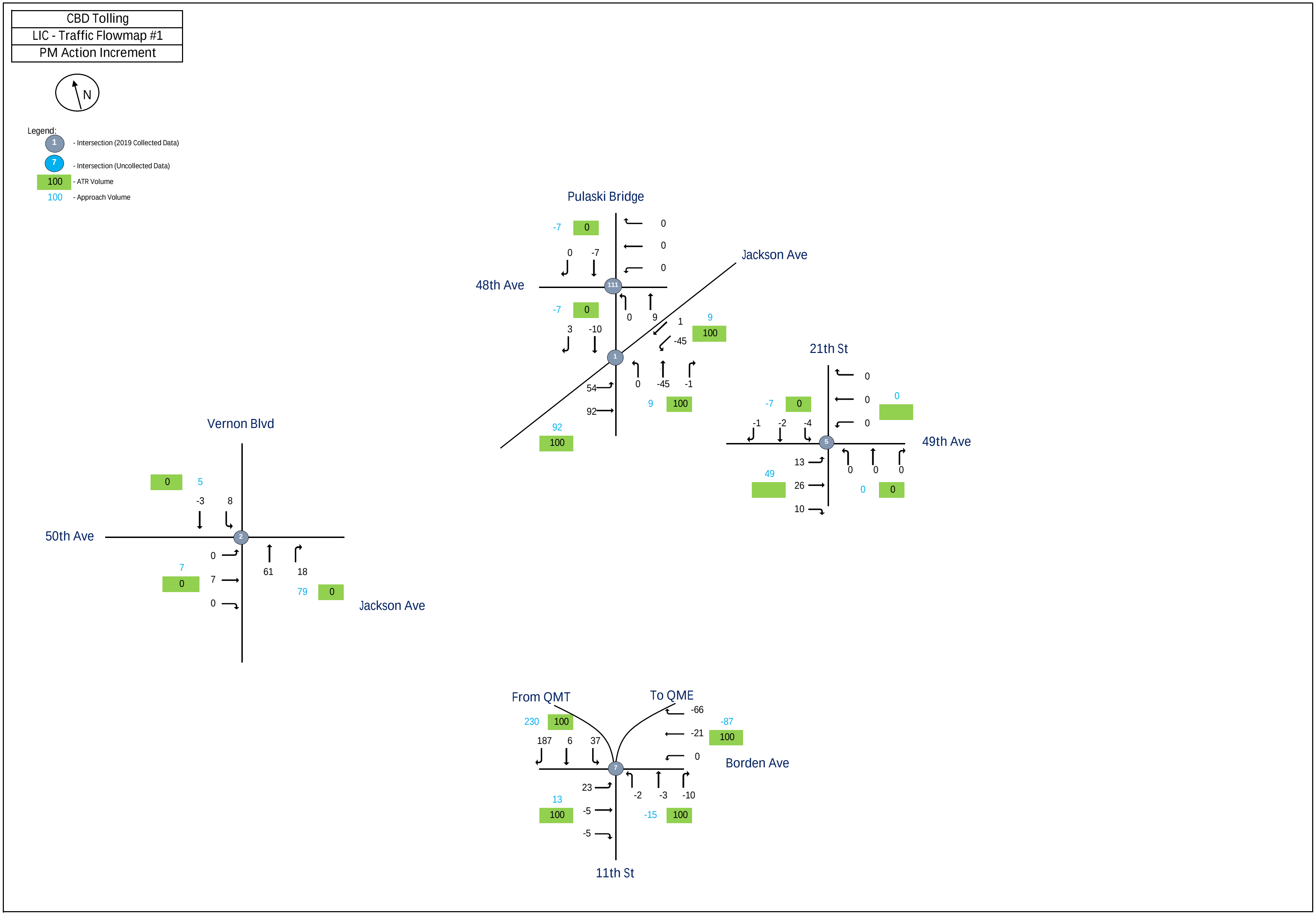
1 - Intersection (2019 Collected Data)

7 - Intersection (Uncollected Data)

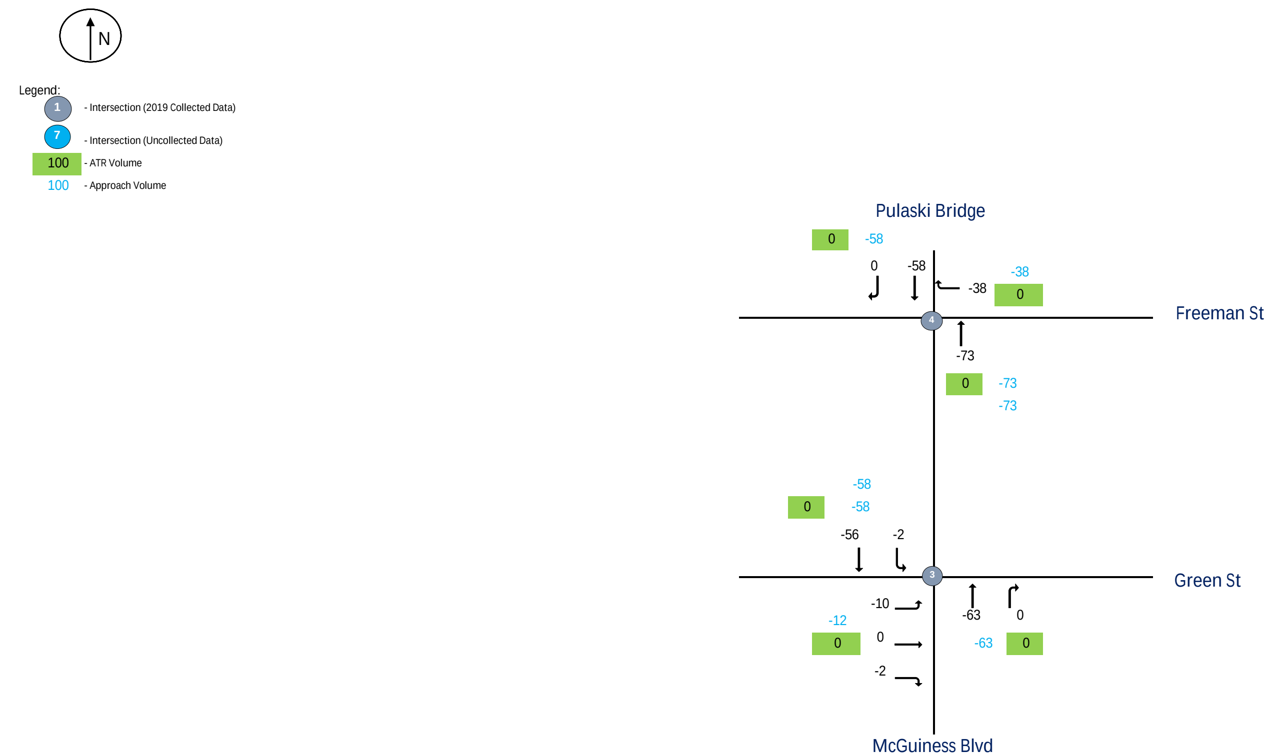
100 - ATR Volume

100 - Approach Volume

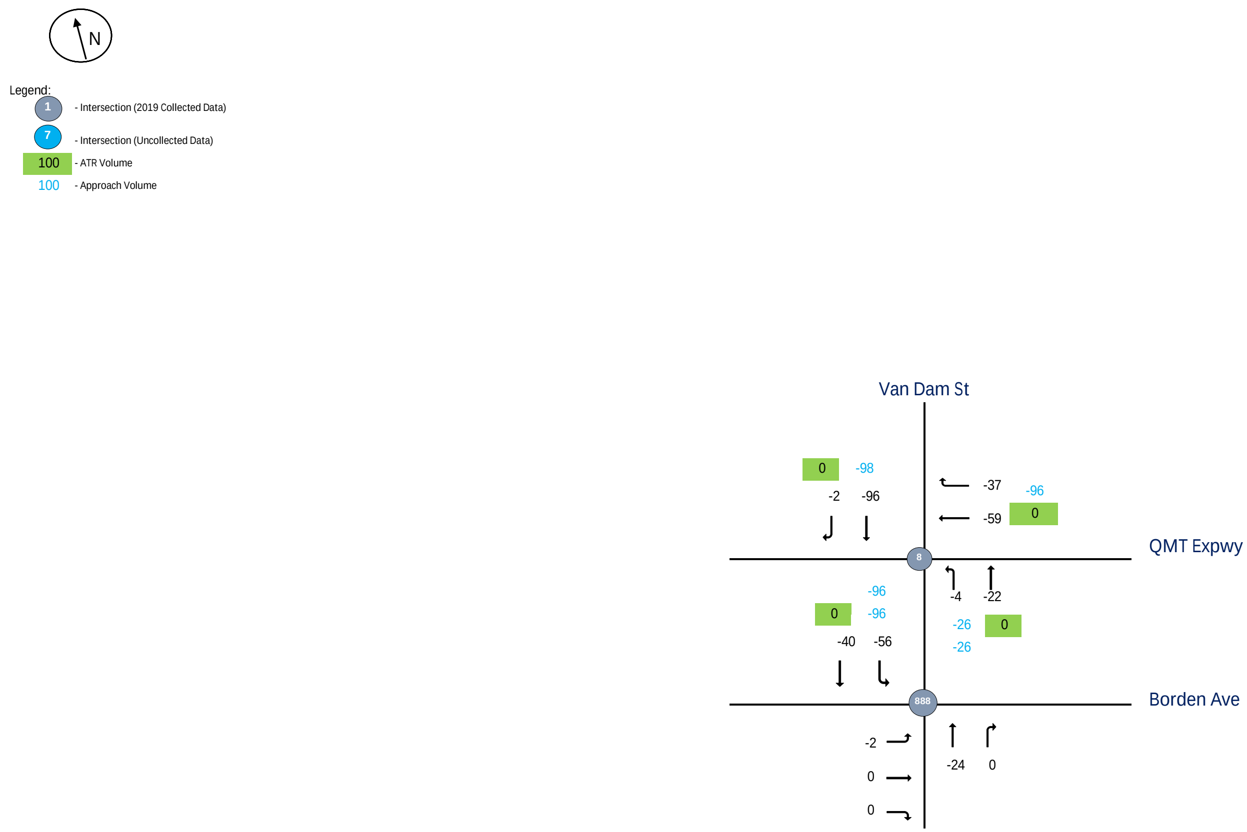



CBD Tolling
LIC - Traffic Flowmap #1
PM Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
48th Ave
Jackson Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St

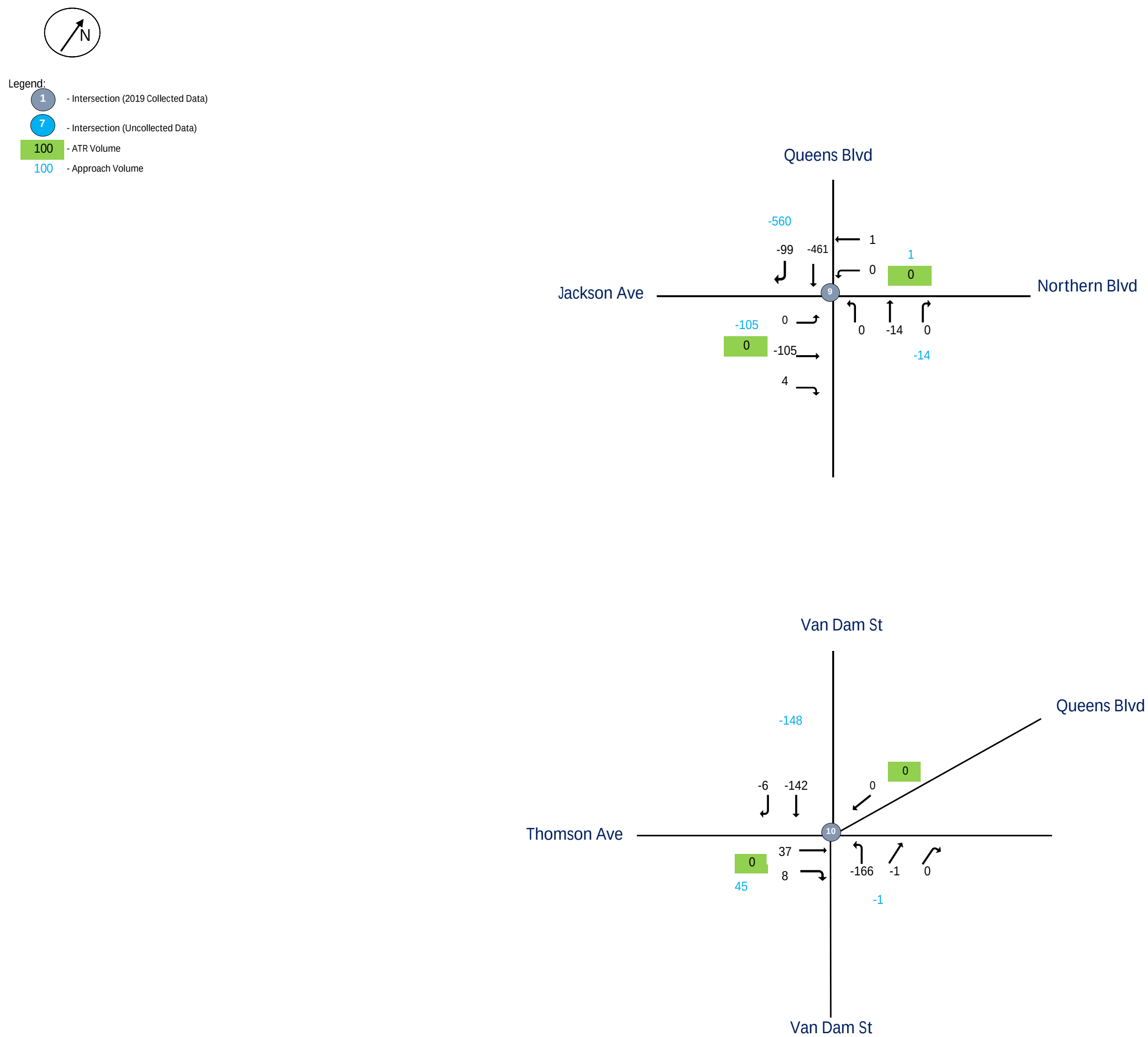
CBD Tolling
LIC - Traffic Flowmap #2
PM Action Increment



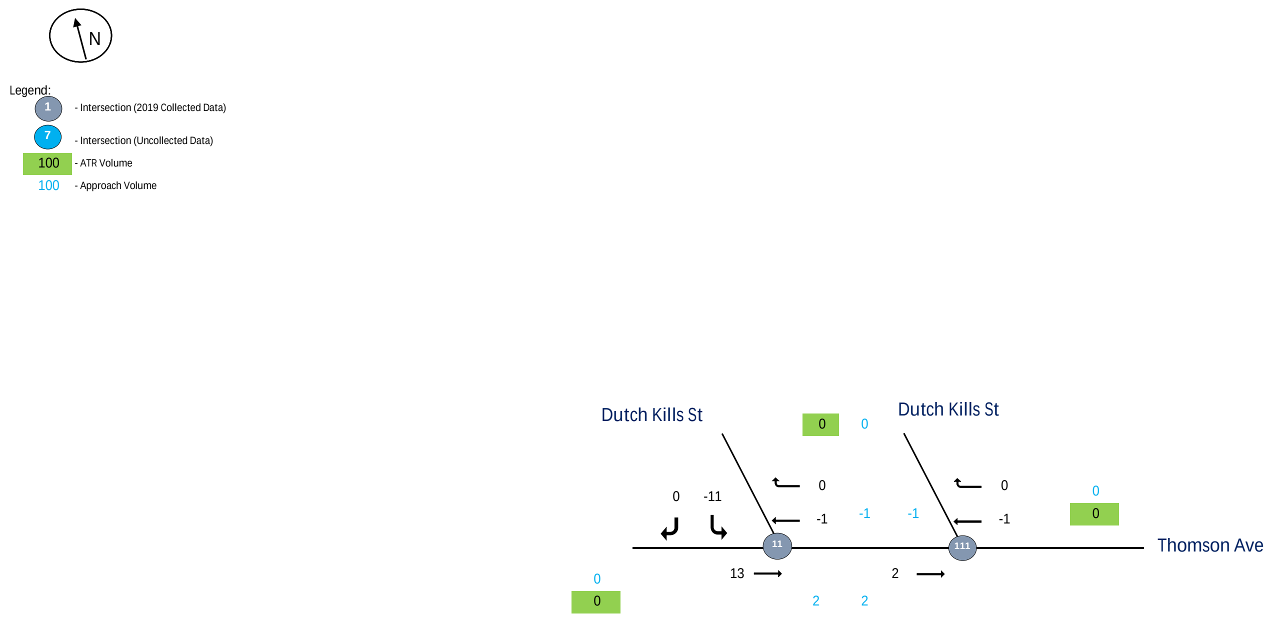
CBD Tolling
LIC - Traffic Flowmap #3
PM Action Increment



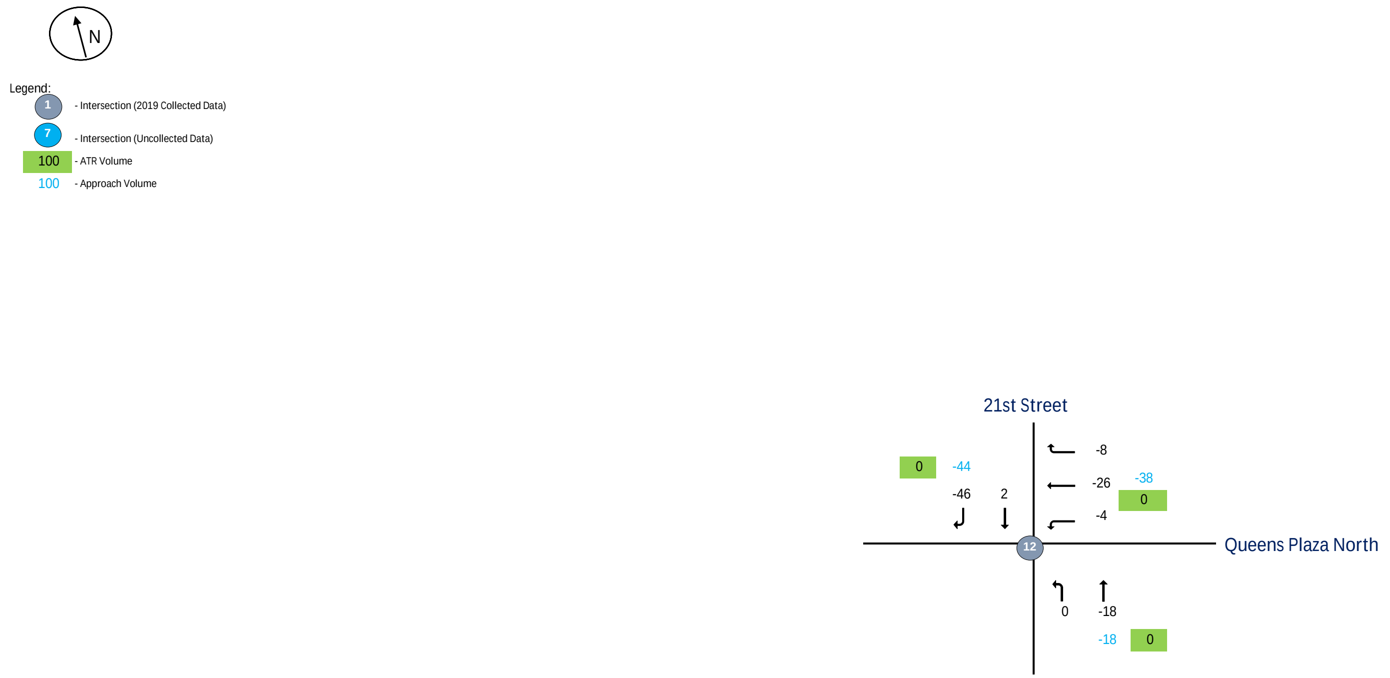
CBD Tolling
LIC - Traffic Flowmap #4
PM Action Increment

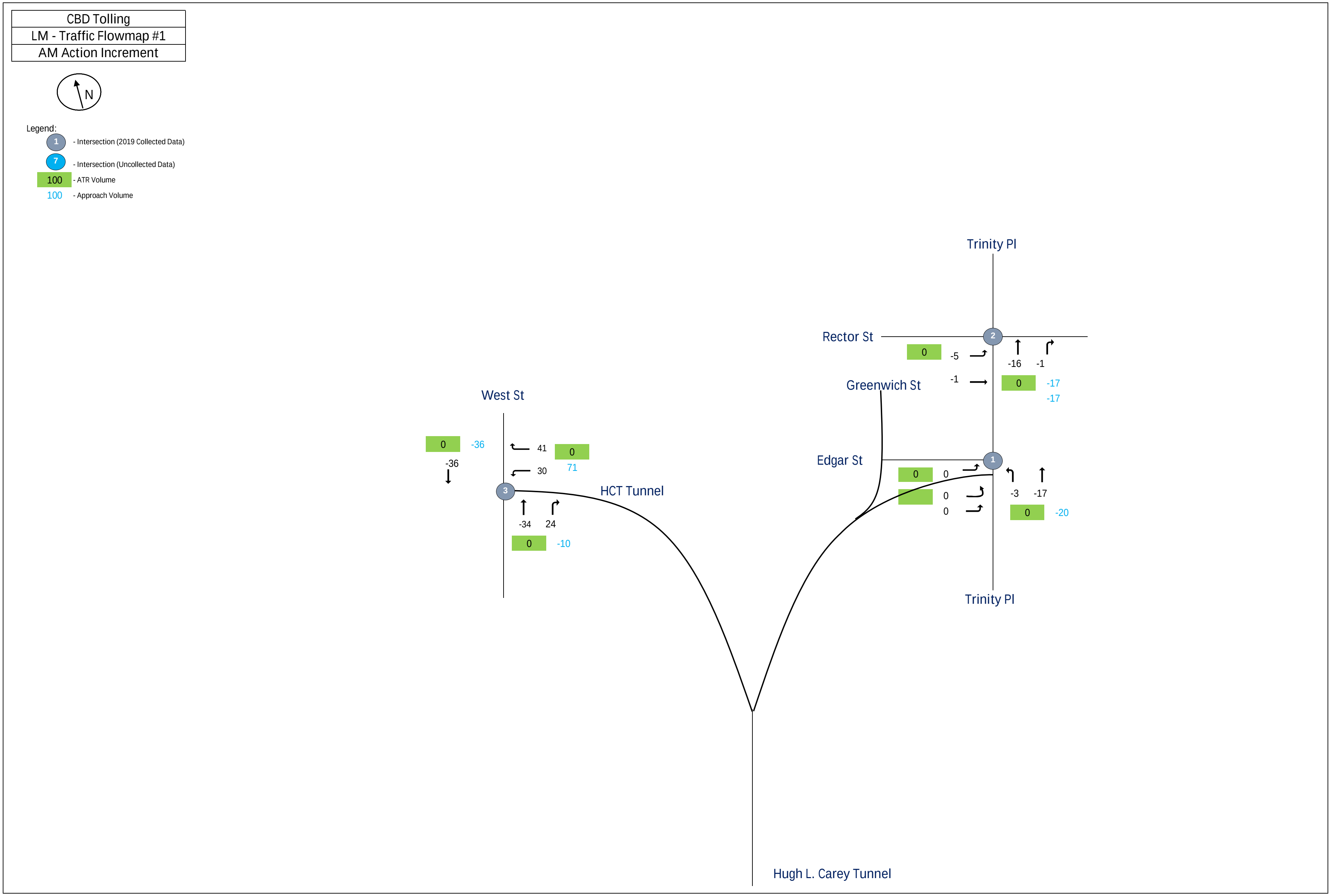


CBD Tolling
LIC - Traffic Flowmap #5
PM Action Increment



CBD Tolling
LIC - Traffic Flowmap #6
PM Action Increment



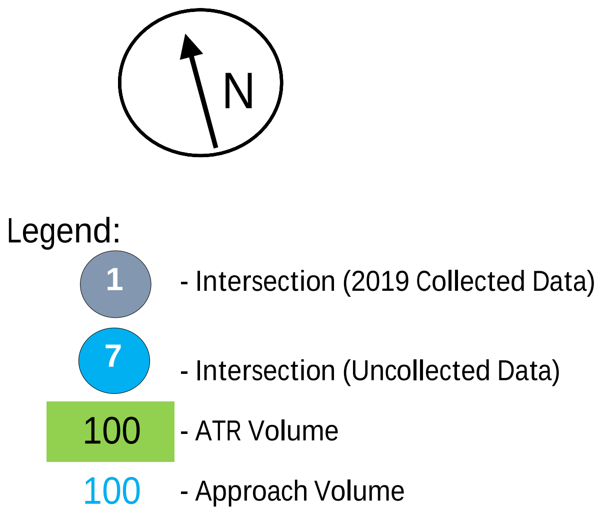


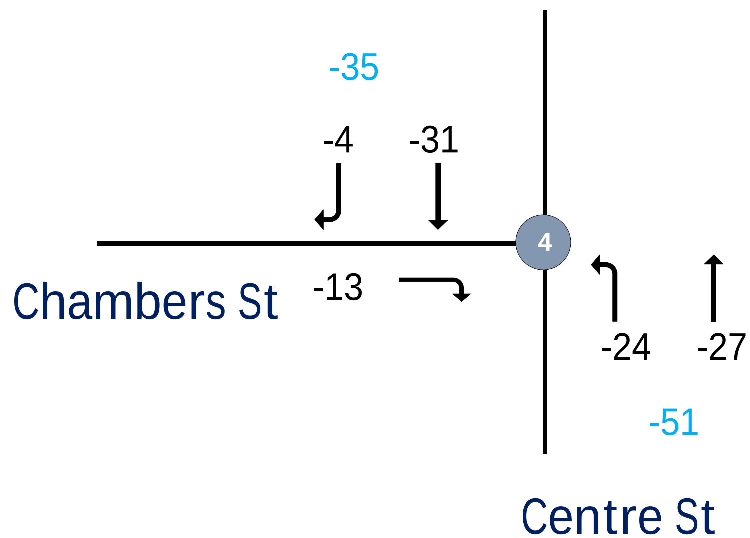
CBD Tolling
LM - Traffic Flowmap #1
AM Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Trinity Pl
Rector St
2
0
-5
-16
-1
-1
0
-17
-17
Greenwich St
West St
0
-36
-36
41
0
30
71
3
HCT Tunnel
-34
24
0
-10
Edgar St
1
0
0
0
0
-3
-17
0
-20
Trinity Pl
Hugh L. Carey Tunnel

CBD Tolling

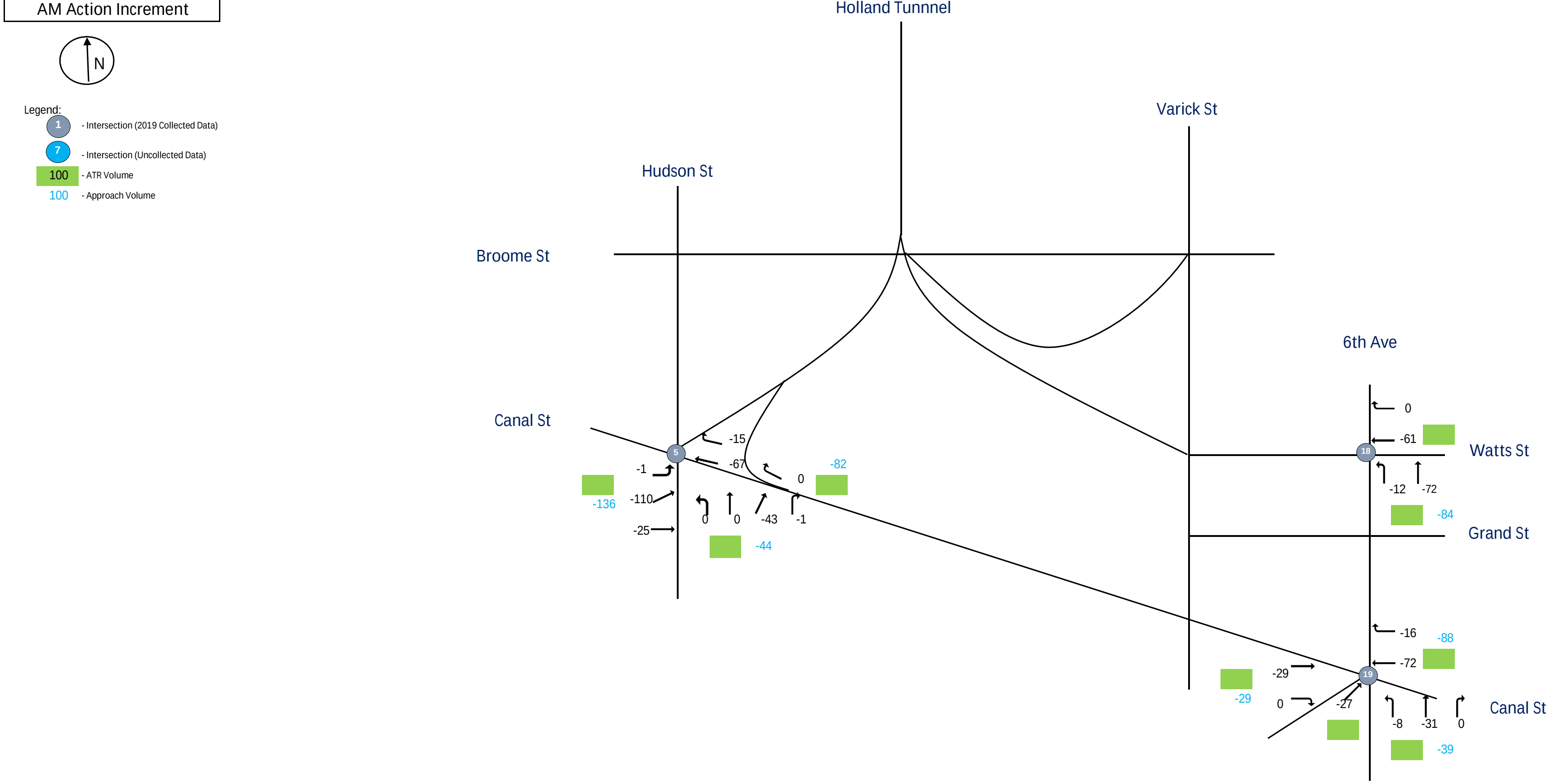
LM - Traffic Flowmap #2

AM Action Increment





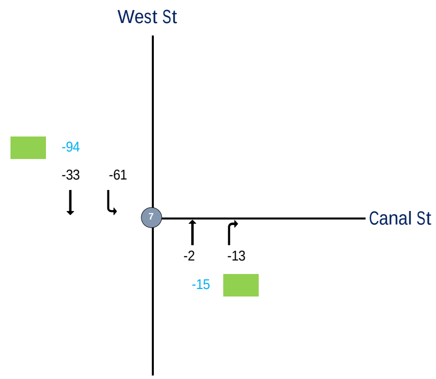
CBD Tolling
LM - Traffic Flowmap #3
AM Action Increment



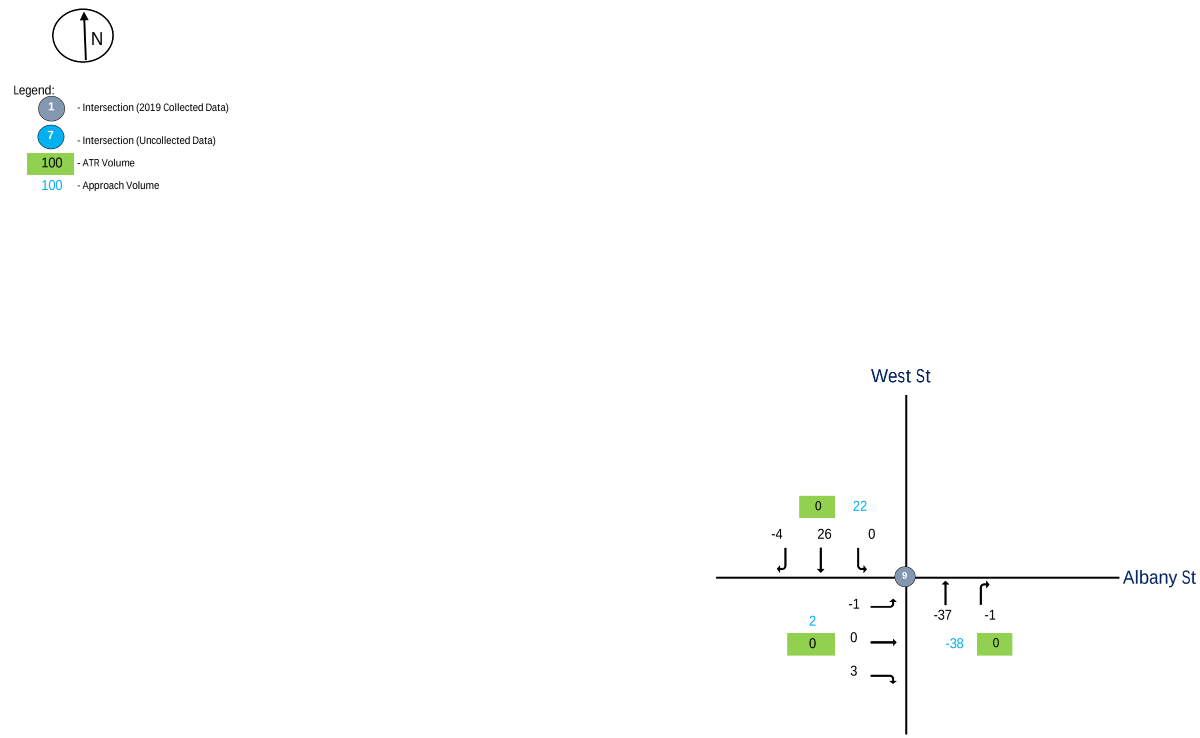
CBD Tolling
LM - Traffic Flowmap #4
AM Action Increment

Legend:

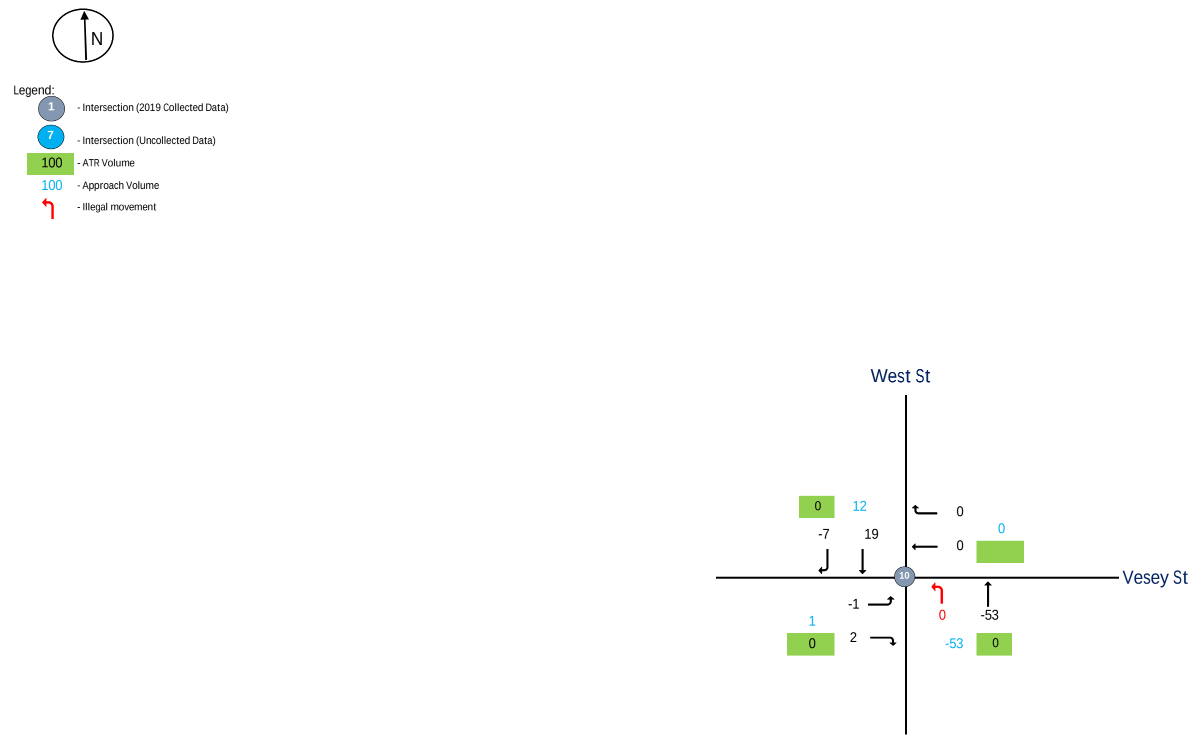
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume



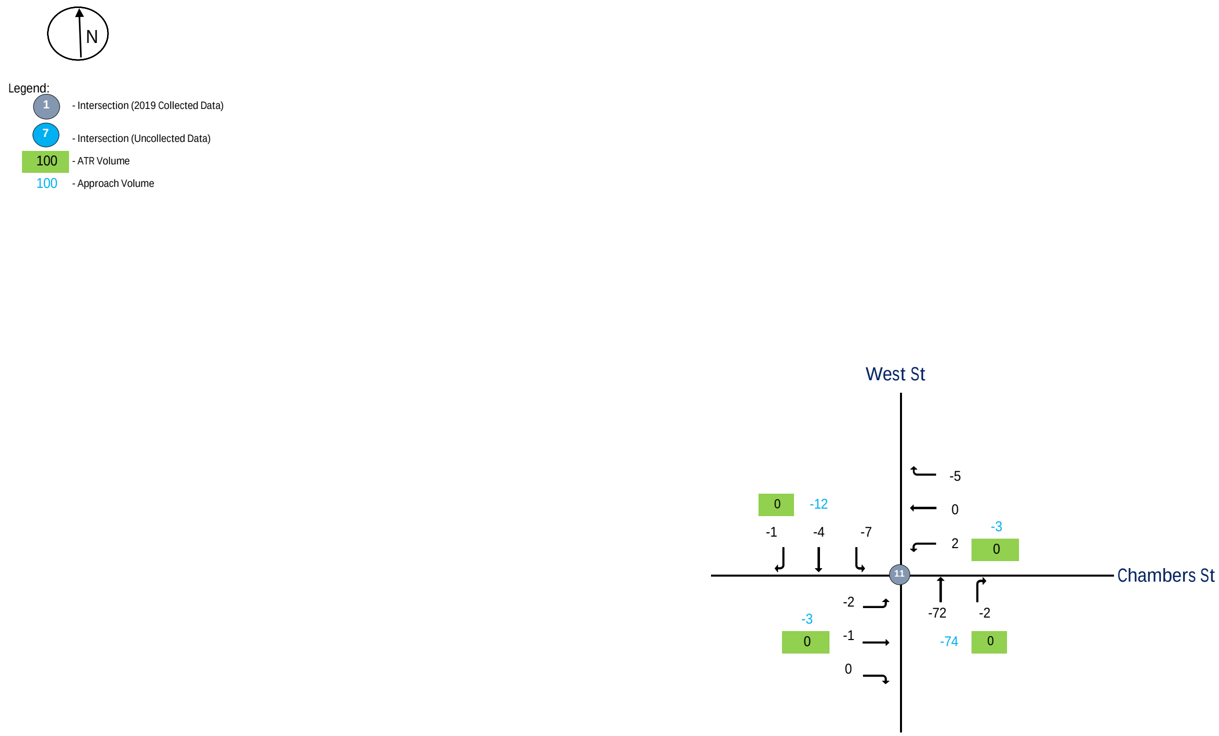
CBD Tolling
LM - Traffic Flowmap #5
AM Action Increment



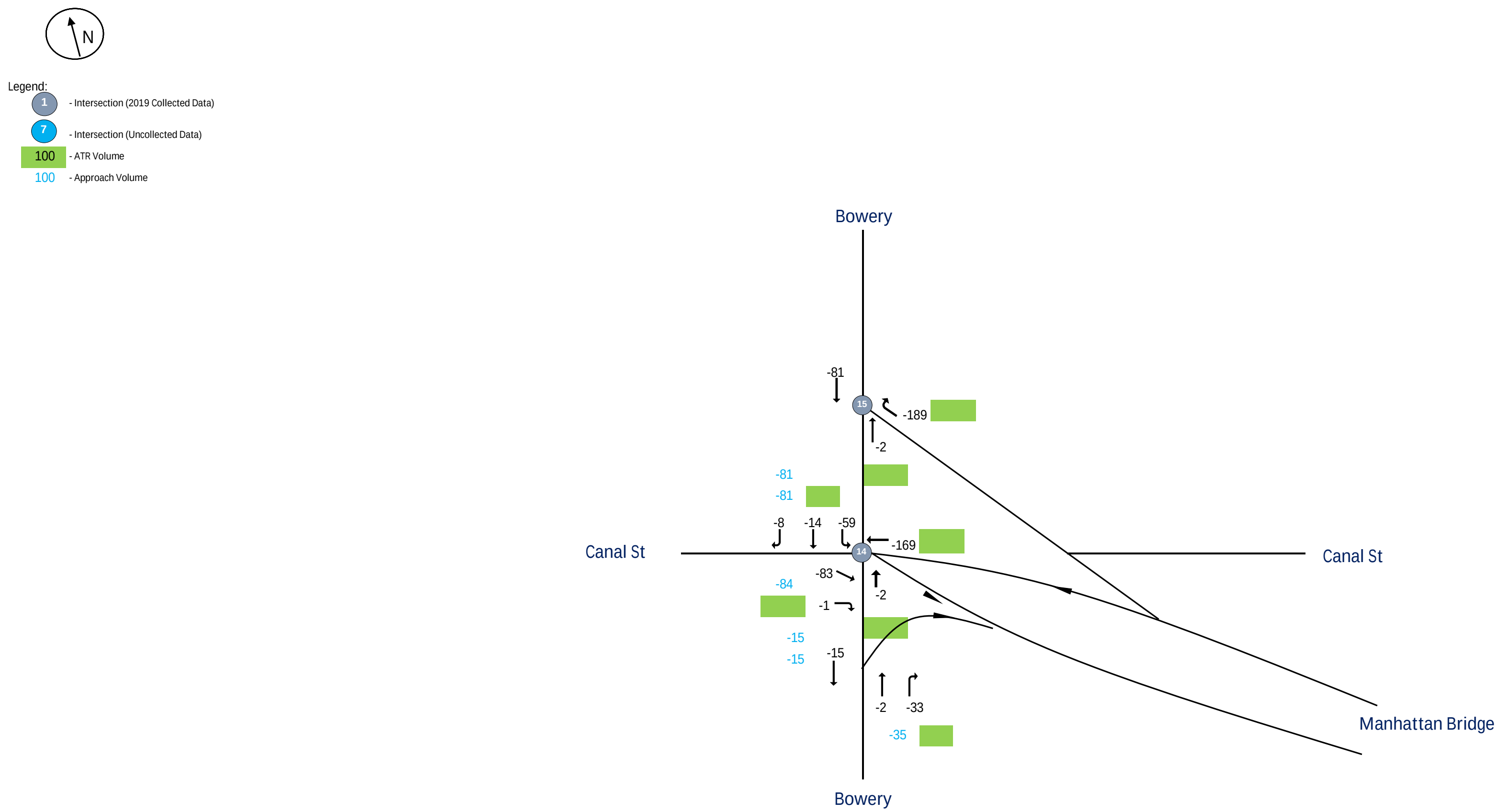
CBD Tolling
LM - Traffic Flowmap #6
AM Action Increment

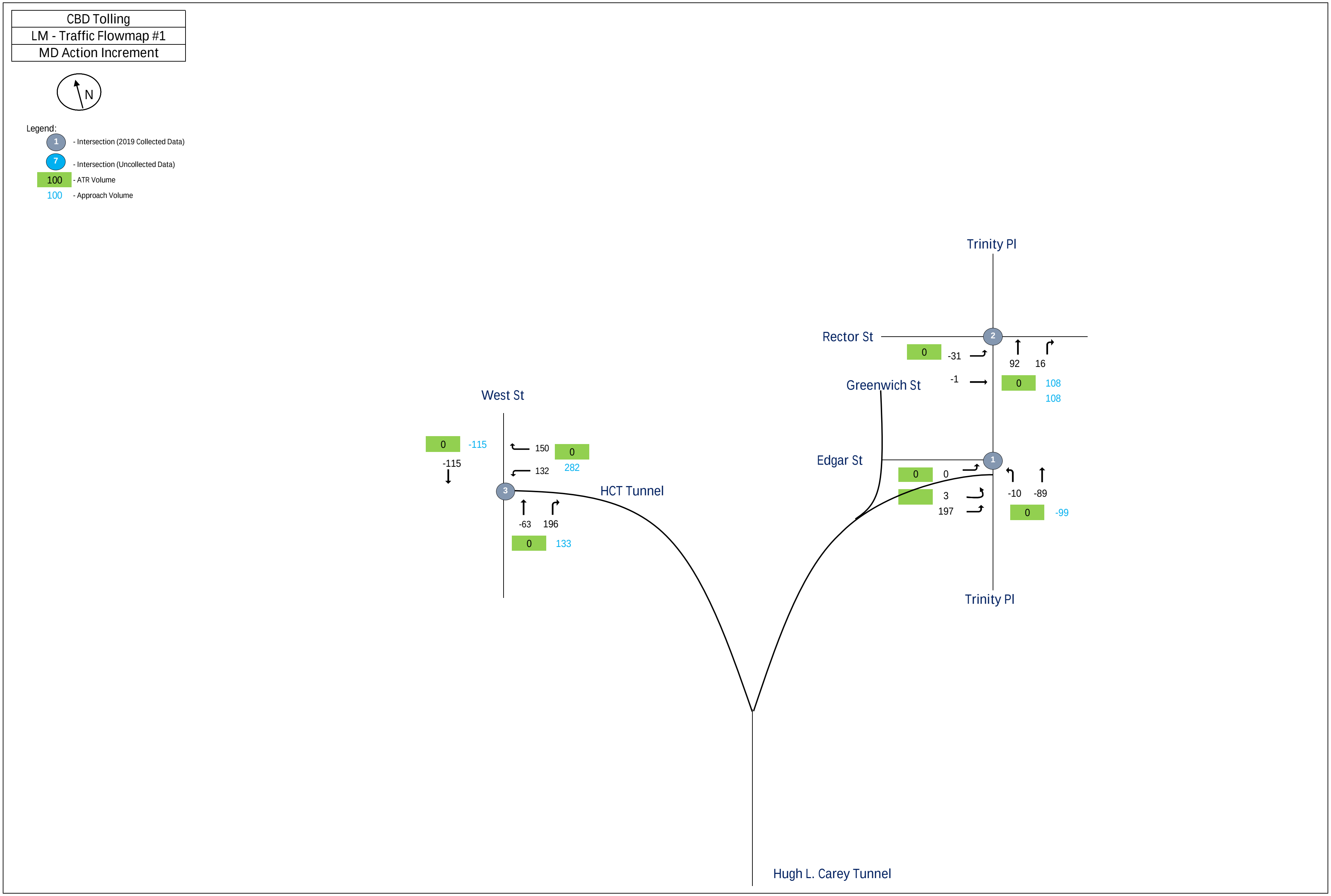


CBD Tolling
LM - Traffic Flowmap #7
AM Action Increment



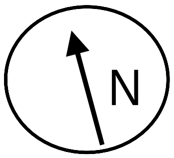
CBD Tolling
LM - Traffic Flowmap #8
AM Action Increment





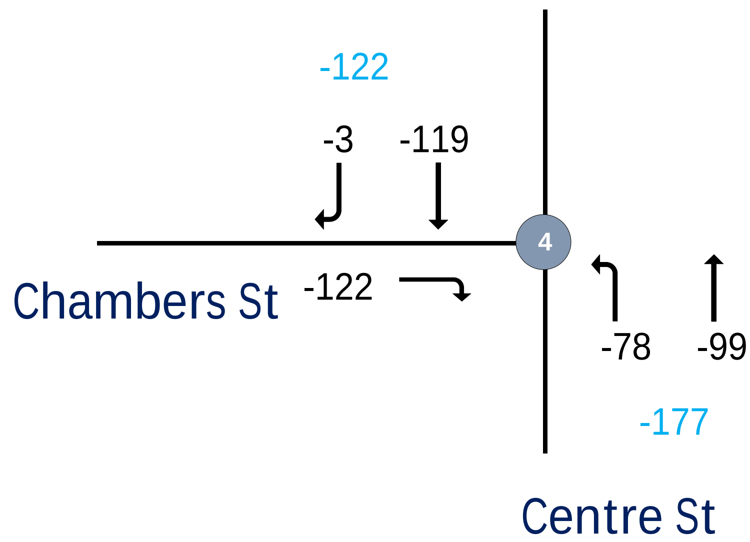
CBD Tolling
LM - Traffic Flowmap #1
MD Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Trinity Pl
Rector St
2
0
-31
92
16
-1
0
108
108
Greenwich St
West St
0
-115
150
0
-115
132
282
Edgar St
1
0
0
3
197
-10
-89
0
-99
3
HCT Tunnel
-63
196
0
133
Trinity Pl
Hugh L. Carey Tunnel

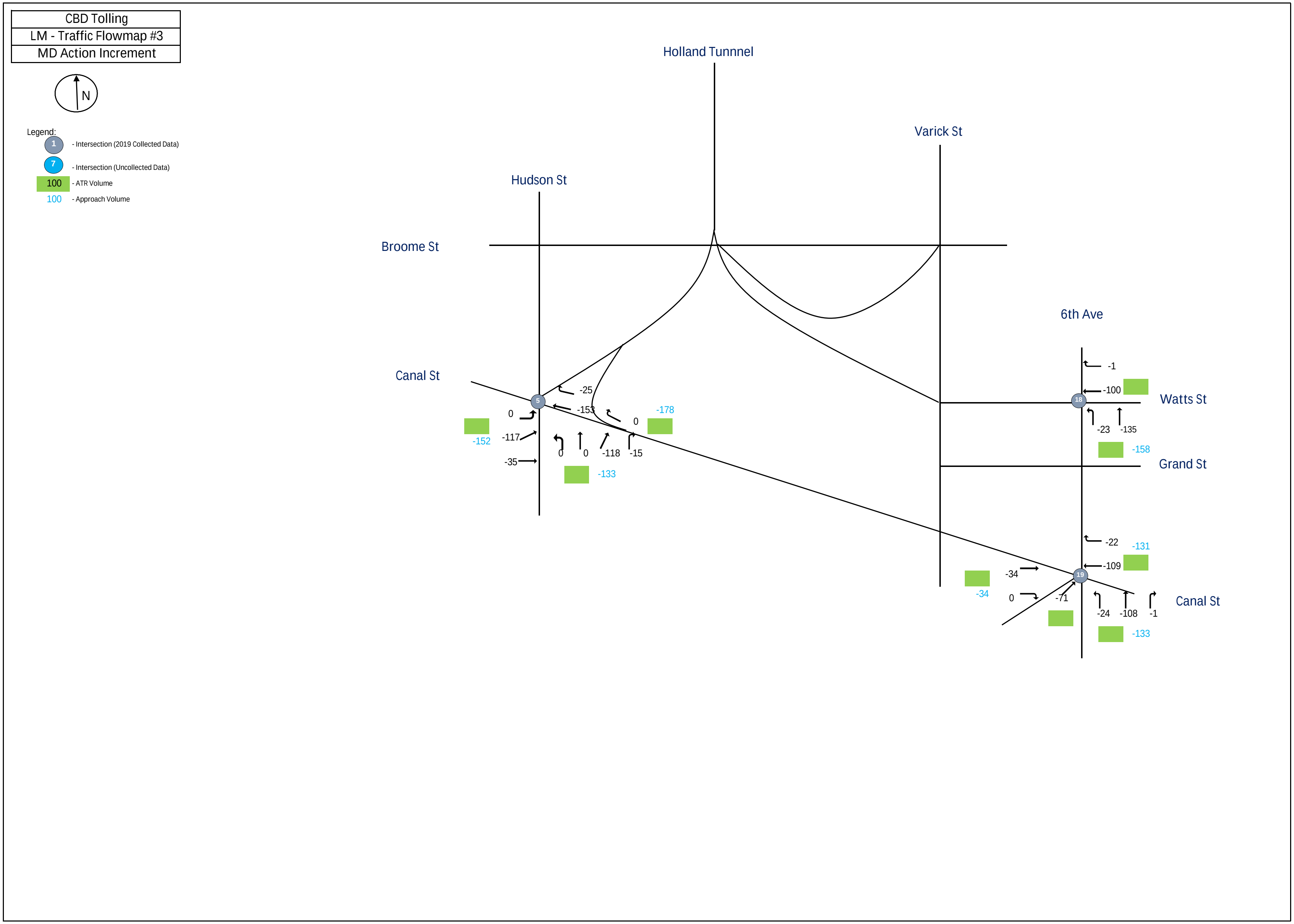
CBD Tolling
LM - Traffic Flowmap #2
MD Action Increment



Legend:

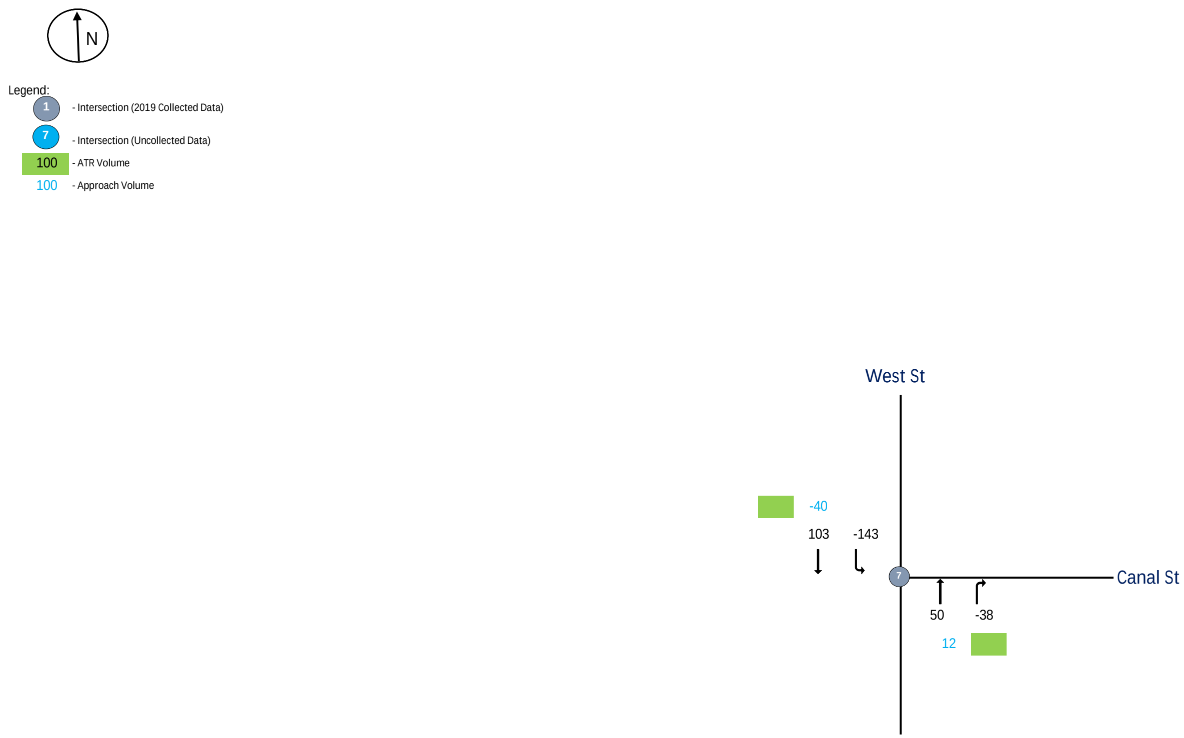
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



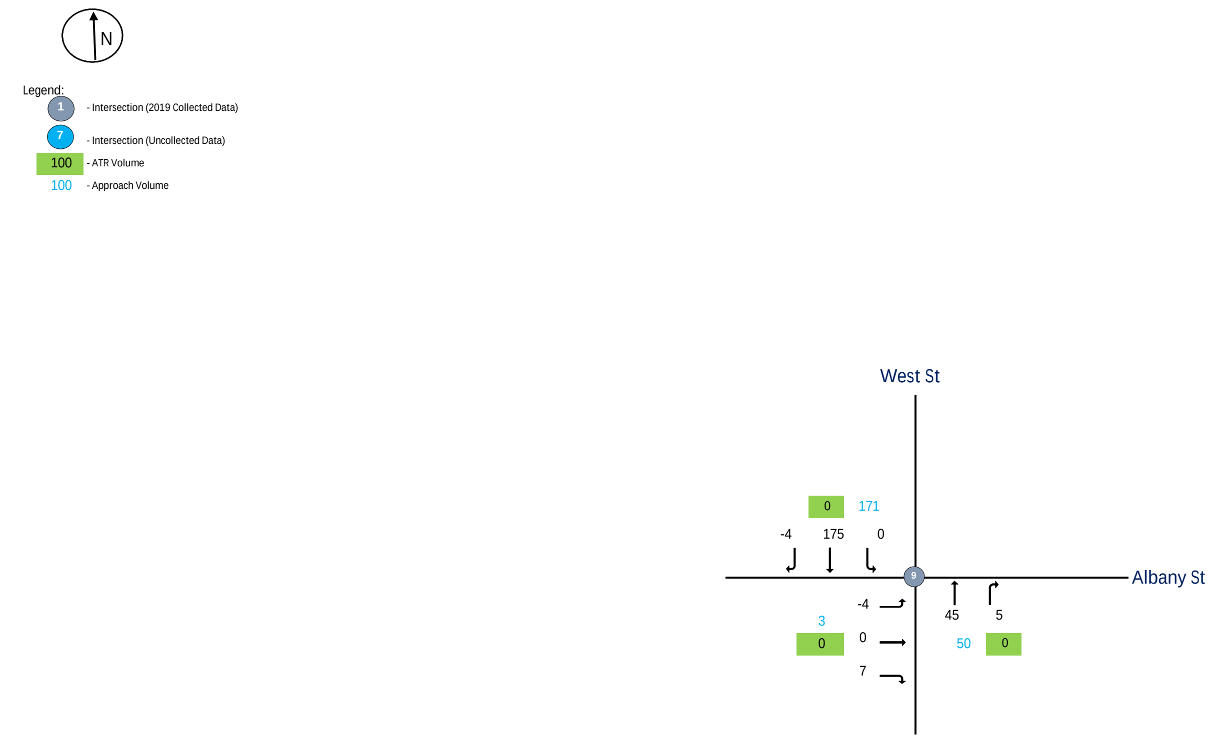


CBD Tolling
LM - Traffic Flowmap #3
MD Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Holland Tunnel
Varick St
Hudson St
Broome St
6th Ave
Canal St
Watts St
Grand St
Canal St
-25
-153
0
-178
0
-152
-117
-35
0
0
-118
-15
-133
-1
-100
-23
-135
-158
-22
-131
-109
-34
-34
0
-71
-24
-108
-1
-133

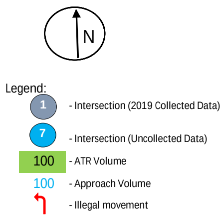
CBD Tolling
LM - Traffic Flowmap #4
MD Action Increment

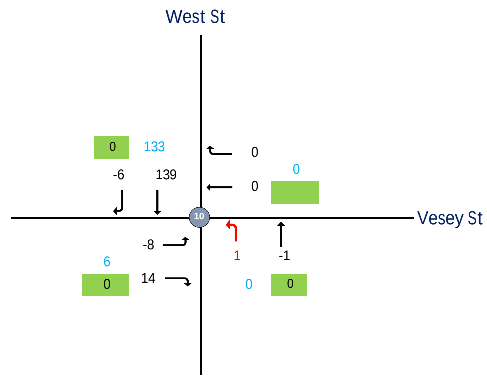


CBD Tolling
LM - Traffic Flowmap #5
MD Action Increment

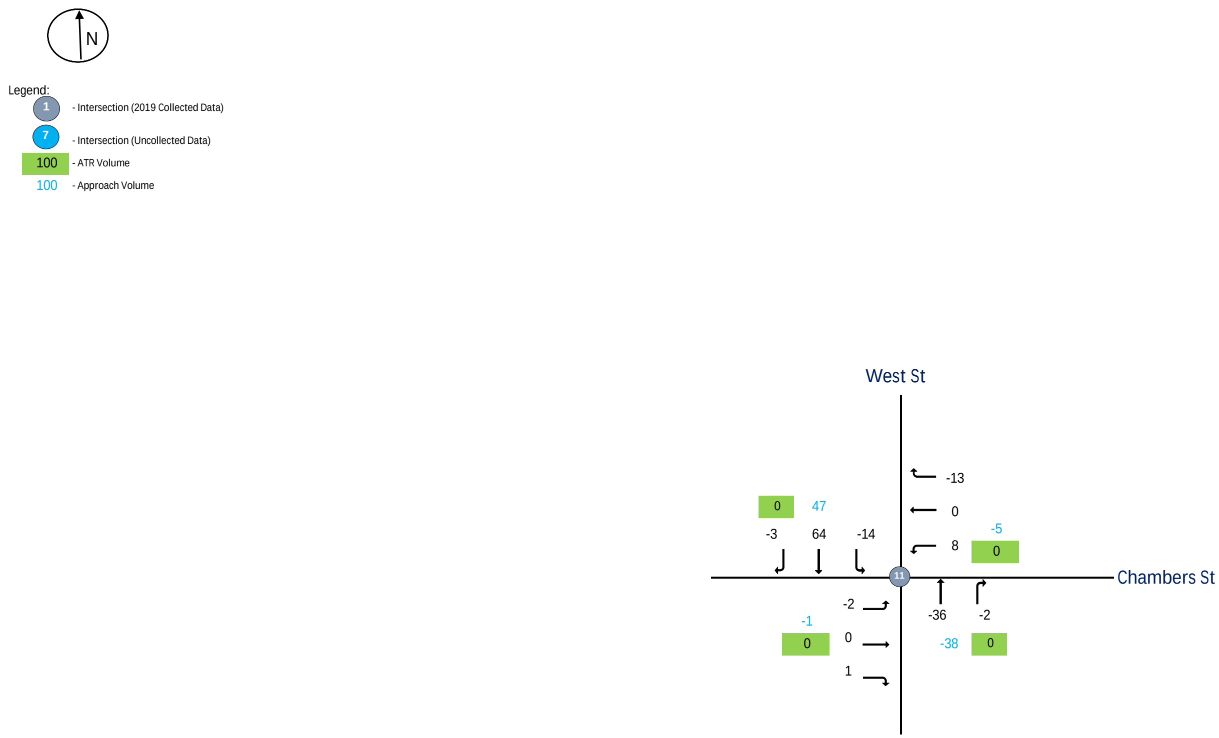


CBD Tolling
LM - Traffic Flowmap #6
MD Action Increment

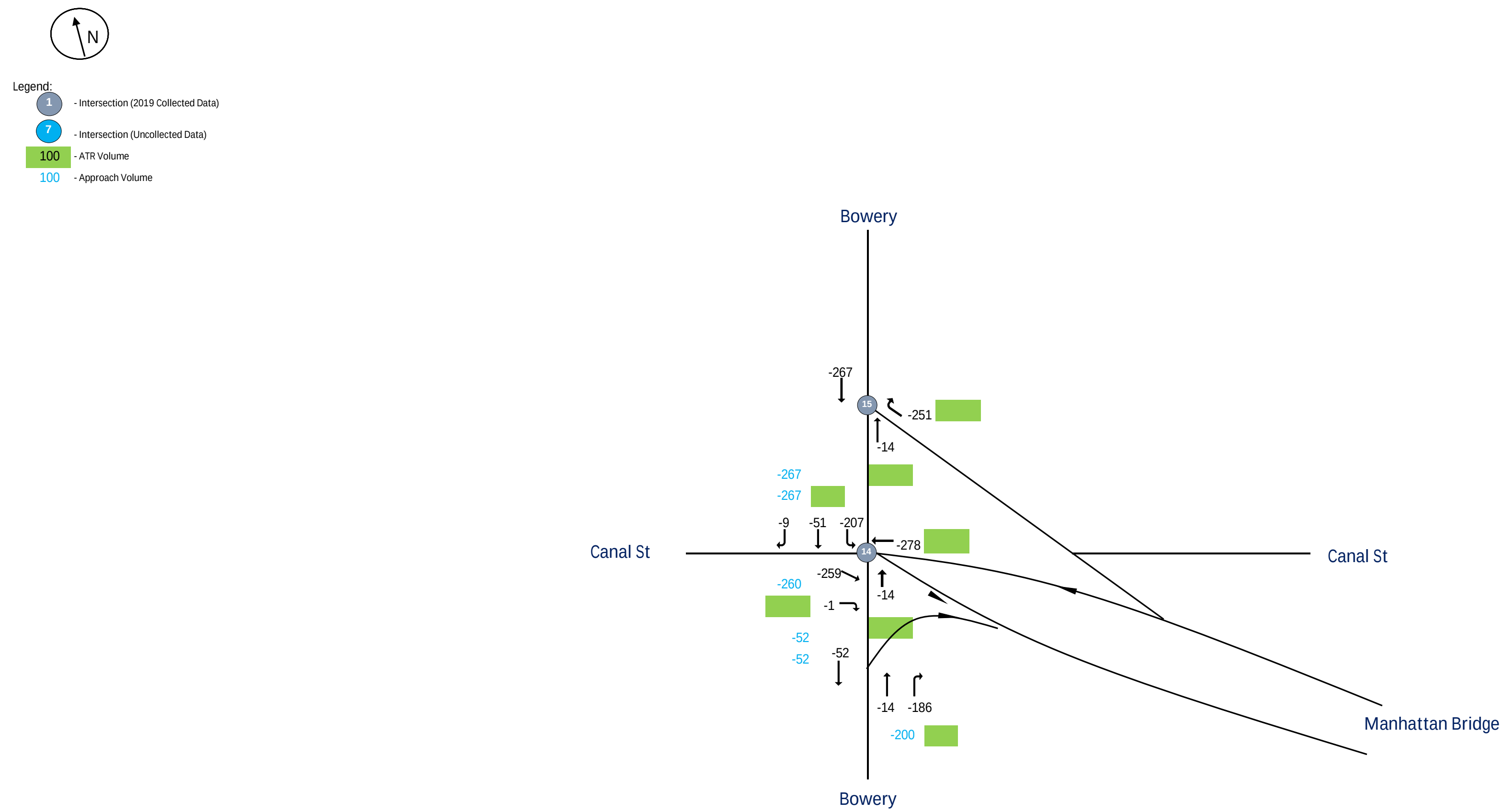


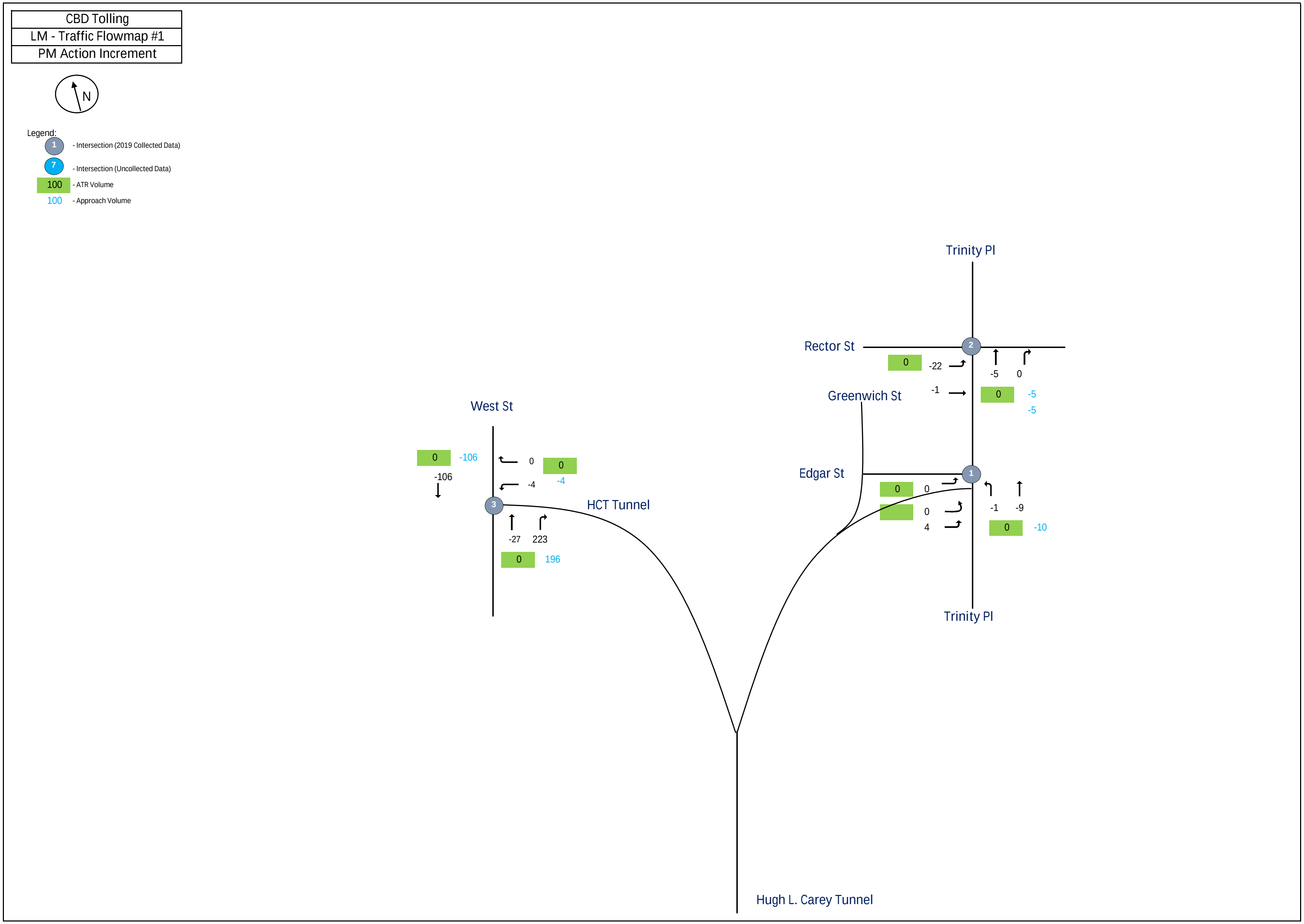


CBD Tolling
LM - Traffic Flowmap #7
MD Action Increment



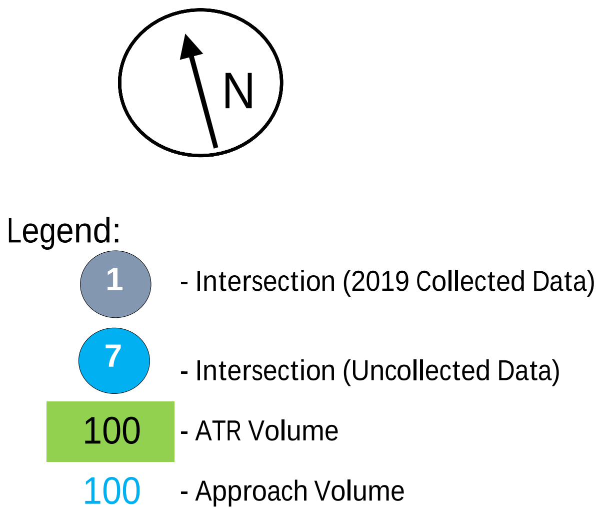
CBD Tolling
LM - Traffic Flowmap #8
MD Action Increment

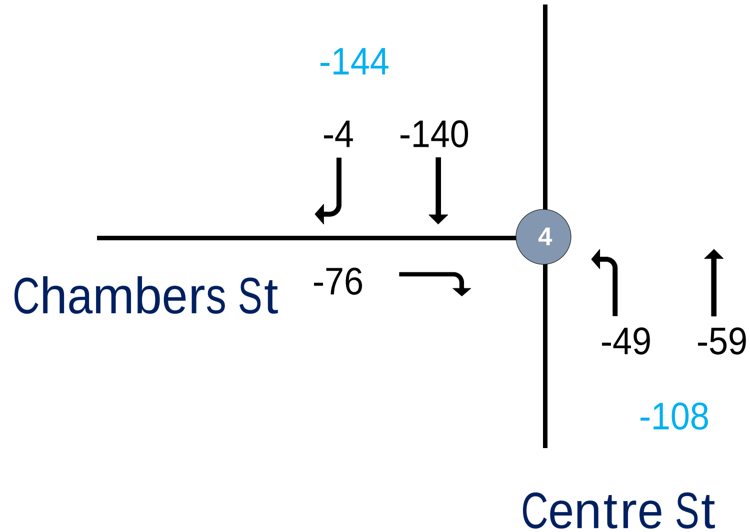




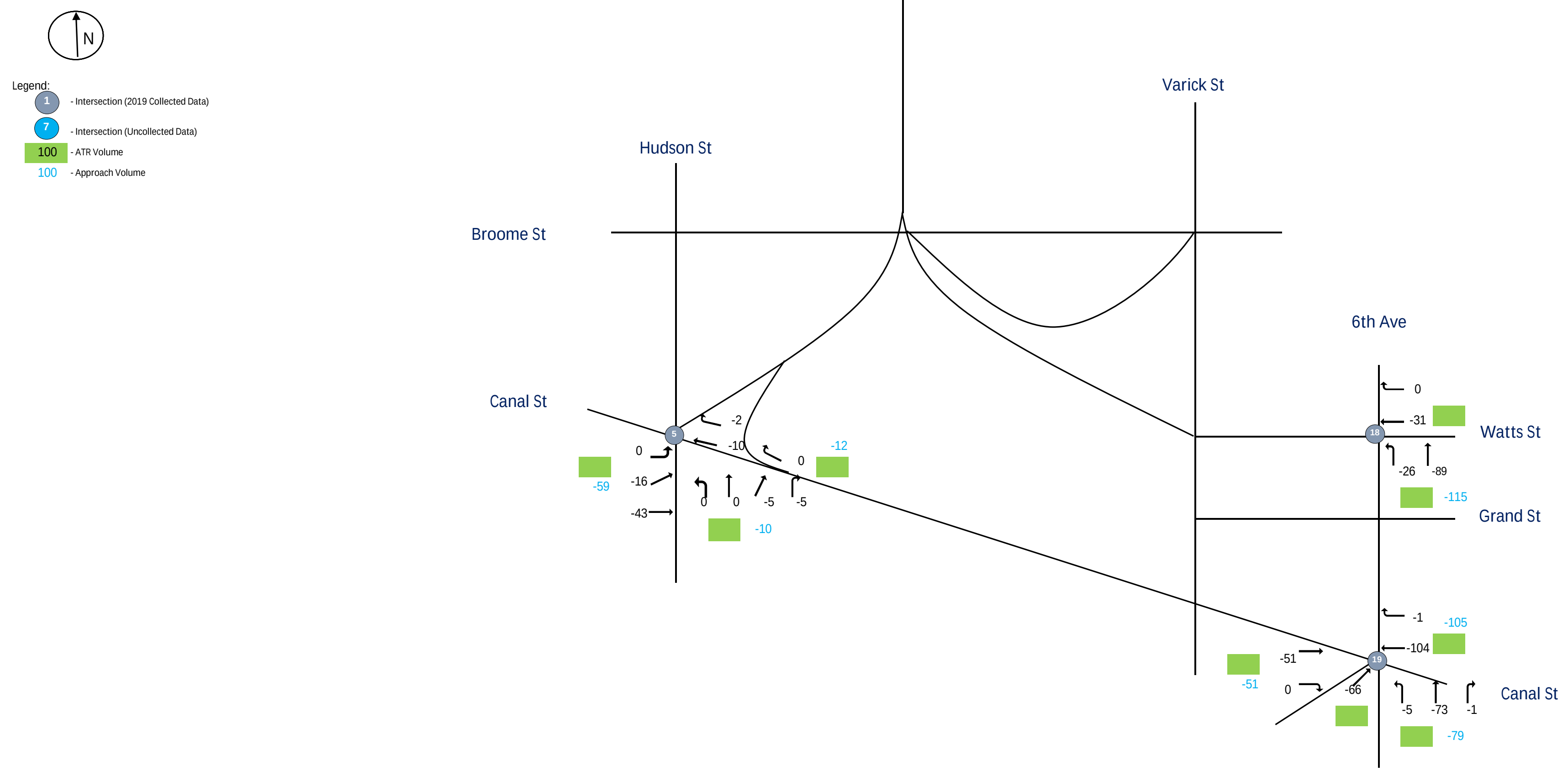
CBD Tolling
LM - Traffic Flowmap #1
PM Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Trinity Pl
Rector St
Greenwich St
West St
Edgar St
HCT Tunnel
Trinity Pl
Hugh L. Carey Tunnel
0
-22
-5
0
-1
0
-5
-5
0
-106
0
0
-106
-4
-4
0
0
-1
-9
0
4
0
-10
-27
223
0
196

CBD Tolling
LM - Traffic Flowmap #2
PM Action Increment

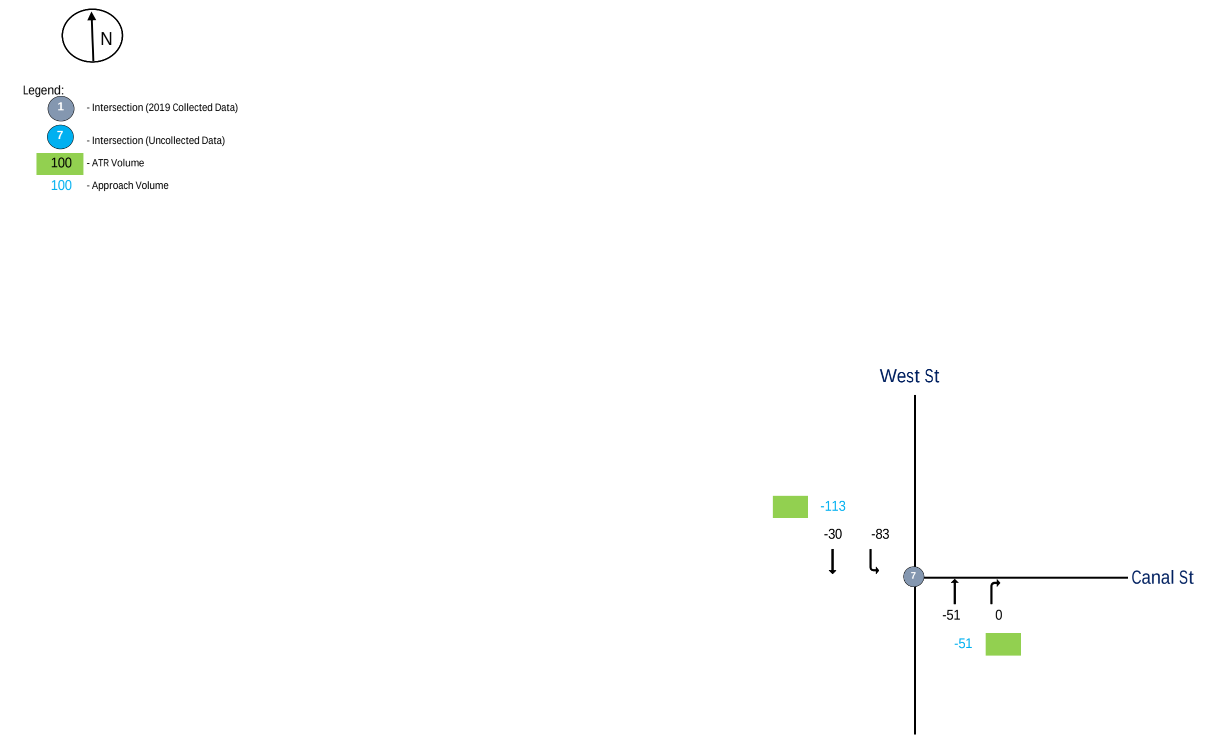




CBD Tolling
LM - Traffic Flowmap #3
PM Action Increment

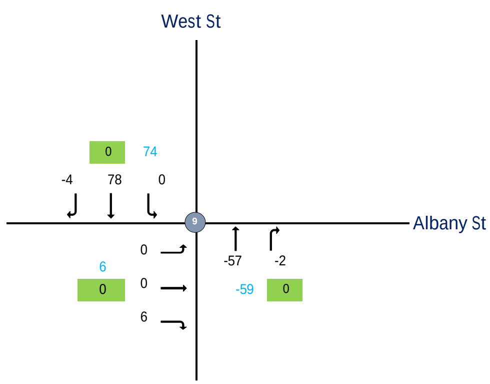


CBD Tolling
LM - Traffic Flowmap #4
PM Action Increment

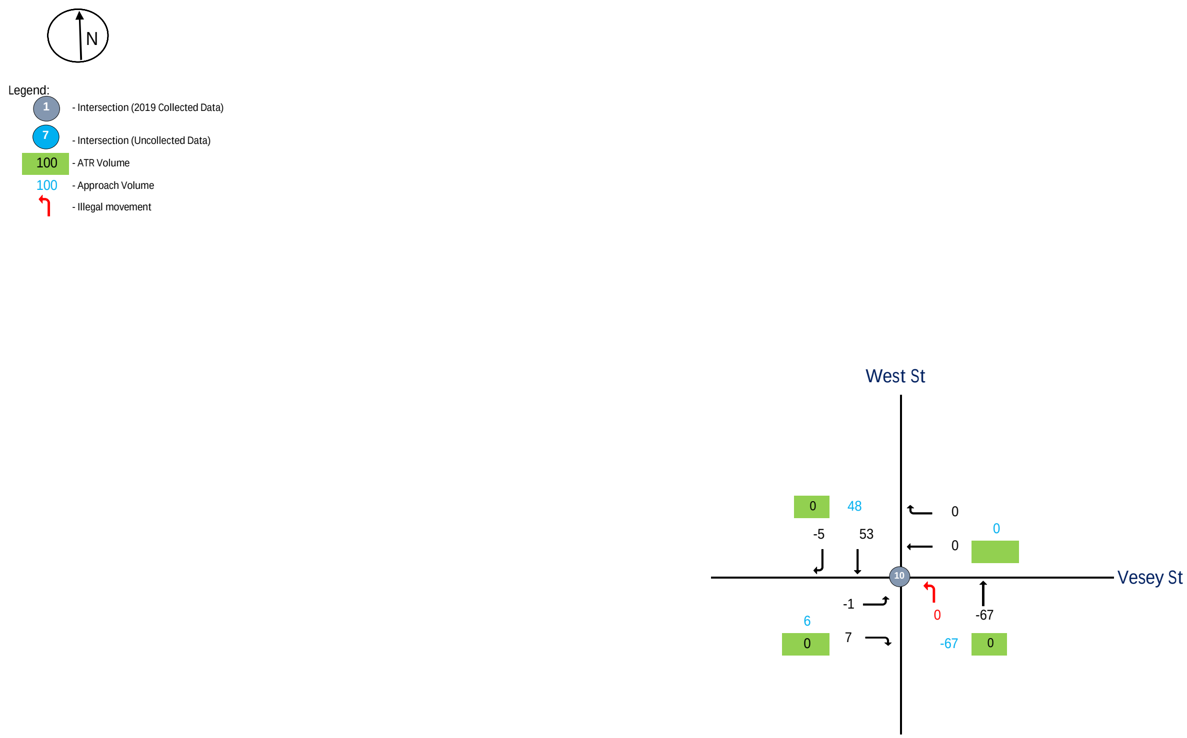


CBD Tolling
LM - Traffic Flowmap #5
PM Action Increment

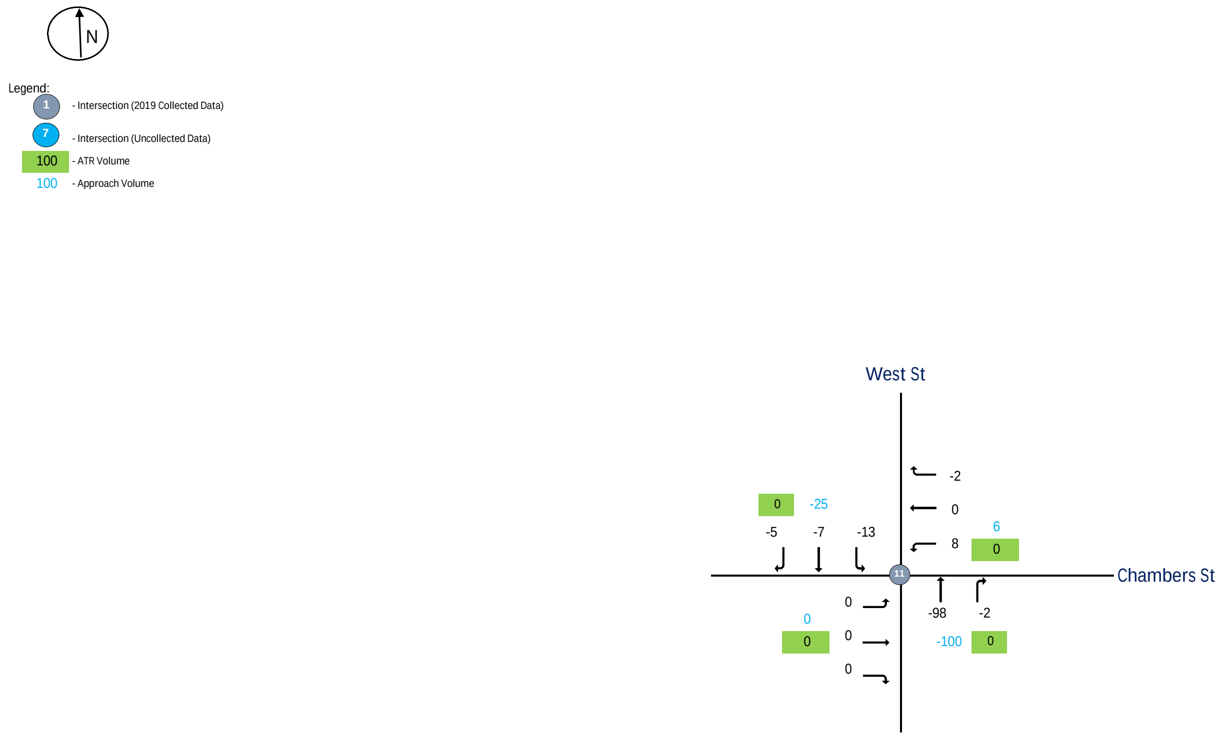
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume



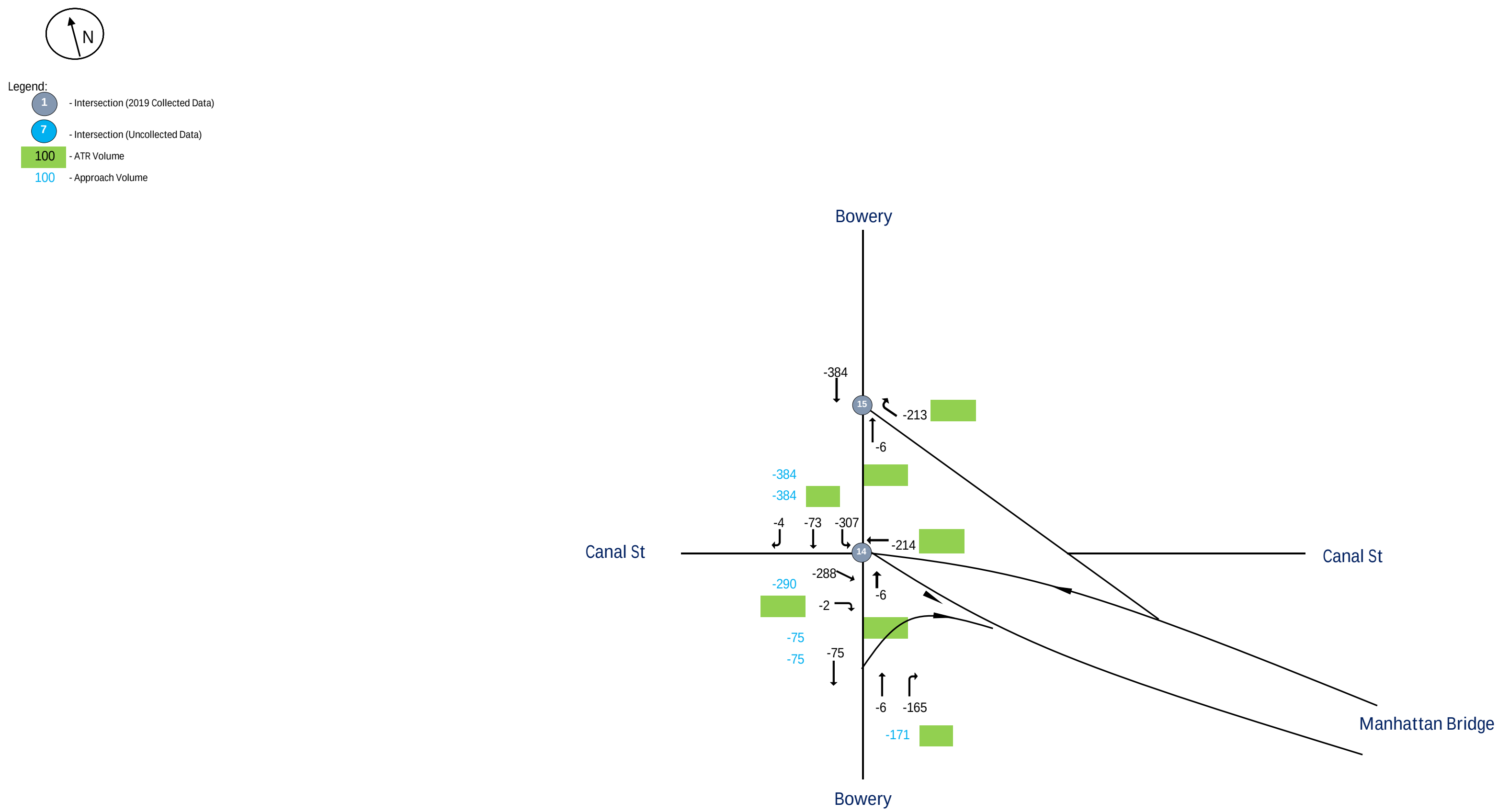
CBD Tolling
LM - Traffic Flowmap #6
PM Action Increment



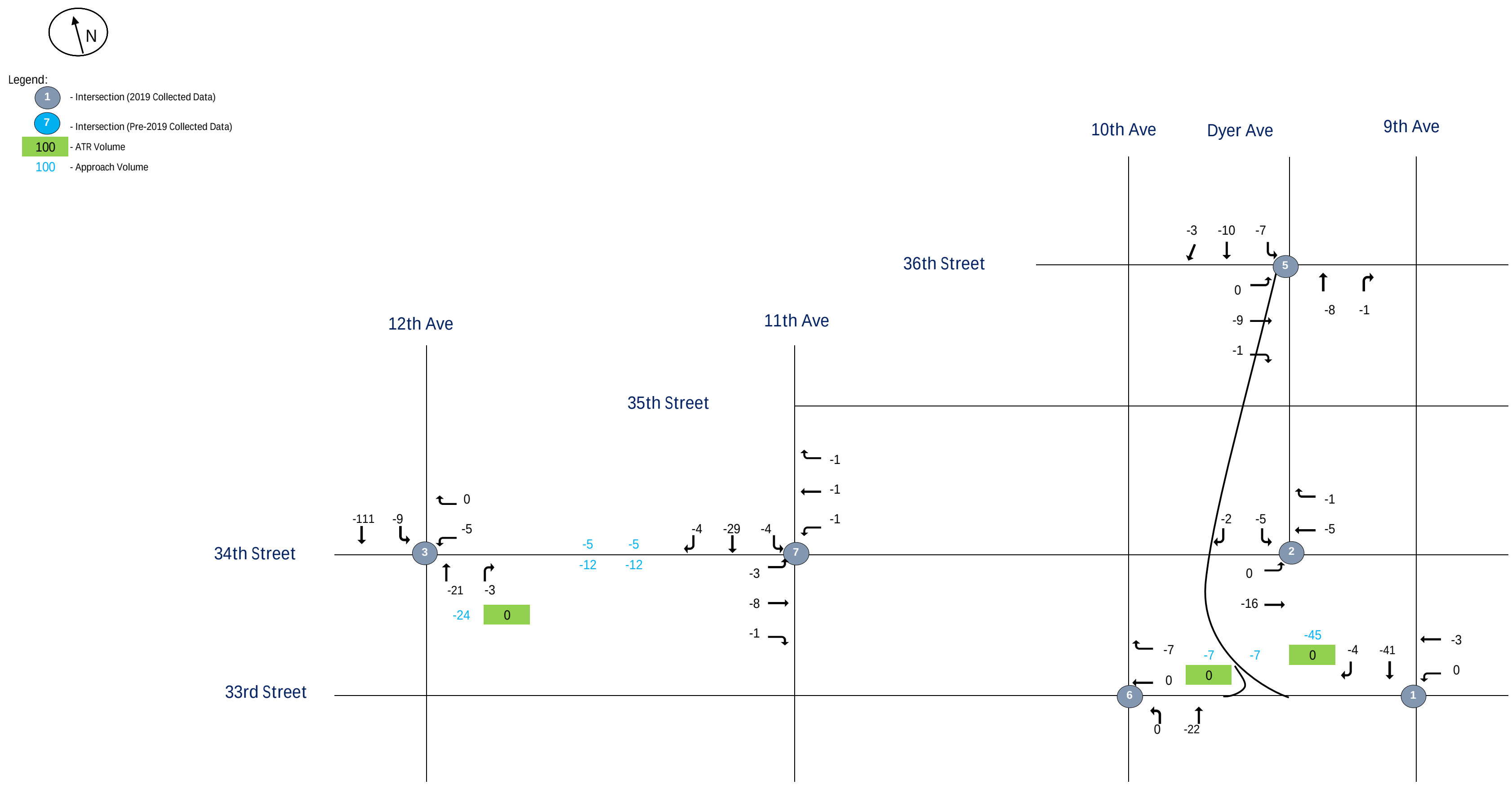
CBD Tolling
LM - Traffic Flowmap #7
PM Action Increment



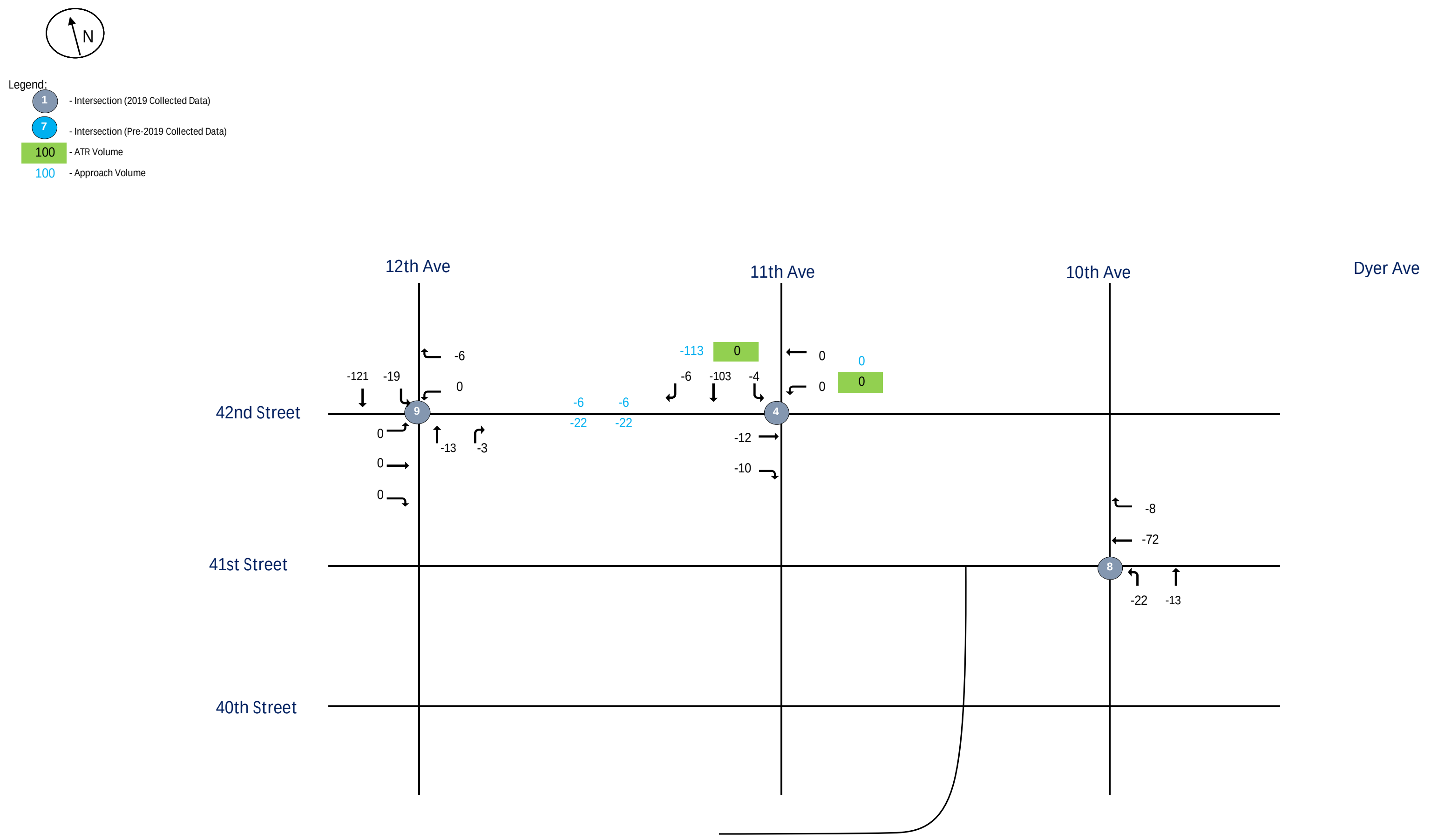
CBD Tolling
LM - Traffic Flowmap #8
PM Action Increment



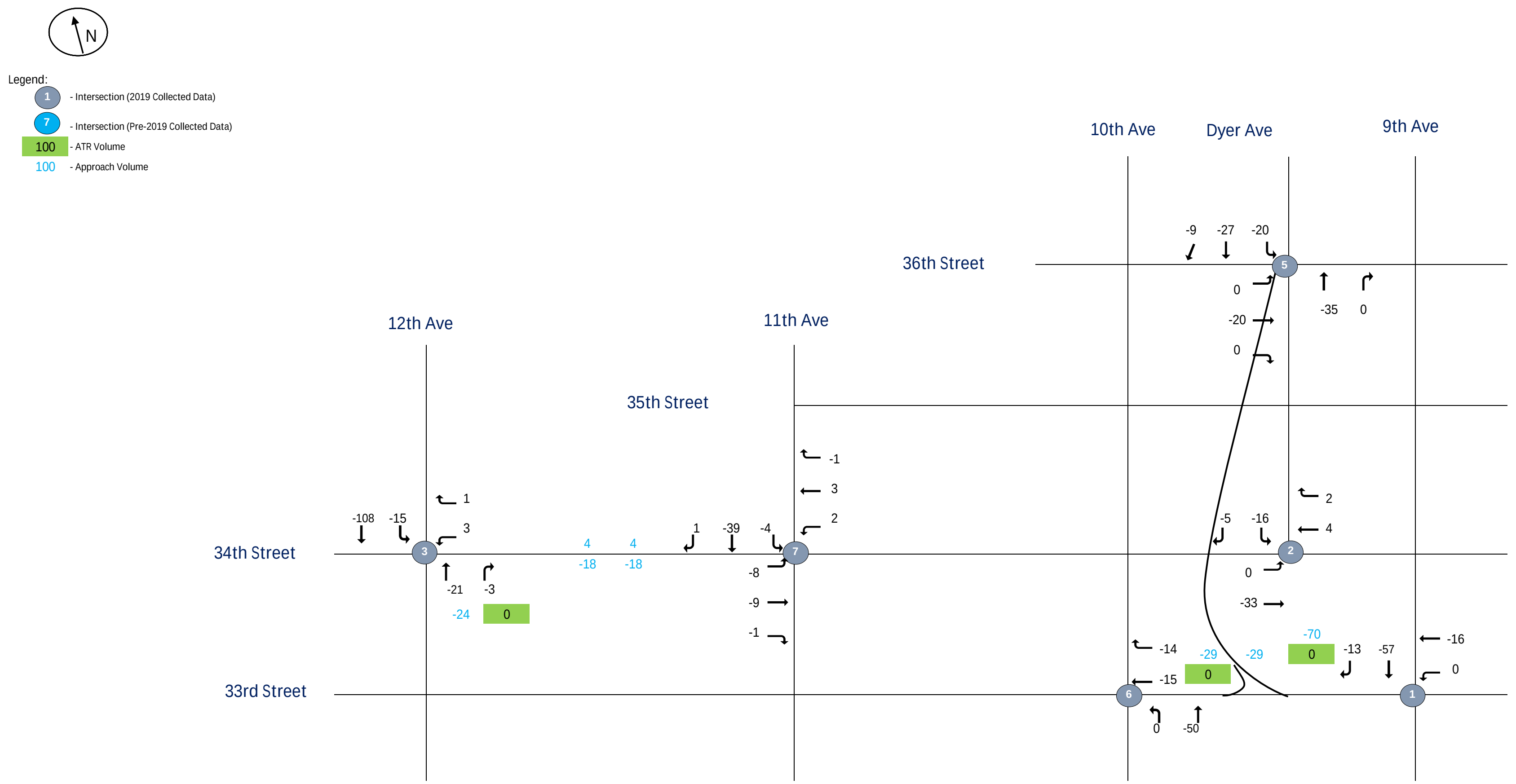
CBD Tolling
LT #1 - Traffic Flowmap
AM Action Increment



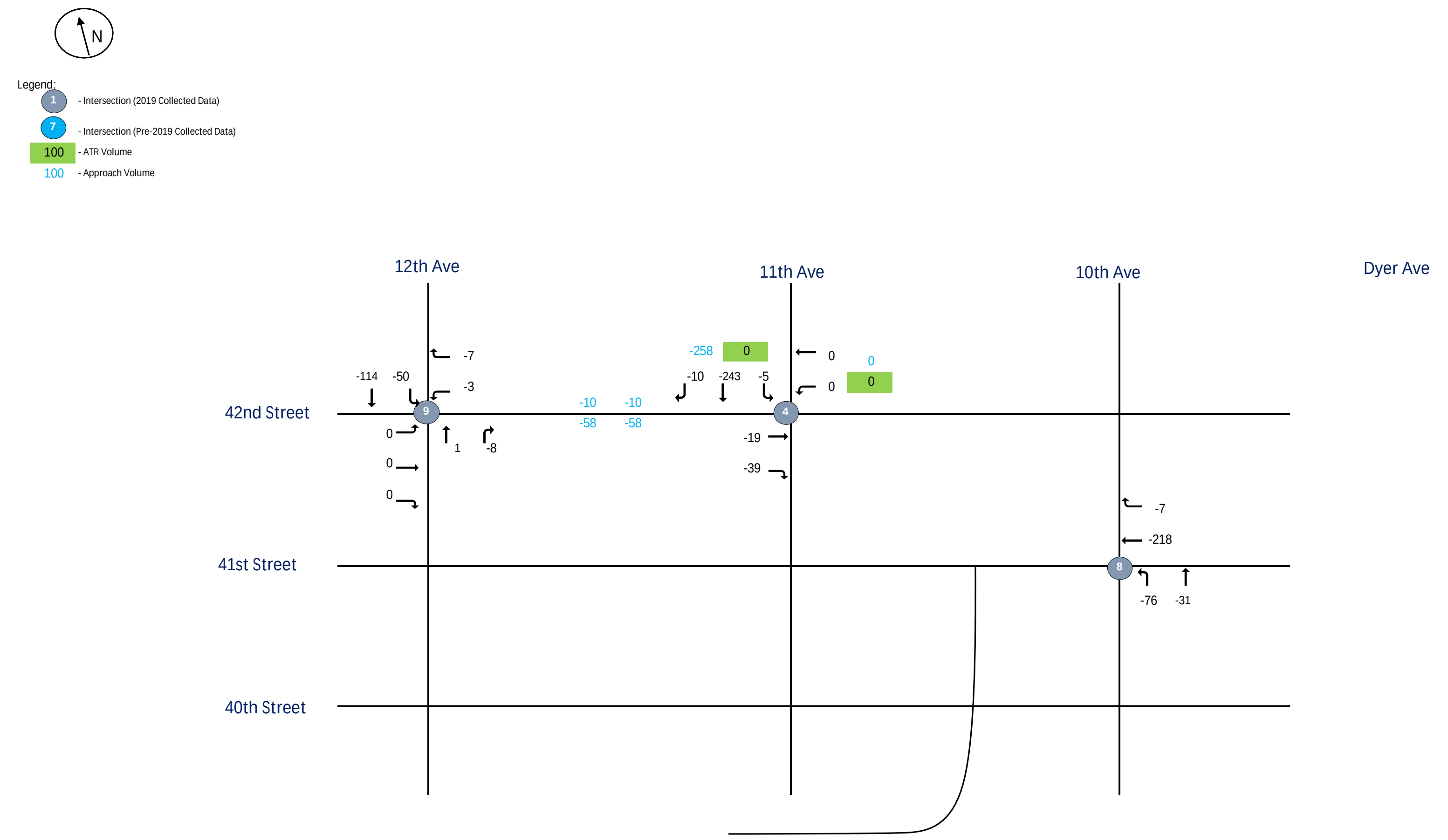
CBD Tolling
LT #2 - Traffic Flowmap
AM Action Increment

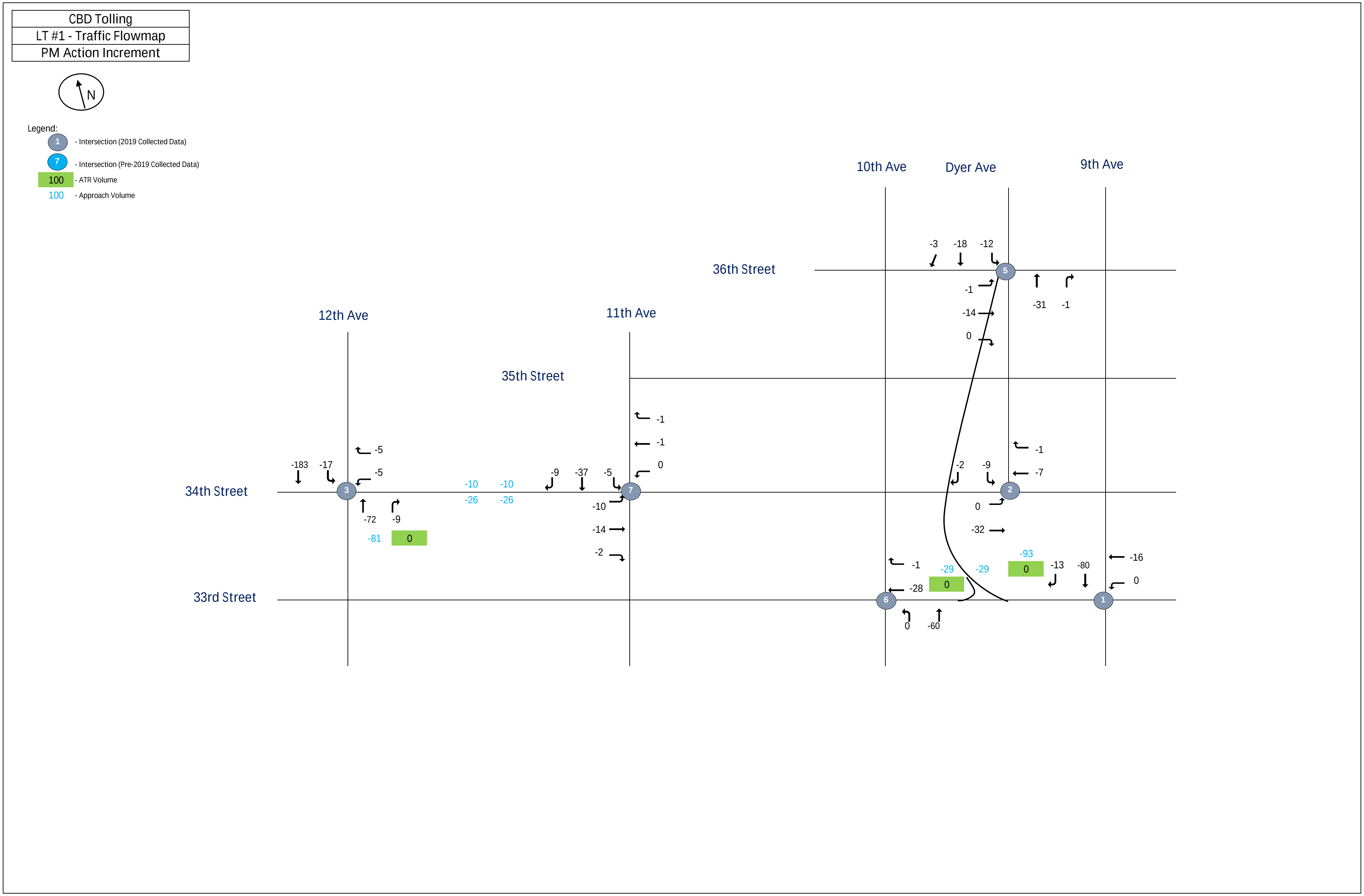


CBD Tolling
LT #1 - Traffic Flowmap
MD Action Increment

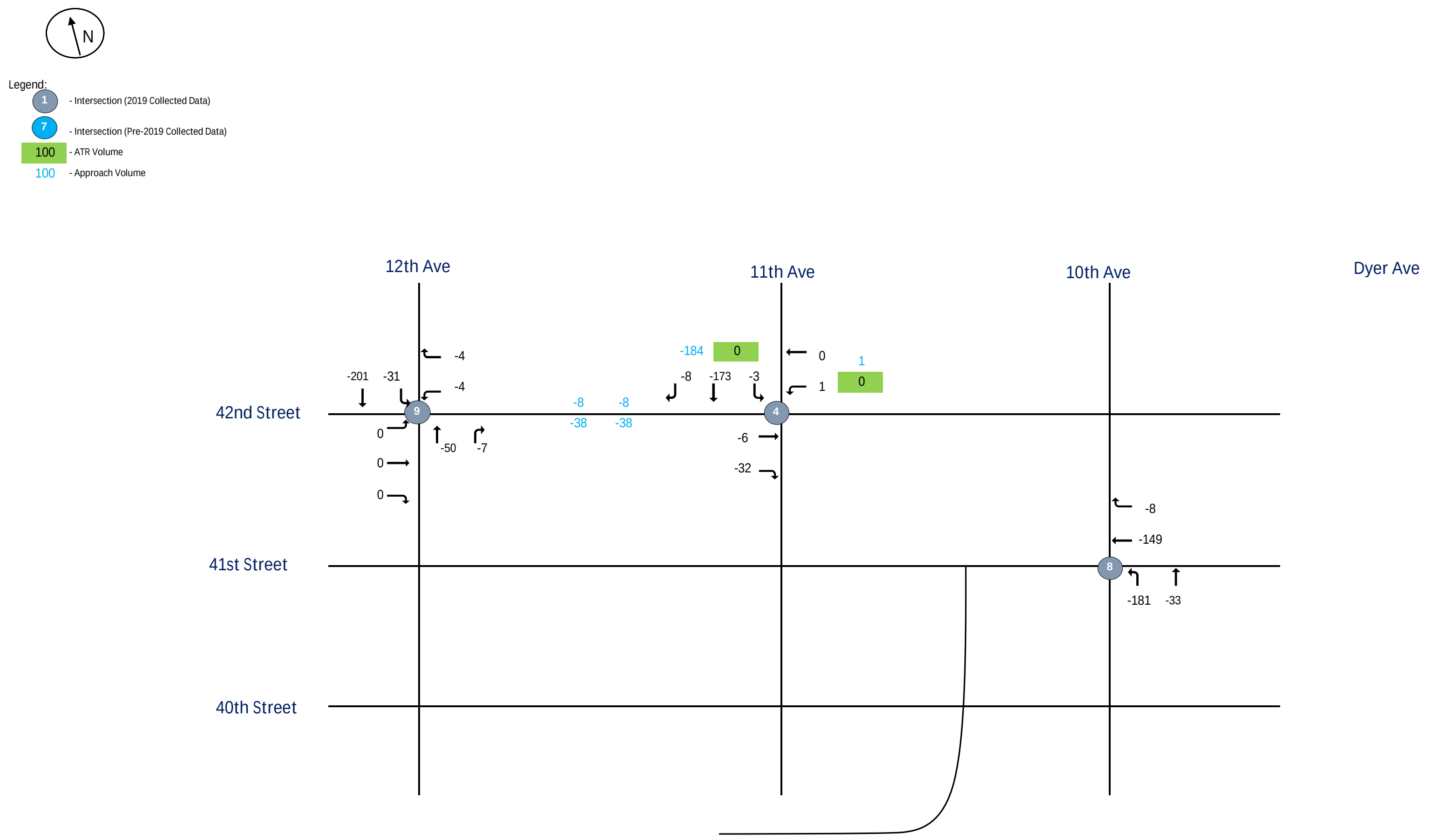


CBD Tolling
LT #2 - Traffic Flowmap
MD Action Increment

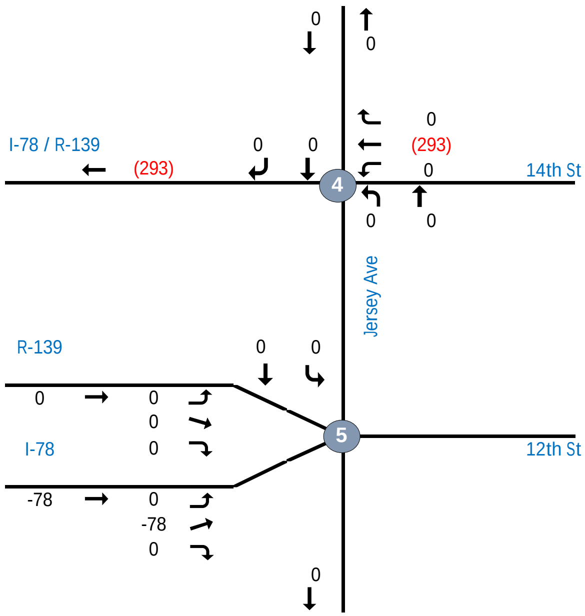


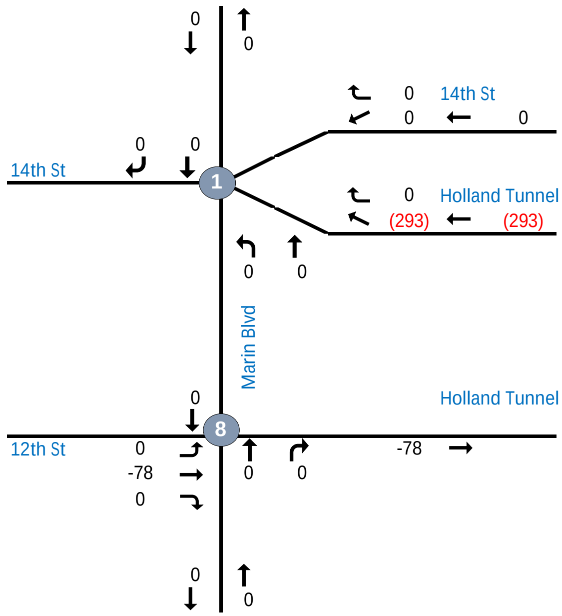

CBD Tolling
LT #1 - Traffic Flowmap
PM Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
36th Street
12th Ave
11th Ave
35th Street
34th Street
33rd Street
-3
-18
-12
-1
-14
0
-31
-1
-1
-1
0
-5
-5
-183
-17
-72
-9
-81
0
-10
-10
-26
-26
-9
-37
-5
-10
-14
-2
-1
-7
-2
-9
0
-32
-93
0
-13
-80
-16
0
-1
-29
-29
0
-28
0
-60

CBD Tolling
LT #2 - Traffic Flowmap
PM Action Increment



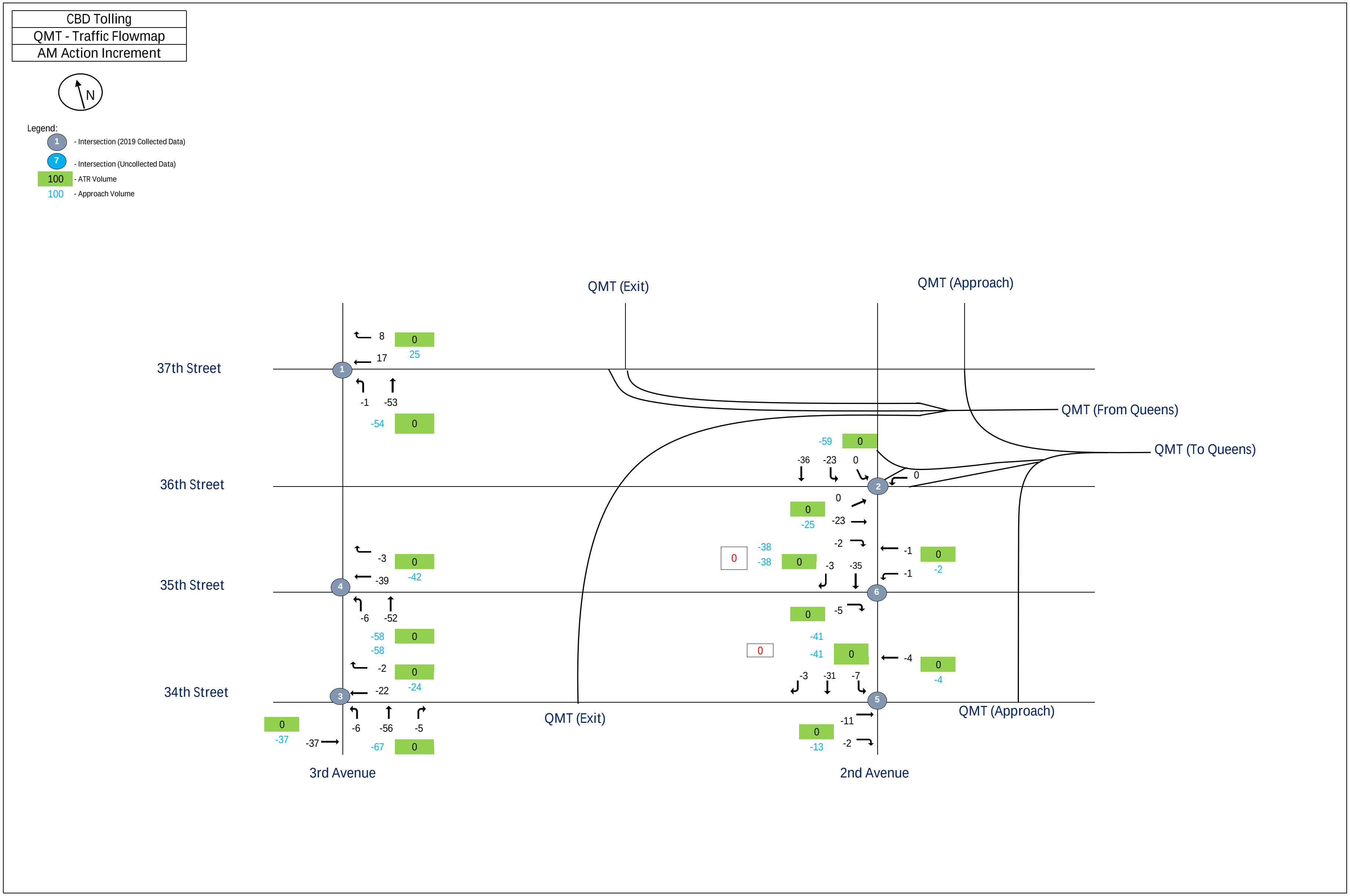
New Jersey
2021 With-Action N1 Increment
AM Peak Hour





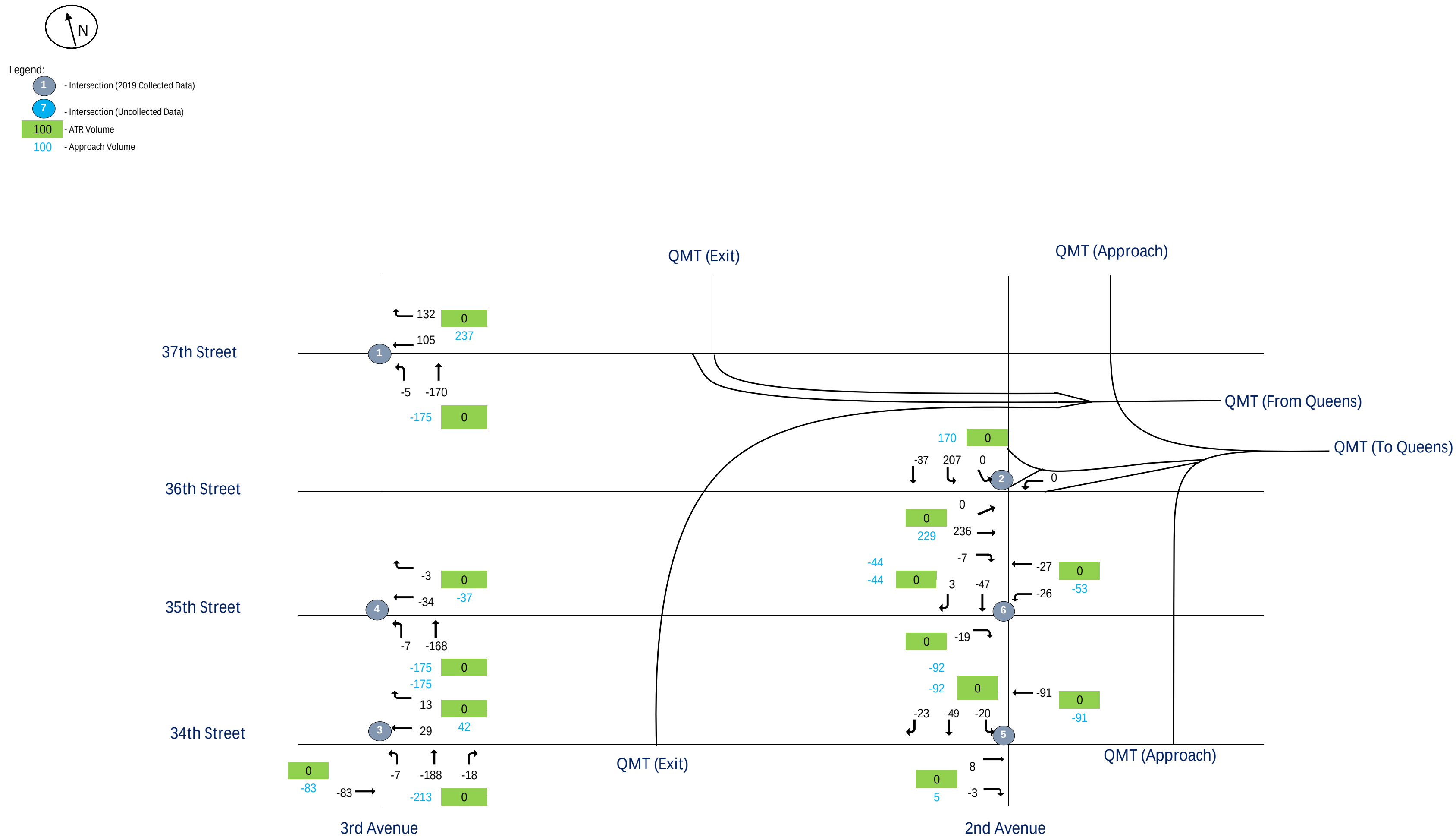
New Jersey
2021 With-Action N1 Increment
MD Peak Hour

New Jersey
2021 With-Action N1 Increment
PM Peak Hour

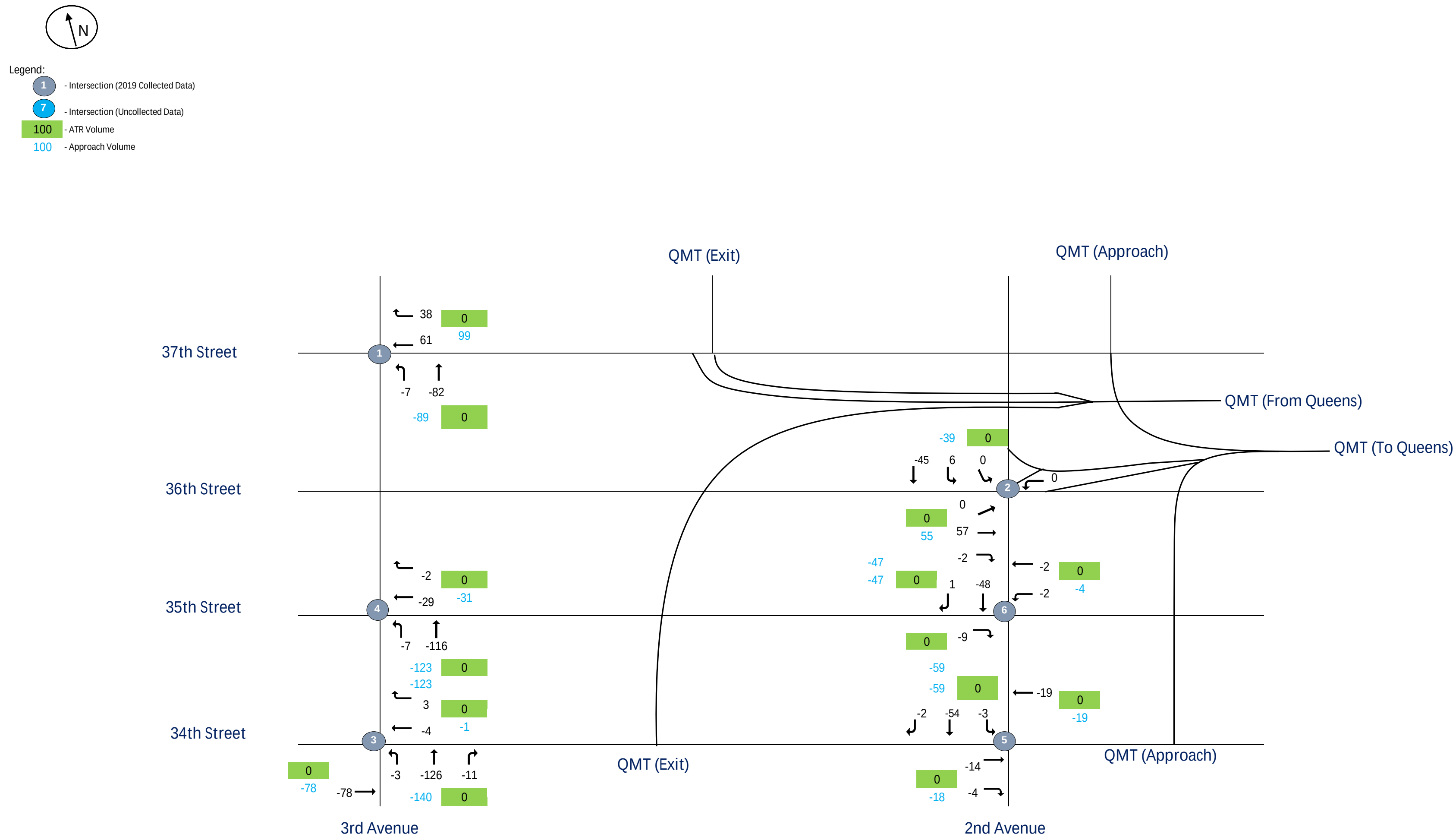


CBD Tolling
QMT - Traffic Flowmap
AM Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
37th Street
36th Street
35th Street
34th Street
QMT (From Queens)
QMT (To Queens)
QMT (Exit)
QMT (Approach)
3rd Avenue
2nd Avenue

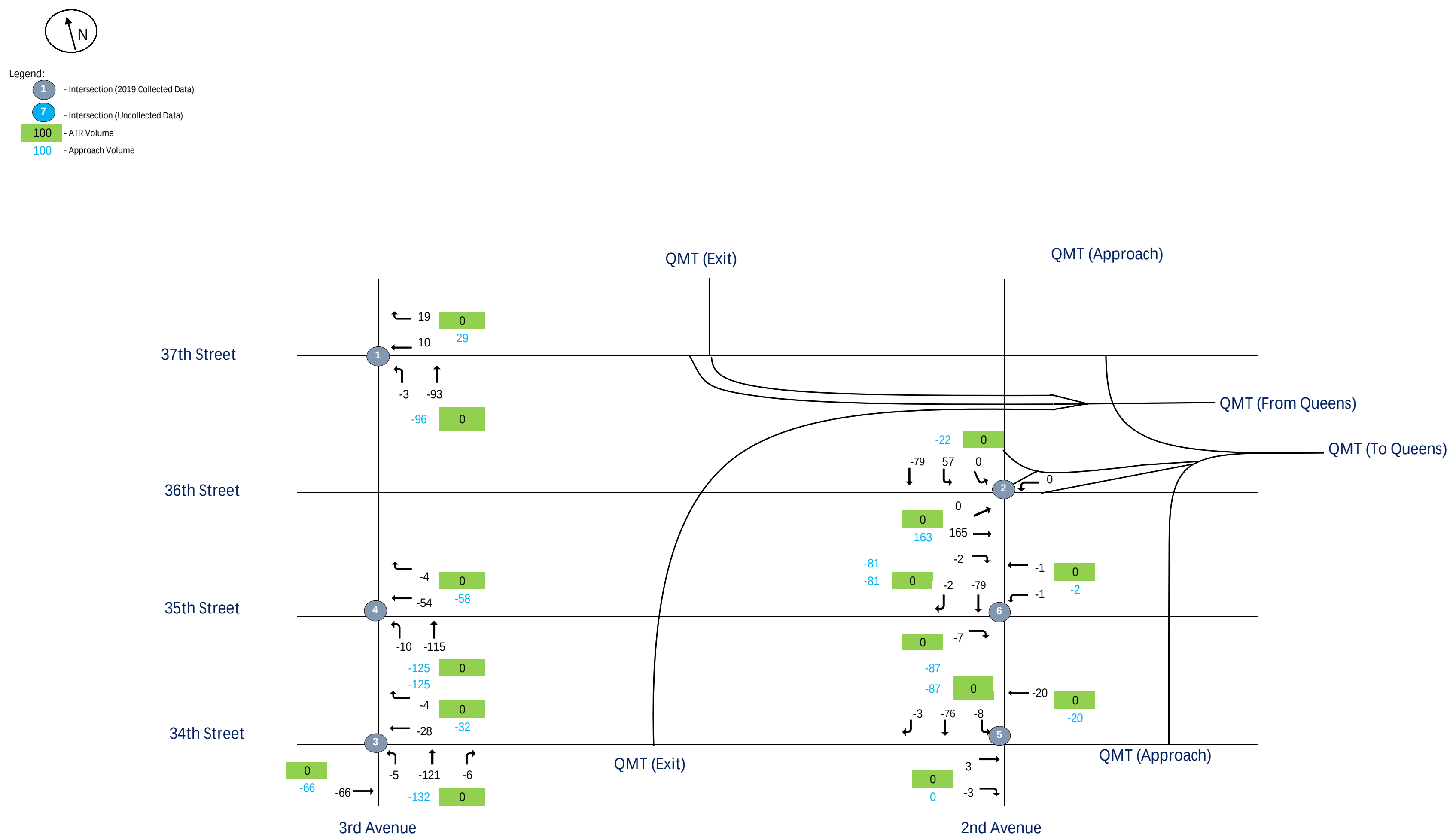
CBD Tolling
QMT - Traffic Flowmap
LN Action Increment



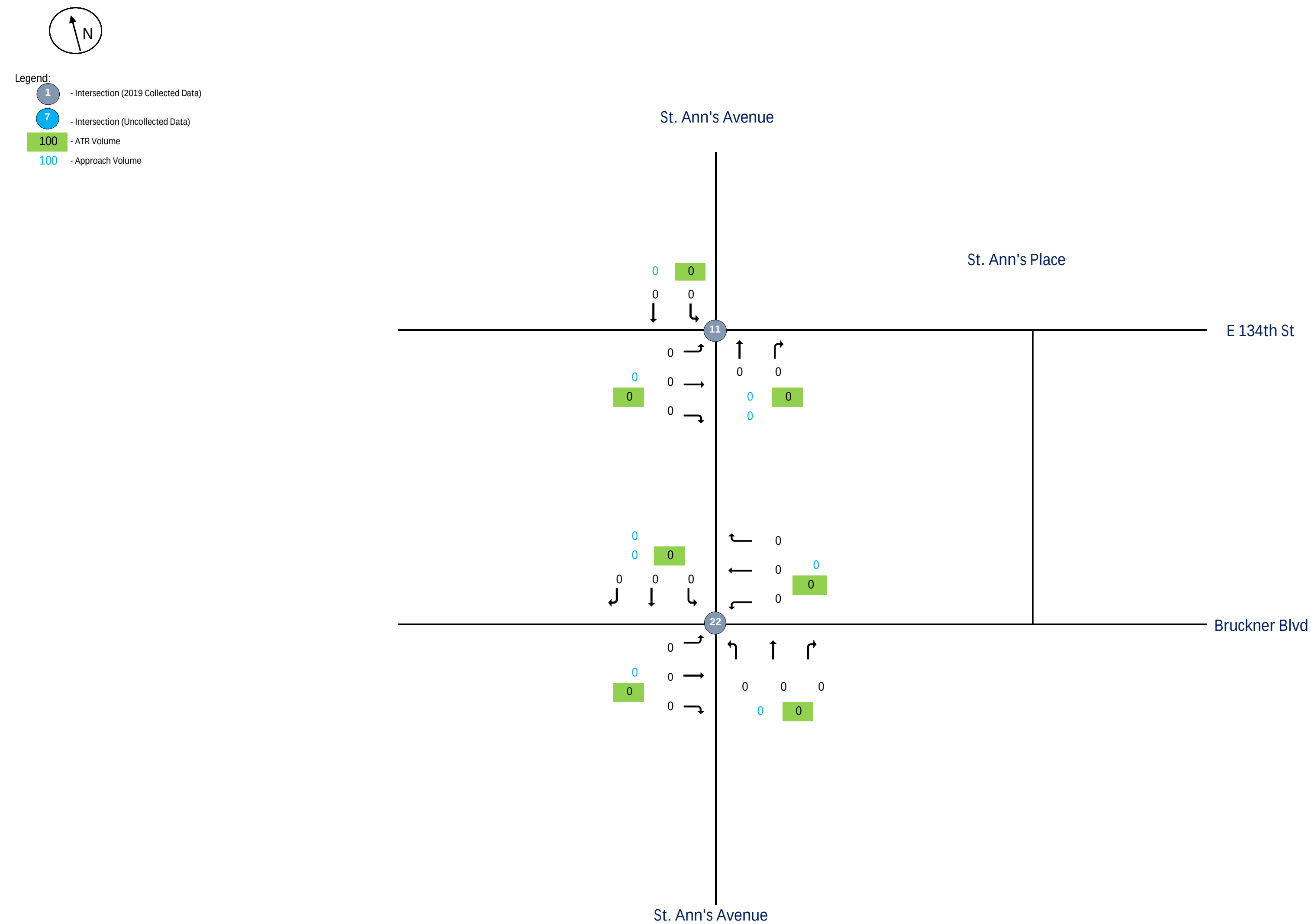
CBD Tolling
QMT - Traffic Flowmap
MD Action Increment



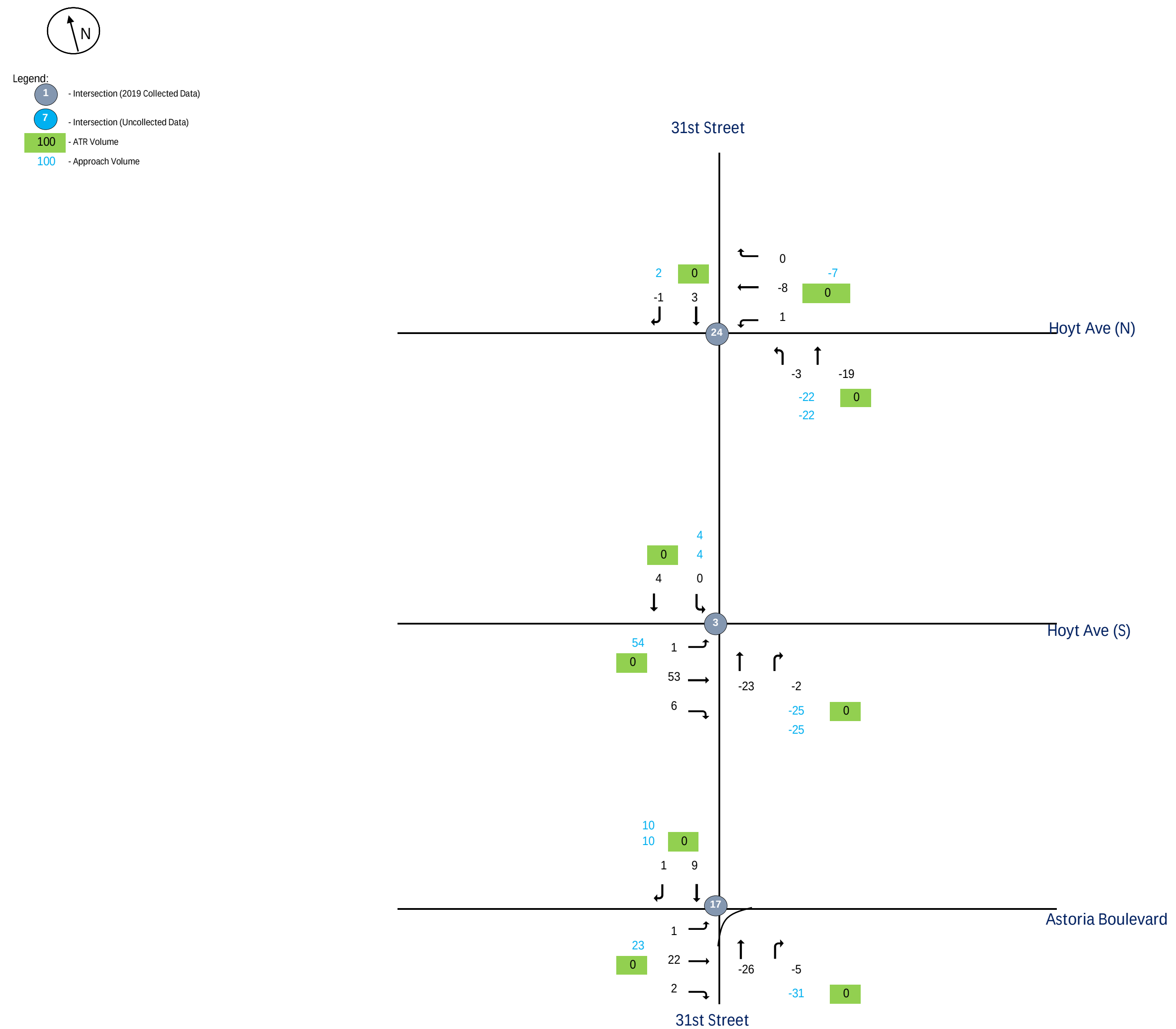
CBD Tolling
QMT - Traffic Flowmap
PM Action Increment



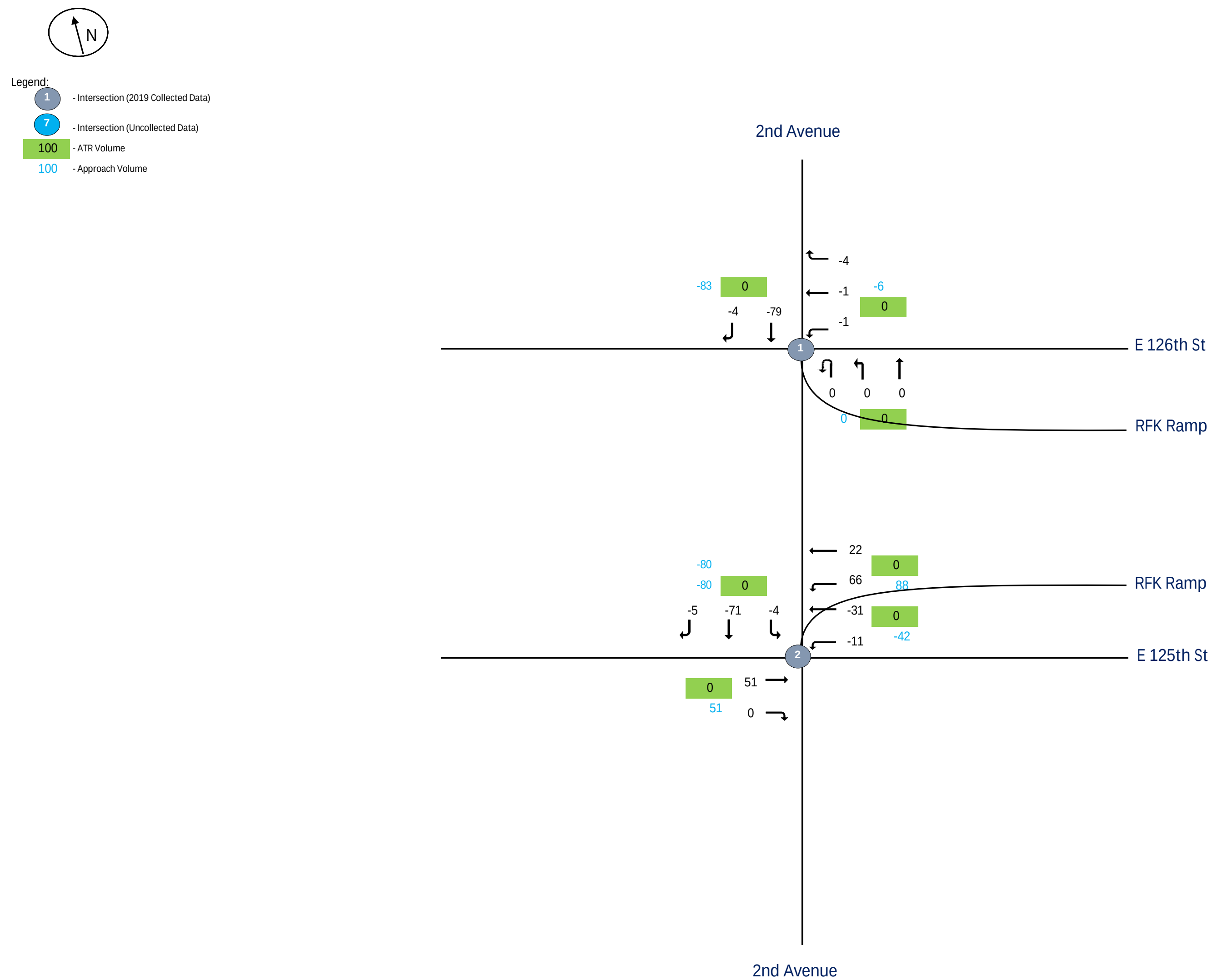
CBD Tolling
RKB - Traffic Flowmap
AM Action Increment

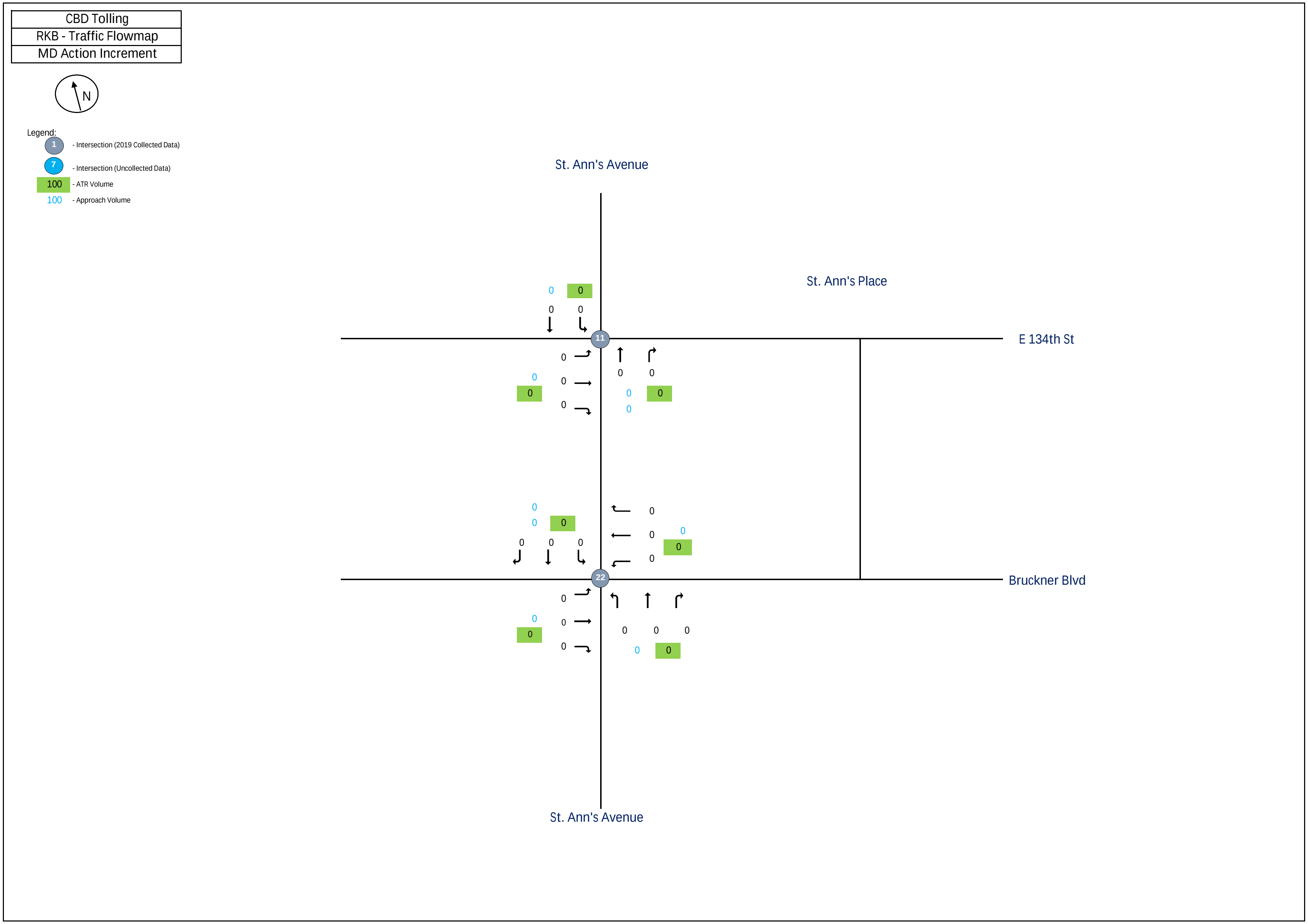


CBD Tolling
AS - Traffic Flowmap
AM Action Increment

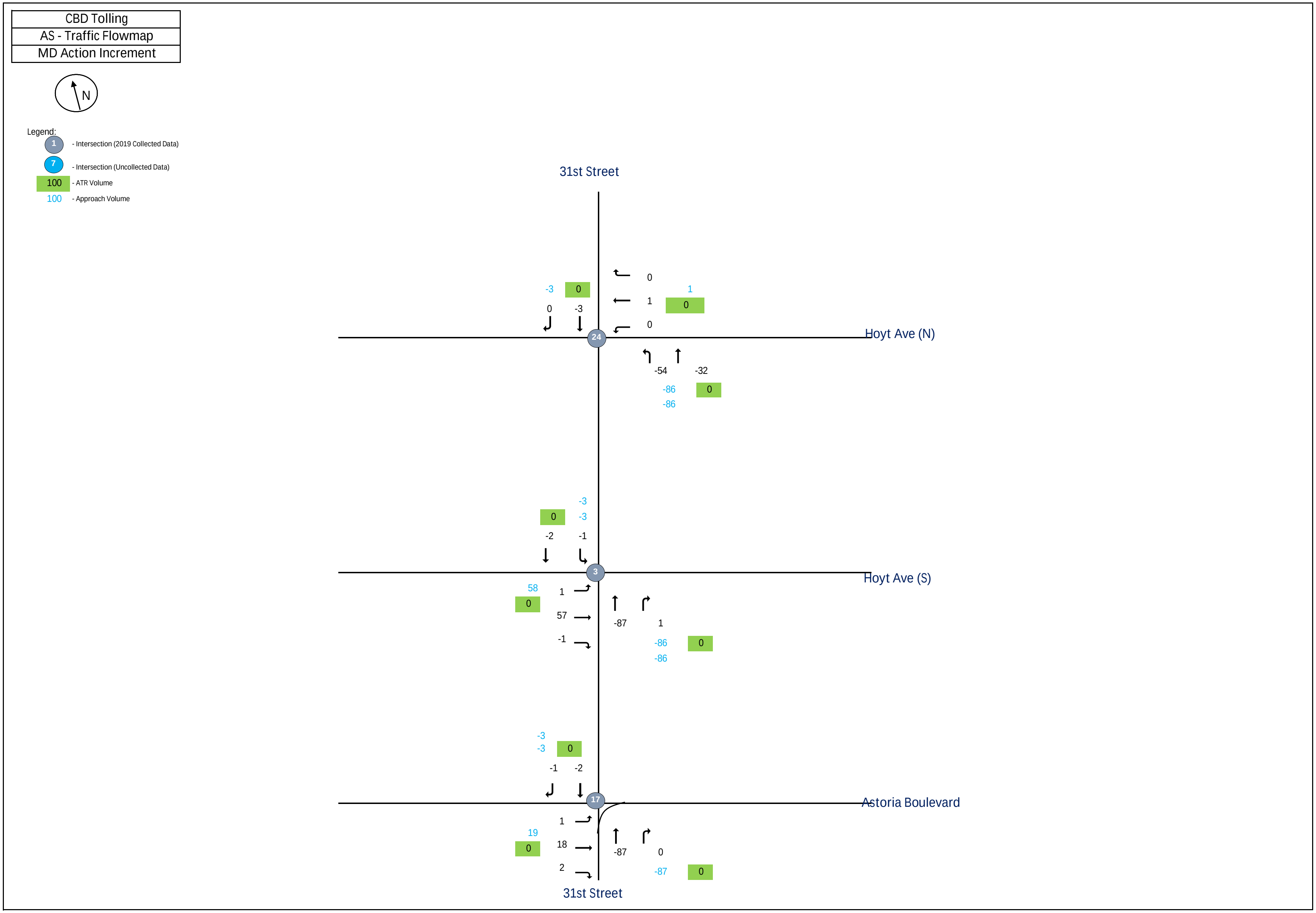


CBD Tolling
RKM - Traffic Flowmap
AM Action Increment



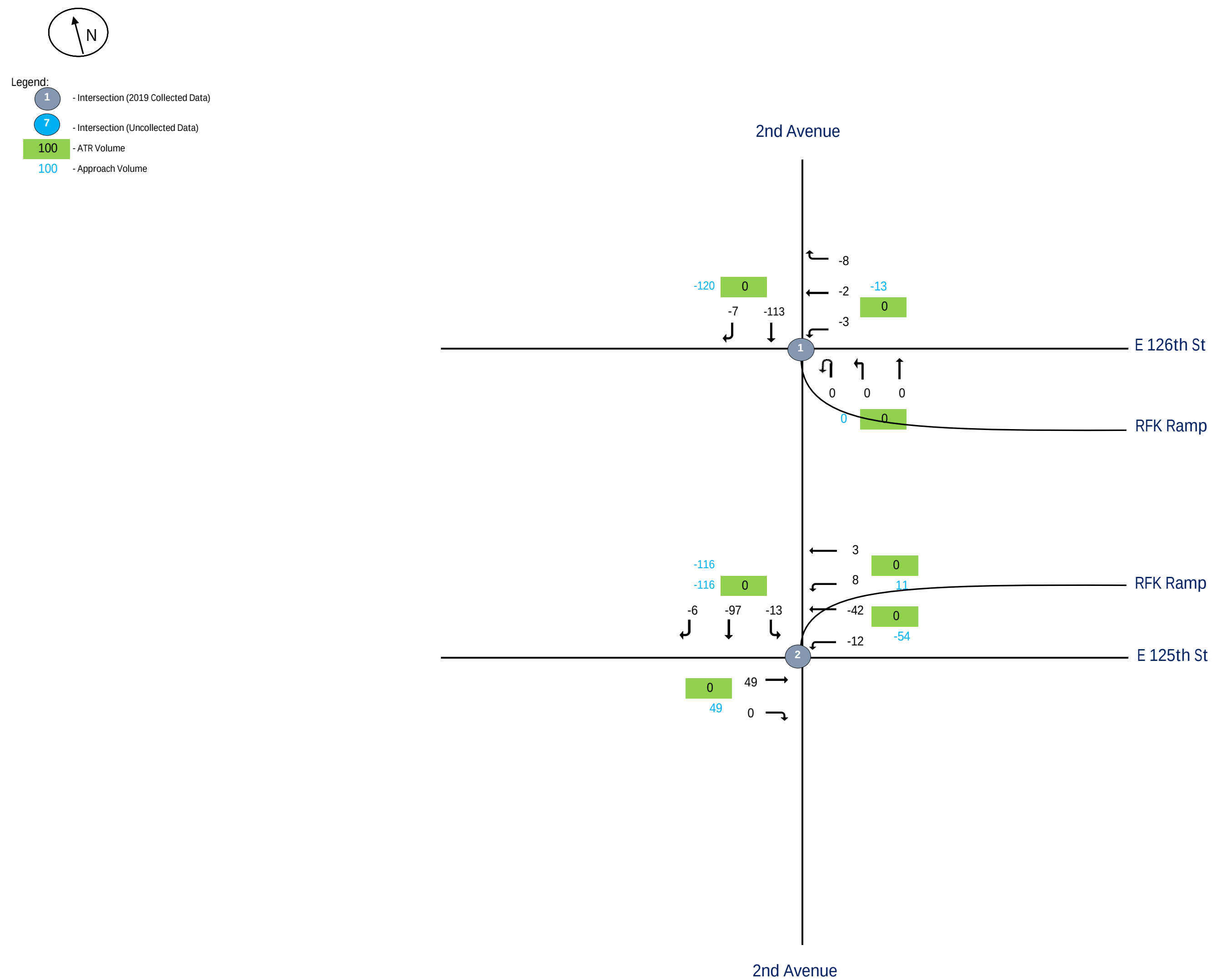


CBD Tolling
RKB - Traffic Flowmap
MD Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
St. Ann's Avenue
St. Ann's Place
E 134th St
Bruckner Blvd
St. Ann's Avenue
11
22
0

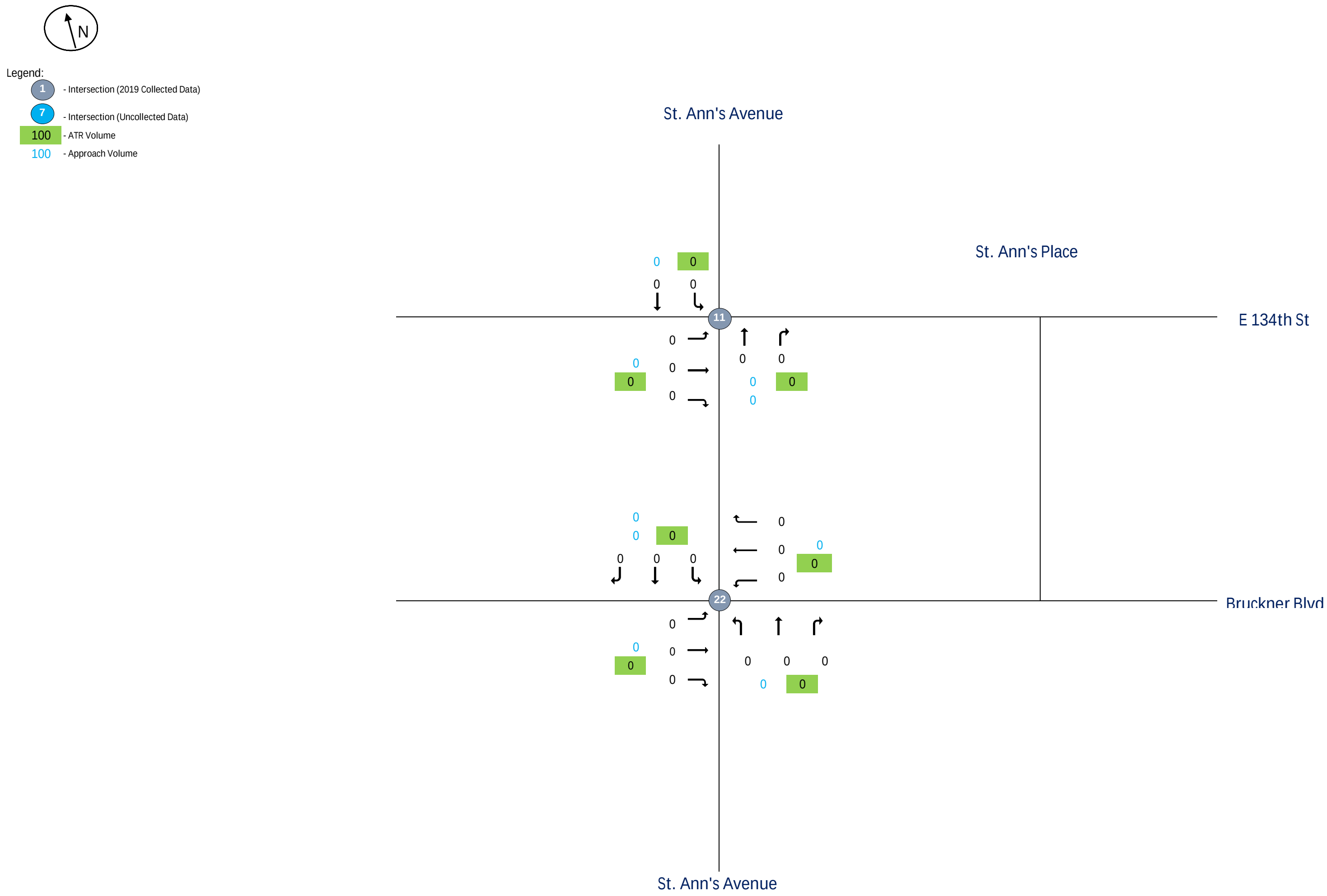


CBD Tolling
AS - Traffic Flowmap
MD Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
Hoyt Ave (N)
Hoyt Ave (S)
Astoria Boulevard
31st Street

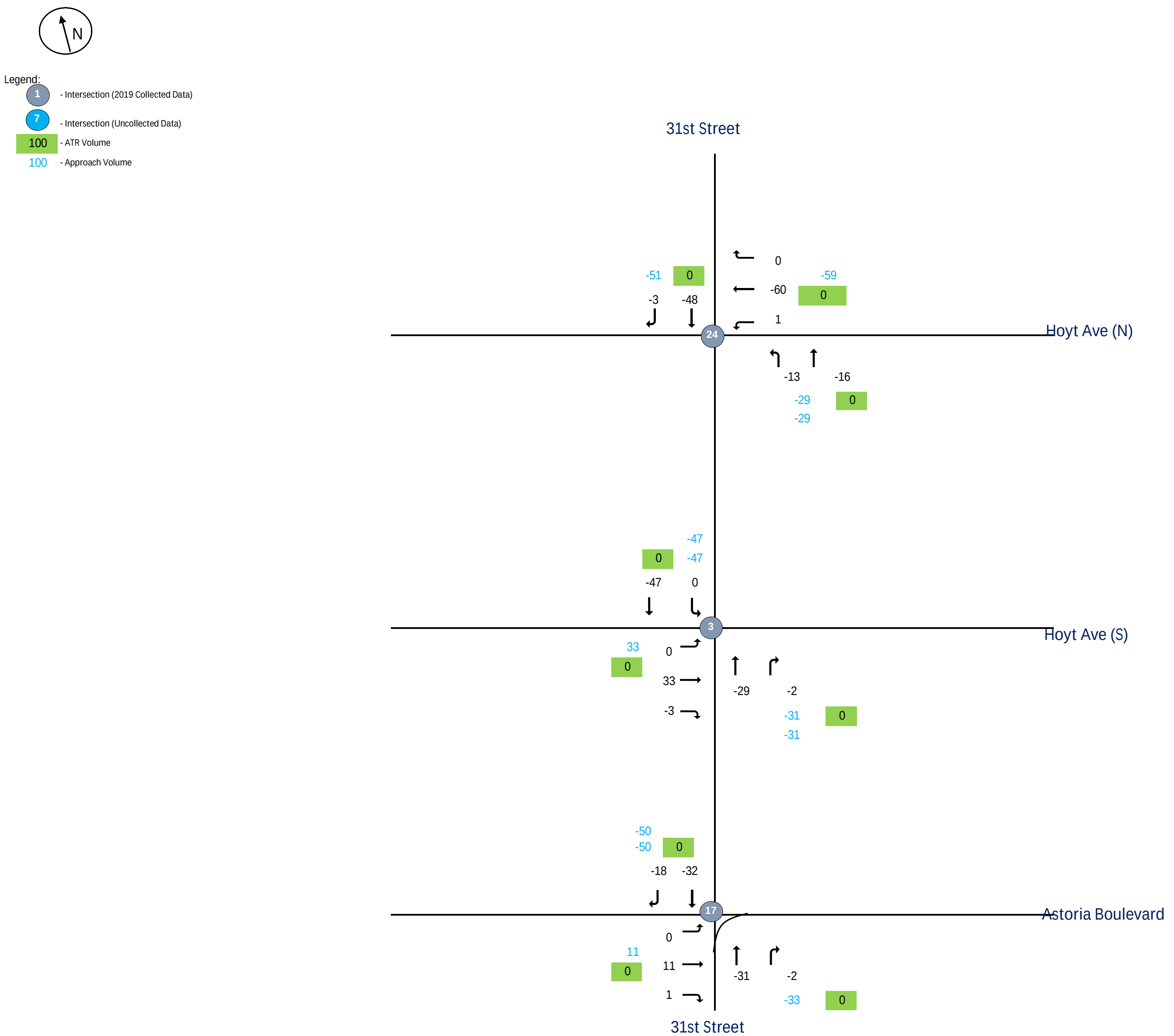
CBD Tolling
RKM - Traffic Flowmap
MD Action Increment



CBD Tolling
RKB - Traffic Flowmap
PM Action Increment



CBD Tolling
AS - Traffic Flowmap
PM Action Increment



CBD Tolling

RKM - Traffic Flowmap

PM Action Increment

N

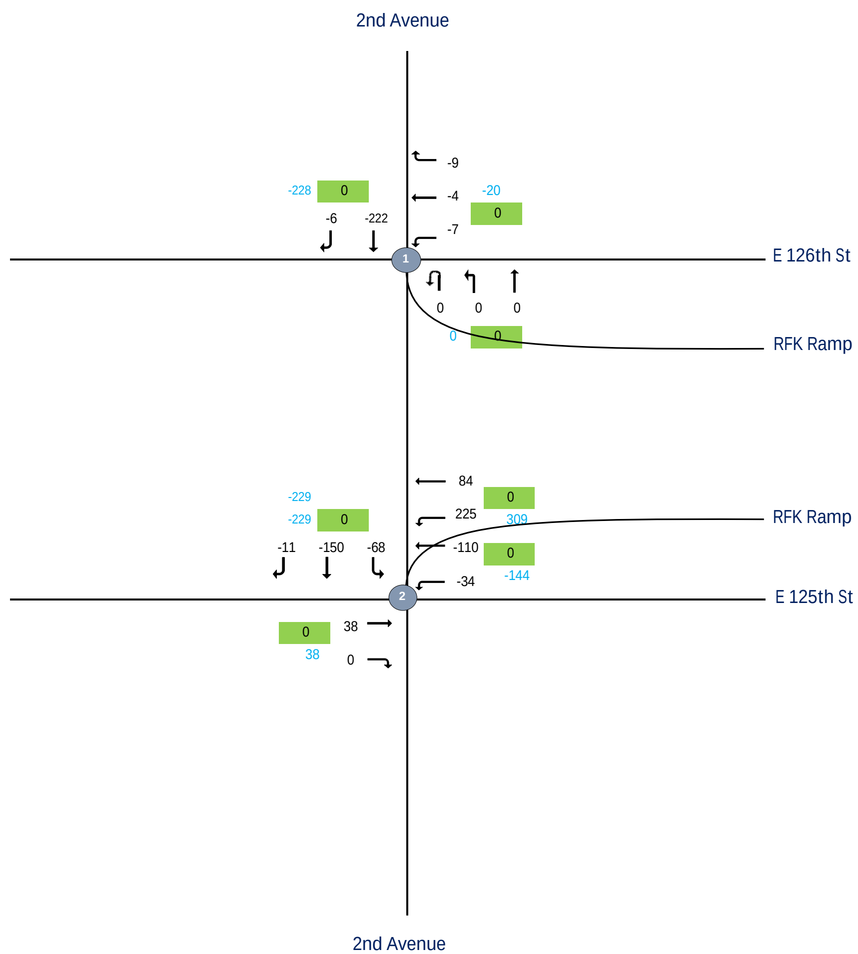
Legend:

1 - Intersection (2019 Collected Data)

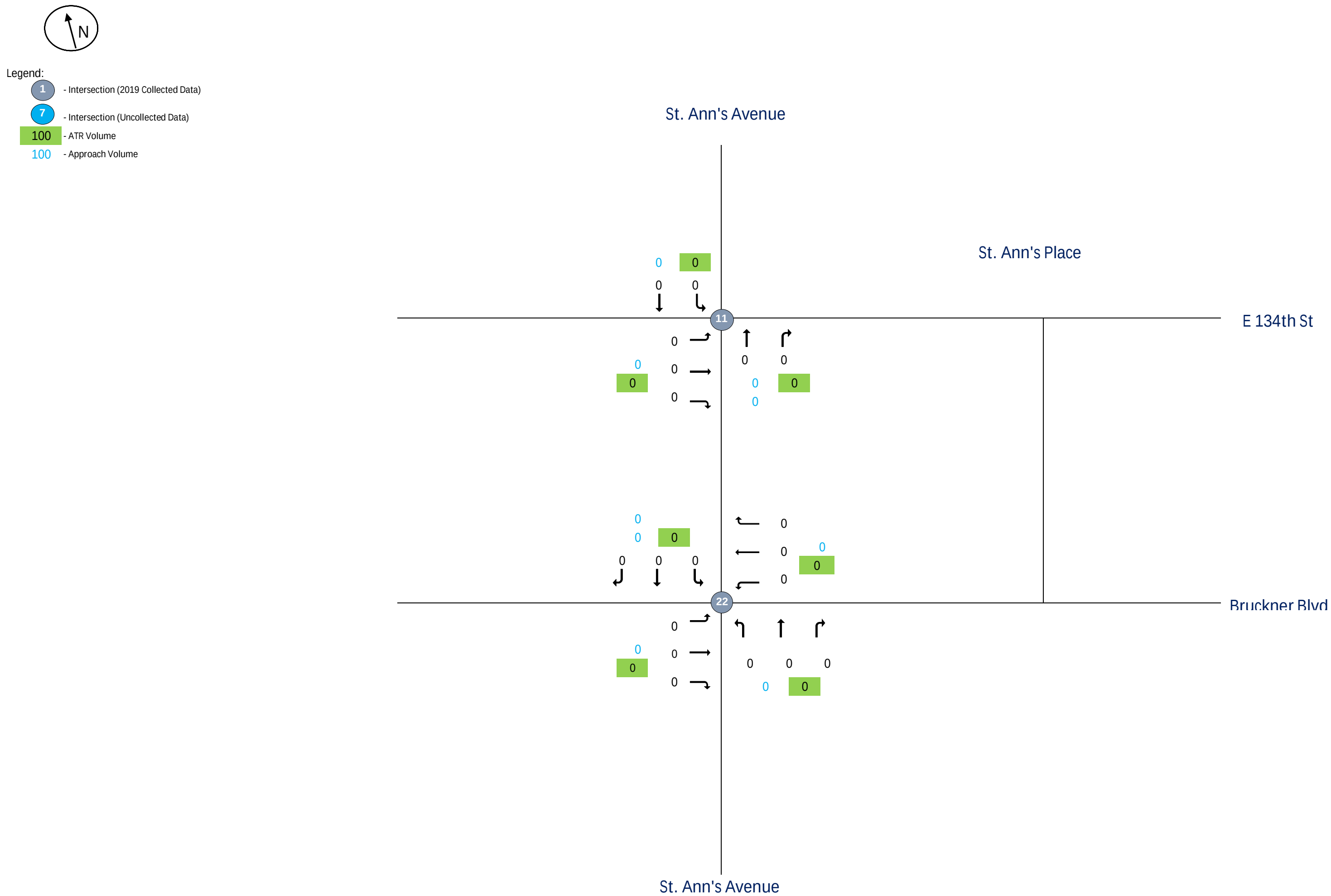
7 - Intersection (Uncollected Data)

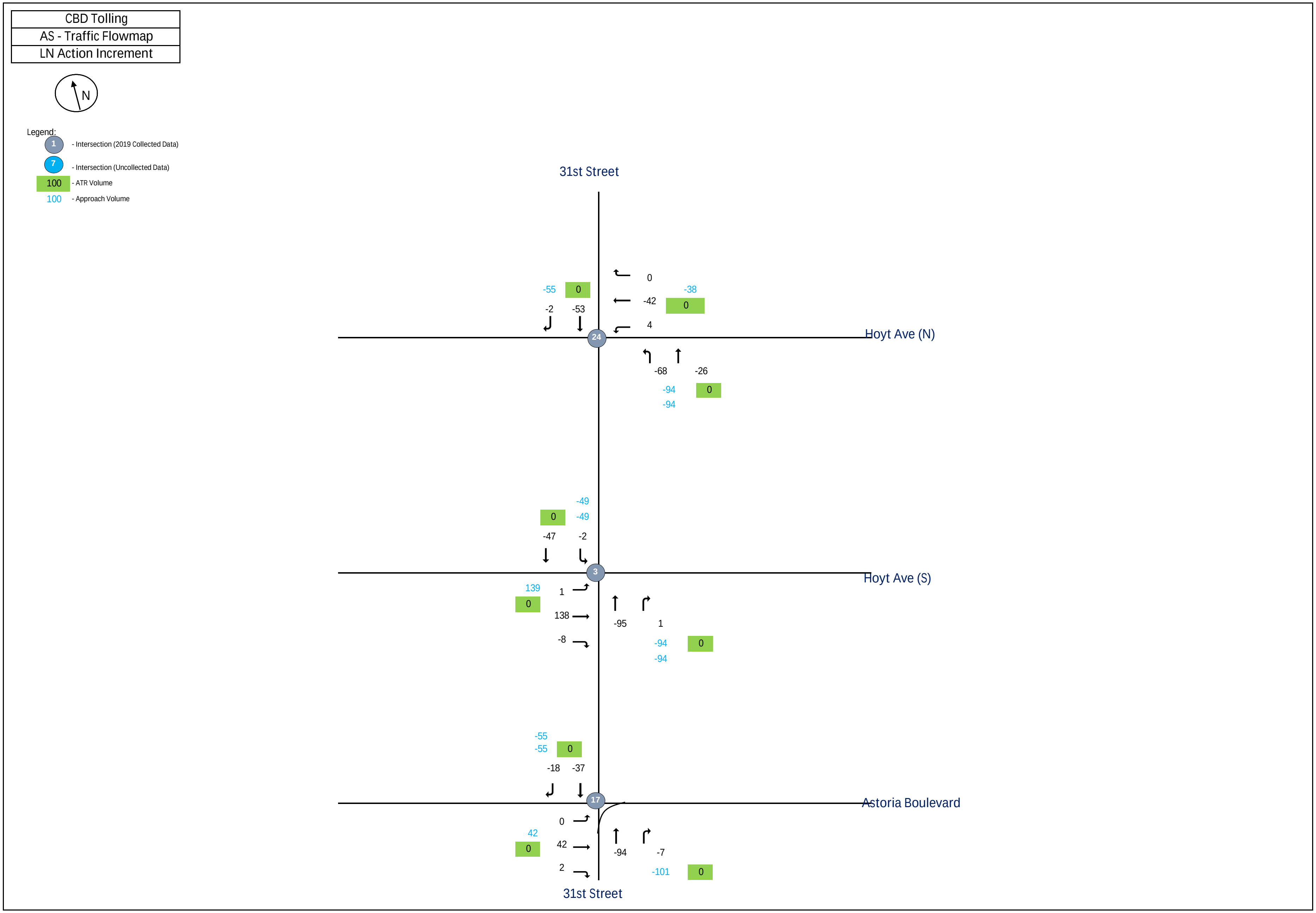
100 - ATR Volume

100 - Approach Volume



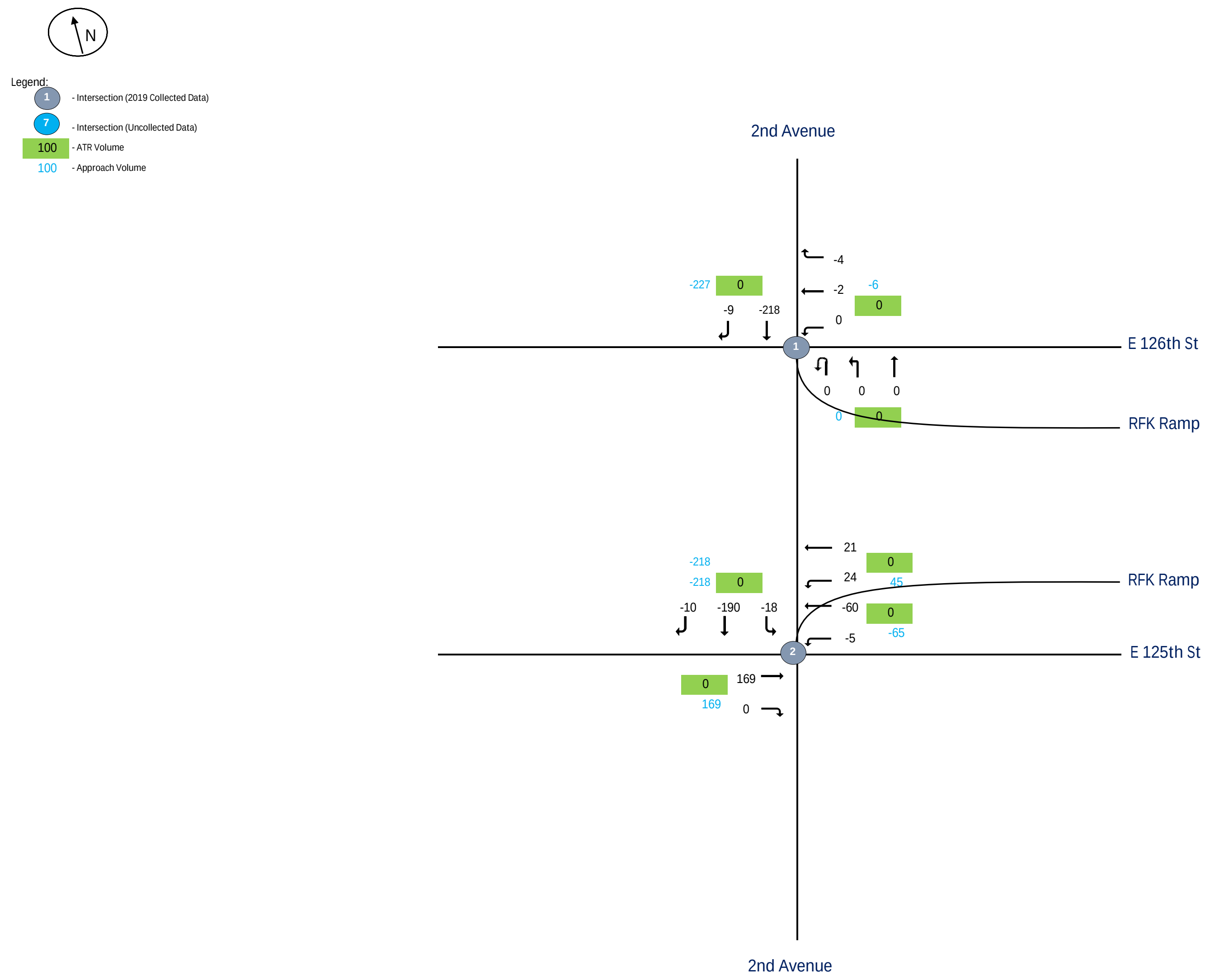
CBD Tolling
RKB - Traffic Flowmap
LN Action Increment



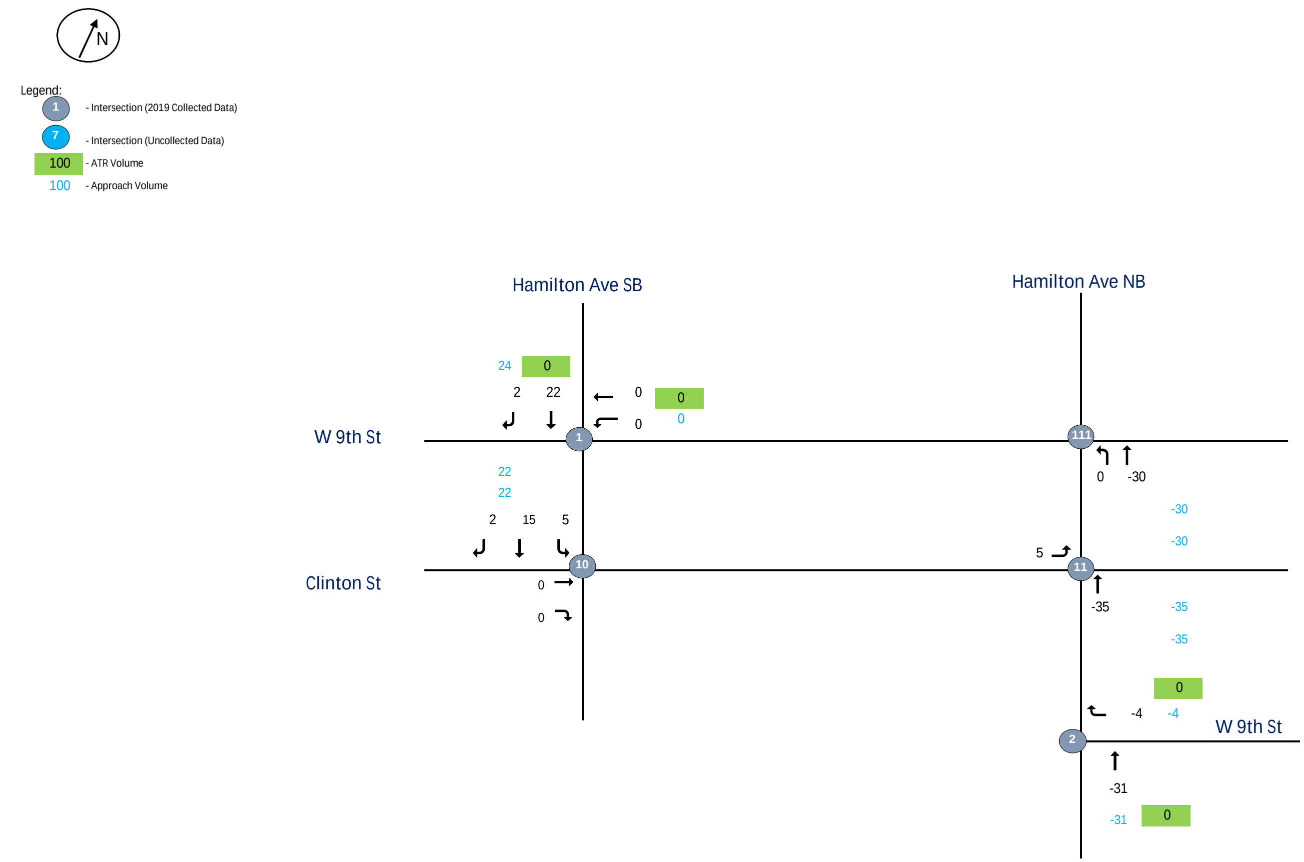


CBD Tolling
AS - Traffic Flowmap
LN Action Increment
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
31st Street
-55
0
-2
-53
0
-42
4
-38
0
24
Hoyt Ave (N)
-68
-26
-94
0
-94
-49
0
-49
-47
-2
3
Hoyt Ave (S)
139
1
0
138
-8
-95
1
-94
0
-94
-55
-55
0
-18
-37
17
Astoria Boulevard
0
42
42
0
2
-94
-7
-101
0
31st Street

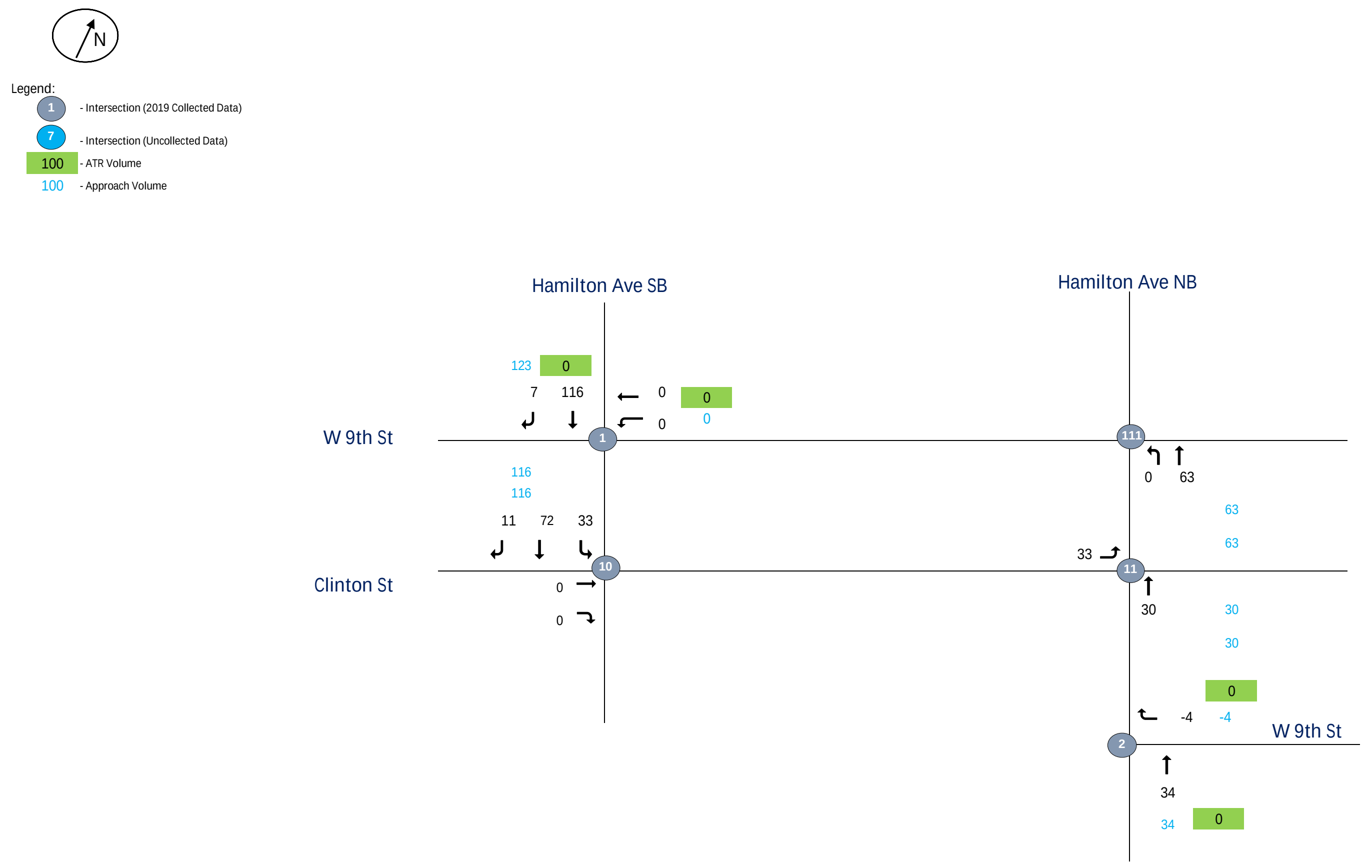
CBD Tolling
RKM - Traffic Flowmap
LN Action Increment



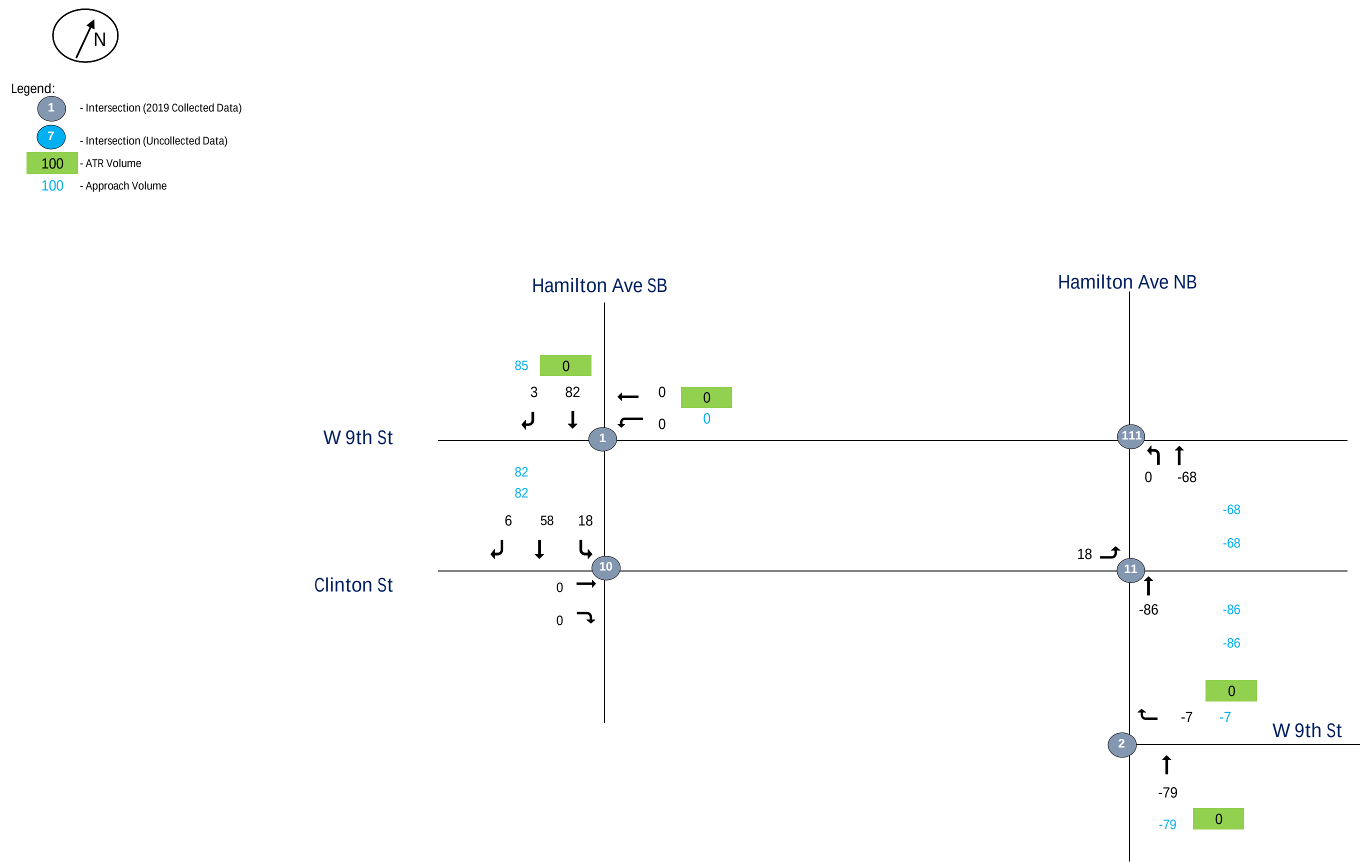
CBD Tolling
Red Hook- Traffic Flowmap
AM Increment



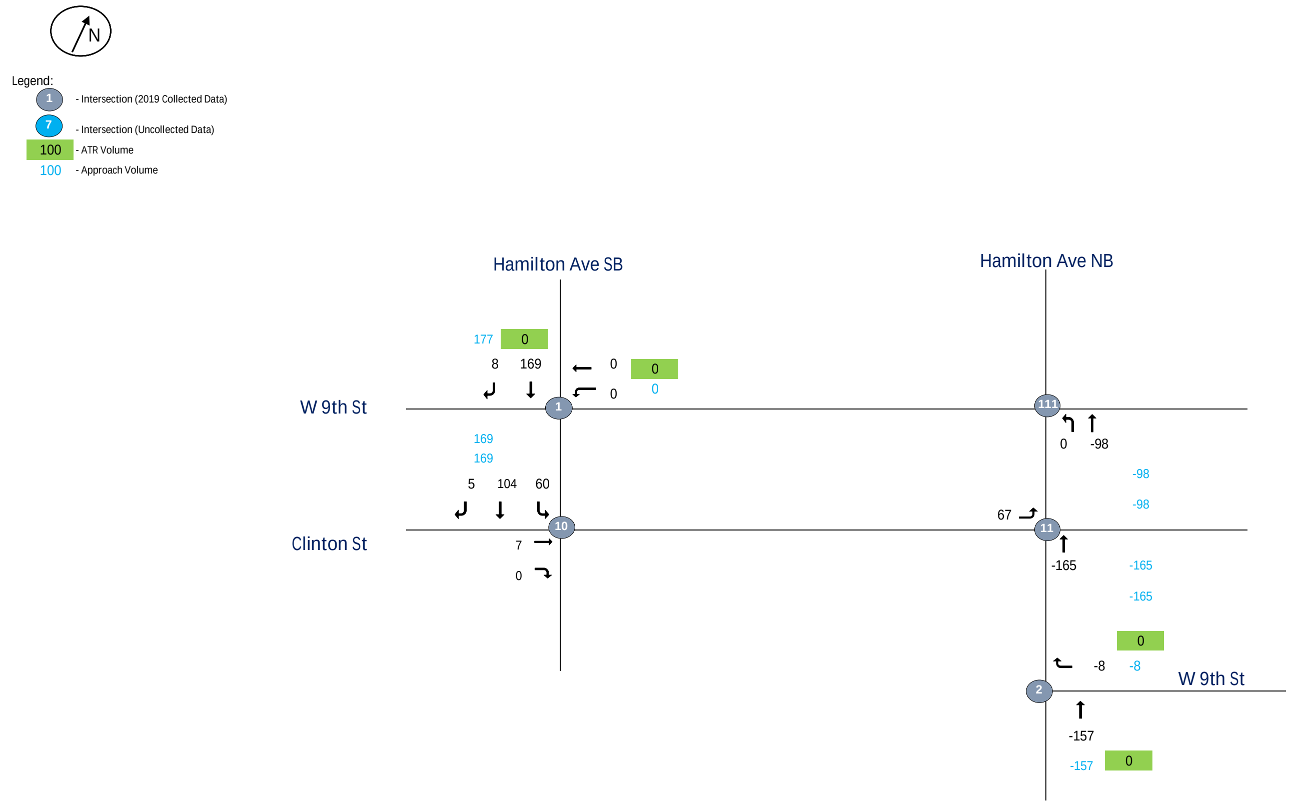
CBD Tolling
Red Hook- Traffic Flowmap
MD Action Increment

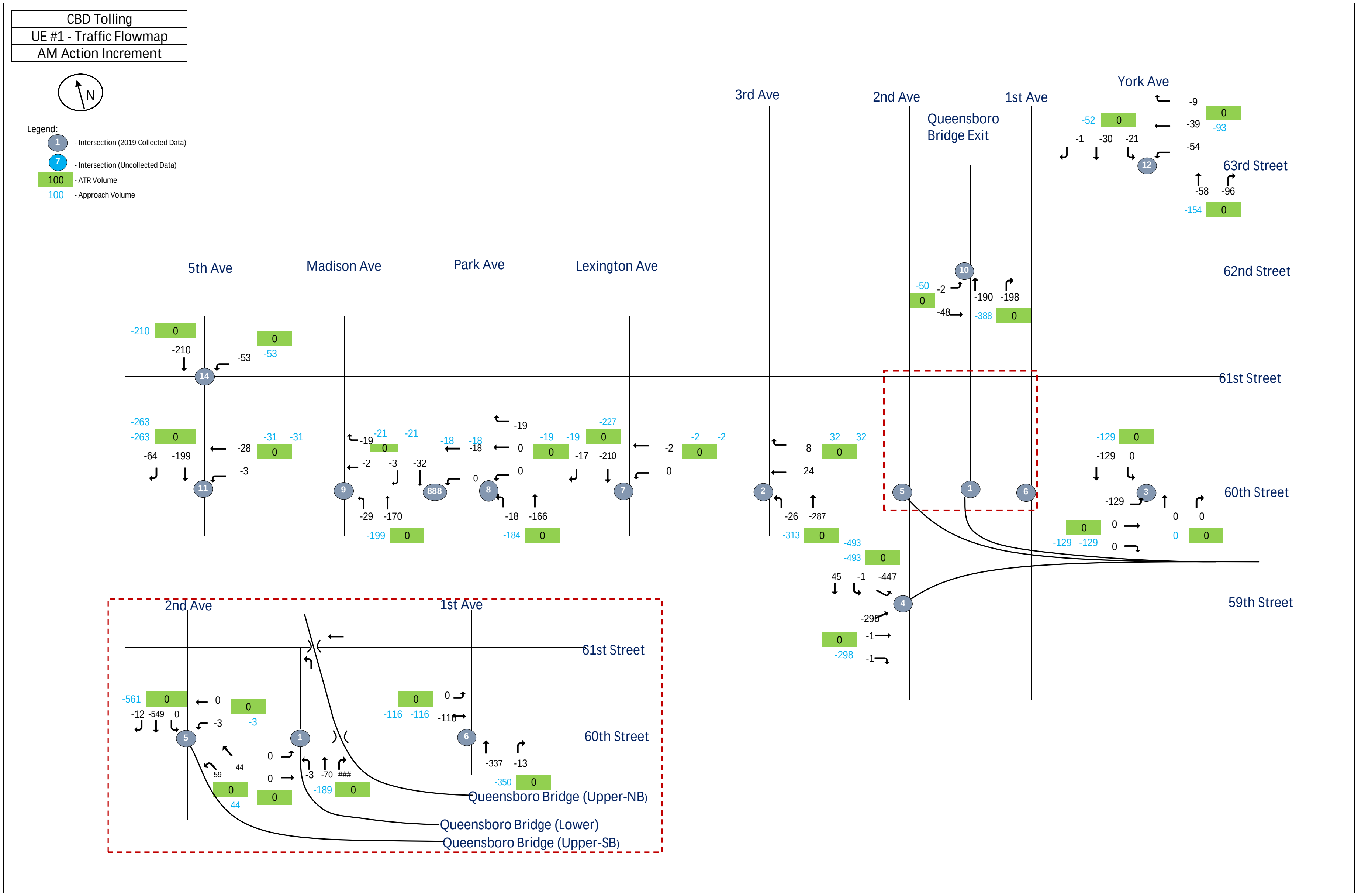


CBD Tolling
Red Hook- Traffic Flowmap
PM Action Increment



CBD Tolling
Red Hook- Traffic Flowmap
LN Action Increment

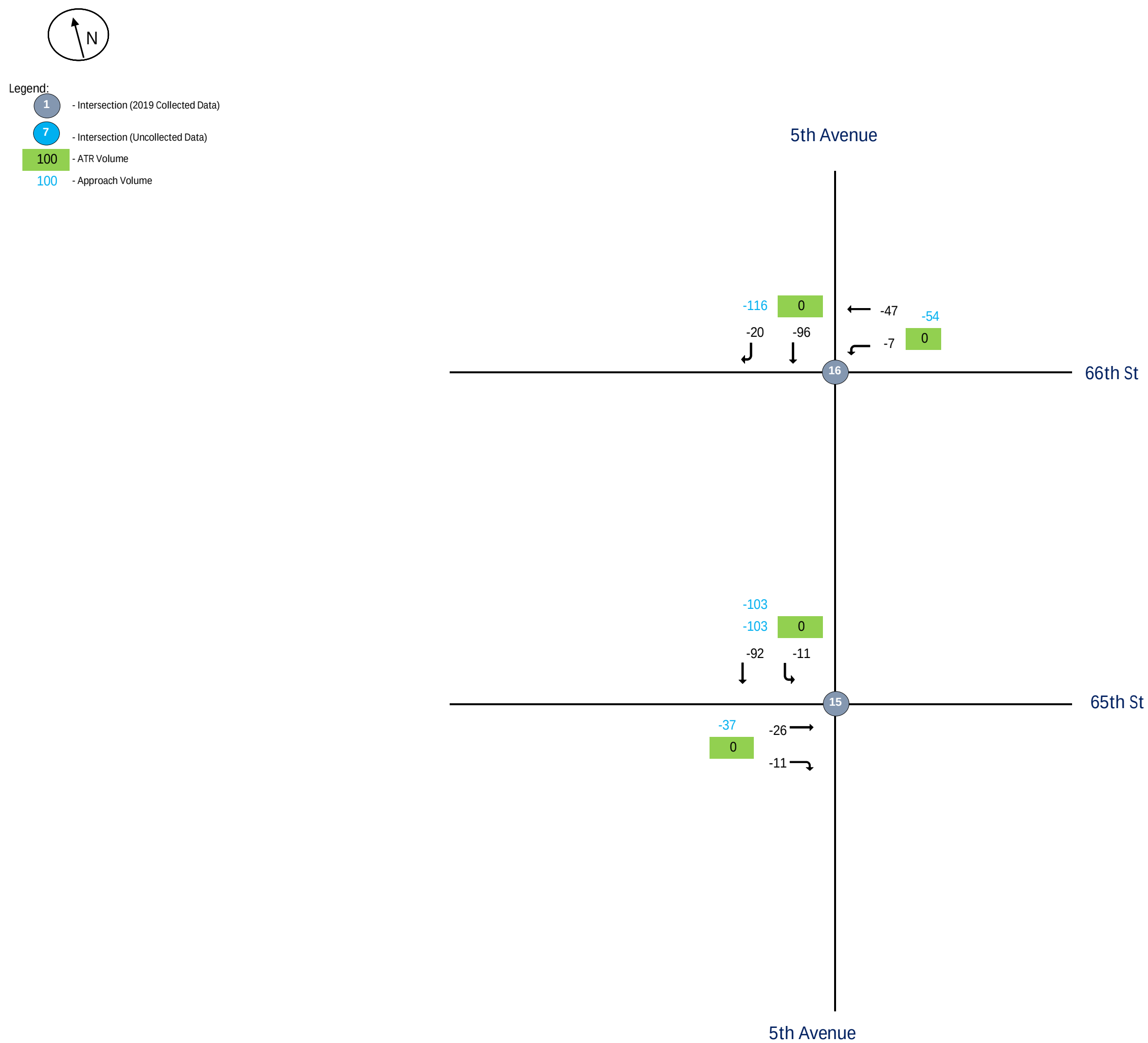




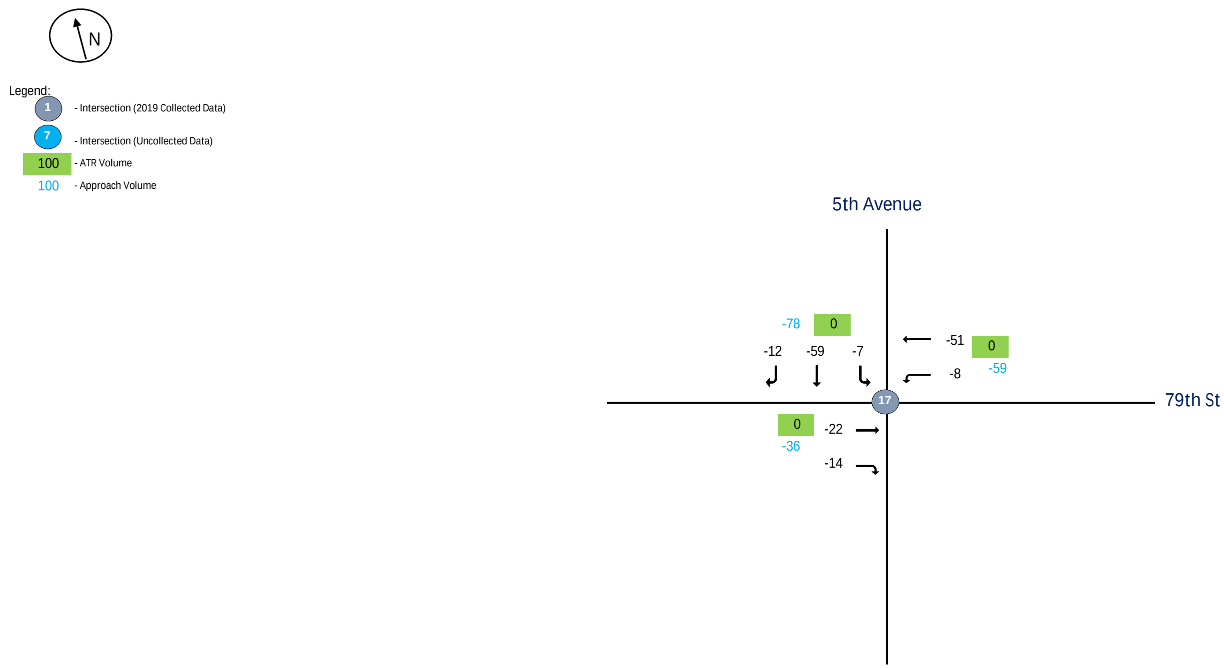
CBD Tolling
UE #1 - Traffic Flowmap
AM Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
AM Action Increment

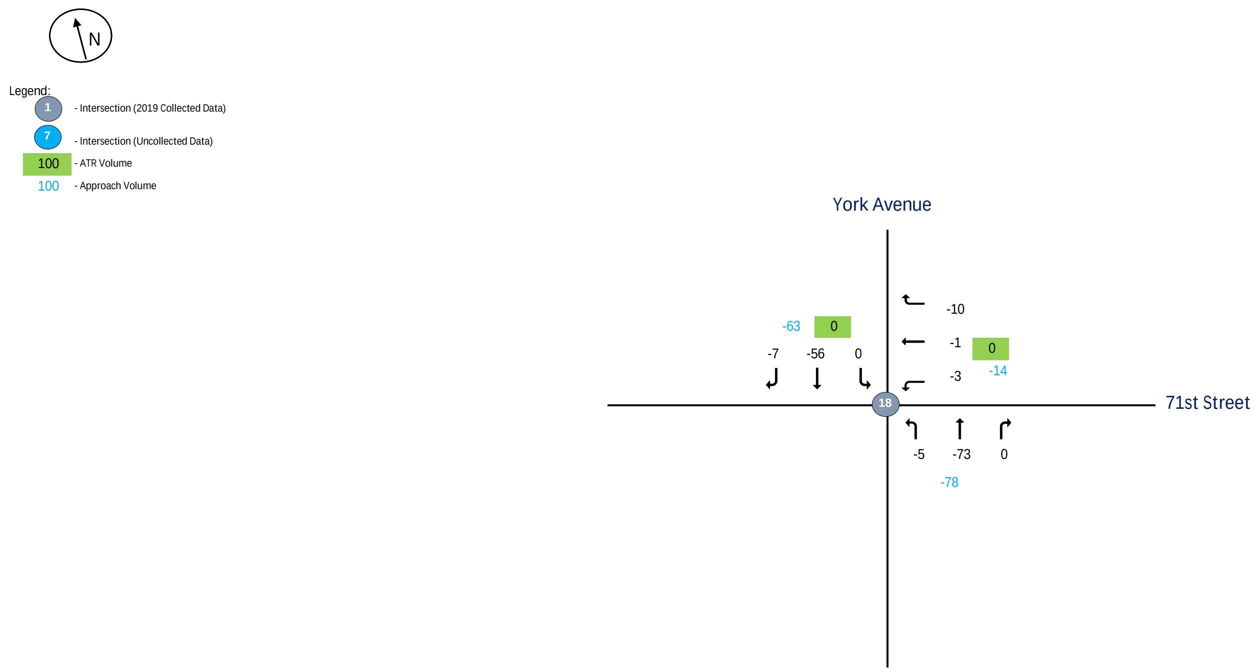
CBD Tolling
UE #3 - Traffic Flowmap
AM Action Increment

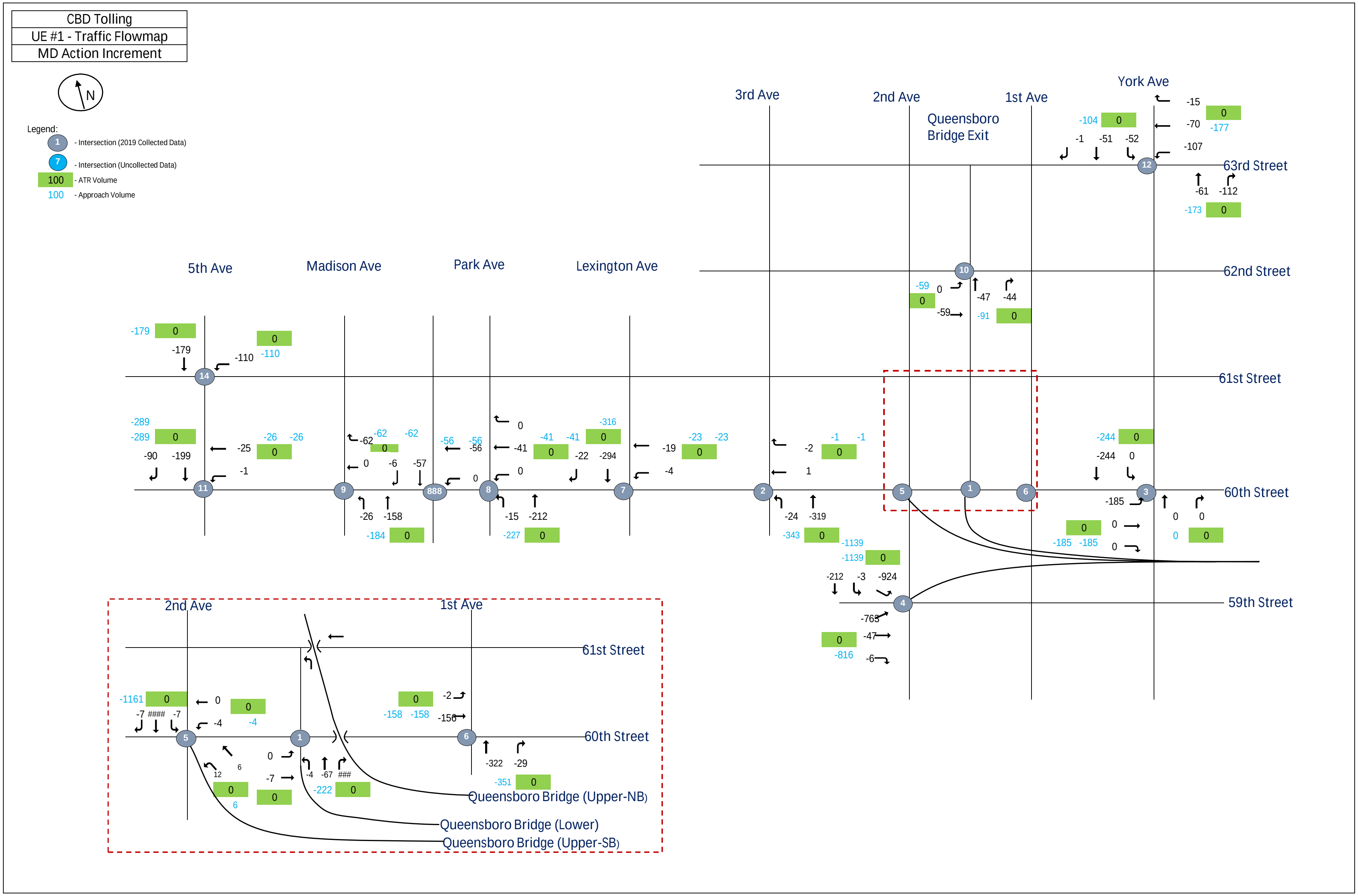


CBD Tolling
UE #3 - Traffic Flowmap
AM Action Increment

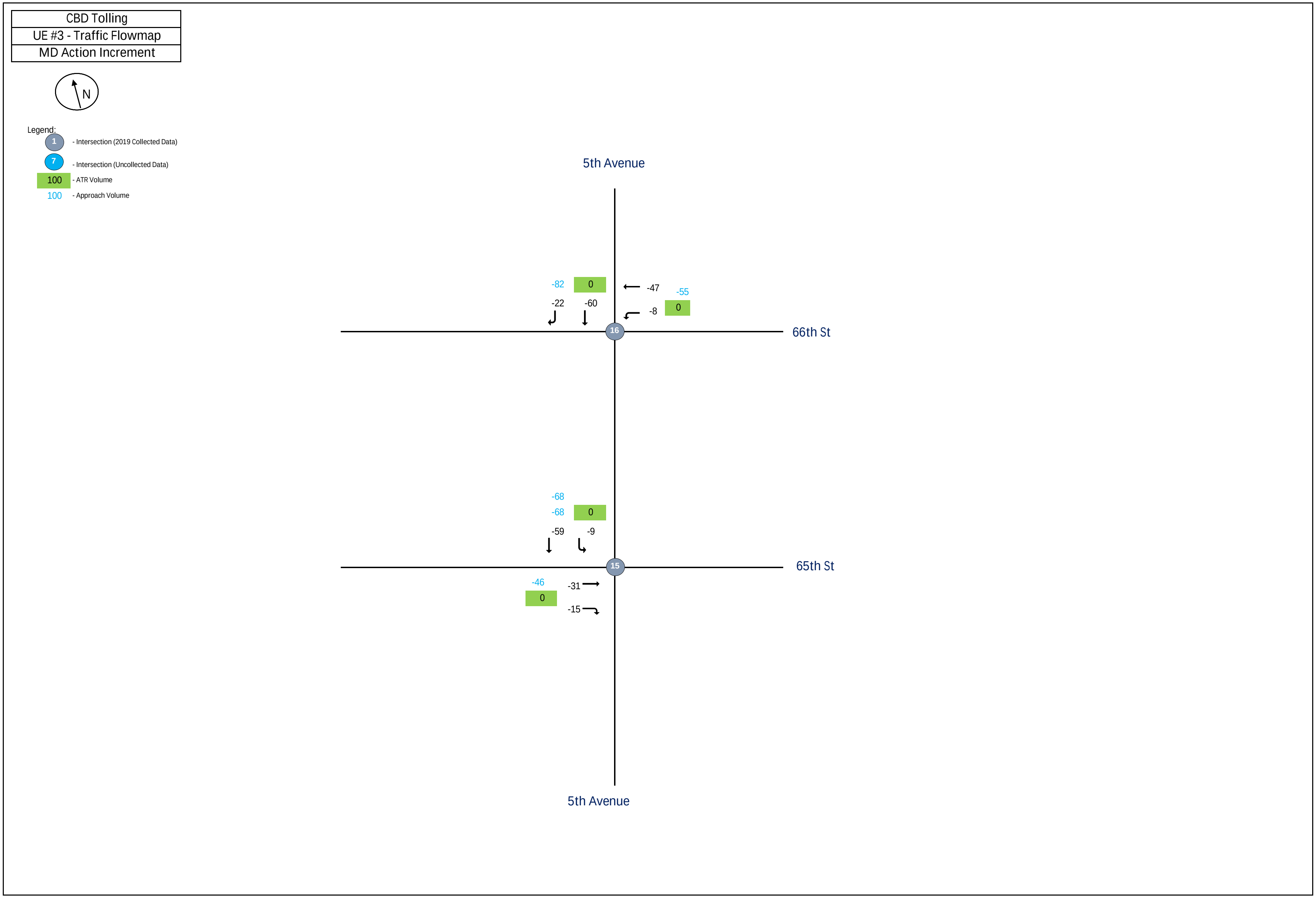


CBD Tolling
UE #4 - Traffic Flowmap
AM Action Increment



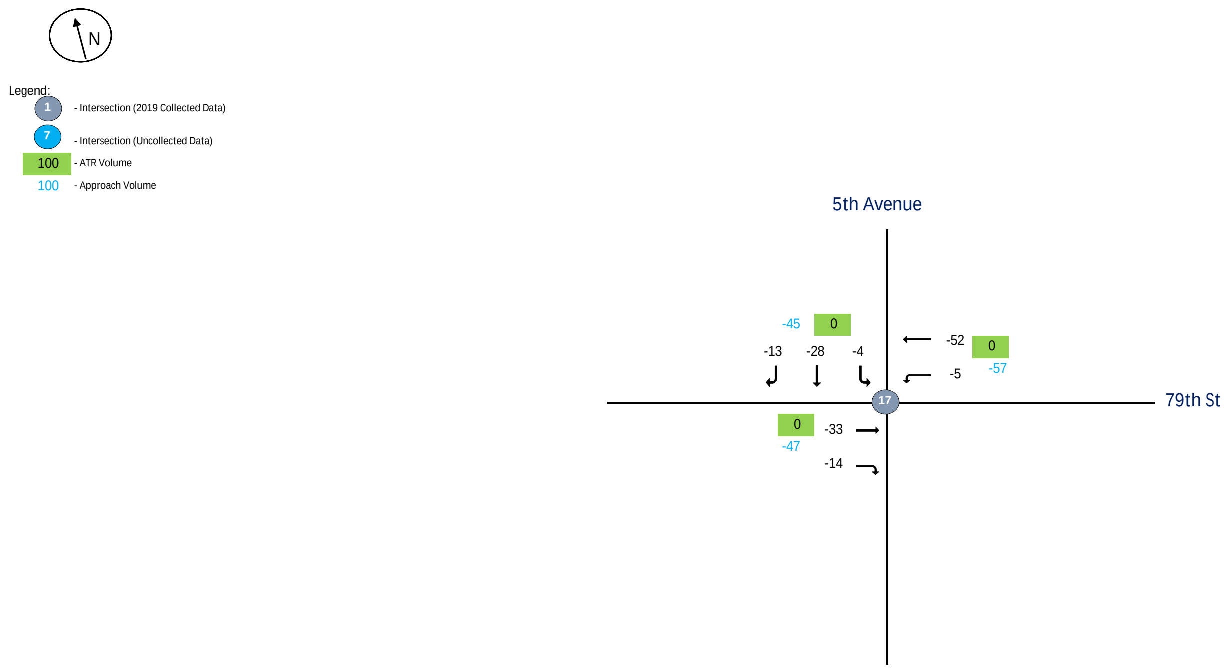

CBD Tolling
UE #1 - Traffic Flowmap
MD Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
MD Action Increment

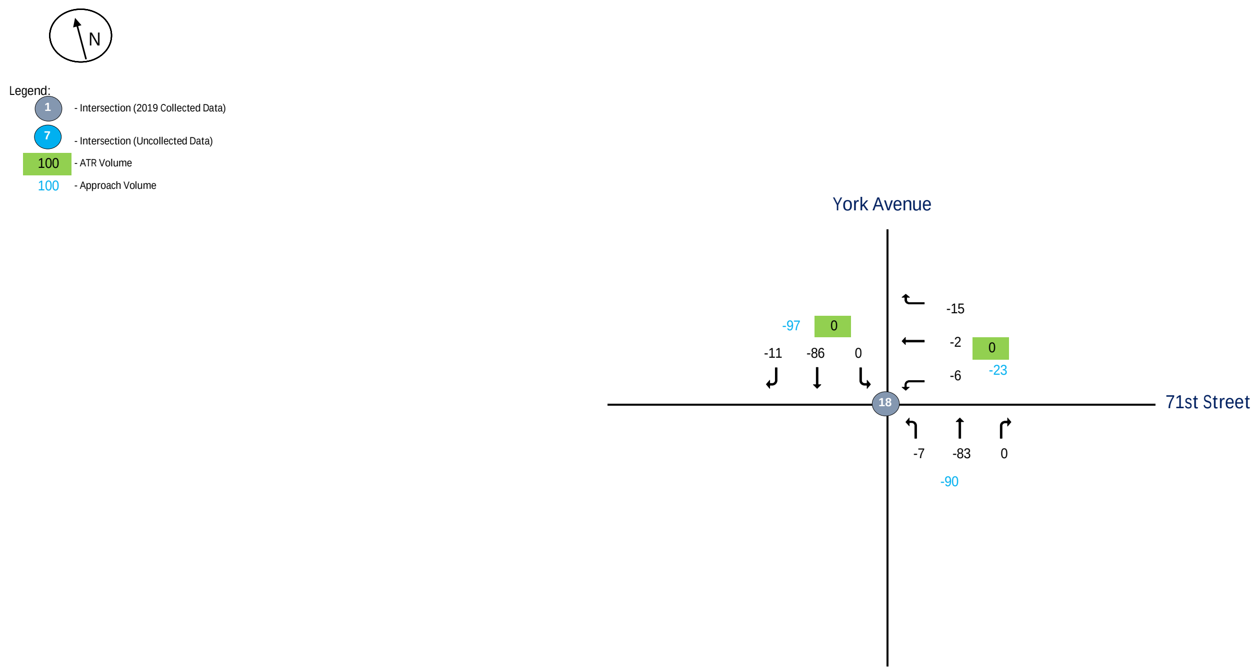


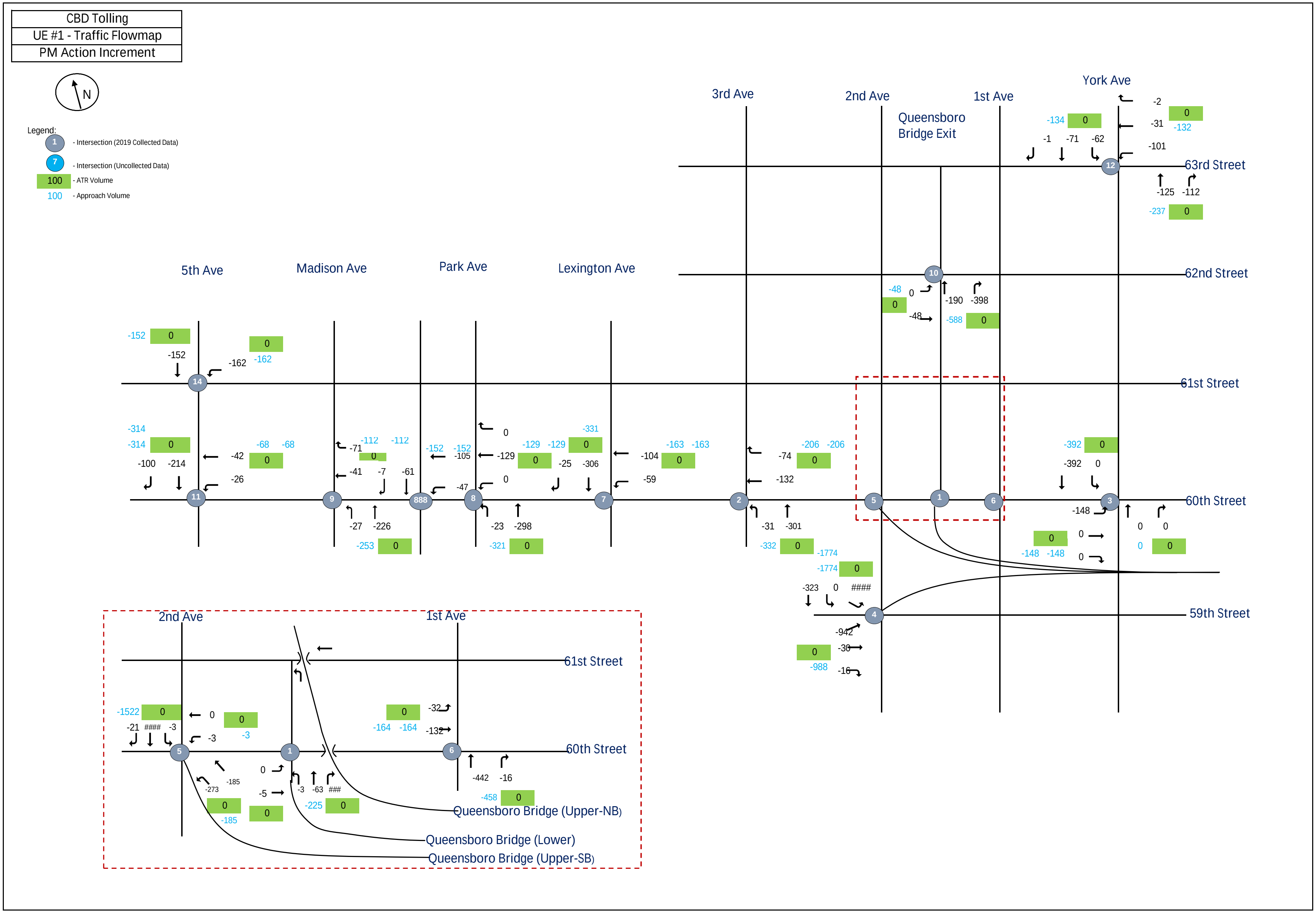
CBD Tolling
UE #3 - Traffic Flowmap
MD Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Avenue
-82
0
-47
-55
-22
-60
-8
0
16
66th St
-68
-68
0
-59
-9
15
65th St
-46
-31
0
-15
5th Avenue

CBD Tolling
UE #3 - Traffic Flowmap
MD Action Increment



CBD Tolling
UE #4 - Traffic Flowmap
MD Action Increment

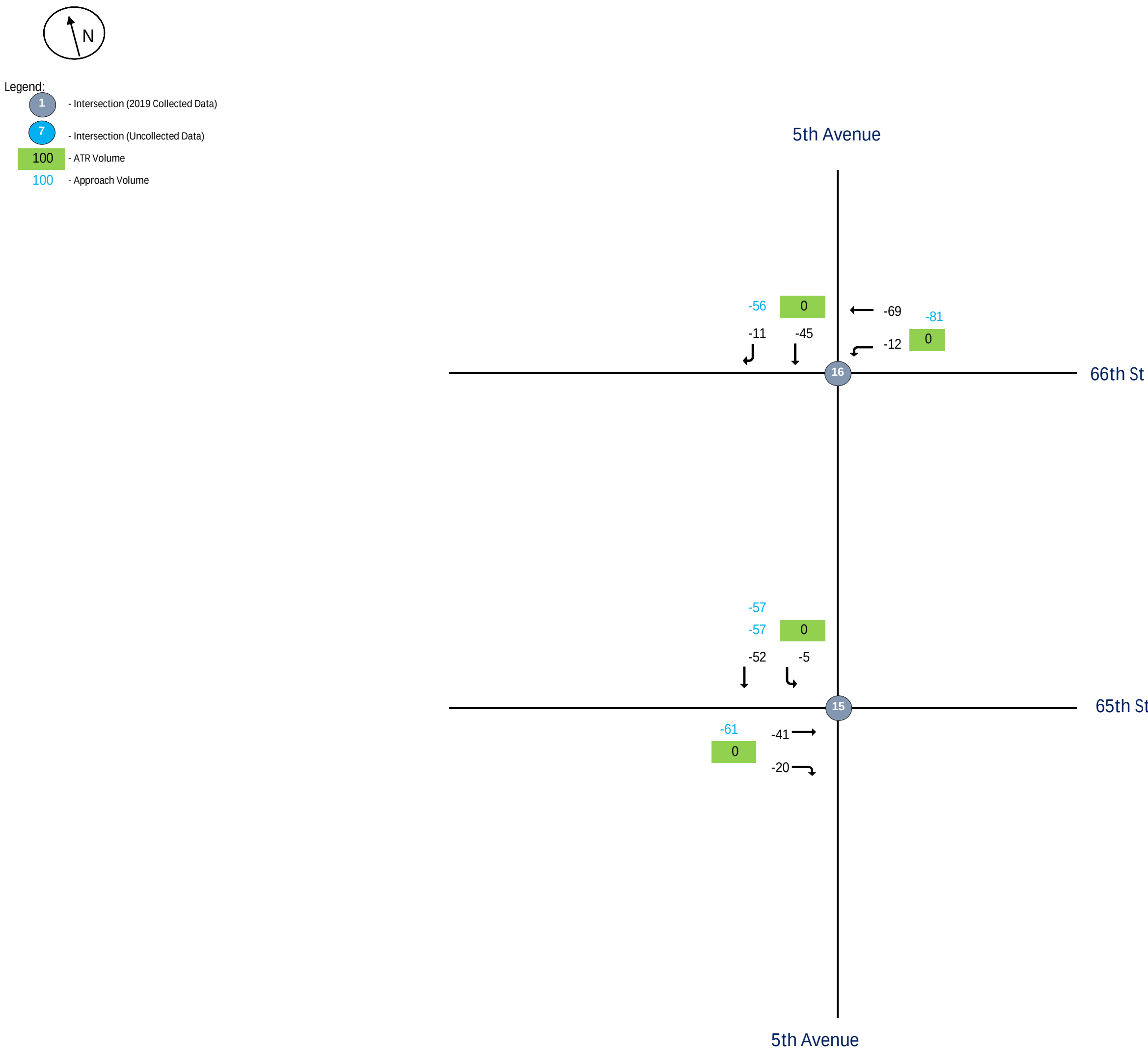




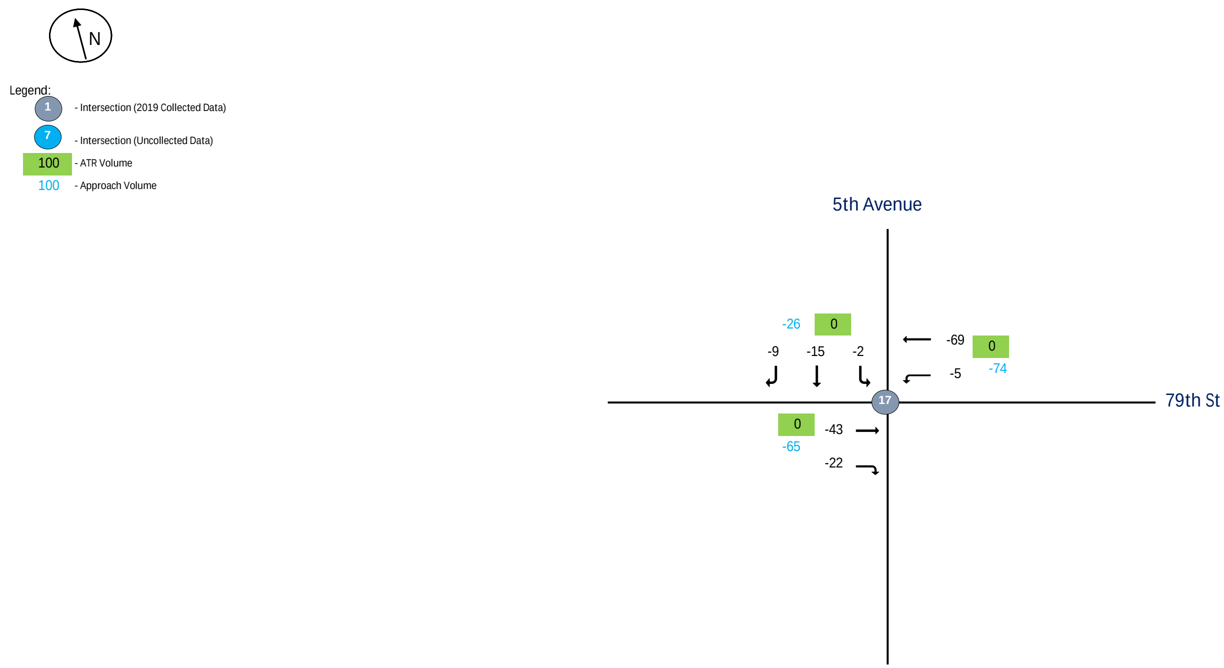
CBD Tolling
UE #1 - Traffic Flowmap
PM Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
PM Action Increment

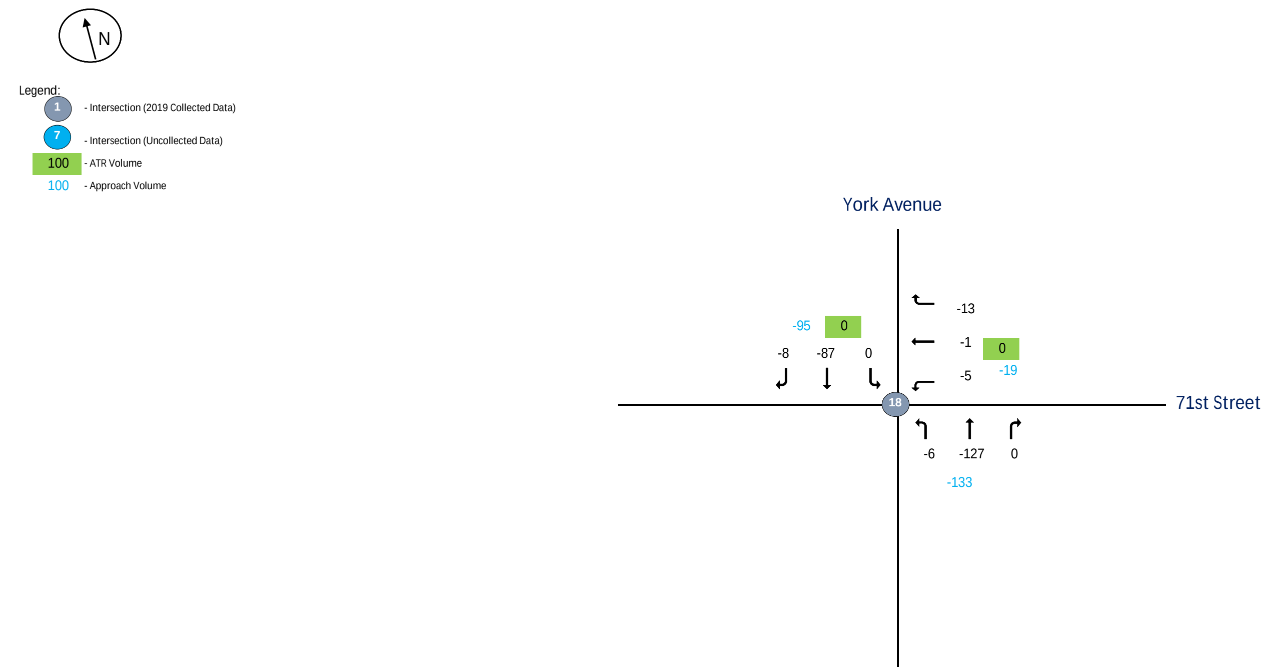
CBD Tolling
UE #3 - Traffic Flowmap
PM Action Increment

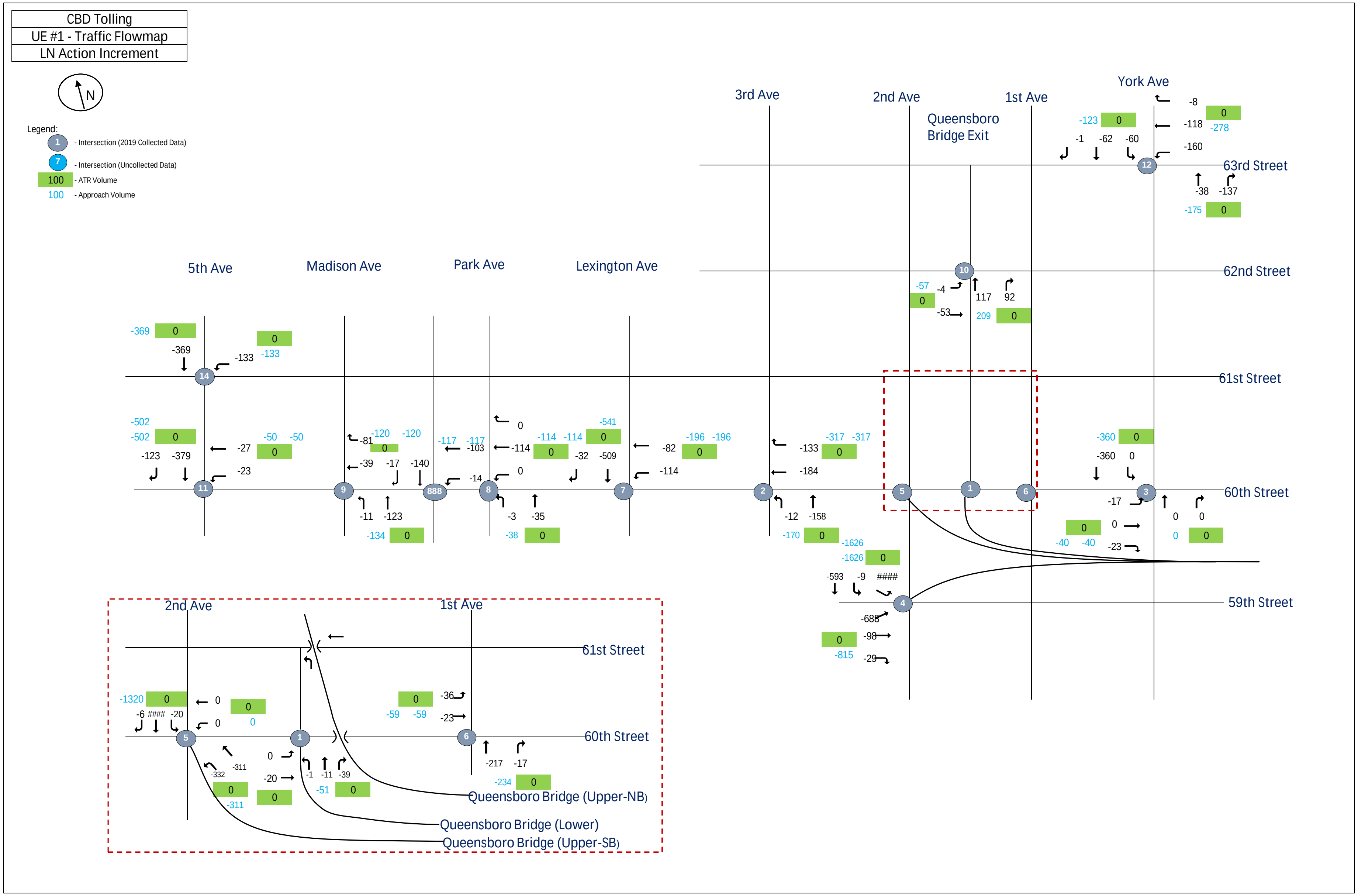


CBD Tolling
UE #3 - Traffic Flowmap
PM Action Increment



CBD Tolling
UE #4 - Traffic Flowmap
PM Action Increment





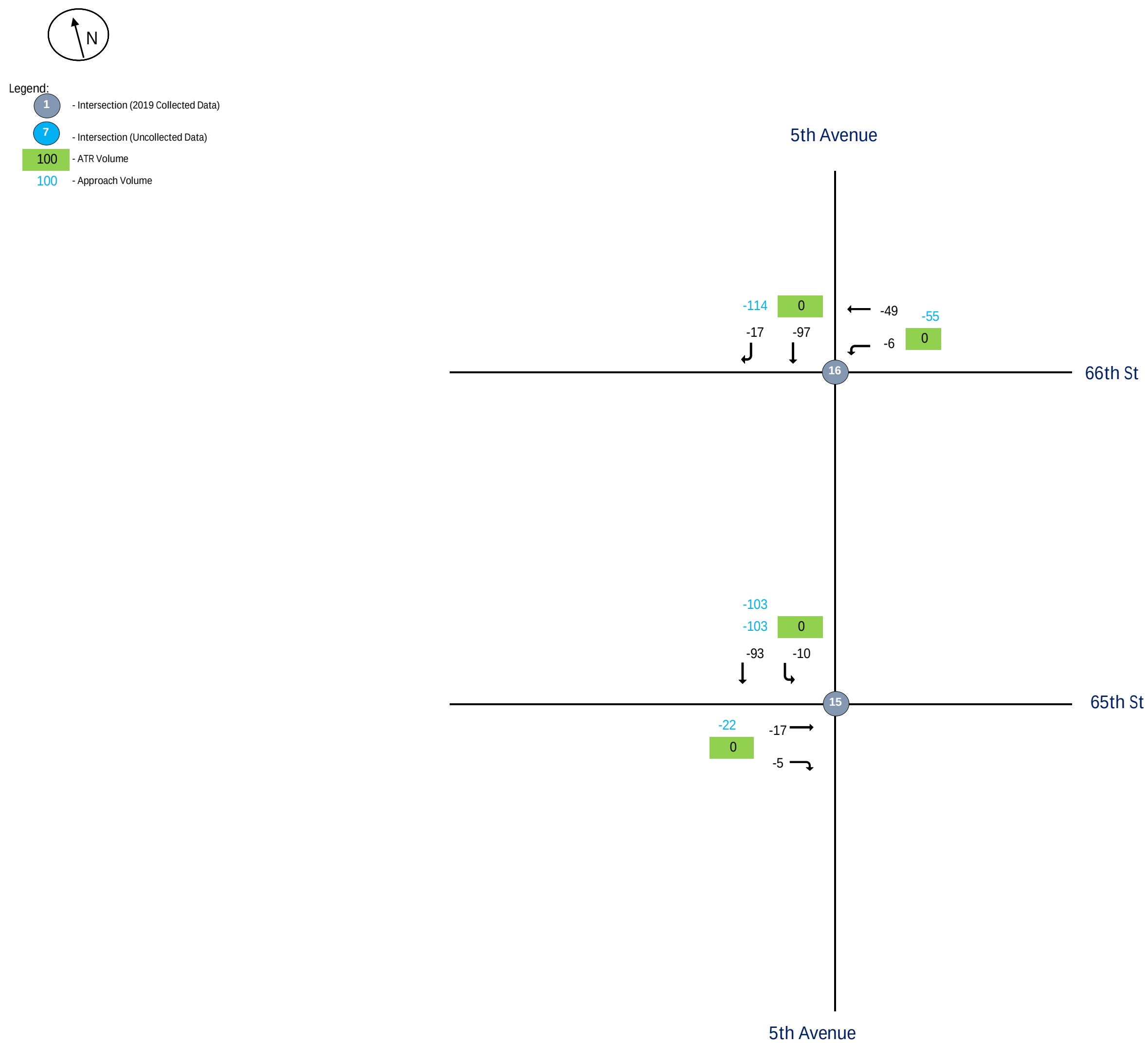
CBD Tolling
UE #1 - Traffic Flowmap
LN Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling

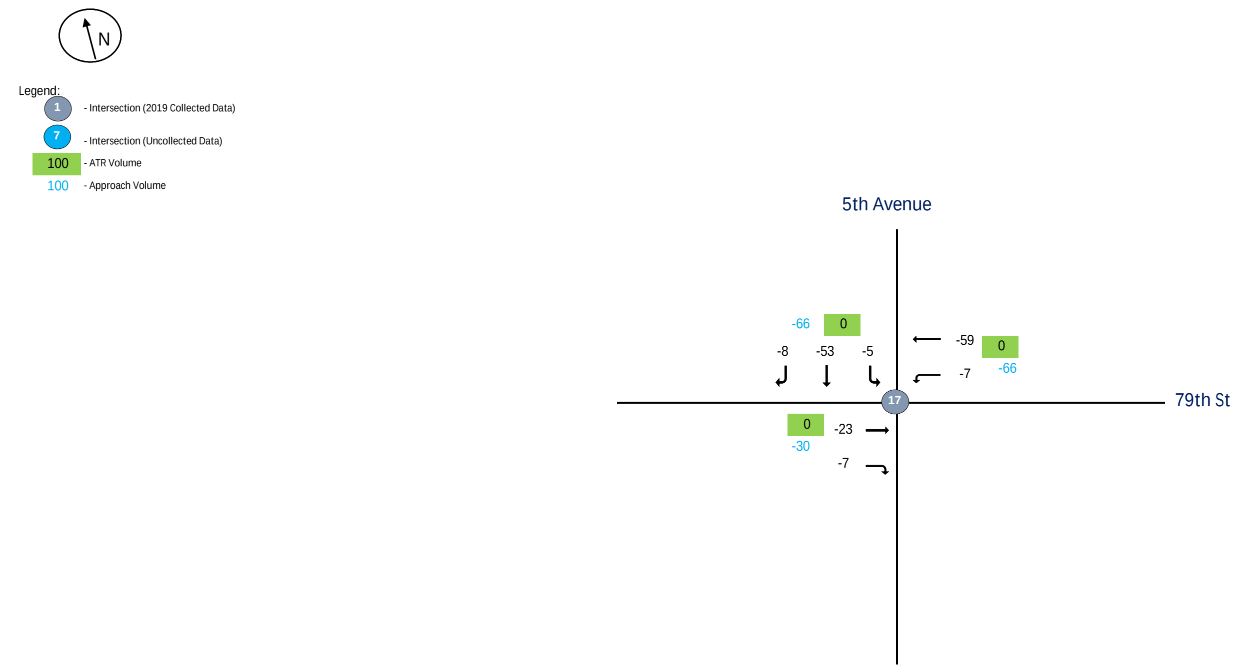
UE #2 - Traffic Flowmap

LN Action Increment

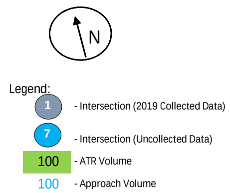
CBD Tolling
UE #3 - Traffic Flowmap
LN Action Increment

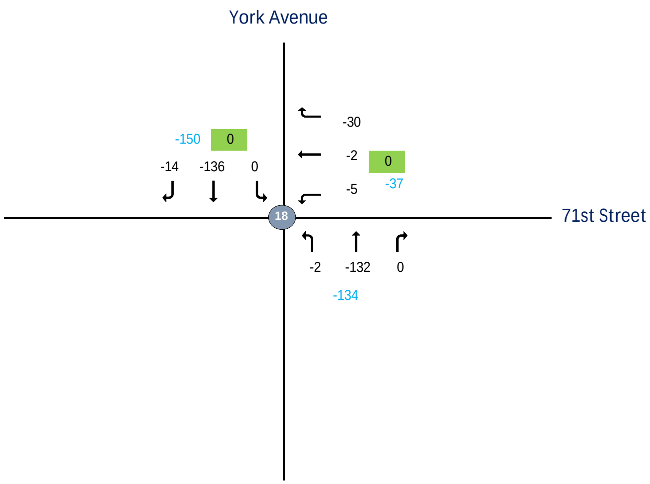


CBD Tolling
UE #3 - Traffic Flowmap
LN Action Increment



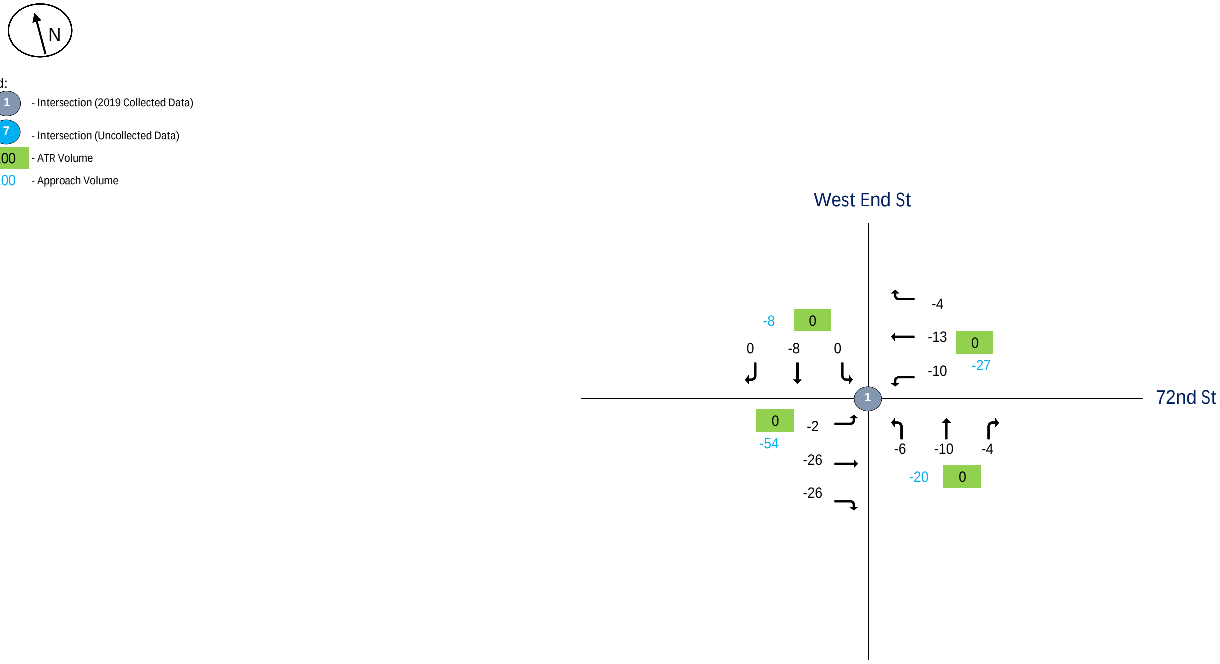
CBD Tolling
UE #4 - Traffic Flowmap
LN Action Increment

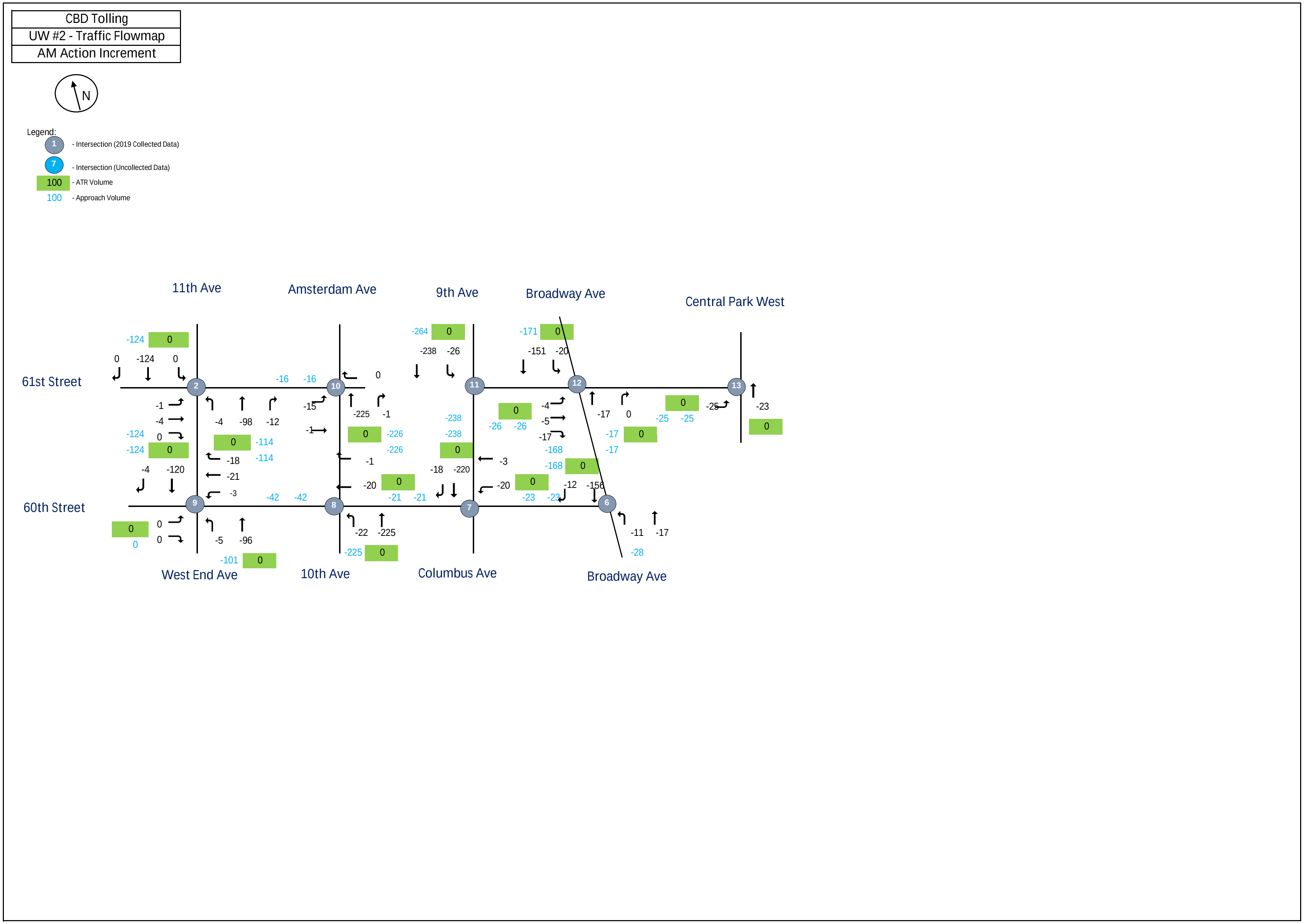




CBD Tolling
UW #1 - Traffic Flowmap
AM Action Increment

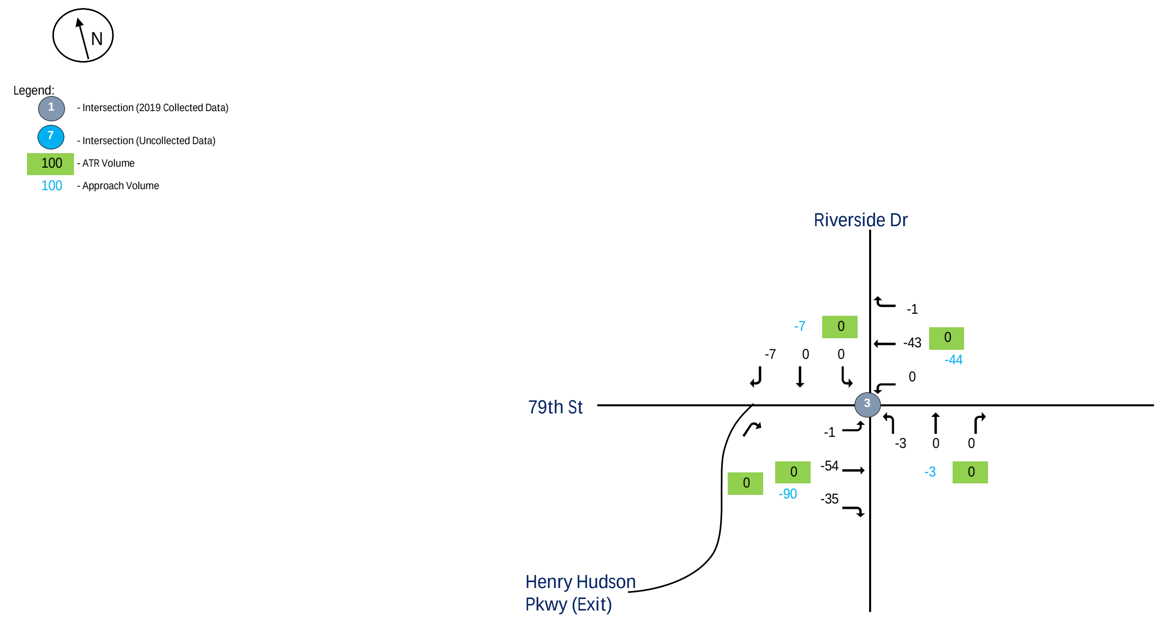
Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume





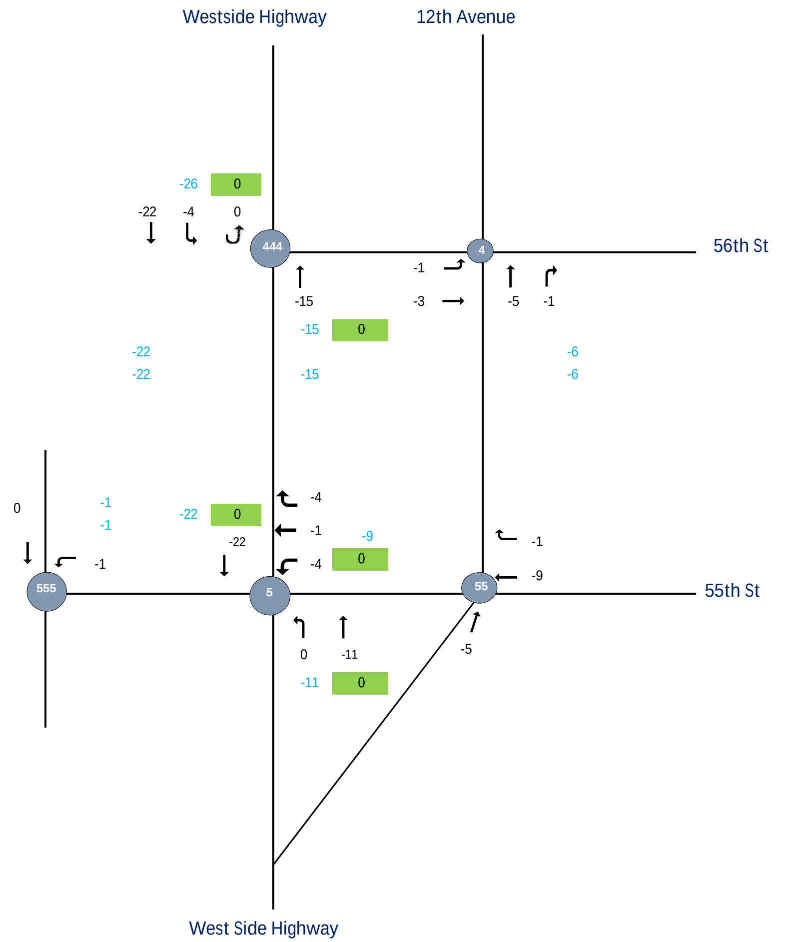
CBD Tolling
UW #2 - Traffic Flowmap
AM Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
11th Ave
Amsterdam Ave
9th Ave
Broadway Ave
Central Park West
61st Street
60th Street
West End Ave
10th Ave
Columbus Ave
Broadway Ave

CBD Tolling
UW #3 - Traffic Flowmap
AM Action Increment



CBD Tolling
UW #4 - Traffic Flowmap
AM Action Increment

Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume

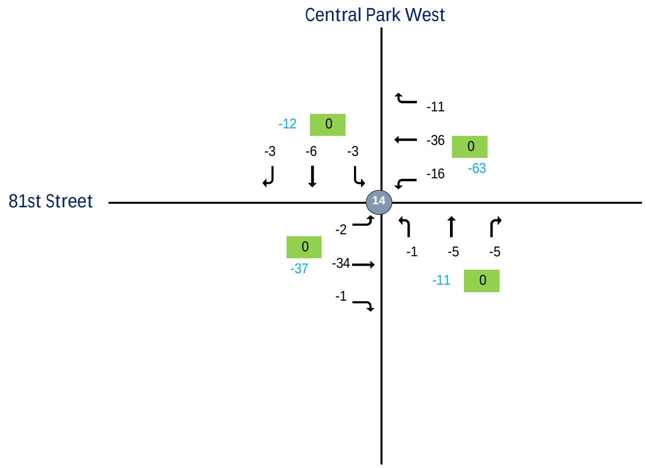


CBD Tolling

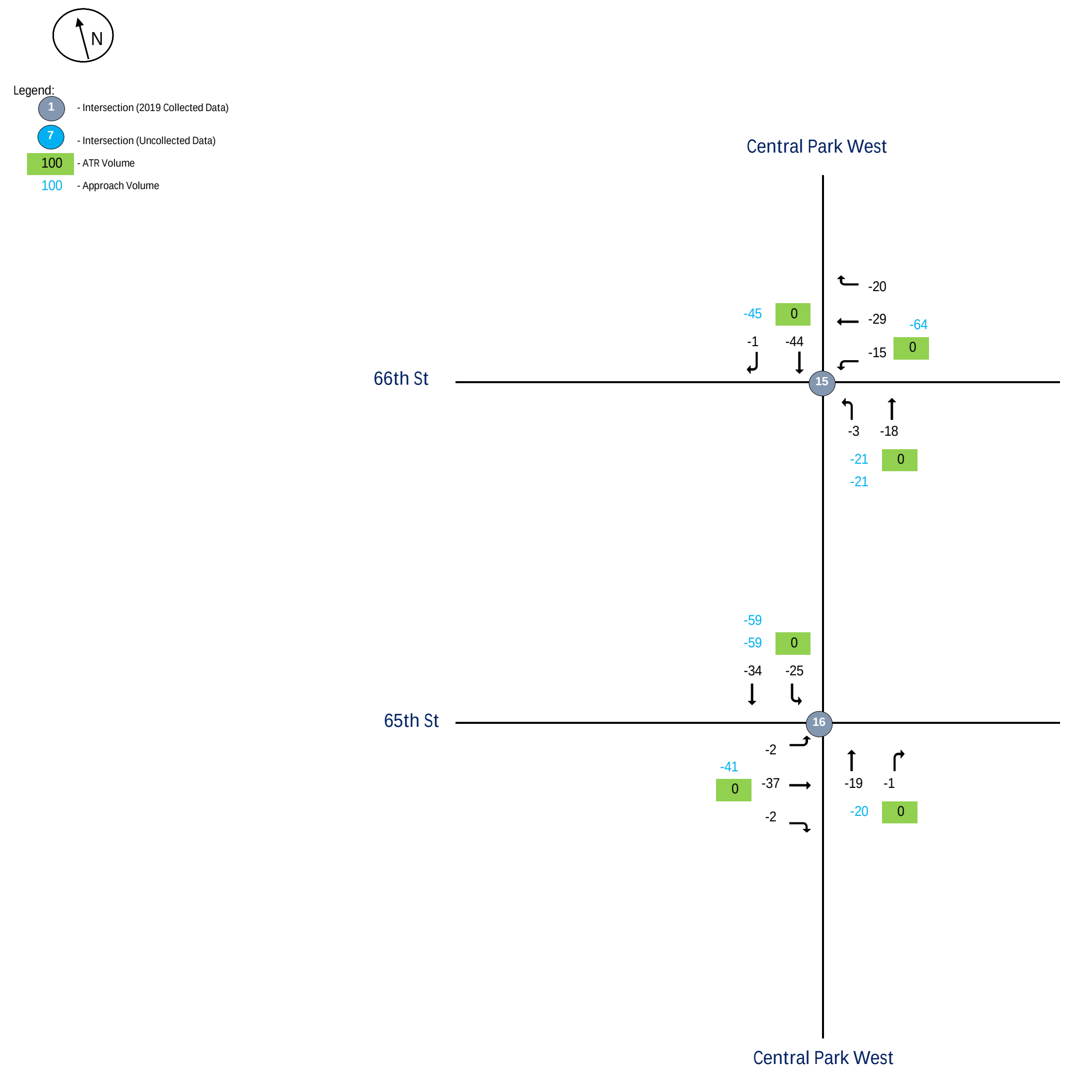
UW #5 - Traffic Flowmap

AM Action Increment

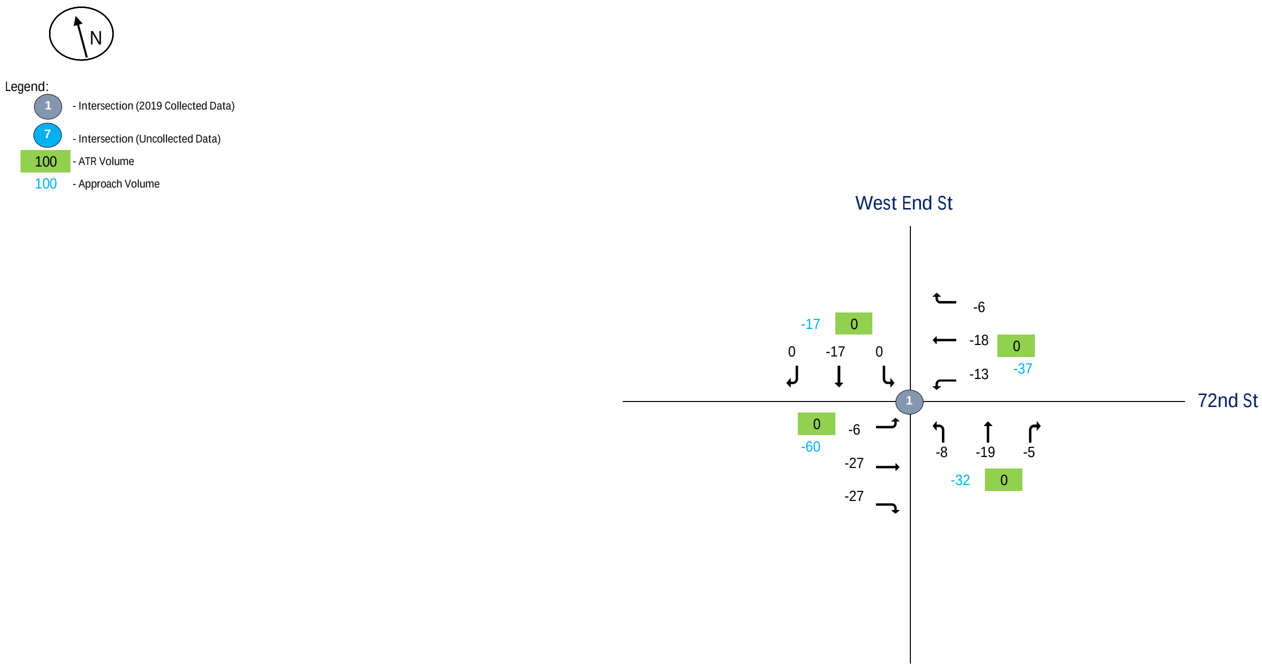
Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



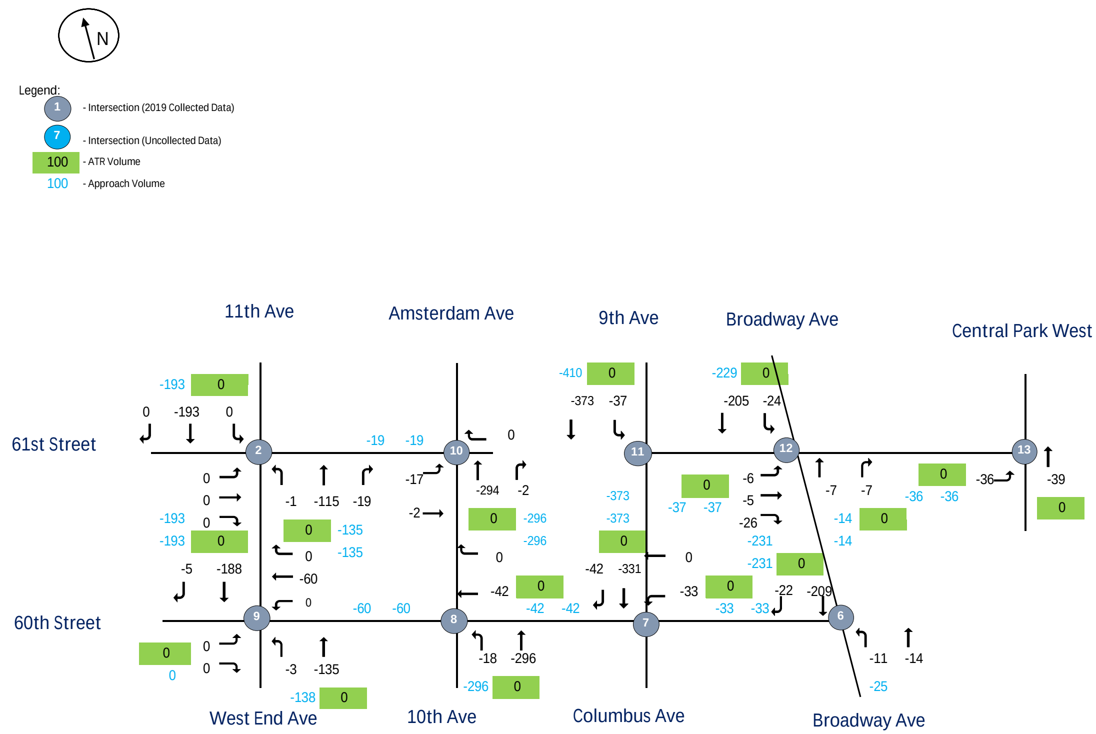
CBD Tolling
UW #6 - Traffic Flowmap
AM Action Increment



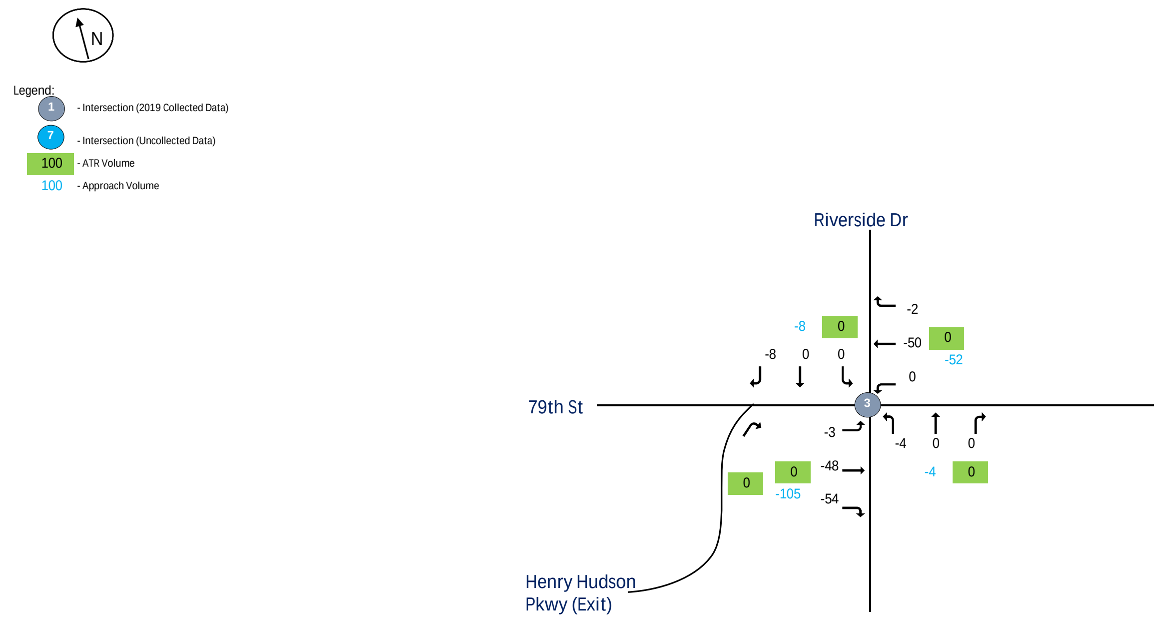
CBD Tolling
UW #1 - Traffic Flowmap
MD Action Increment

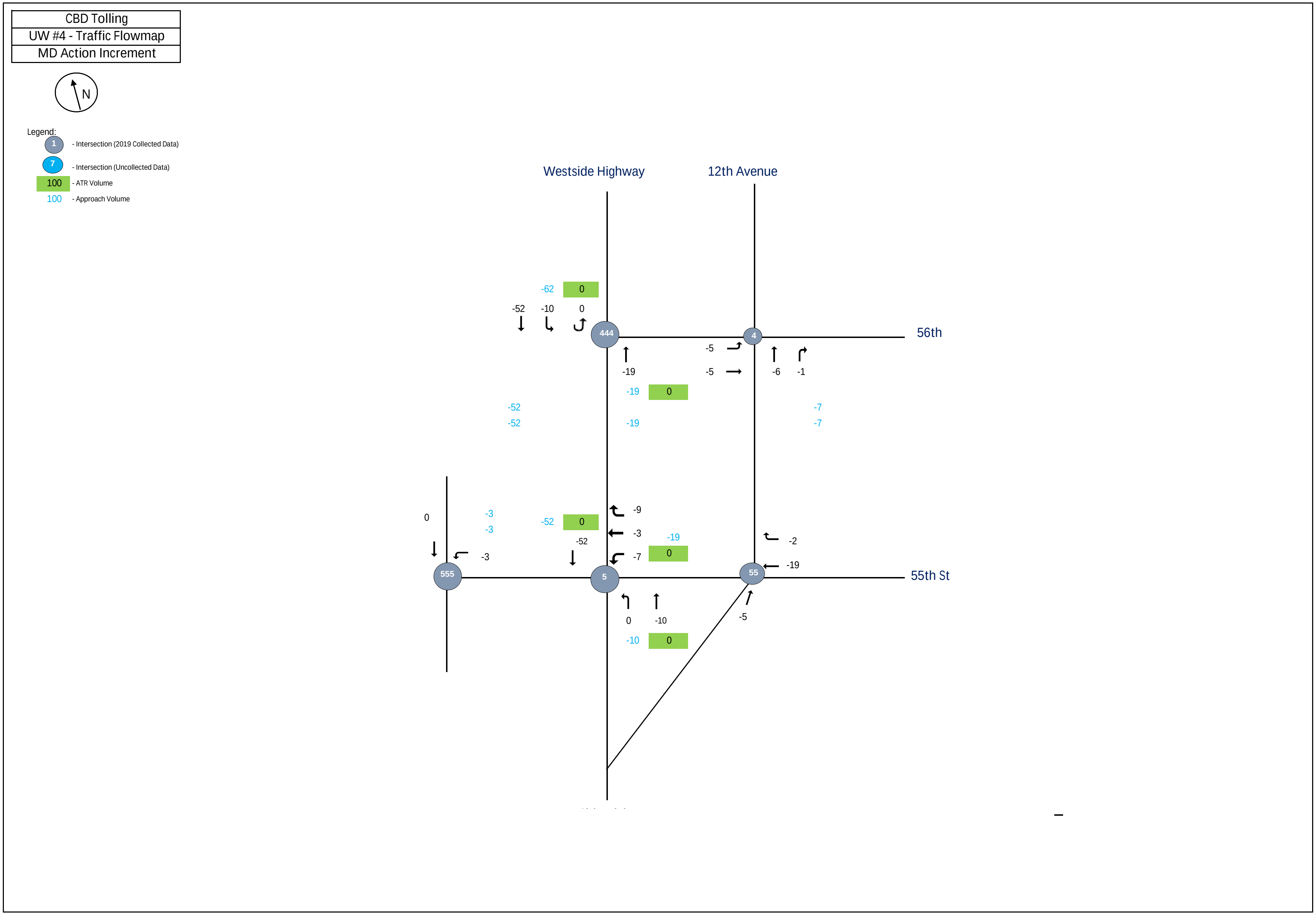


CBD Tolling
UW #2 - Traffic Flowmap
MD Action Increment



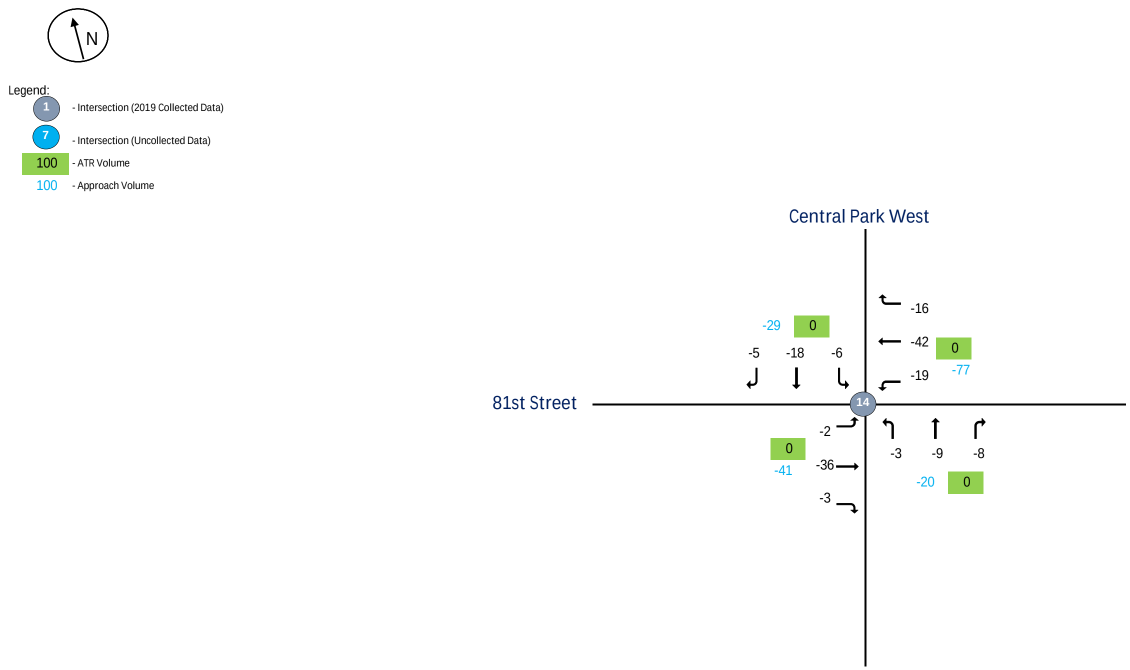
CBD Tolling
UW #3 - Traffic Flowmap
MD Action Increment



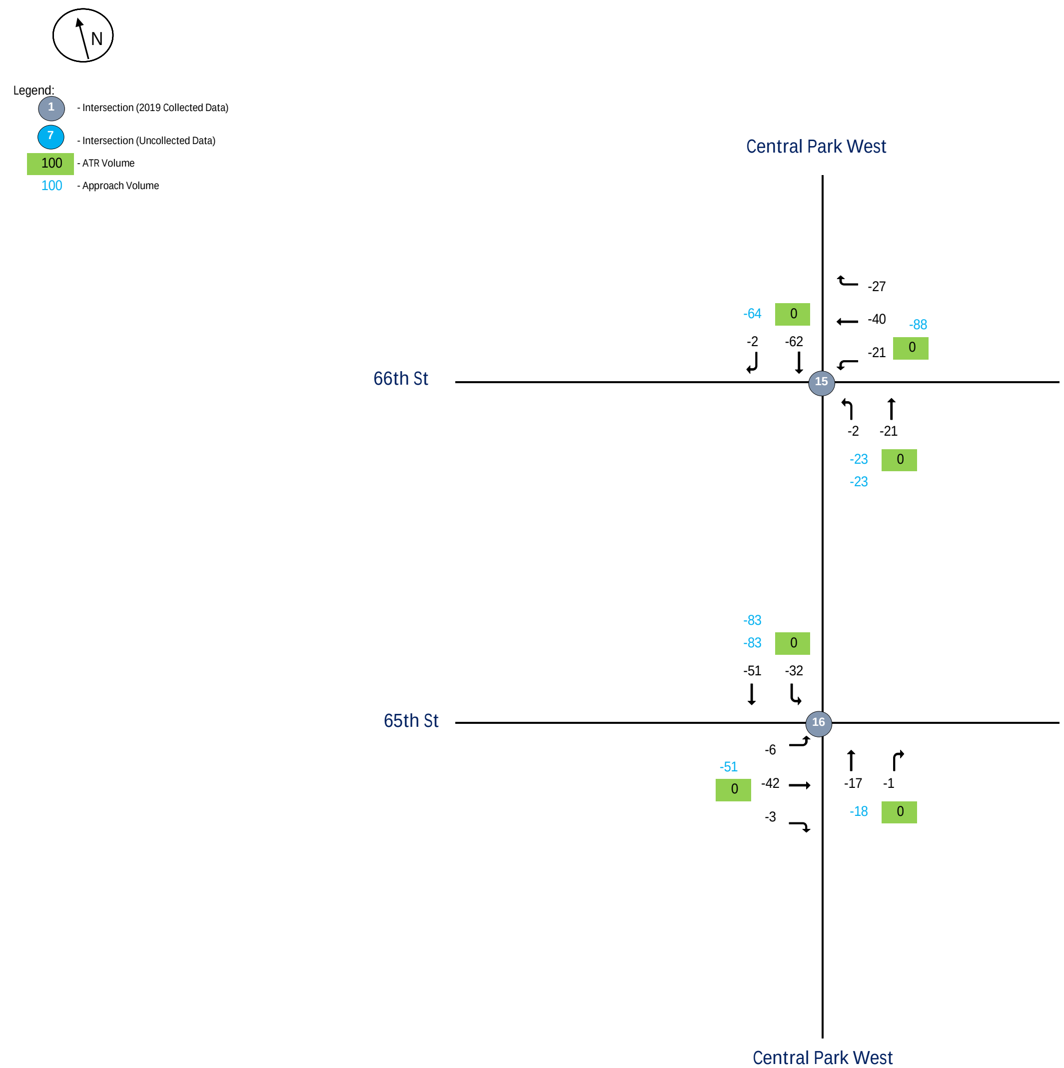


CBD Tolling
UW #4 - Traffic Flowmap
MD Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th
55th St
444
4
5
55
555
-62
0
-52
-10
0
-5
-5
-19
-6
-1
-19
0
-52
-52
-19
-7
-7
-3
-3
0
-52
0
-9
-3
-52
-7
-19
0
-2
-19
-3
0
-10
-5
-10
0

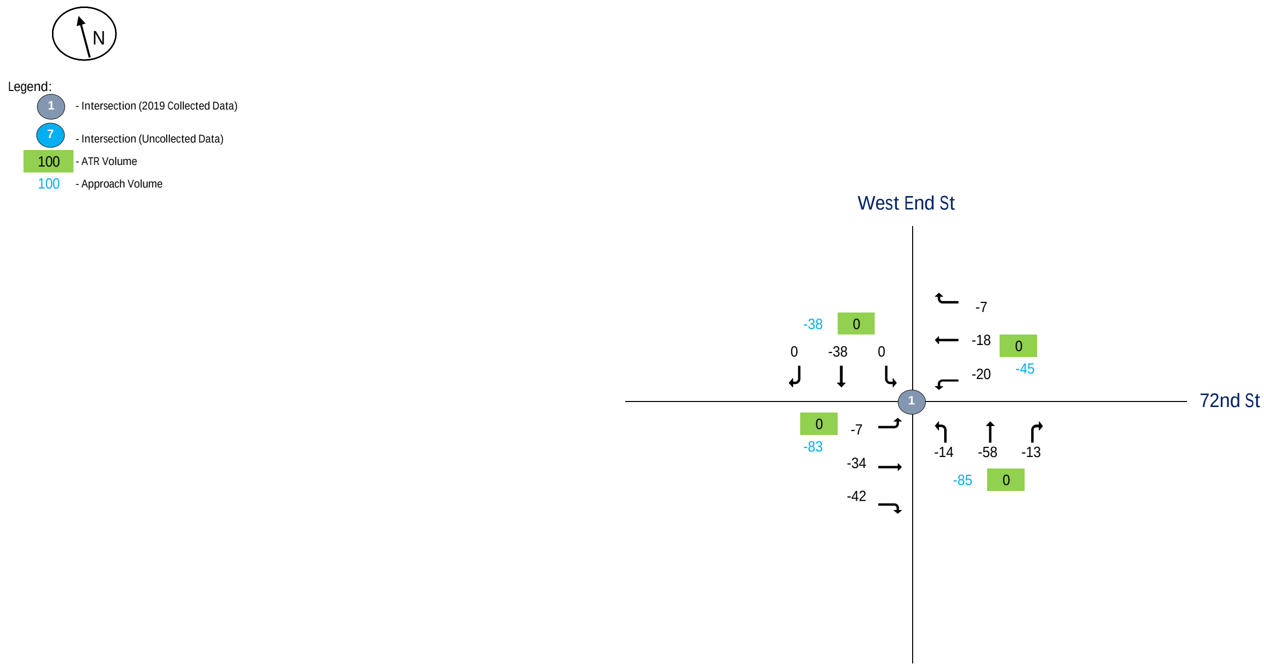
CBD Tolling
UW #5 - Traffic Flowmap
MD Action Increment



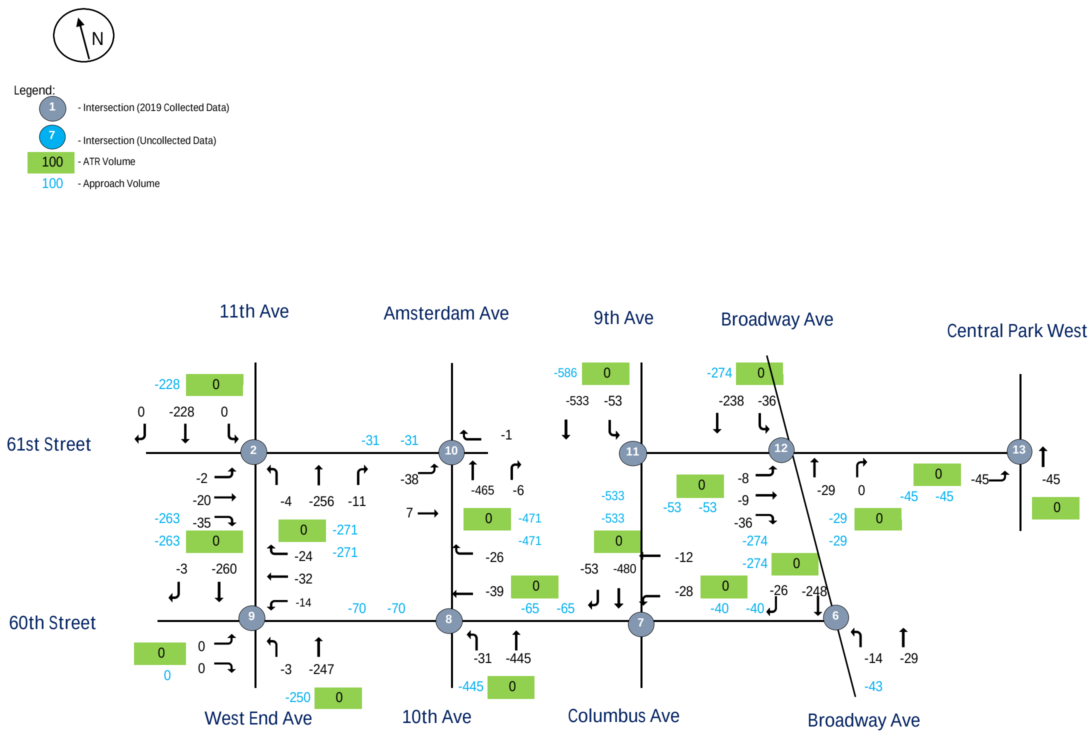
CBD Tolling
UW #6 - Traffic Flowmap
MD Action Increment



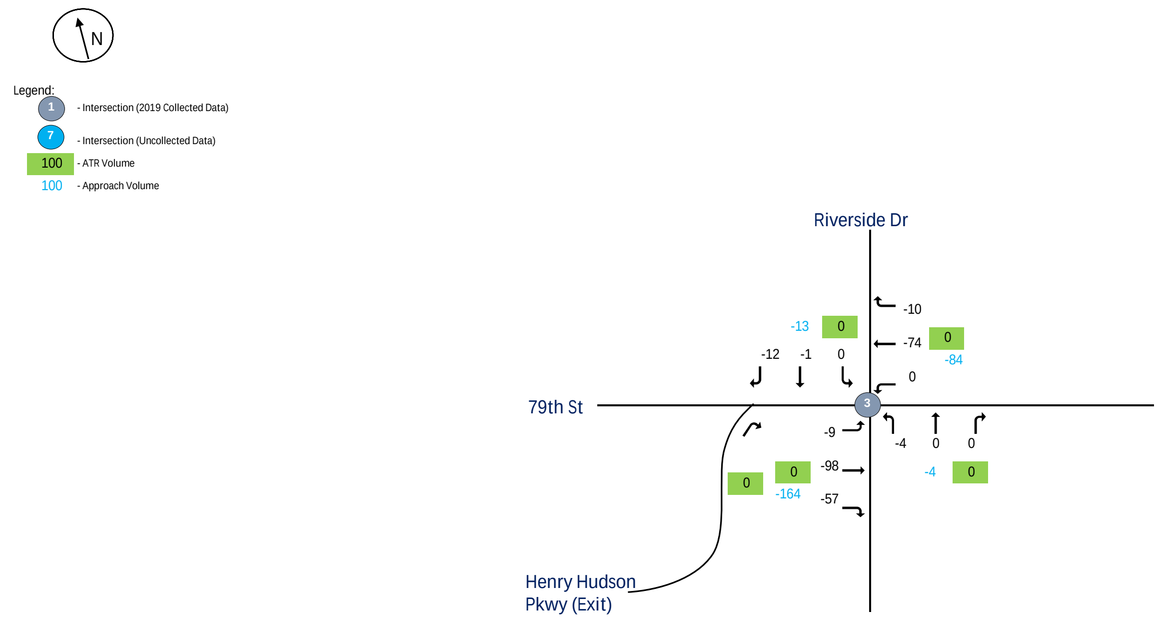
CBD Tolling
UW #1 - Traffic Flowmap
PM Action Increment



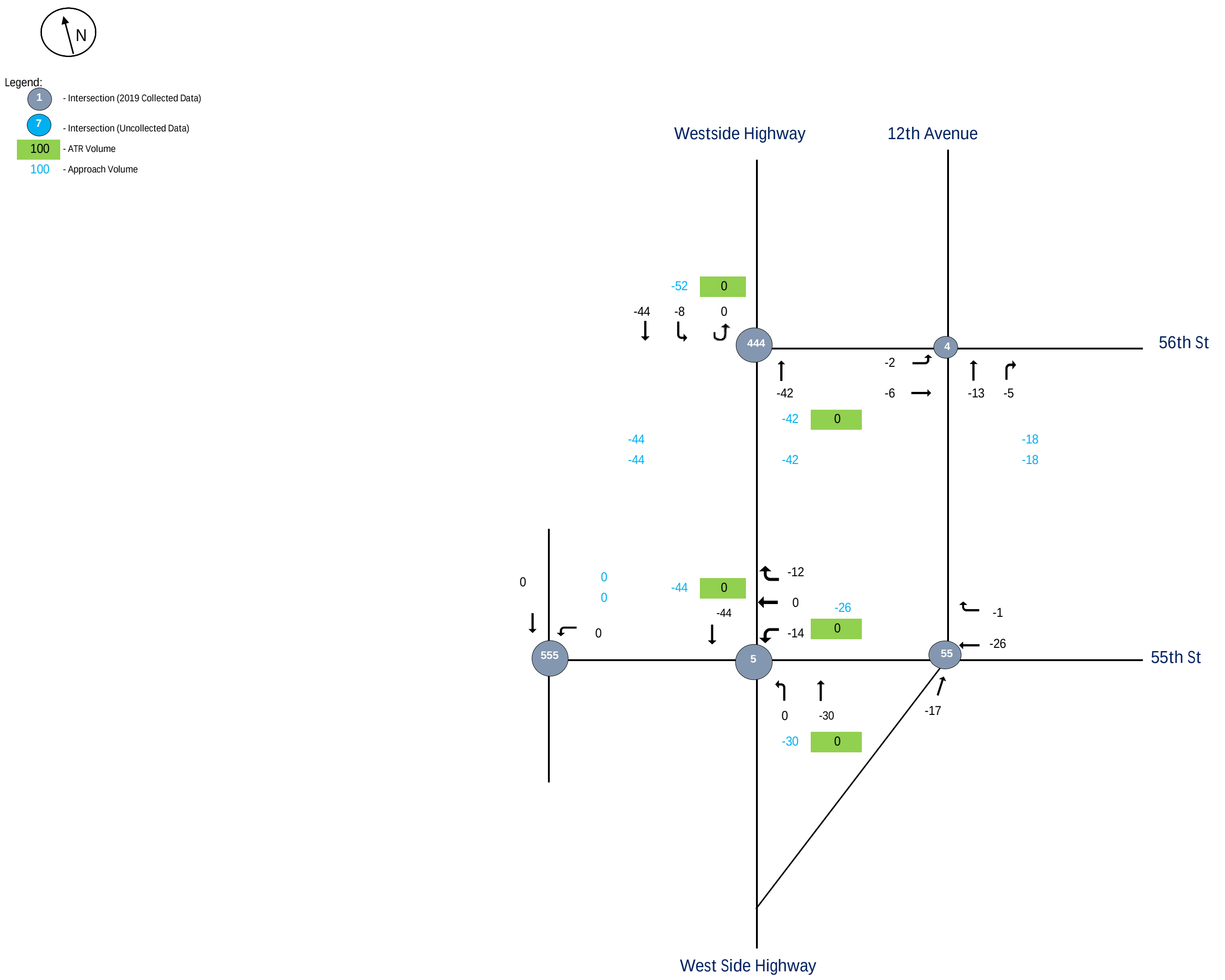
CBD Tolling
UW #2 - Traffic Flowmap
PM Action Increment



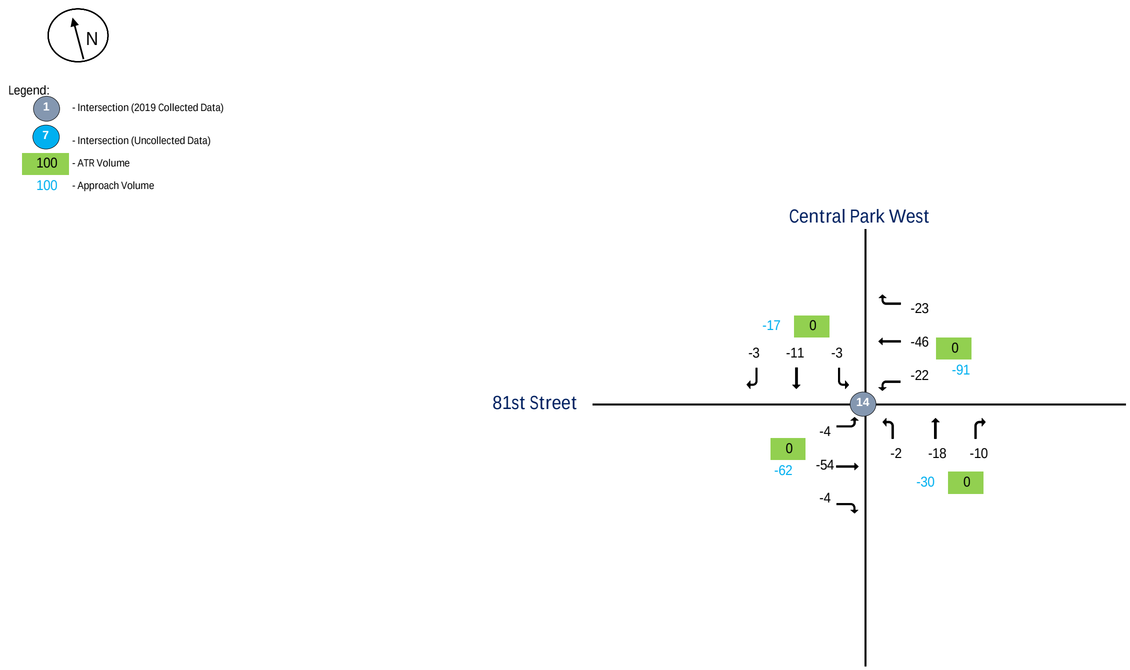
CBD Tolling
UW #3 - Traffic Flowmap
PM Action Increment



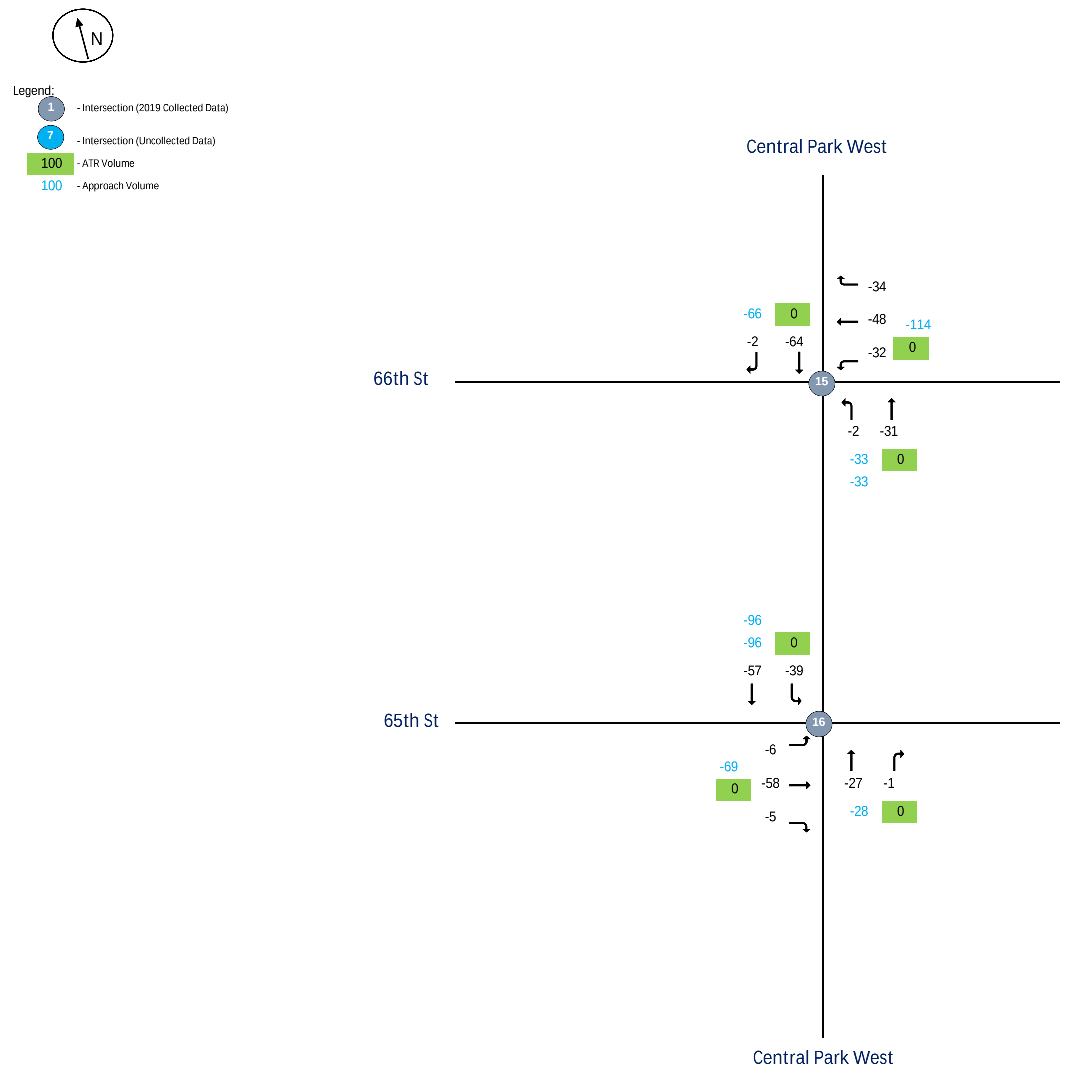
CBD Tolling
UW #4 - Traffic Flowmap
PM Action Increment



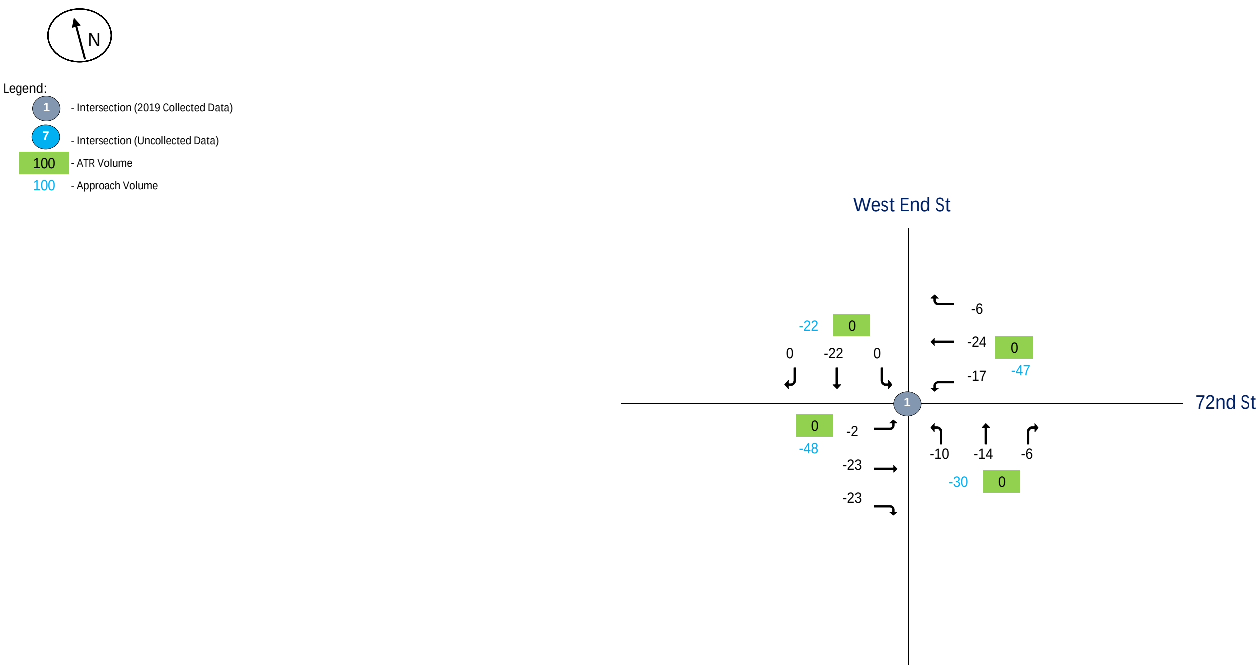
CBD Tolling
UW #5 - Traffic Flowmap
PM Action Increment

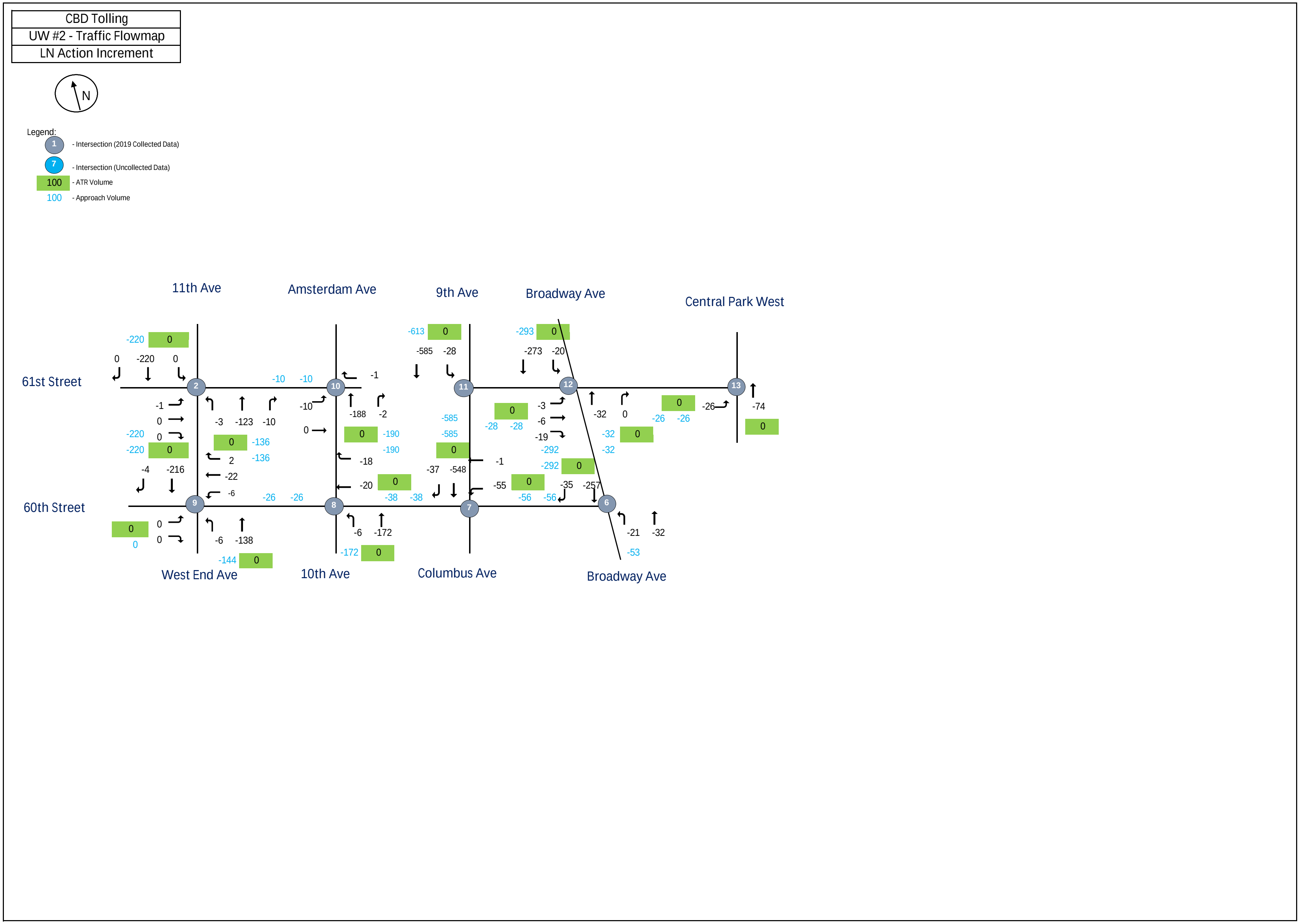


CBD Tolling
UW #6 - Traffic Flowmap
PM Action Increment

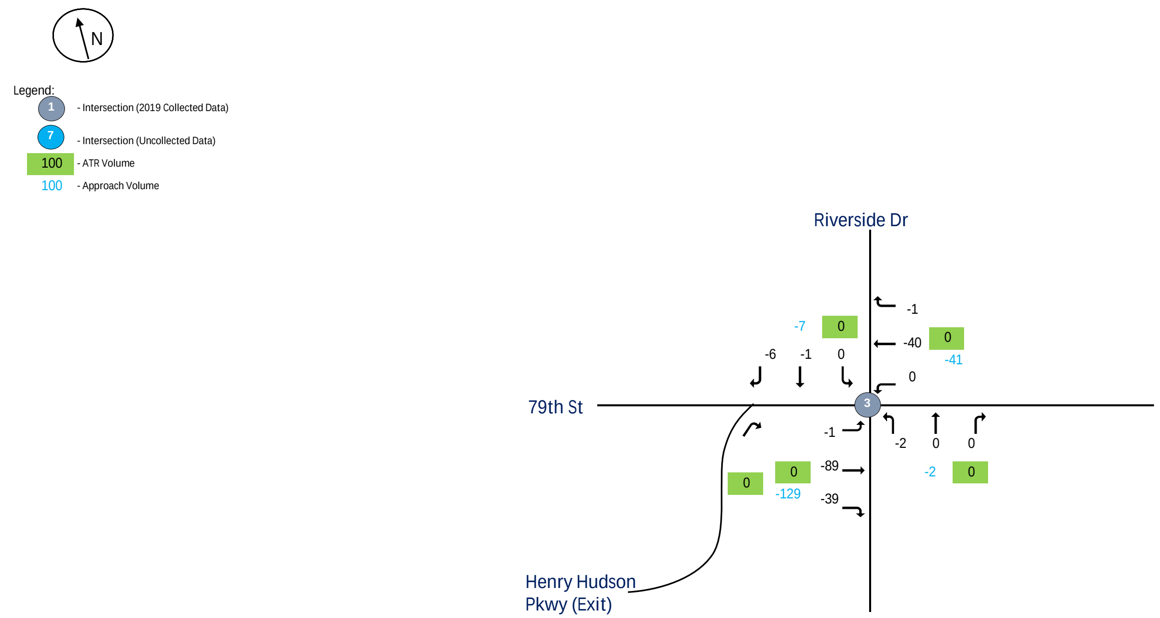


CBD Tolling
UW #1 - Traffic Flowmap
LN Action Increment

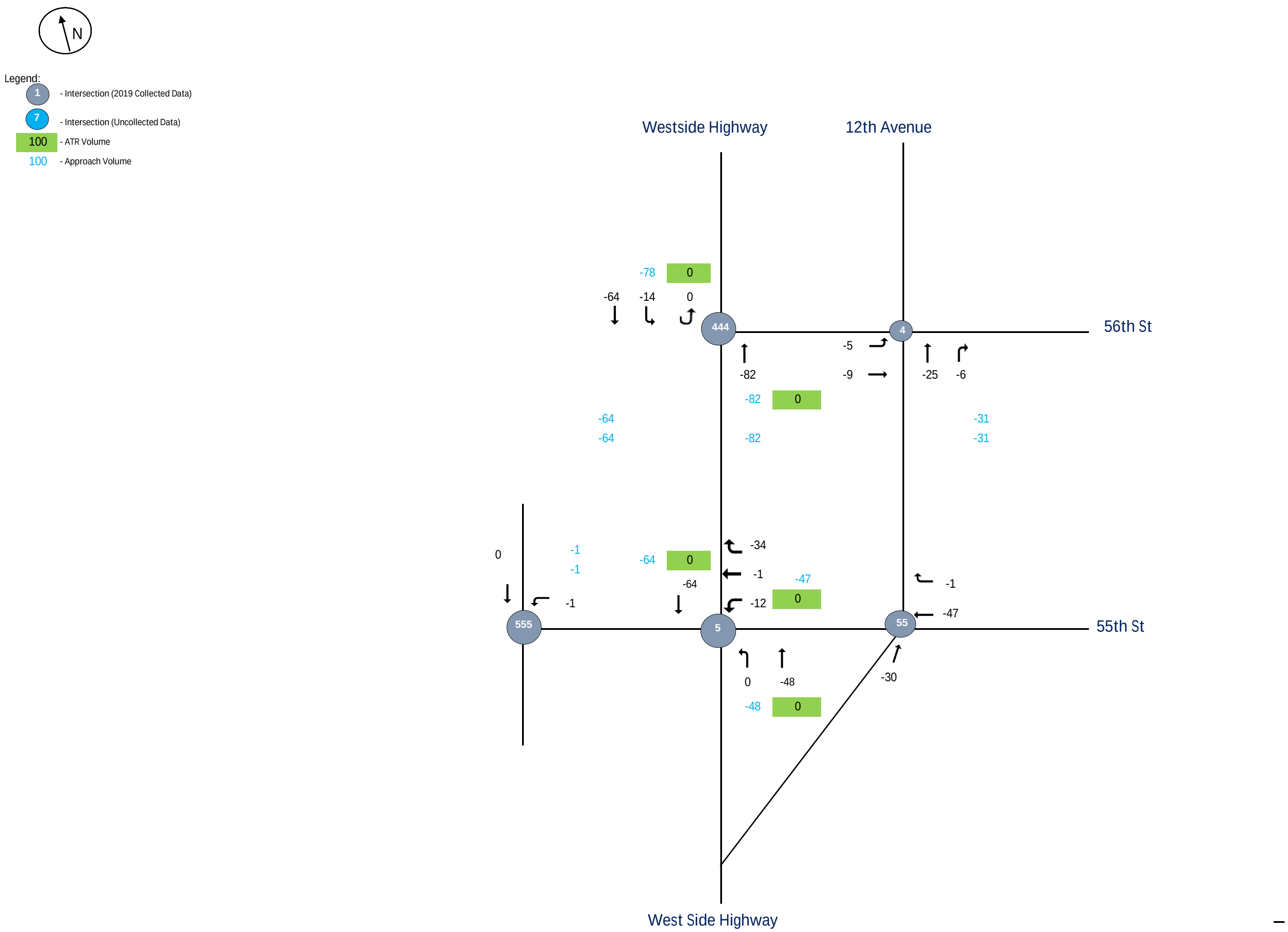



CBD Tolling
UW #2 - Traffic Flowmap
LN Action Increment
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
11th Ave
Amsterdam Ave
9th Ave
Broadway Ave
Central Park West
61st Street
60th Street
West End Ave
10th Ave
Columbus Ave
Broadway Ave

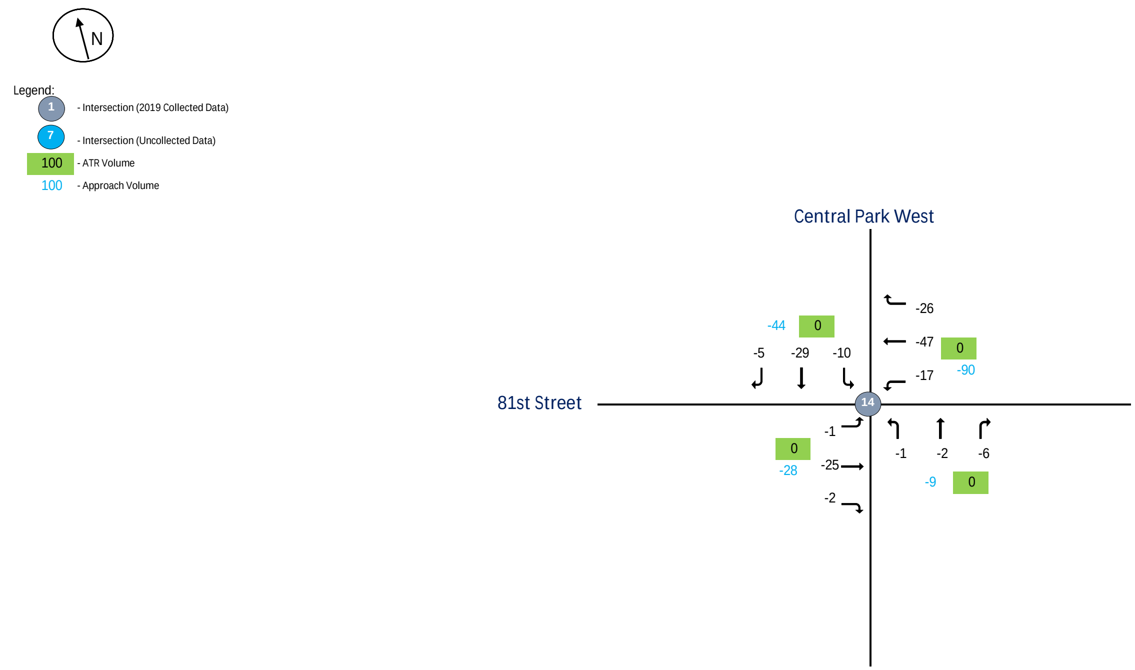
CBD Tolling
UW #3 - Traffic Flowmap
LN Action Increment

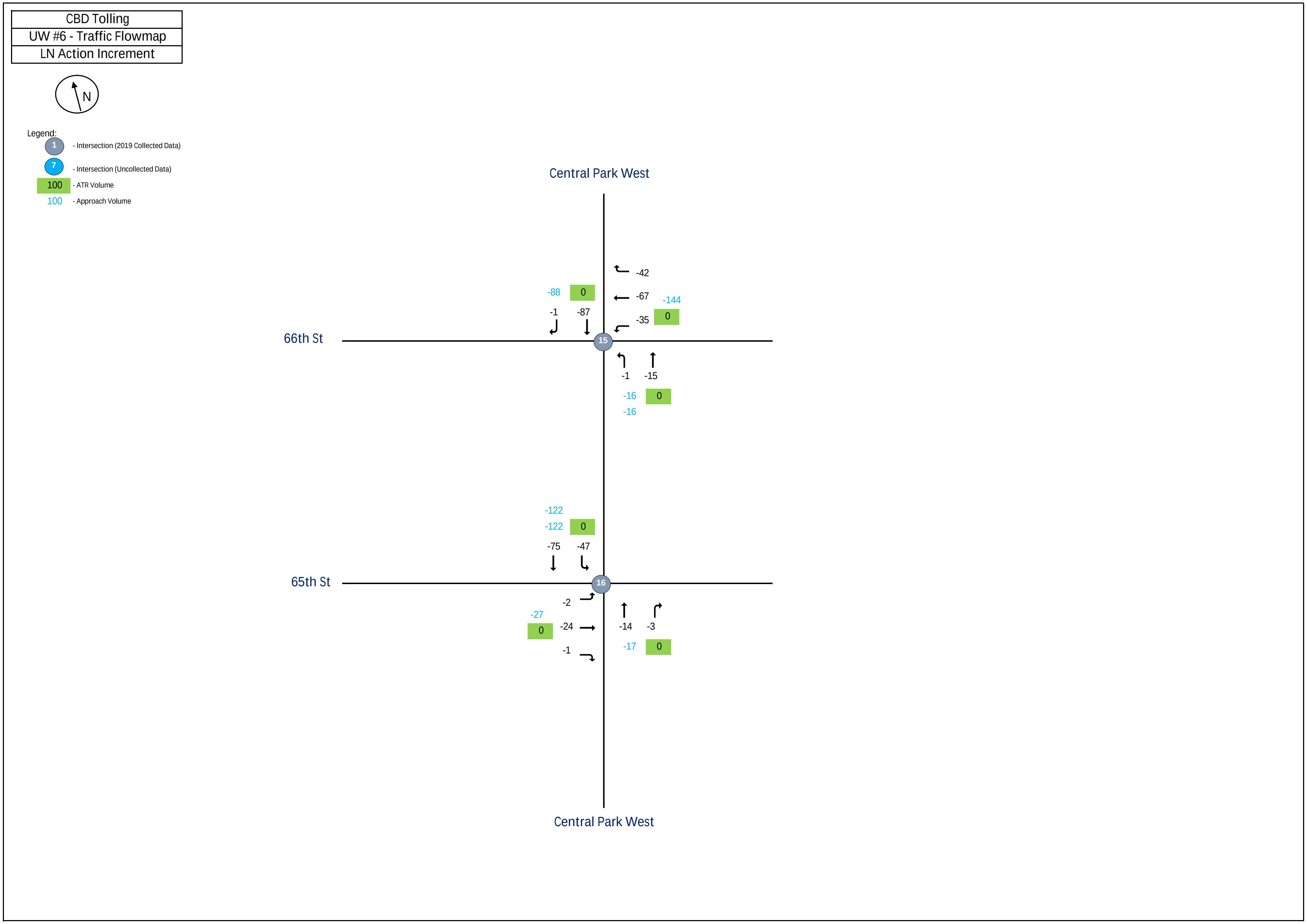


CBD Tolling
UW #4 - Traffic Flowmap
LN Action Increment

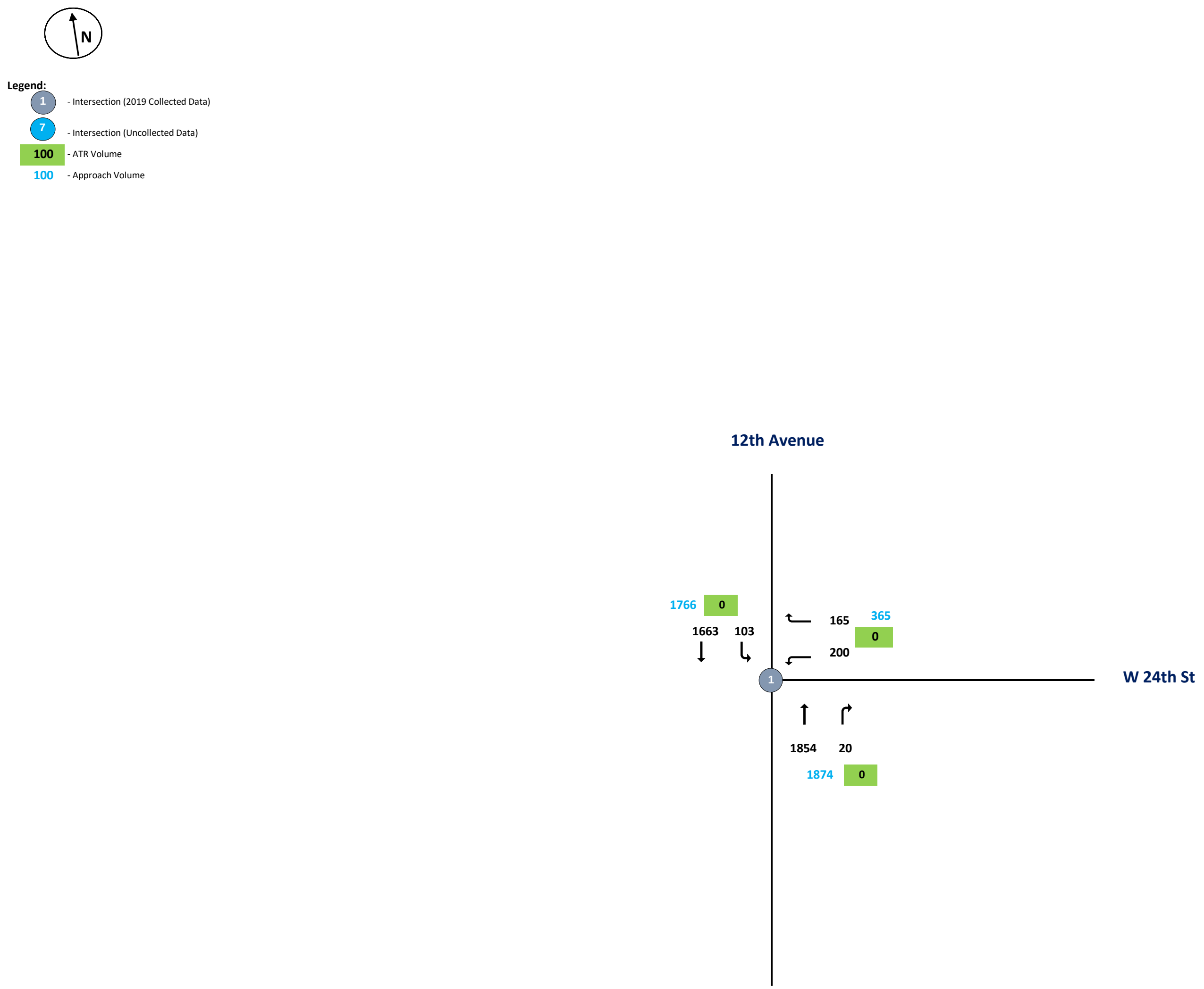


CBD Tolling
UW #5 - Traffic Flowmap
LN Action Increment

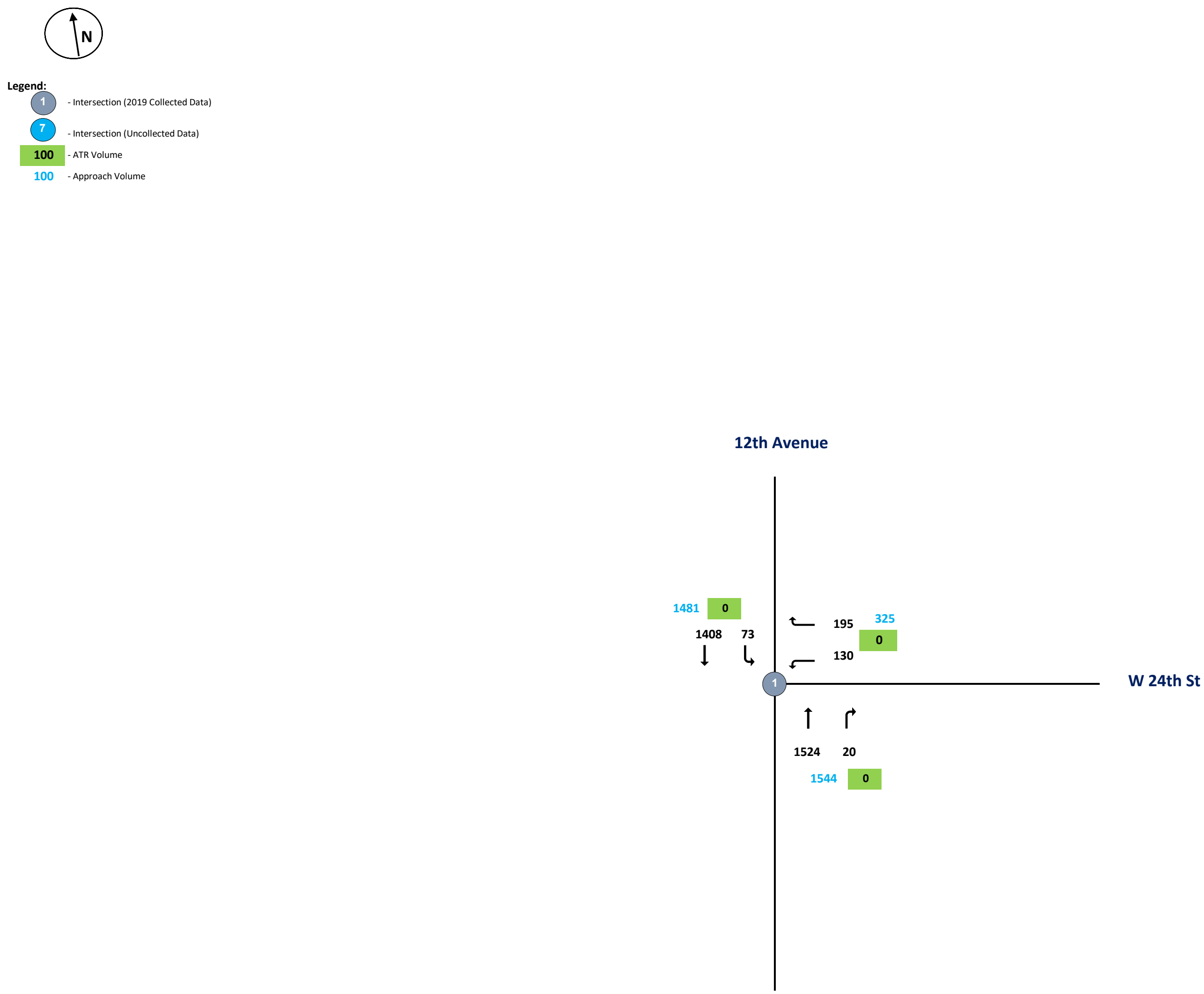



CBD Tolling
UW #6 - Traffic Flowmap
LN Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Central Park West
66th St
-88
0
-1
-87
-42
-67
-144
-35
0
15
-1
-15
-16
0
-16
-122
-122
0
-75
-47
65th St
16
-2
-27
-24
0
-1
-14
-3
-17
0
Central Park West

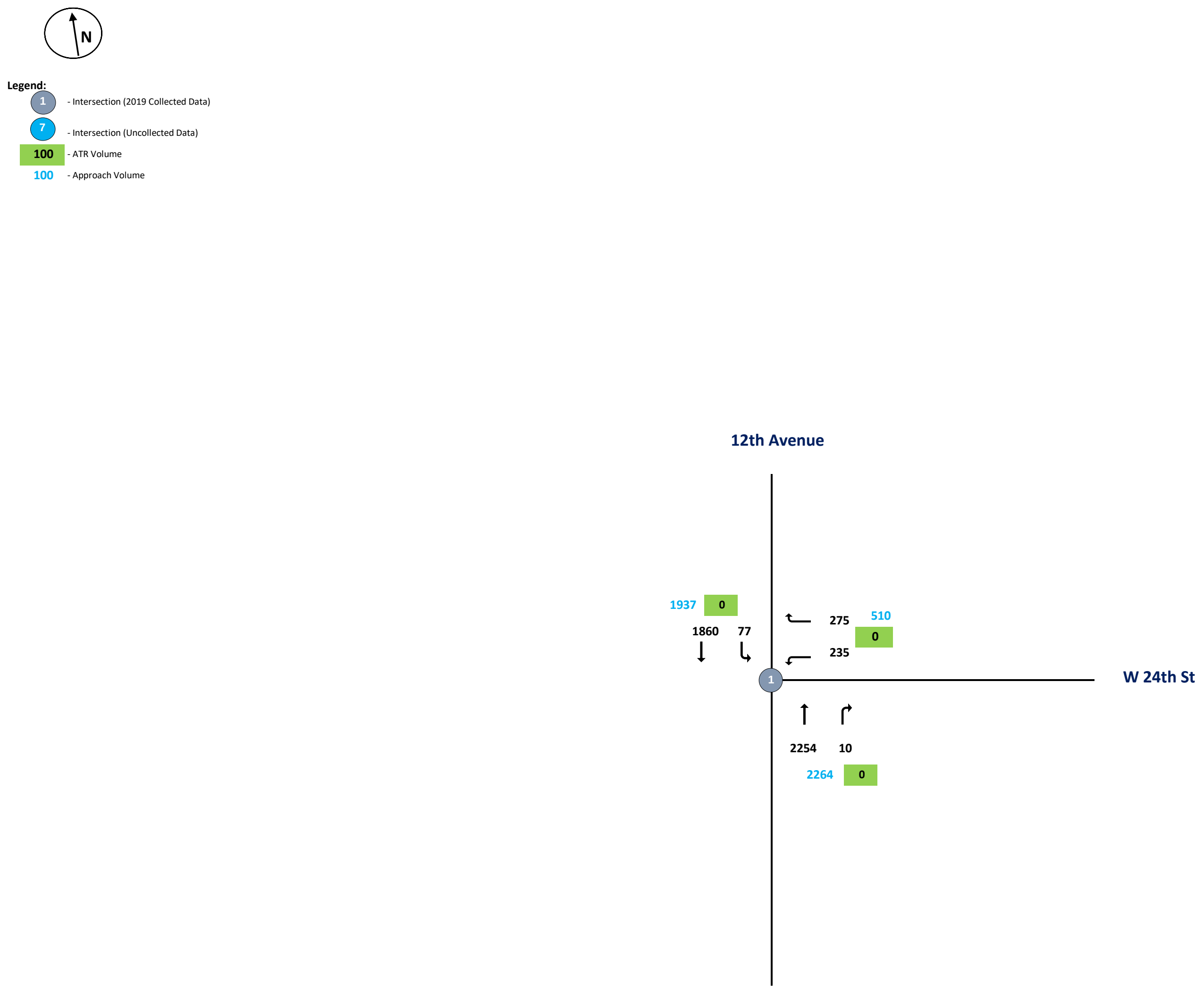
CBD Tolling
9A - Traffic Flowmap
AM With Action



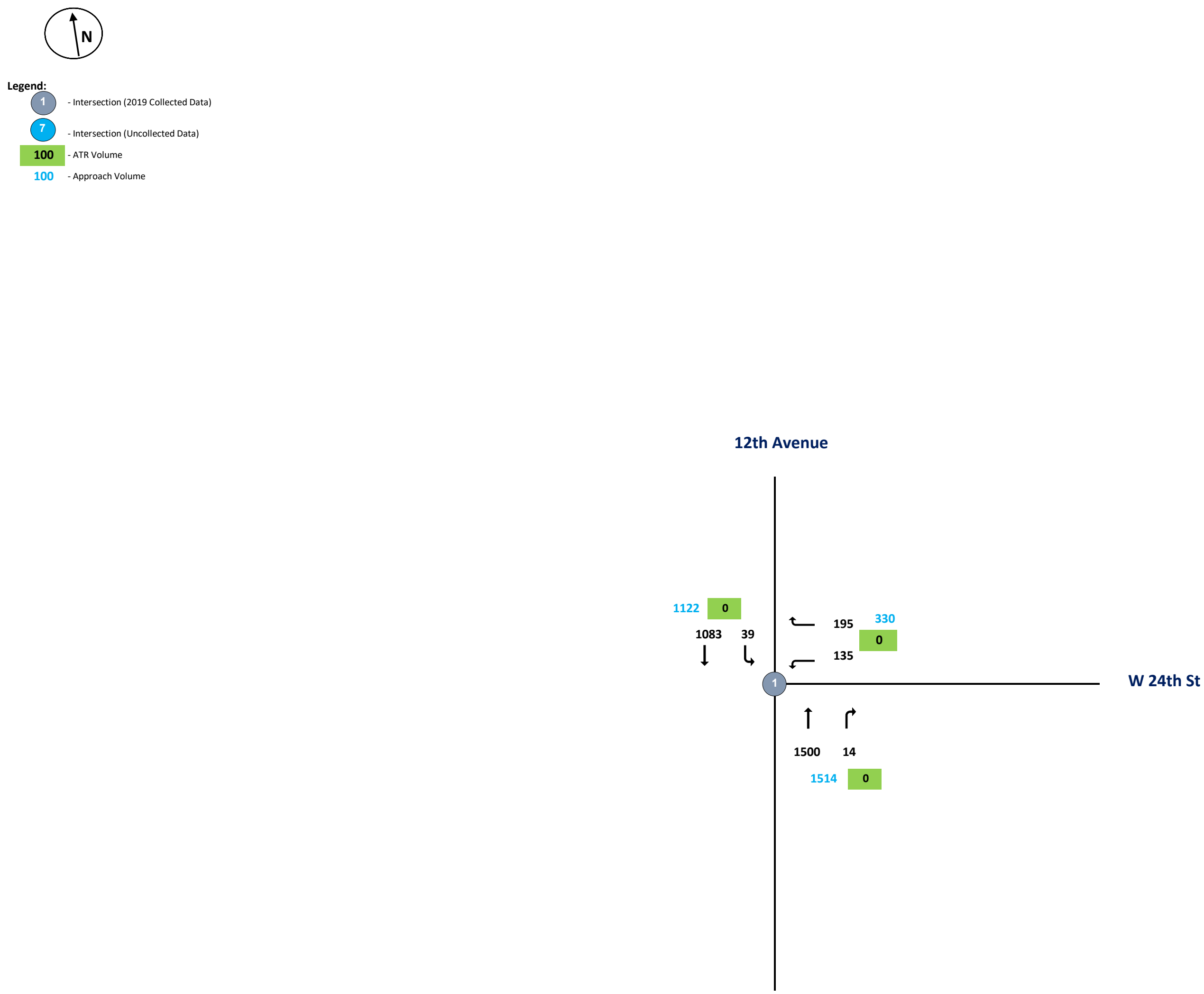
CBD Tolling
9A - Traffic Flowmap
MD With-Action



CBD Tolling
9A - Traffic Flowmap
PM With Action



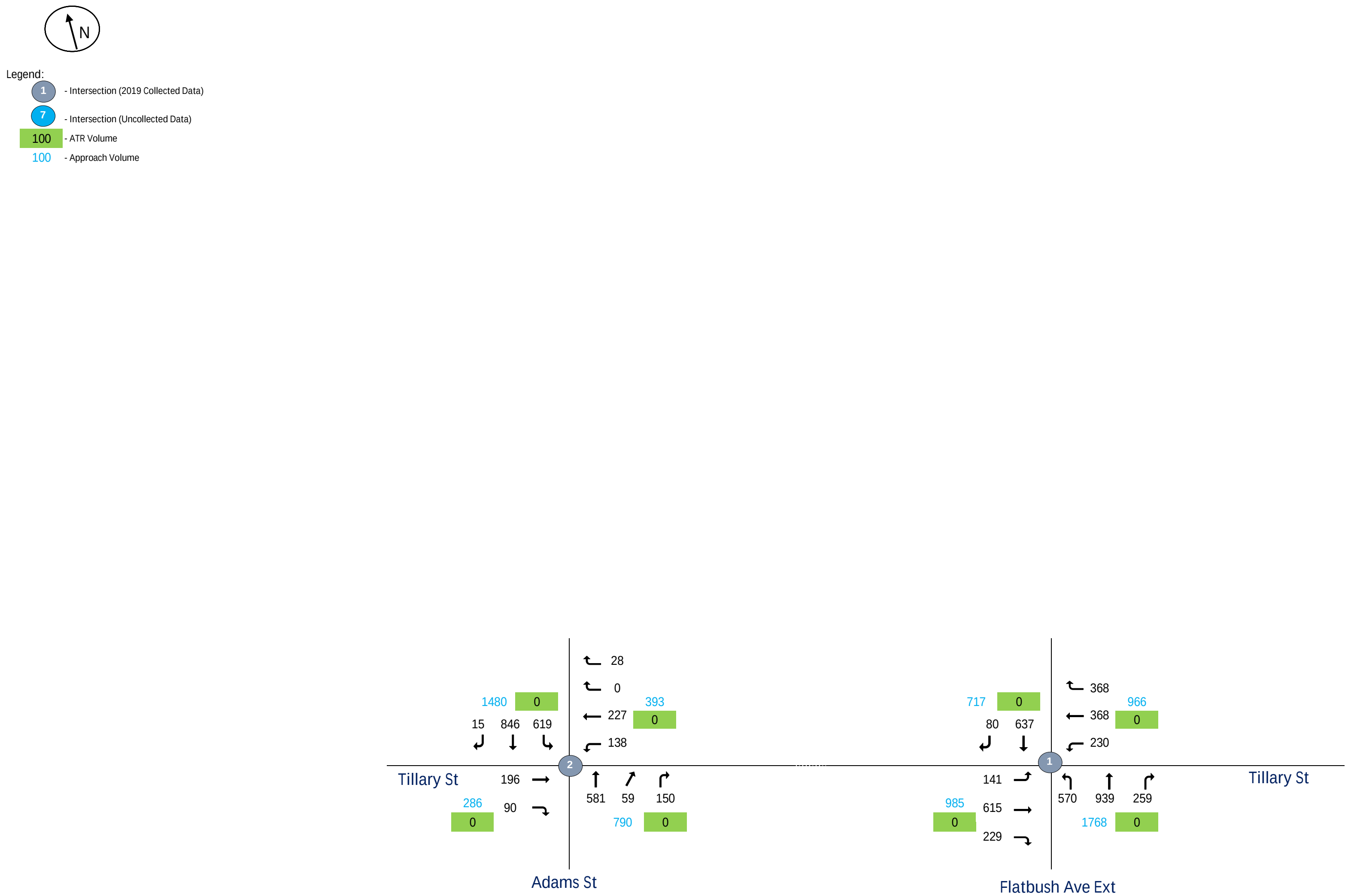
CBD Tolling
9A - Traffic Flowmap
LN With-Action



CBD Tolling

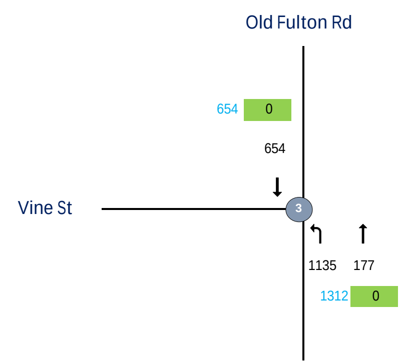
Dumbo #1- Traffic Flowmap

AM With Action



CBD Tolling
Dumbo #2 - Traffic Flowmap
AM With Action

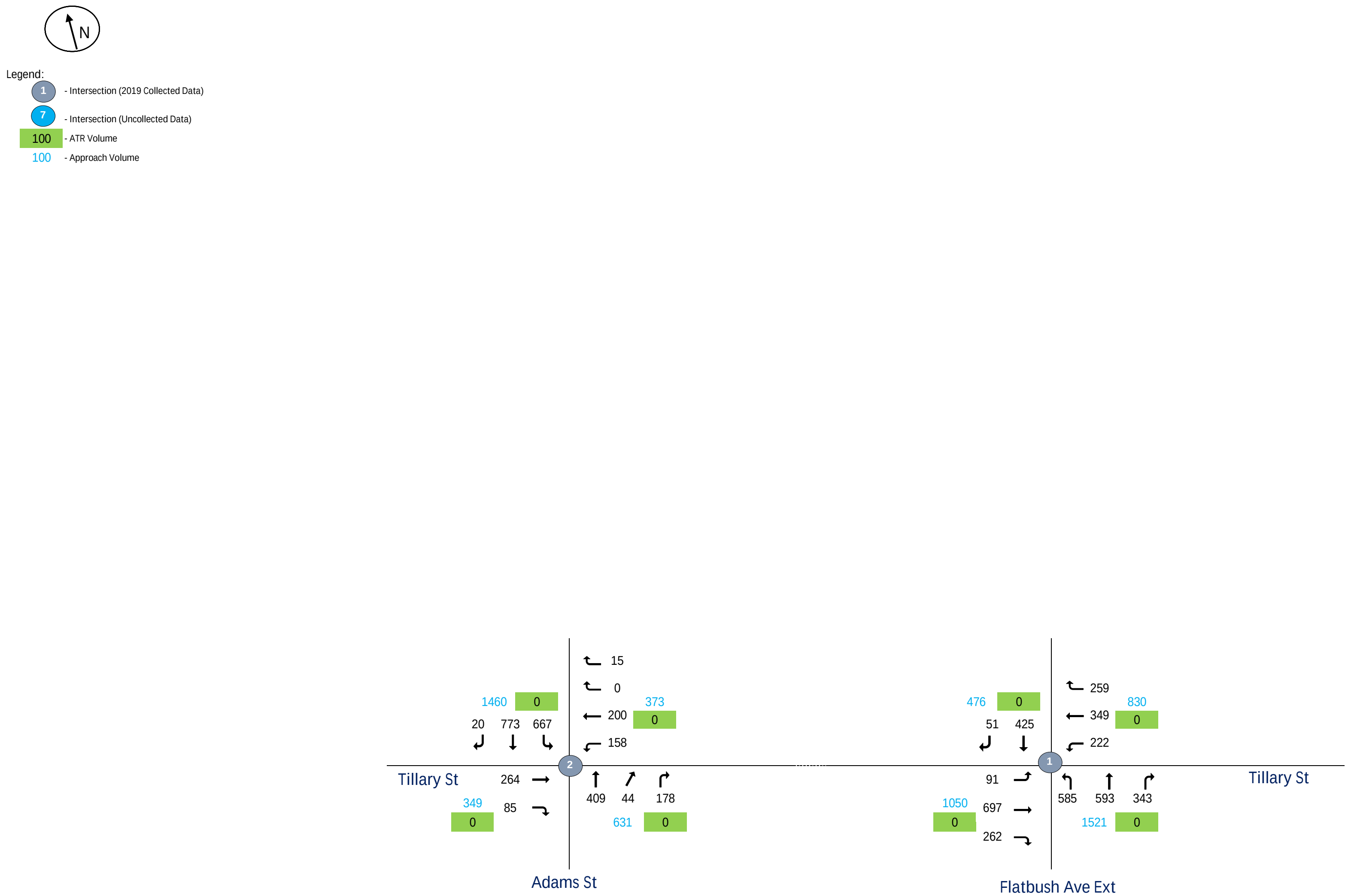
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume

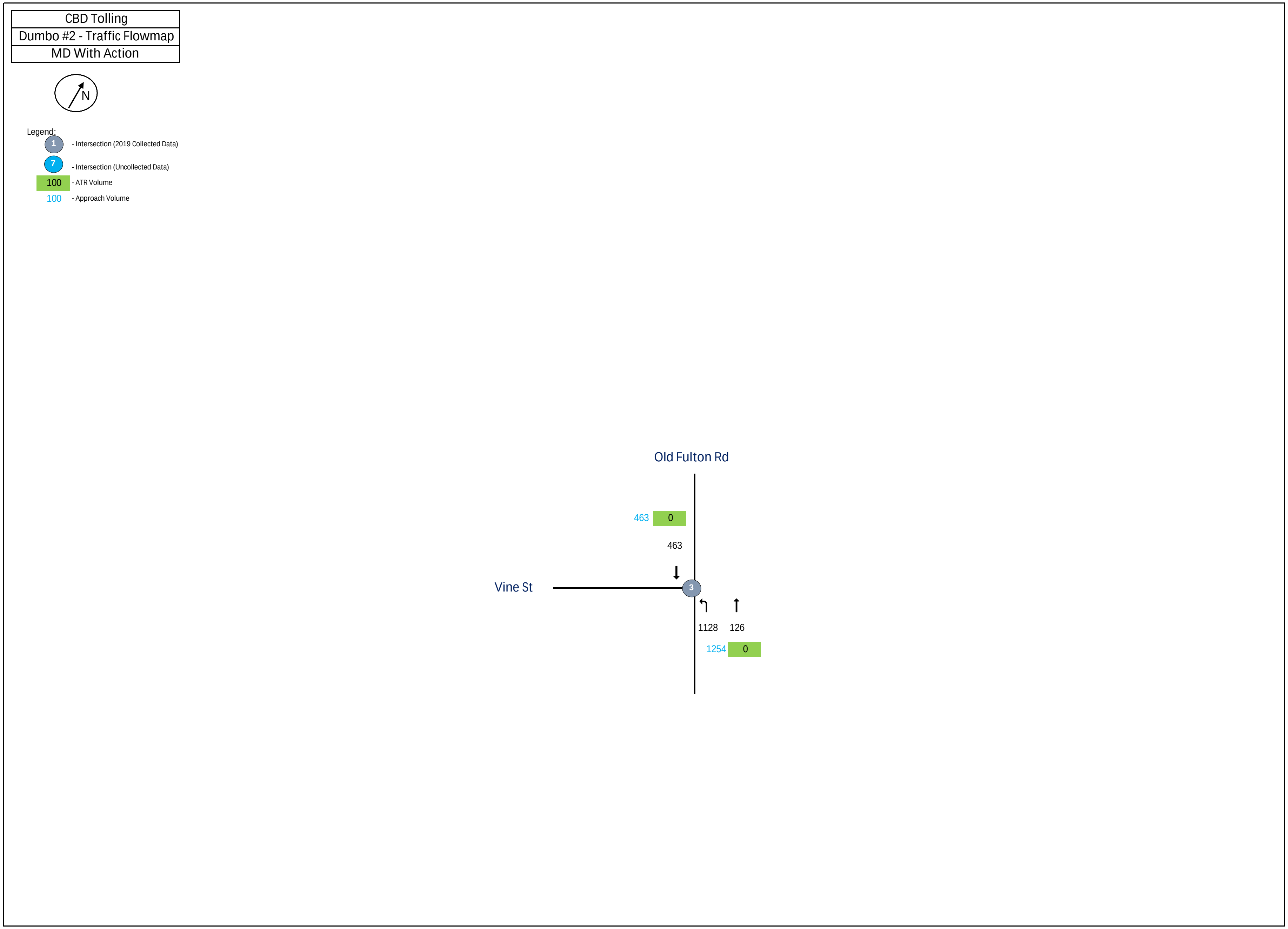


CBD Tolling

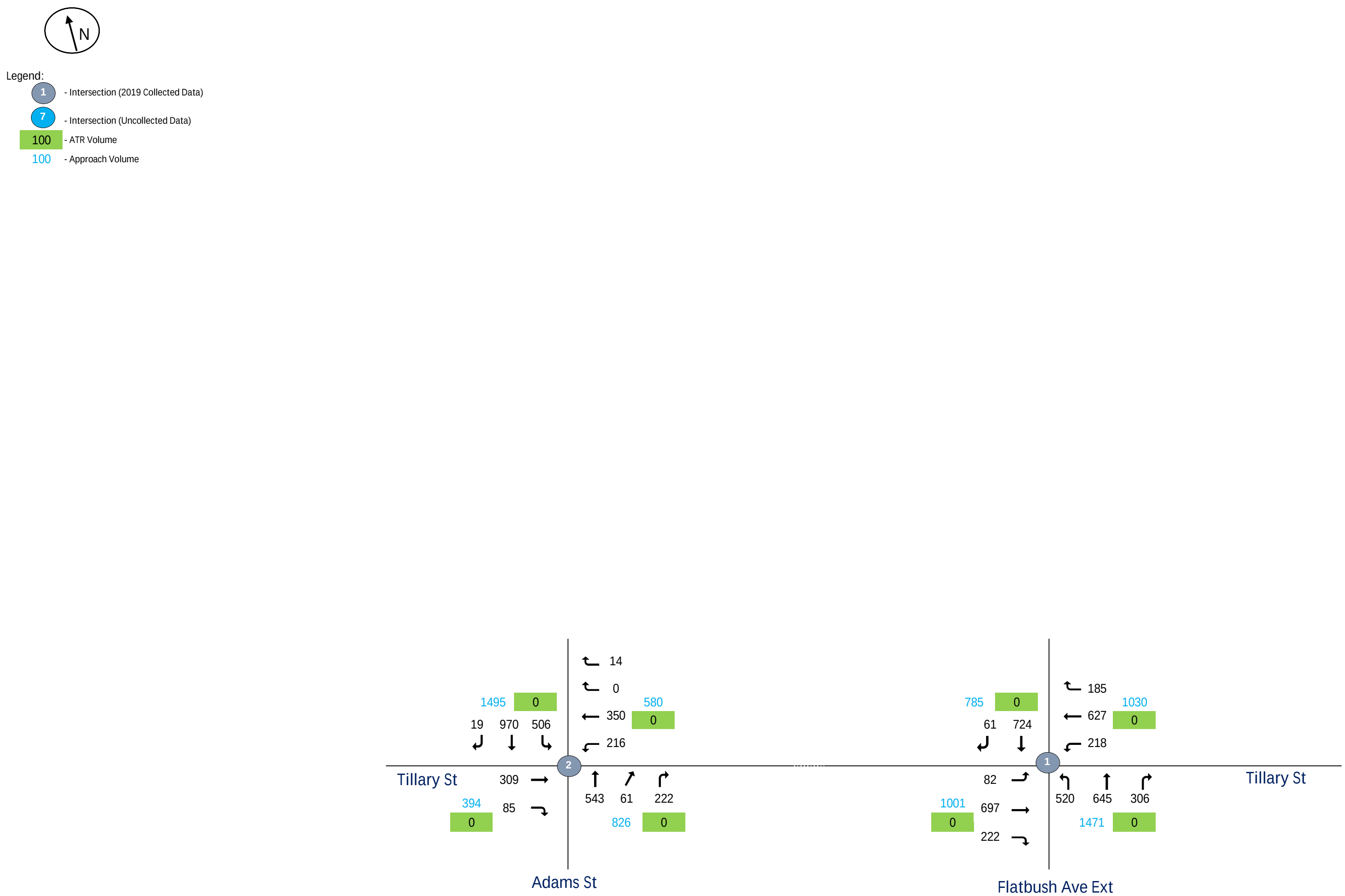
Dumbo - Traffic Flowmap

MD With Action

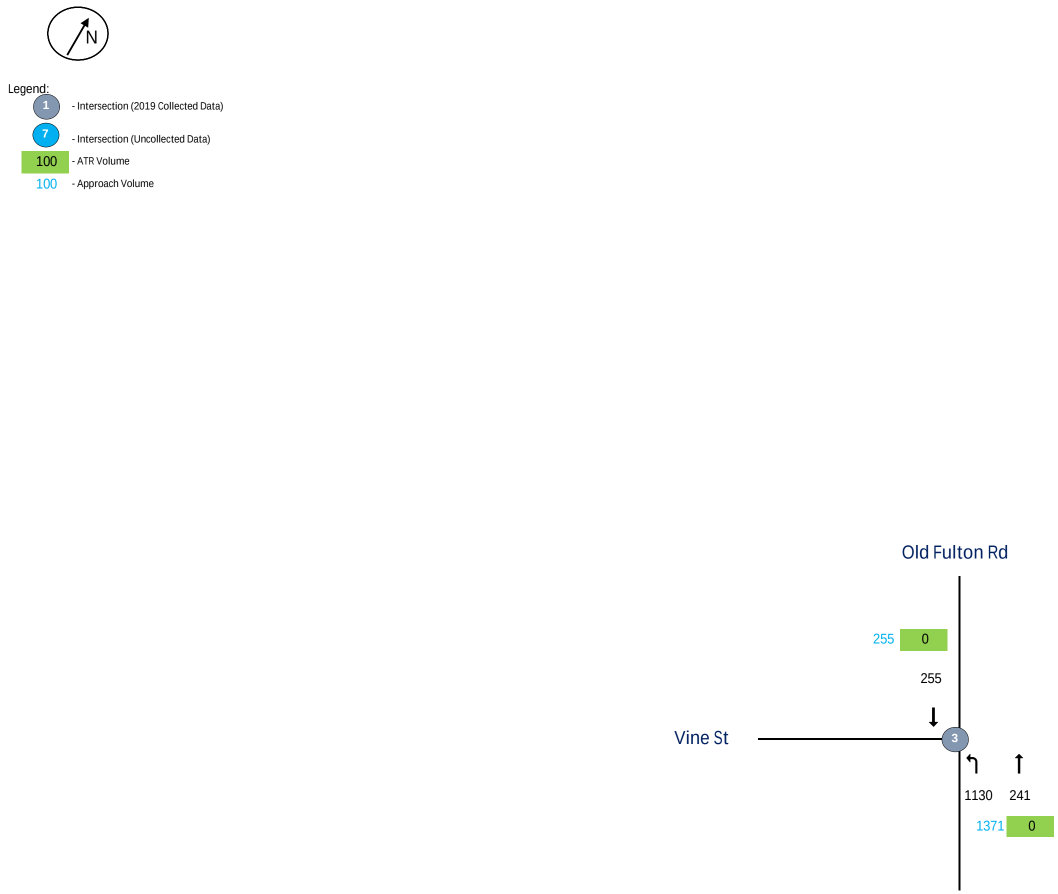



CBD Tolling
Dumbo #2 - Traffic Flowmap
MD With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Old Fulton Rd
463
0
463
Vine St
3
1128
126
1254
0

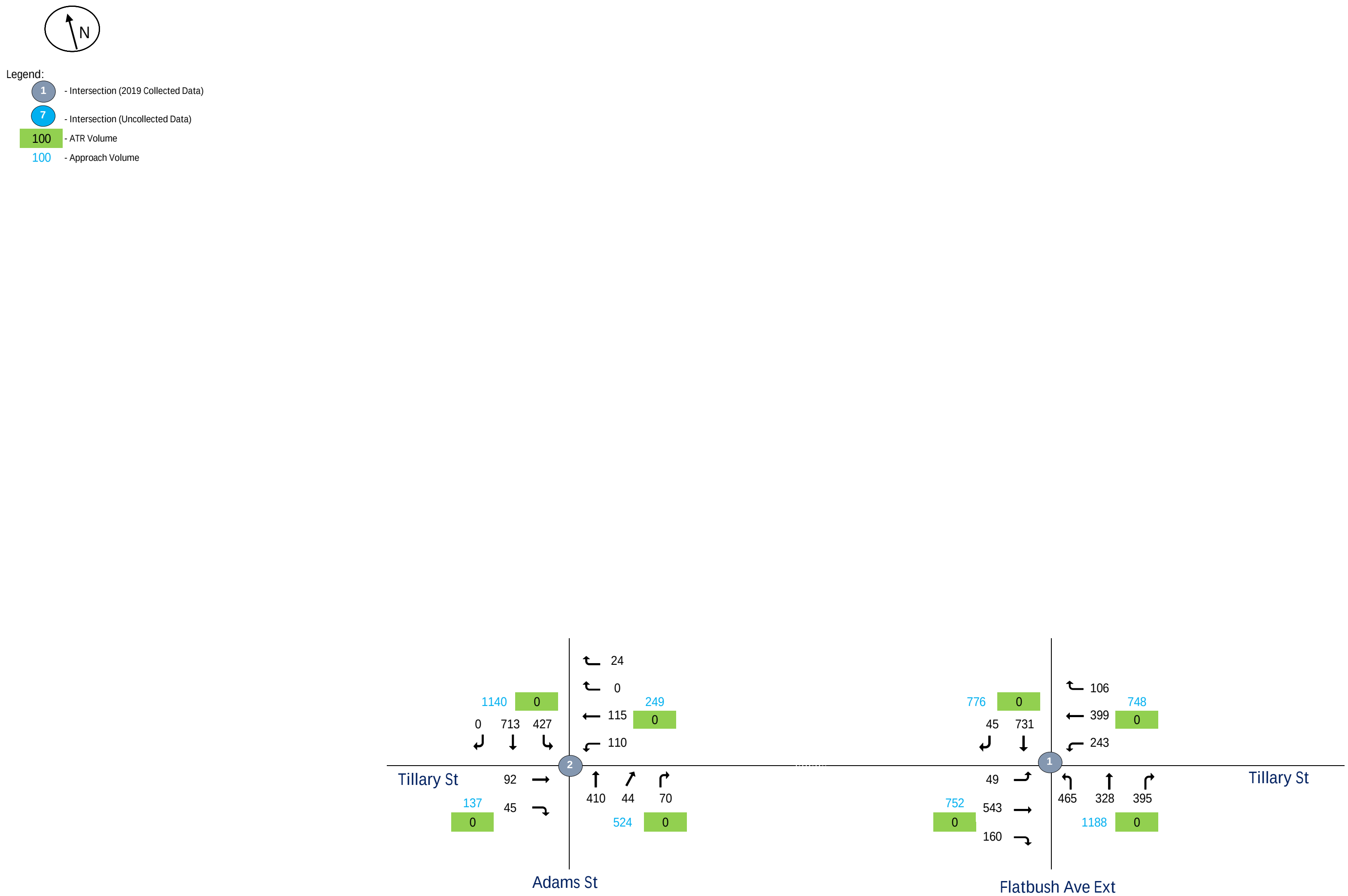
CBD Tolling
Dumbo - Traffic Flowmap
PM With Action



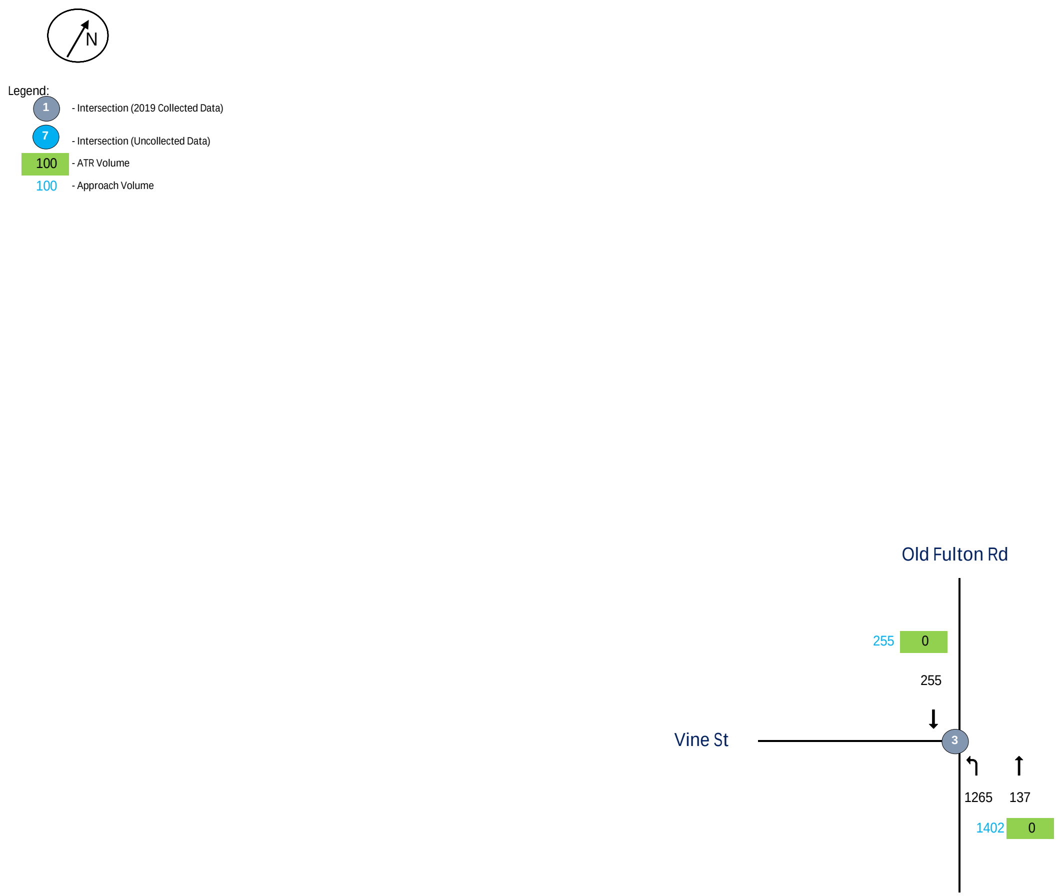
CBD Tolling
Dumbo #2 - Traffic Flowmap
PM With Action



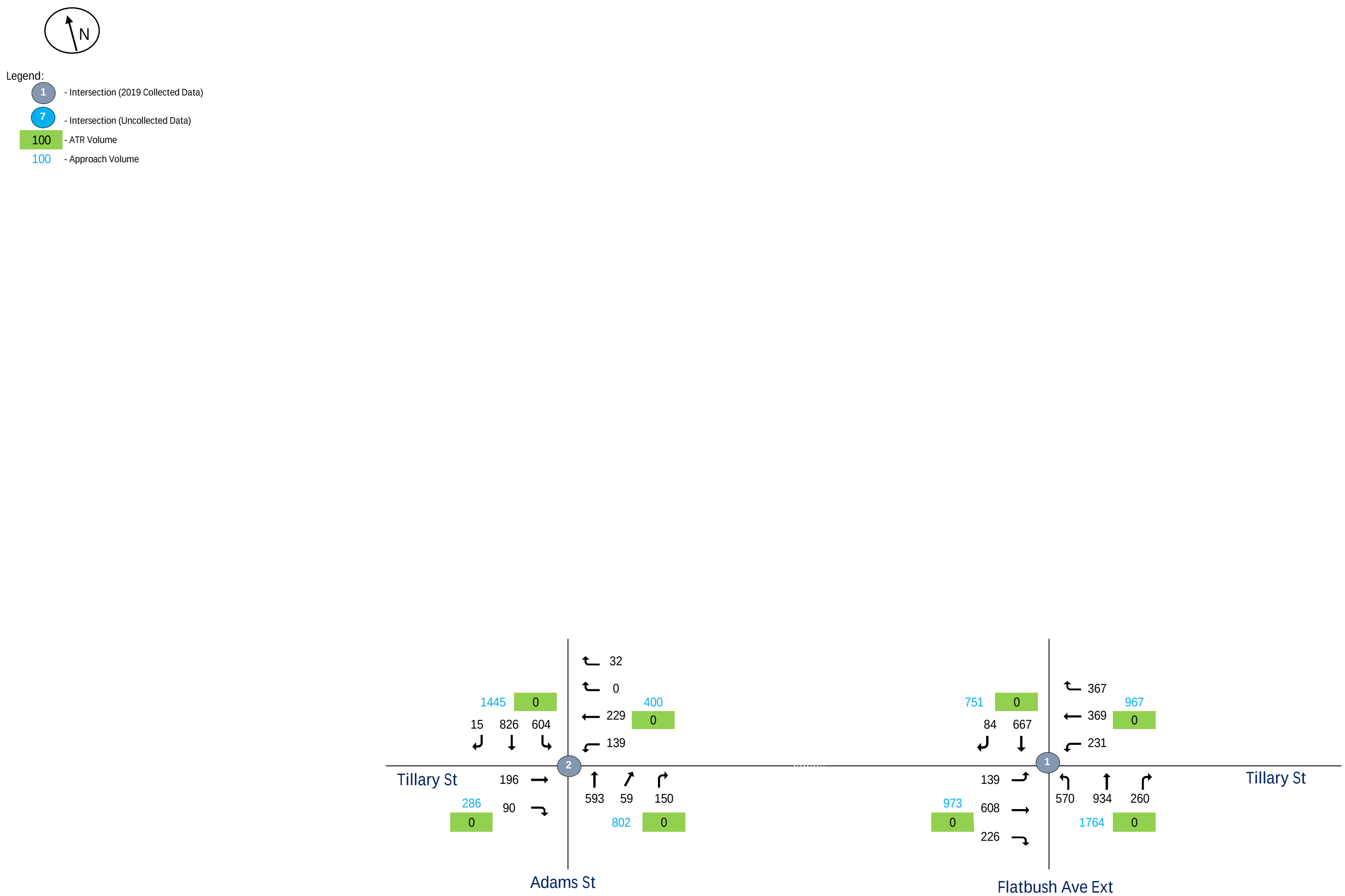
CBD Tolling
Dumbo - Traffic Flowmap
LN With Action



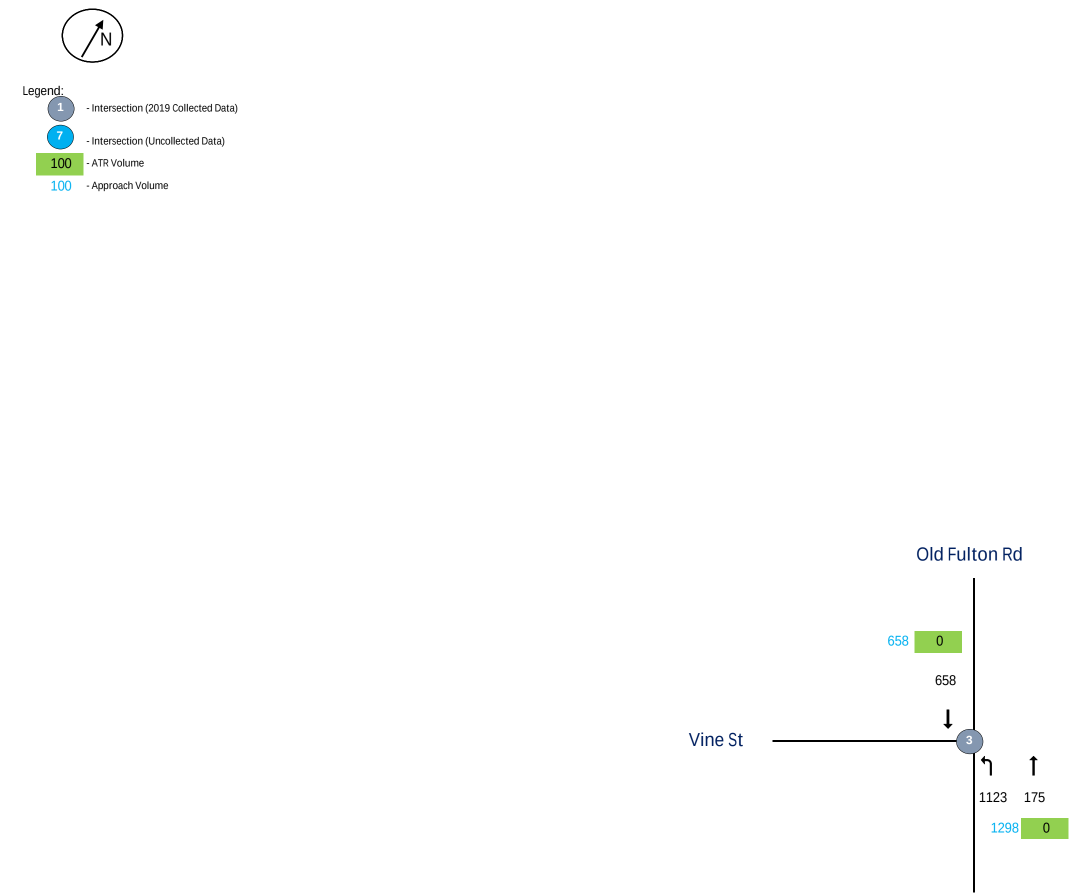
CBD Tolling
Dumbo #2 - Traffic Flowmap
LN With Action



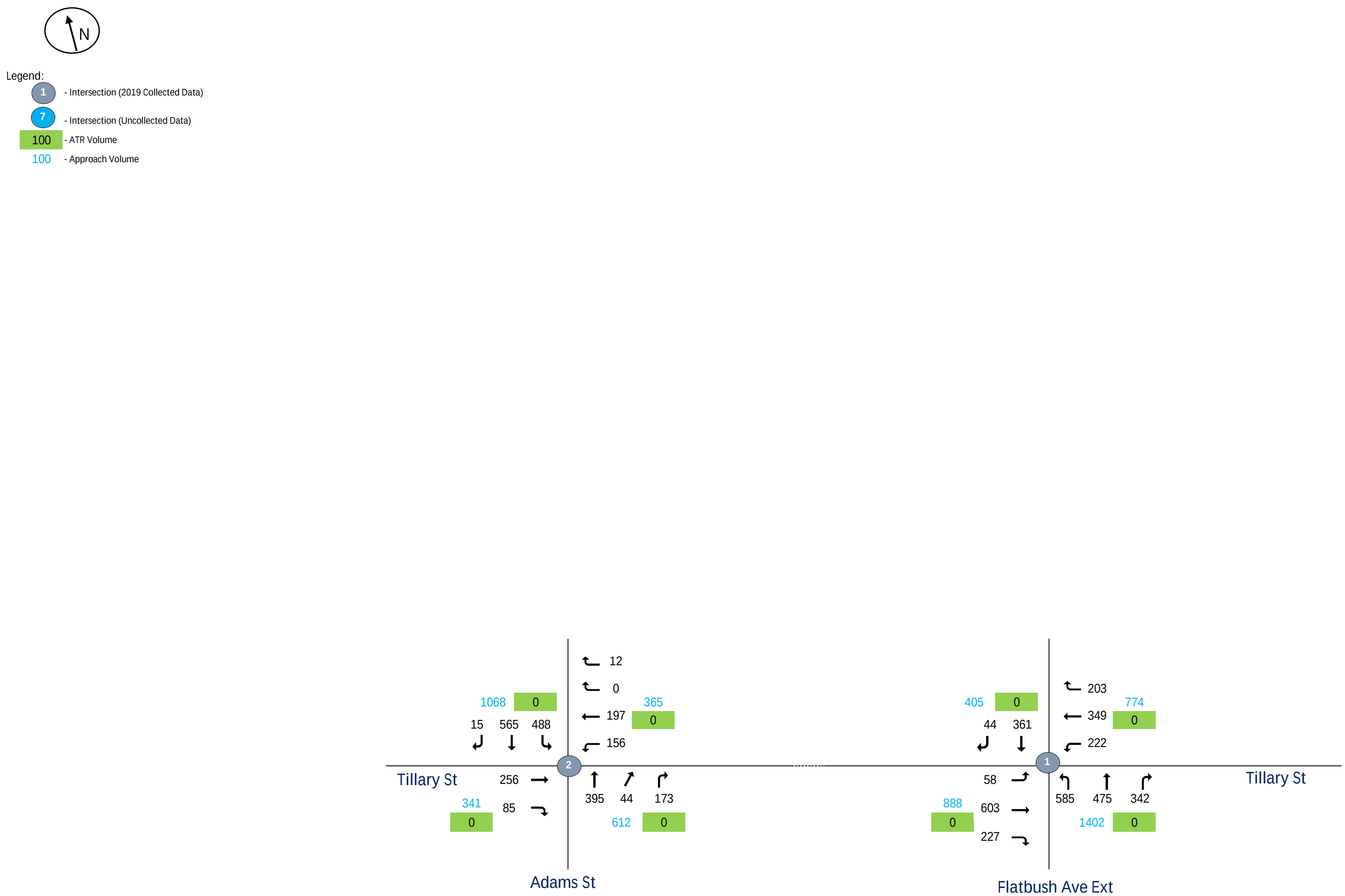
CBD Tolling
Dumbo #1- Traffic Flowmap
AM With Action

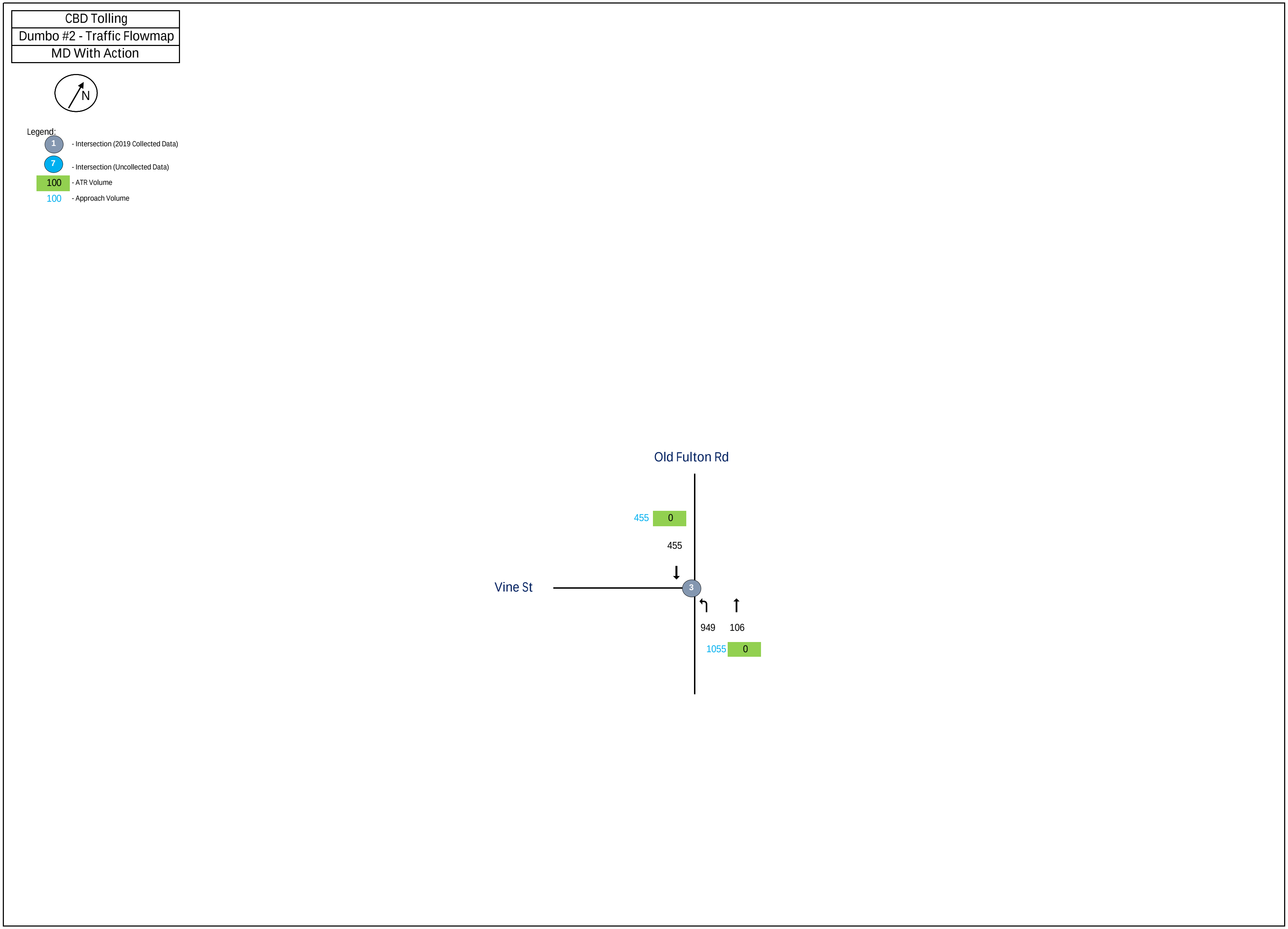


CBD Tolling
Dumbo #2 - Traffic Flowmap
AM With Action



CBD Tolling
Dumbo - Traffic Flowmap
MD With Action




CBD Tolling
Dumbo #2 - Traffic Flowmap
MD With Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Old Fulton Rd
455
0
455
Vine St
3
949
106
1055
0

CBD Tolling
Dumbo - Traffic Flowmap
PM With Action

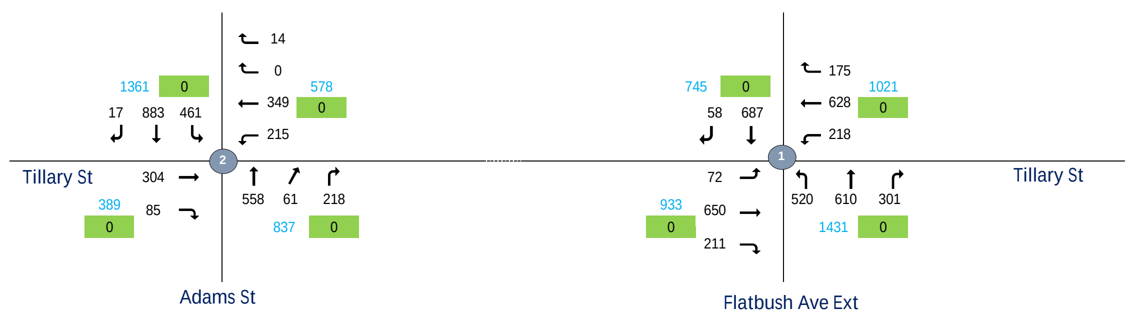
Legend:

1 - Intersection (2019 Collected Data)

7 - Intersection (Uncollected Data)

100 - ATR Volume

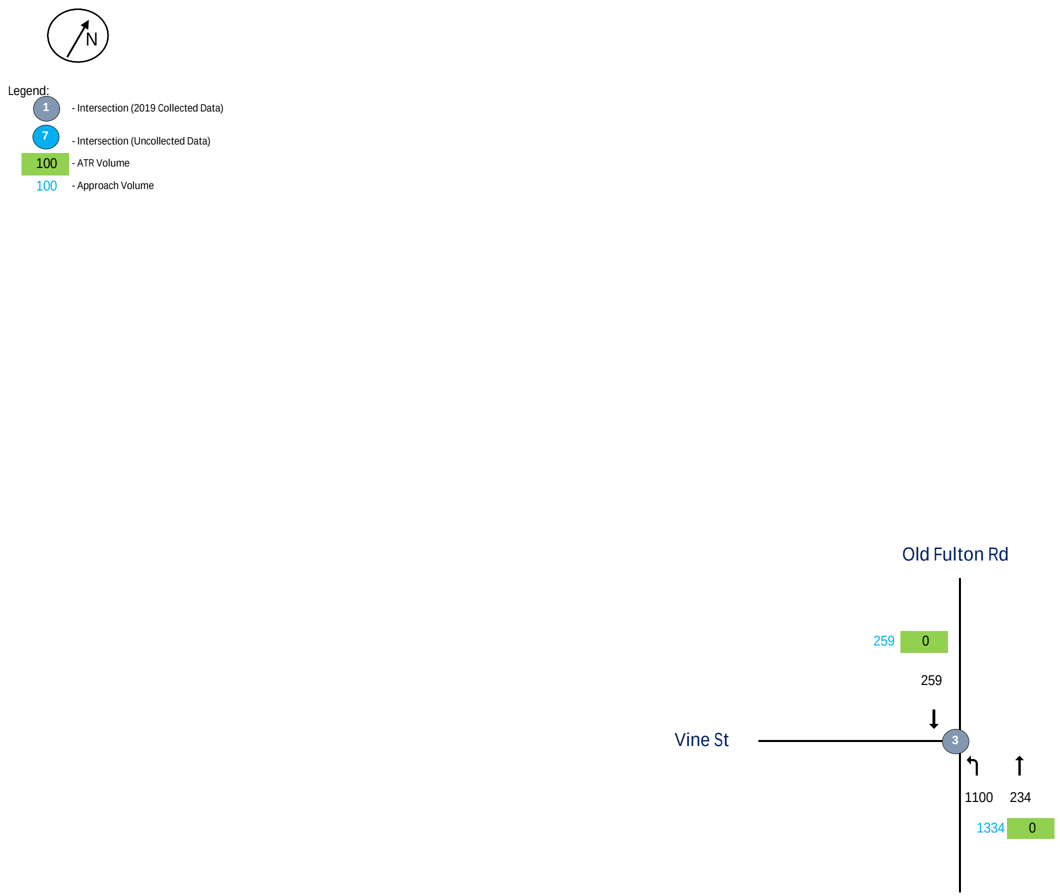
100 - Approach Volume



CBD Tolling

Dumbo #2 - Traffic Flowmap

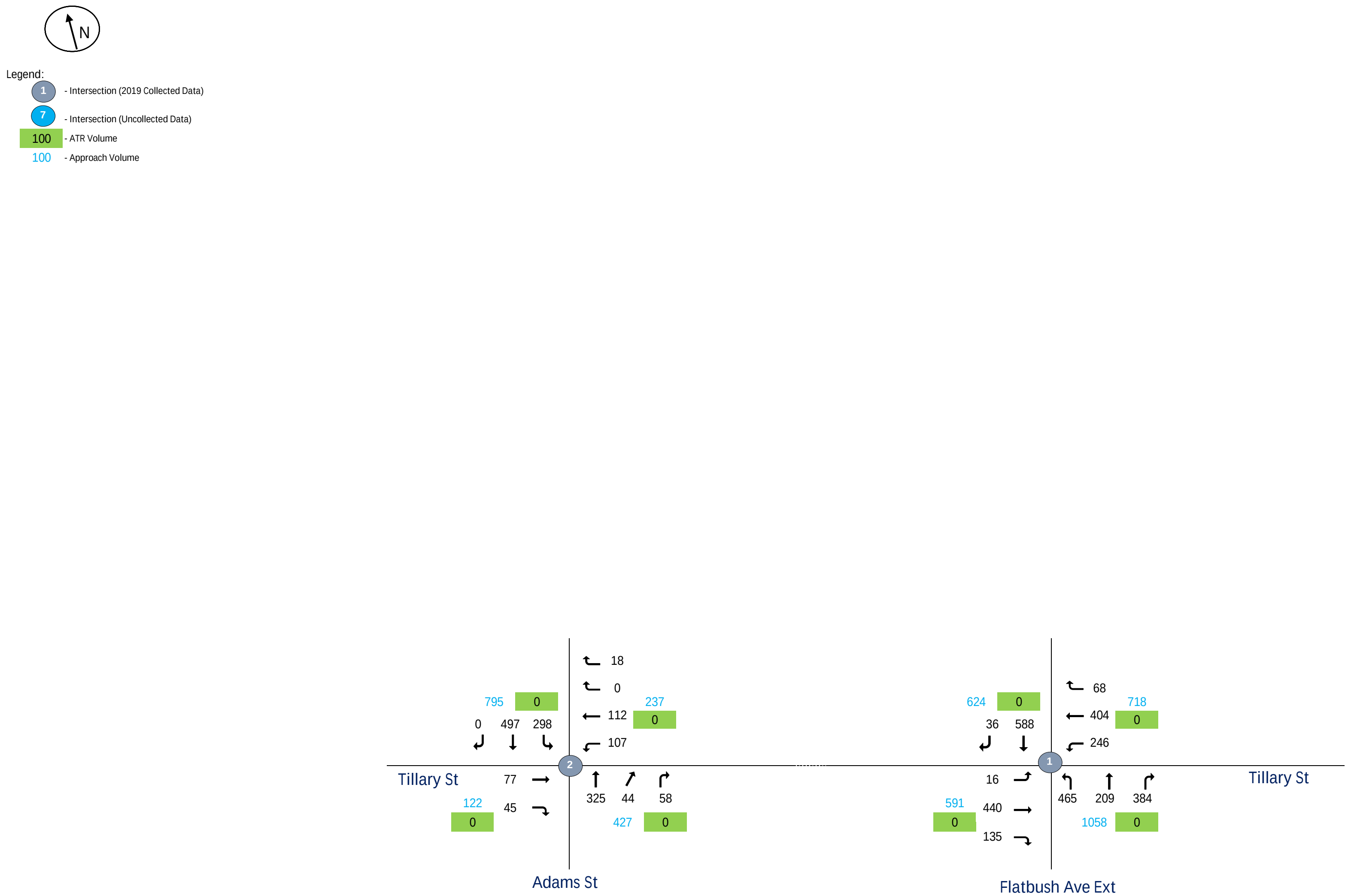
PM With Action



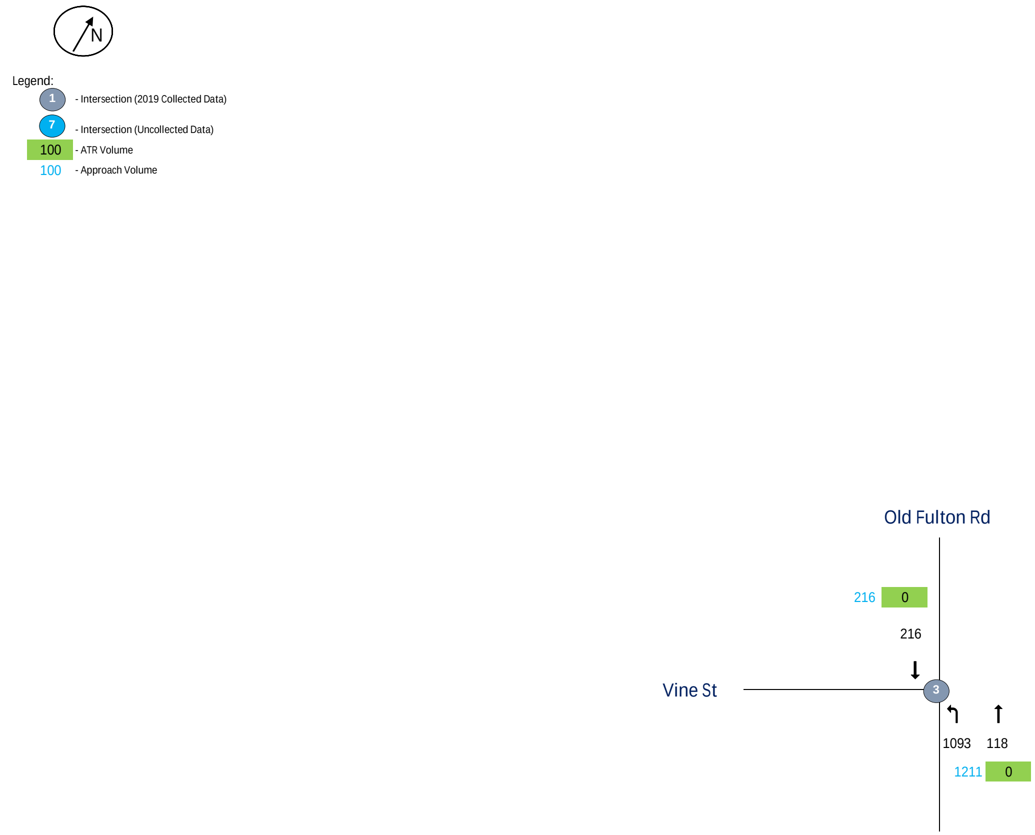
CBD Tolling

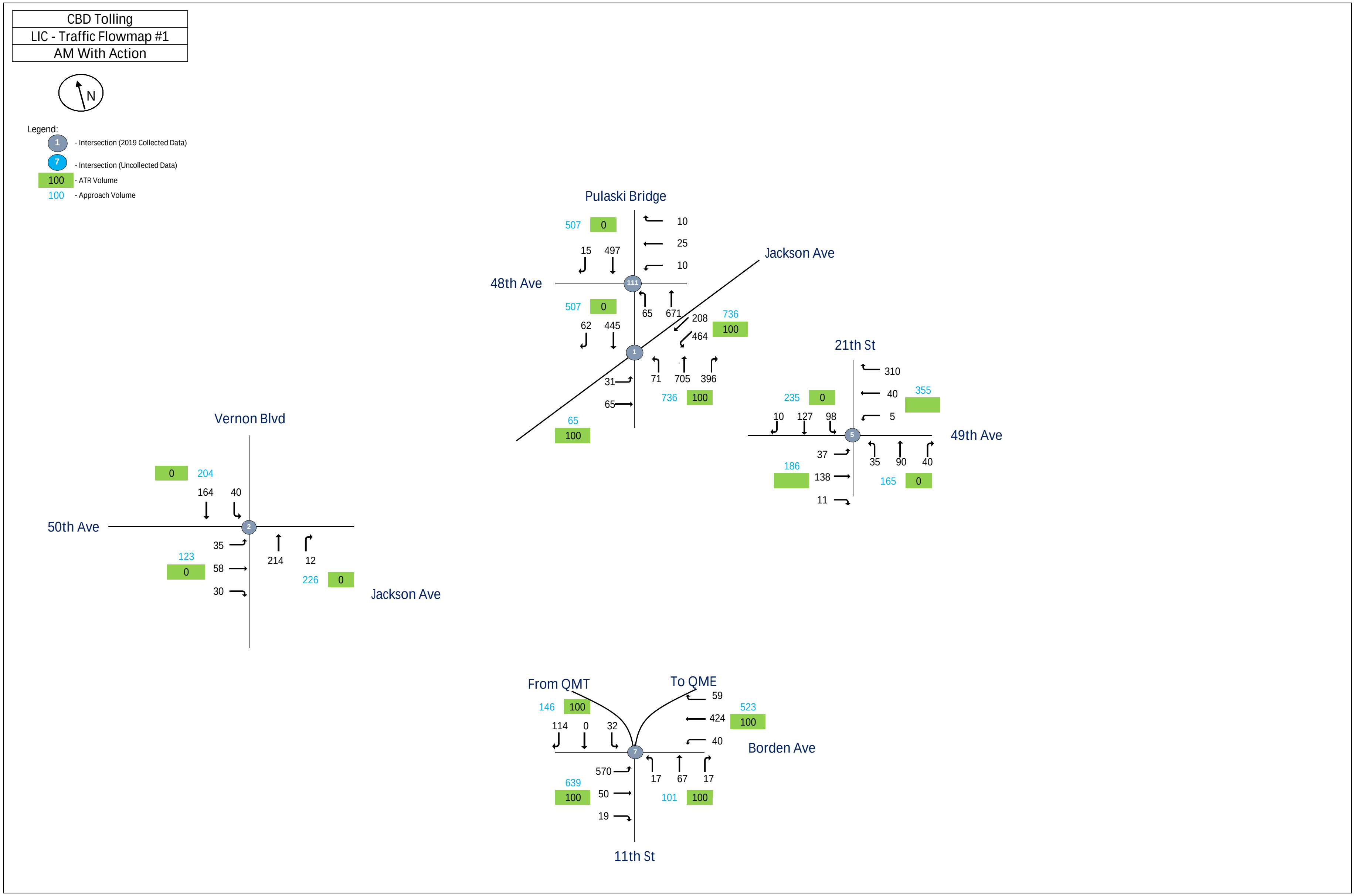
Dumbo - Traffic Flowmap

LN With Action

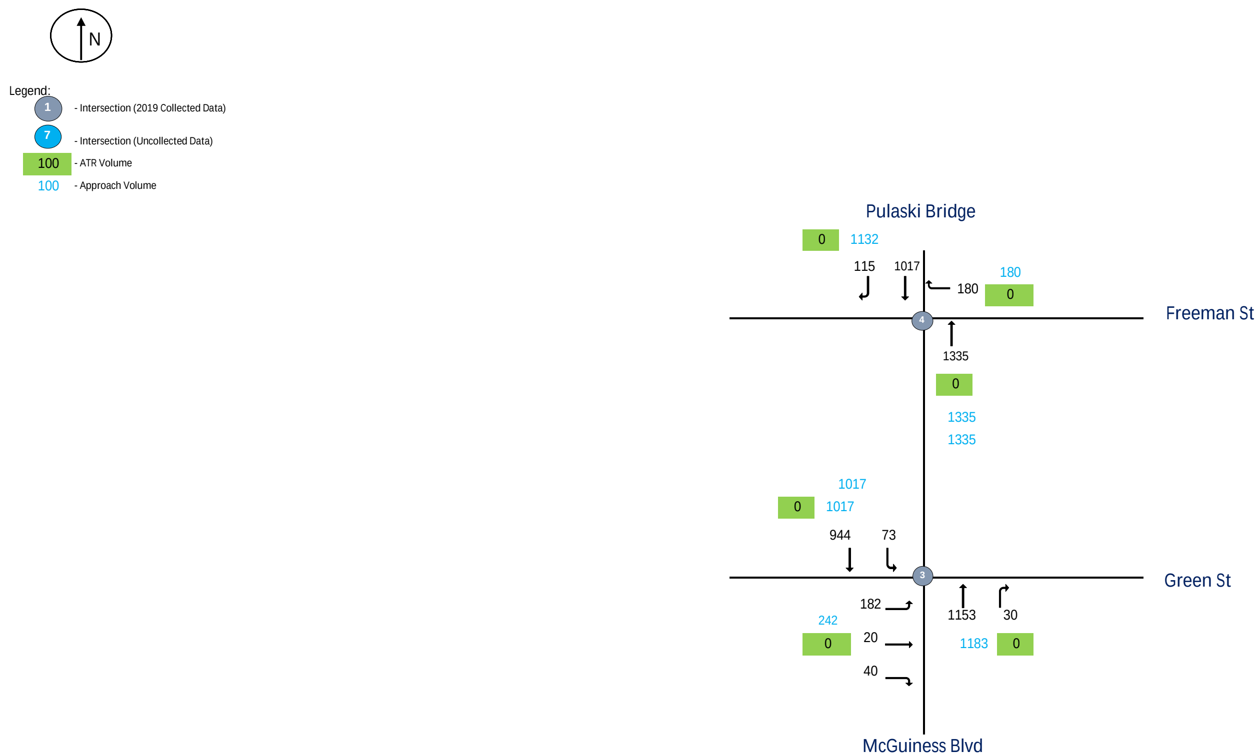


CBD Tolling
Dumbo #2 - Traffic Flowmap
LN With Action

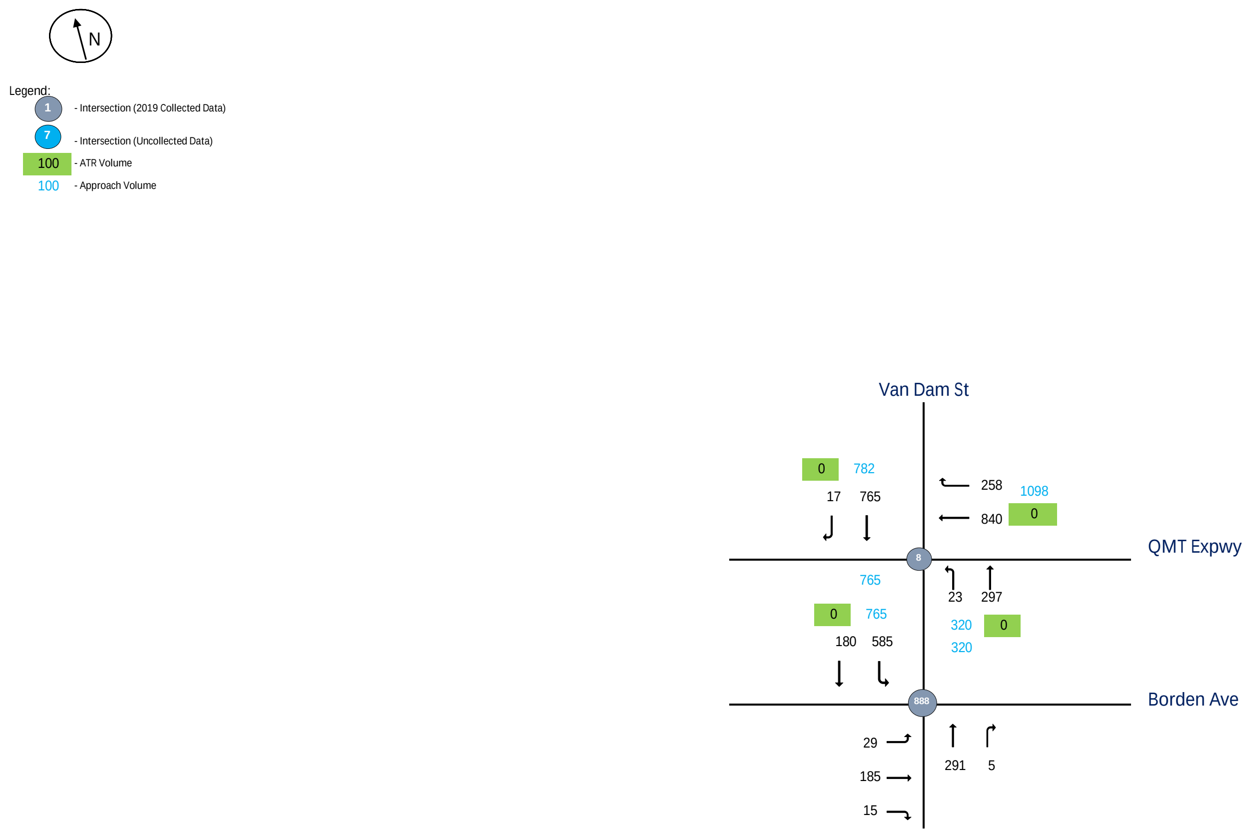



CBD Tolling
LIC - Traffic Flowmap #1
AM With Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
48th Ave
Jackson Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St

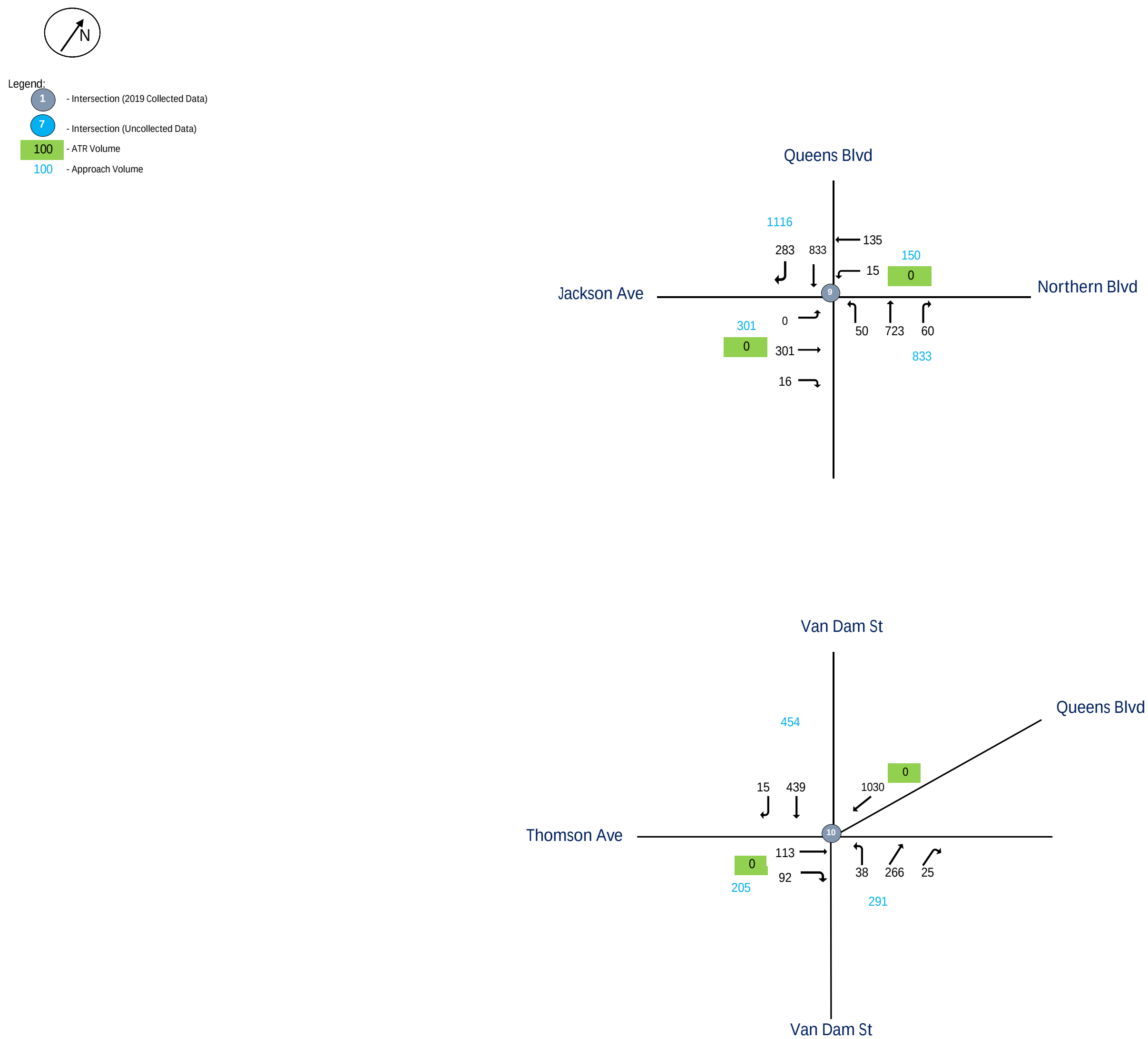
CBD Tolling
LIC - Traffic Flowmap #2
AM With Action



CBD Tolling
LIC - Traffic Flowmap #3
AM With Action



CBD Tolling
LIC - Traffic Flowmap #4
AM With Action



CBD Tolling

LIC - Traffic Flowmap #5

AM With Action

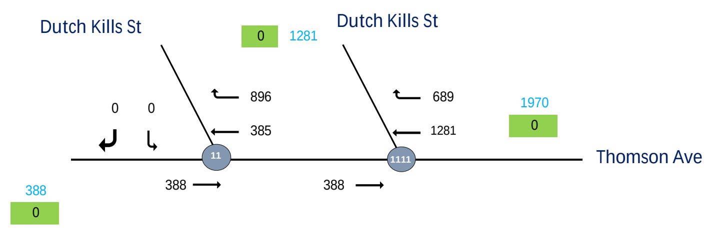
Legend:

1 - Intersection (2019 Collected Data)

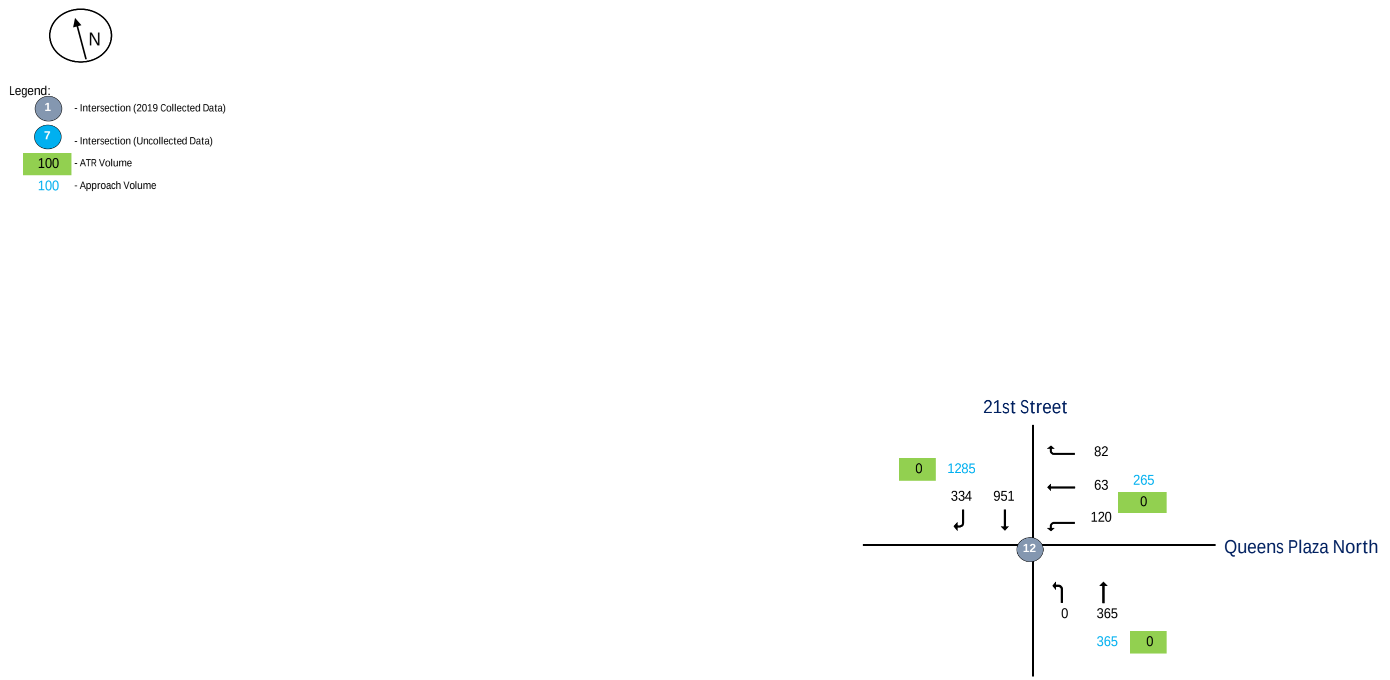
7 - Intersection (Uncollected Data)

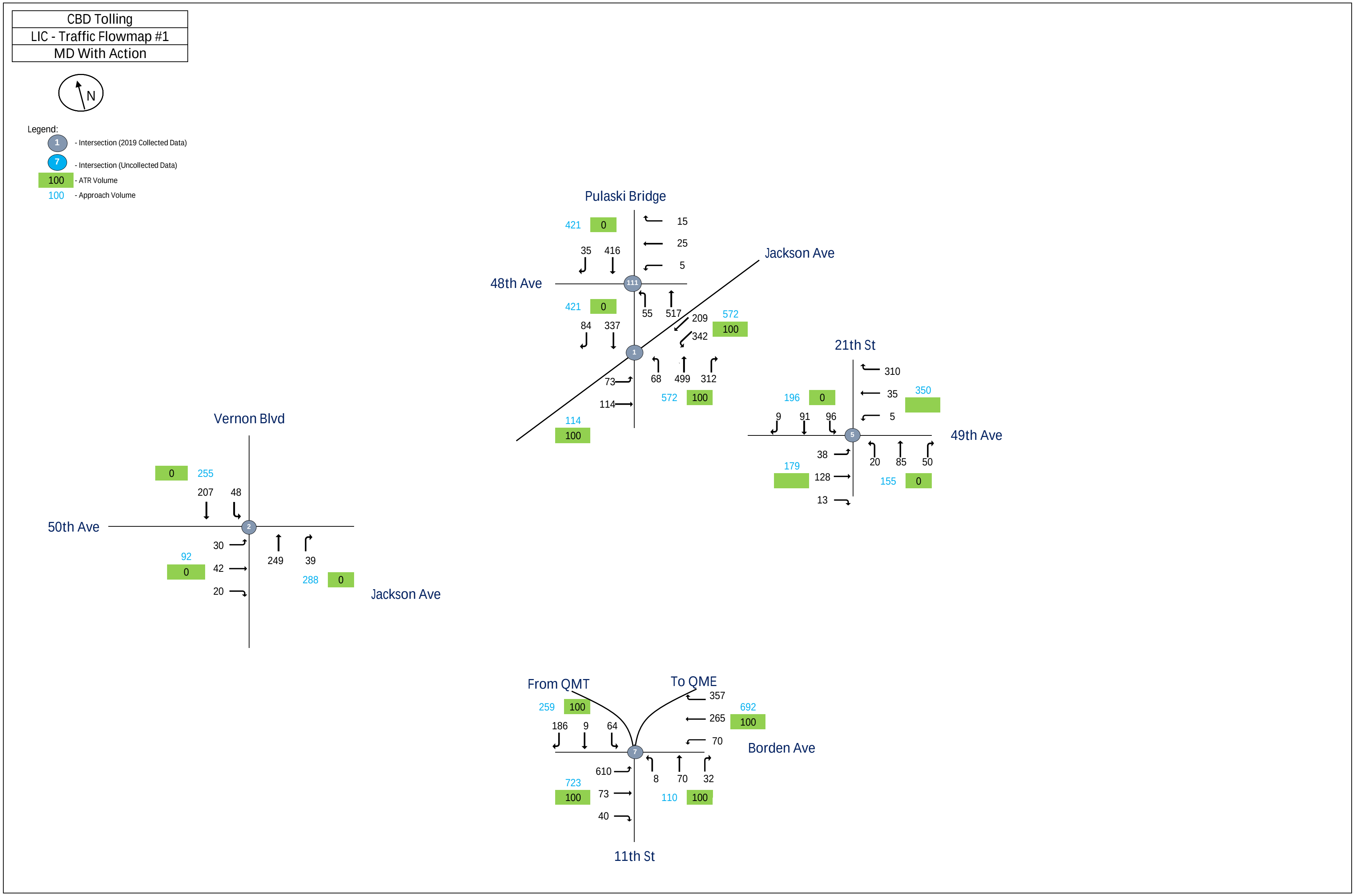
100 - ATR Volume

100 - Approach Volume

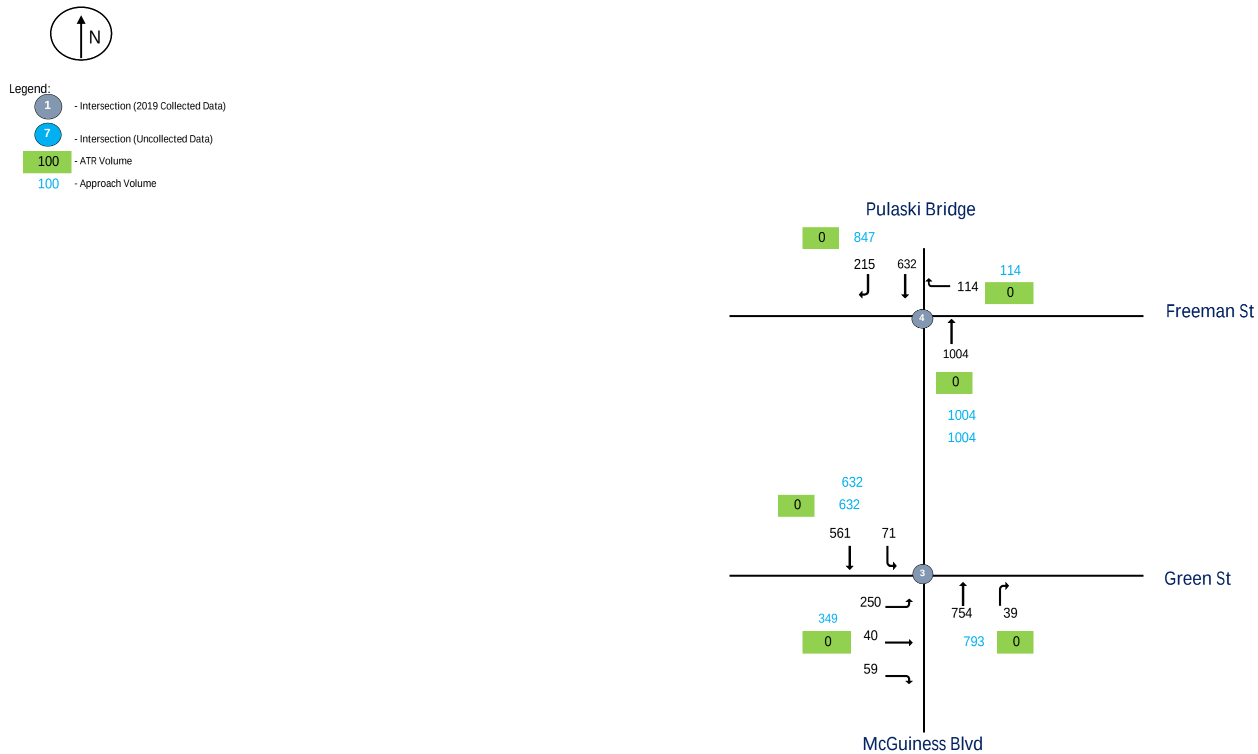


CBD Tolling
LIC - Traffic Flowmap #6
AM With Action

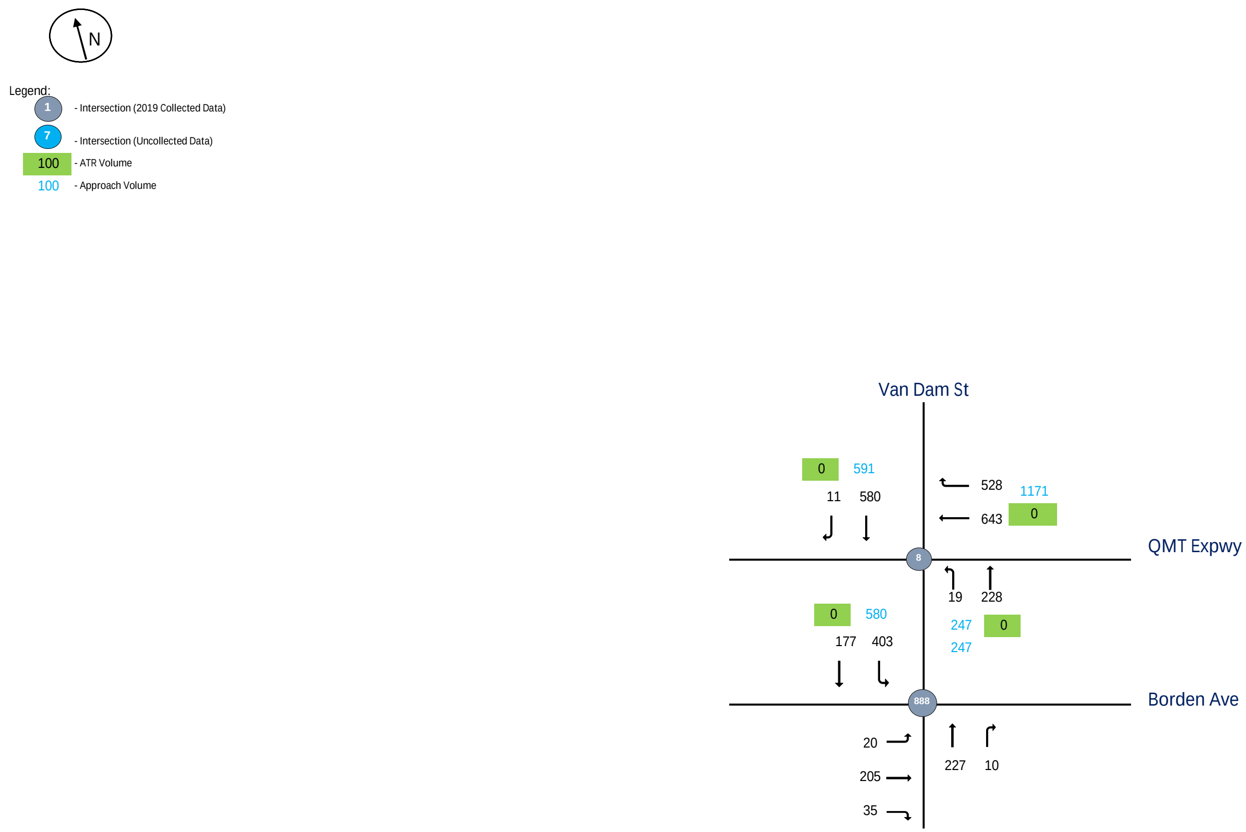



CBD Tolling
LIC - Traffic Flowmap #1
MD With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
Jackson Ave
48th Ave
21th St
49th Ave
Vernon Blvd
50th Ave
Jackson Ave
From QMT
To QME
Borden Ave
11th St
421
0
15
25
5
35
416
421
0
55
517
209
342
572
100
84
337
68
499
312
73
114
572
100
114
100
310
35
5
196
0
350
9
91
96
38
179
128
13
20
85
50
155
0
0
255
207
48
30
42
20
92
0
249
39
288
0
259
100
186
9
64
357
265
70
692
100
610
73
40
723
100
8
70
32
110
100

CBD Tolling
LIC - Traffic Flowmap #2
MD With Action



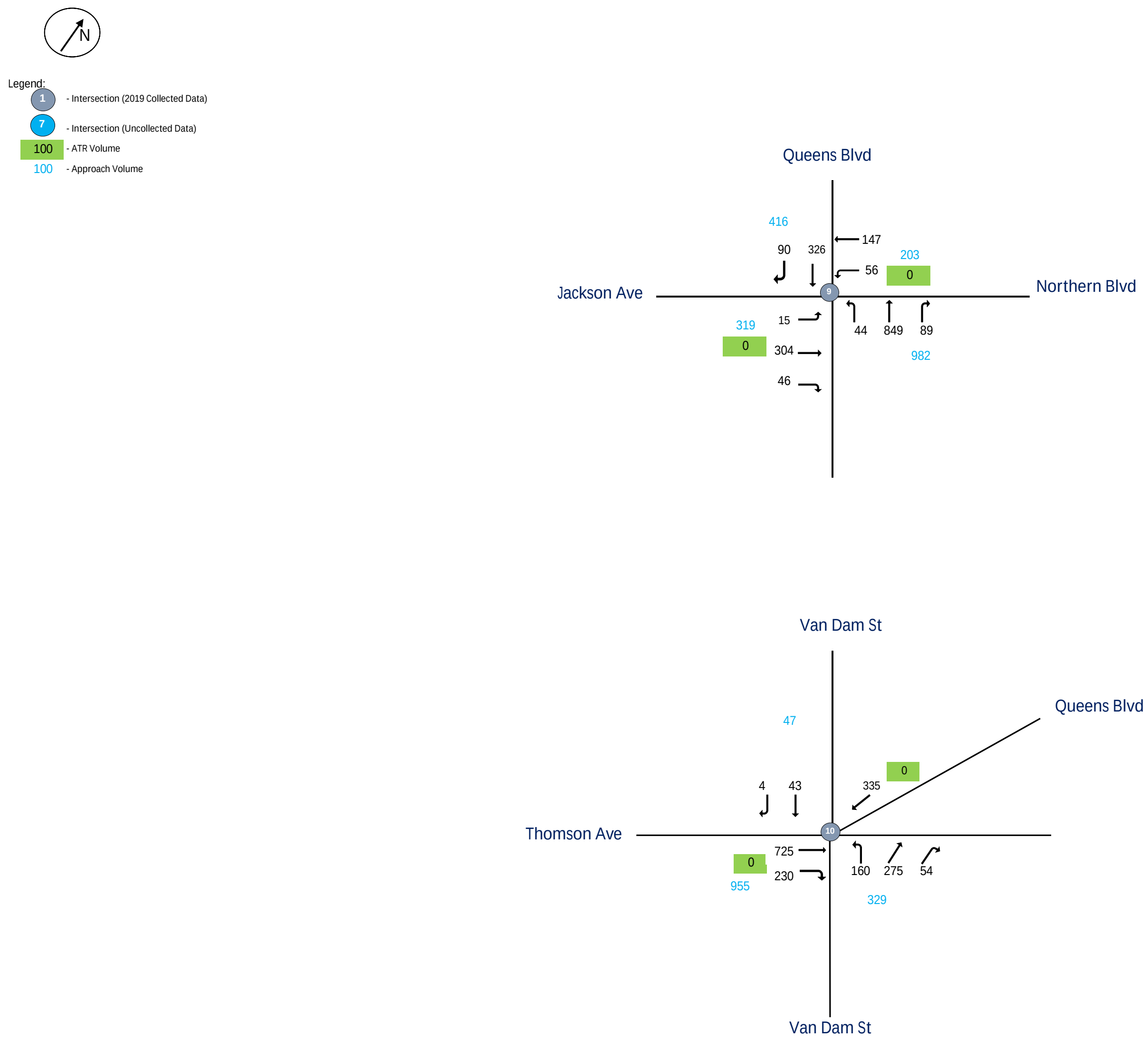
CBD Tolling
LIC - Traffic Flowmap #3
MD With Action



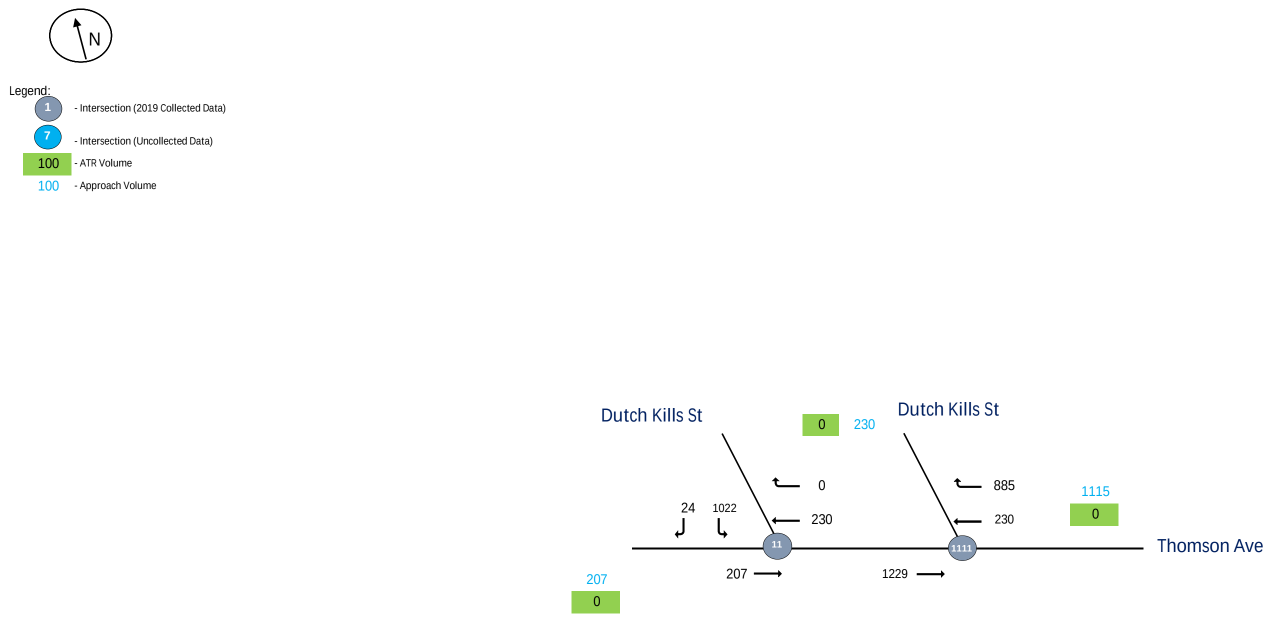
CBD Tolling

LIC - Traffic Flowmap #4

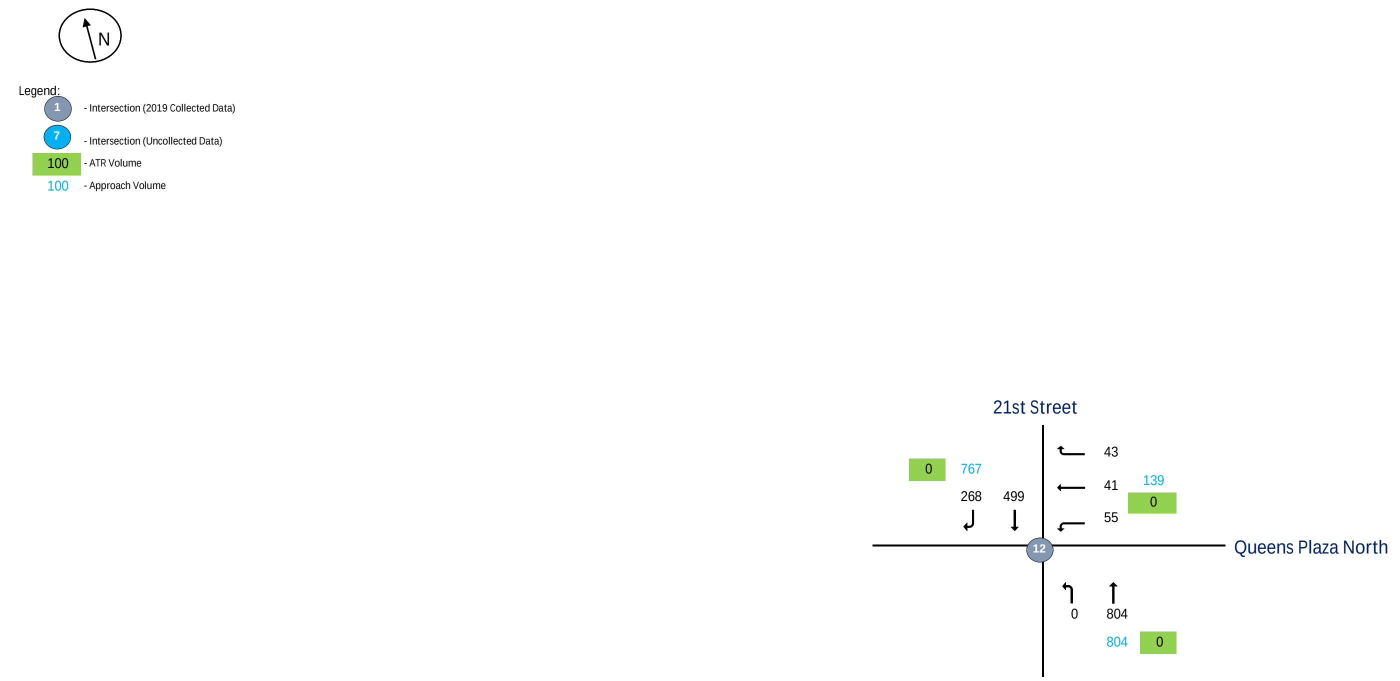
MD With Action

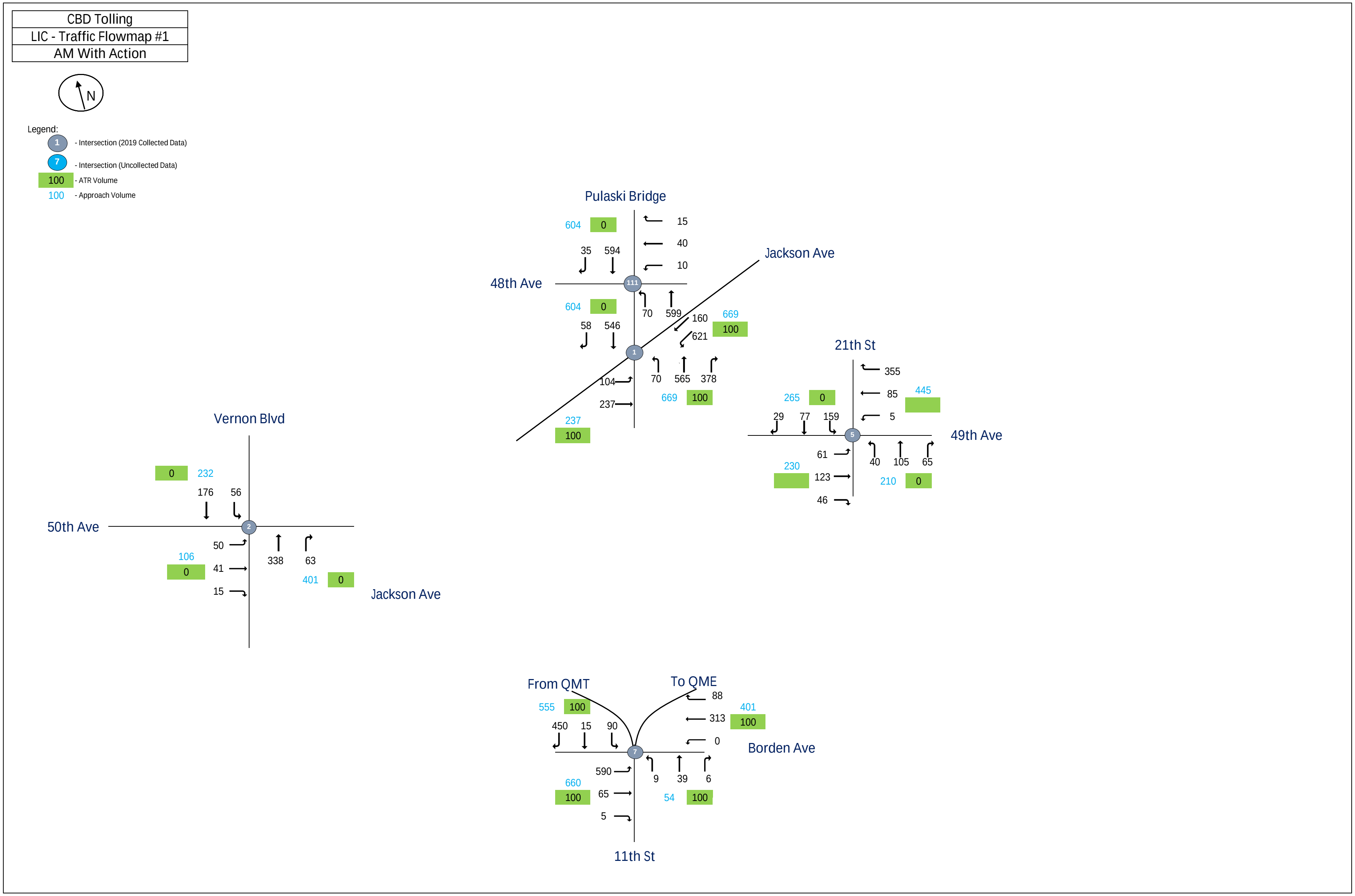


CBD Tolling
LIC - Traffic Flowmap #5
MD With Action

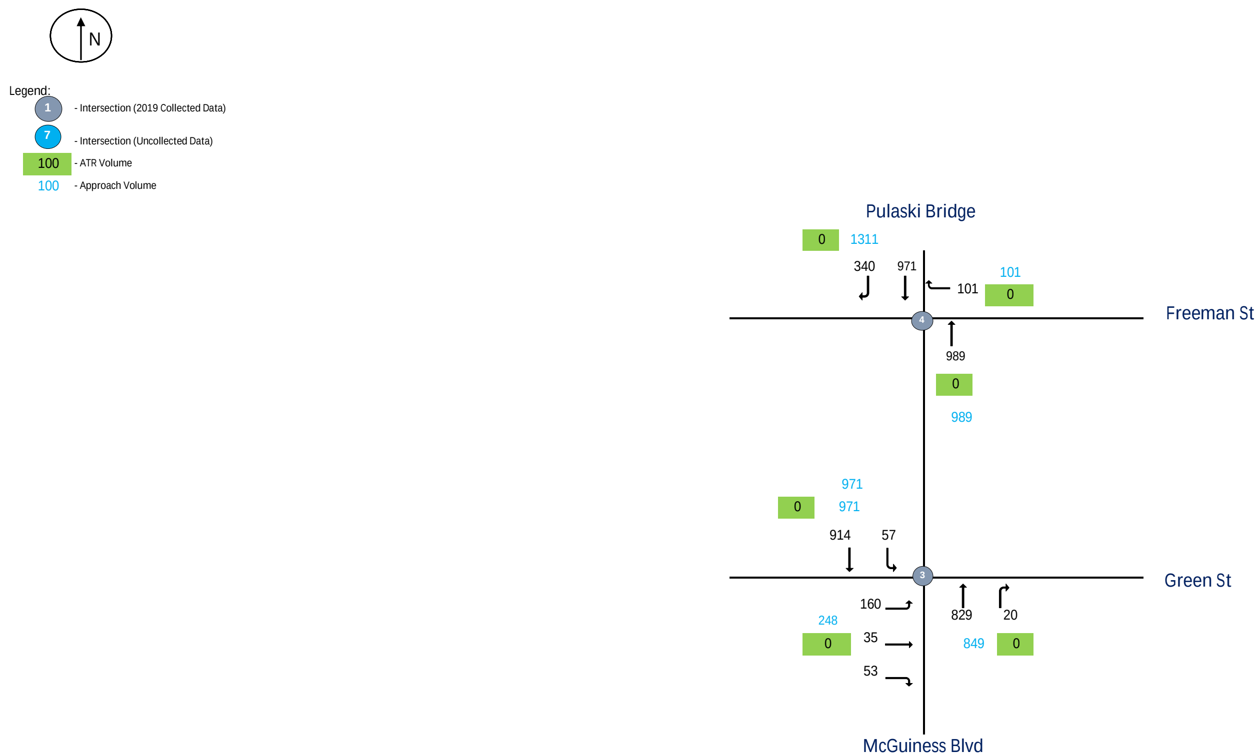


CBD Tolling
LIC - Traffic Flowmap #6
MD With Action

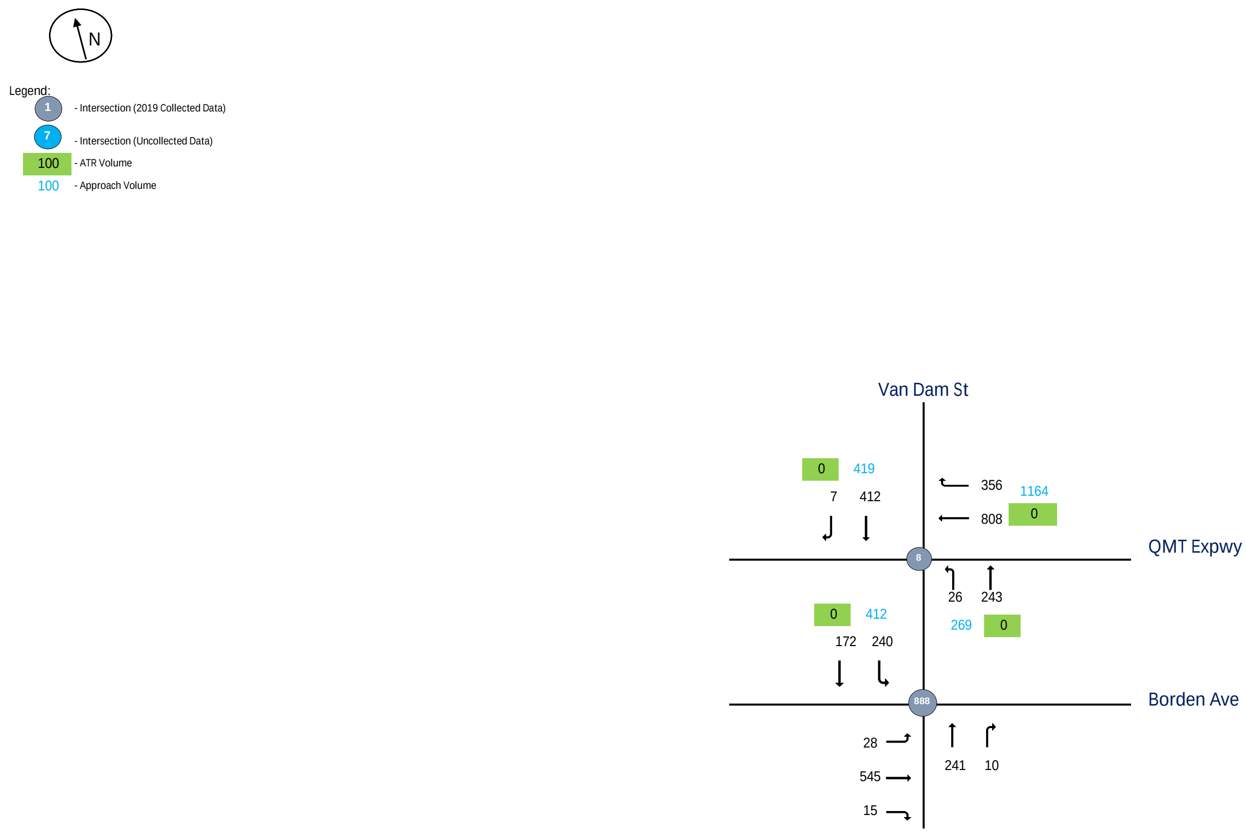



CBD Tolling
LIC - Traffic Flowmap #1
AM With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Pulaski Bridge
48th Ave
Jackson Ave
604
0
35
594
15
40
10
111
70
599
160
621
669
100
58
546
1
70
565
378
104
237
669
100
237
100
21th St
355
85
5
445
265
0
29
77
159
5
49th Ave
61
123
46
230
40
105
65
210
0
Vernon Blvd
0
232
176
56
50th Ave
2
50
41
15
106
0
338
63
401
0
Jackson Ave
From QMT
To QME
555
100
450
15
90
88
313
0
401
100
Borden Ave
7
590
65
5
660
100
9
39
6
54
100
11th St

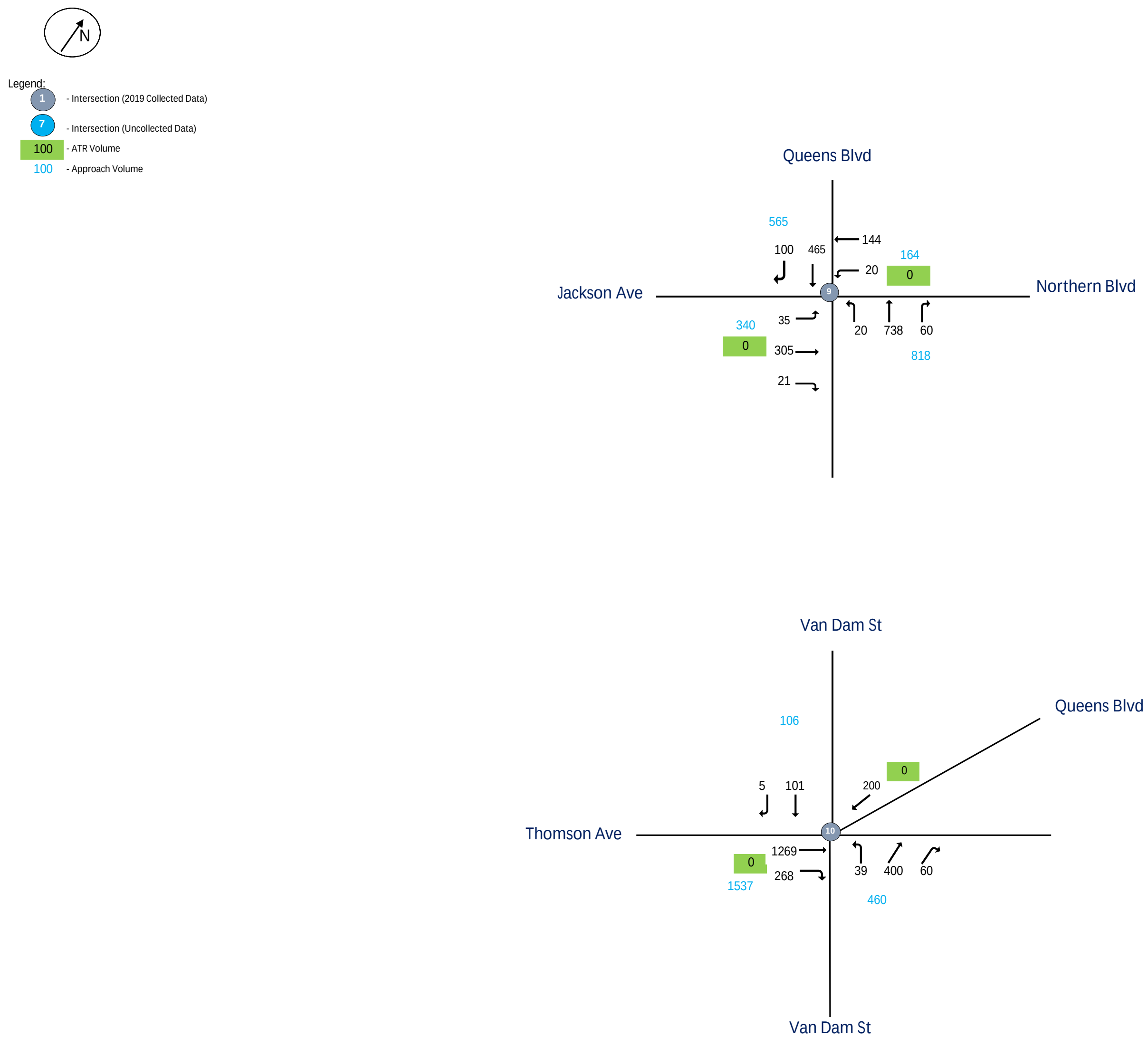
CBD Tolling
LIC - Traffic Flowmap #2
AM With Action



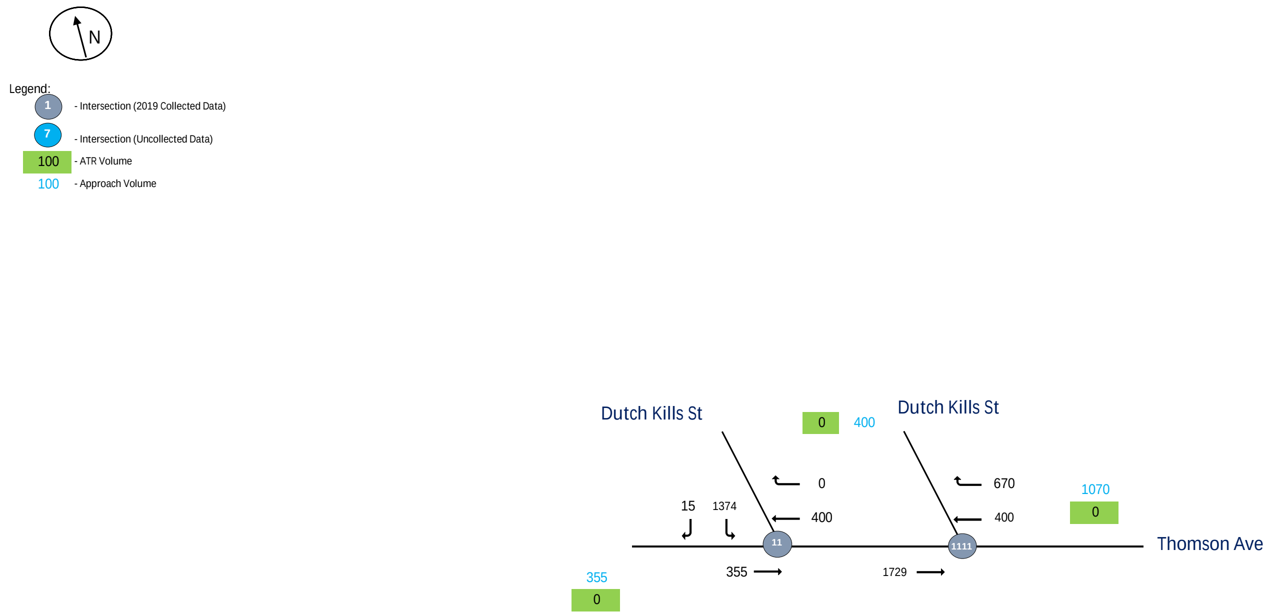
CBD Tolling
LIC - Traffic Flowmap #3
AM With Action



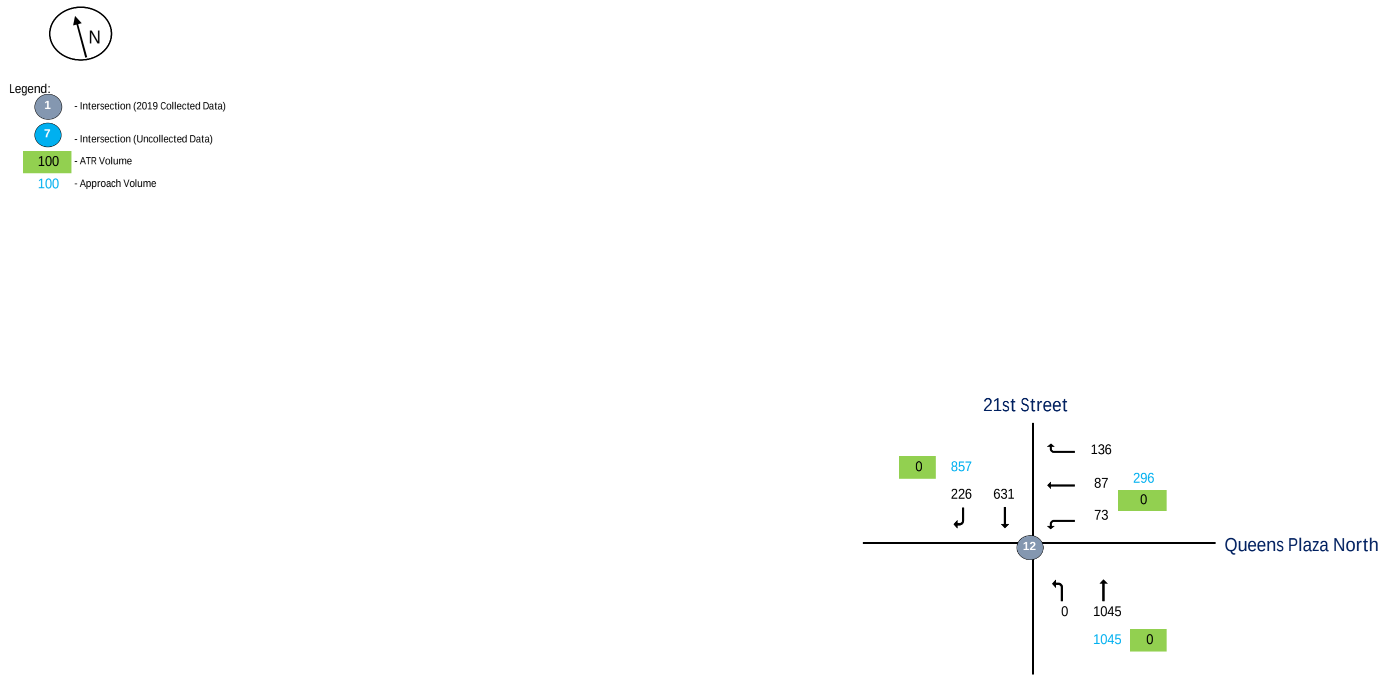
CBD Tolling
LIC - Traffic Flowmap #4
AM With Action



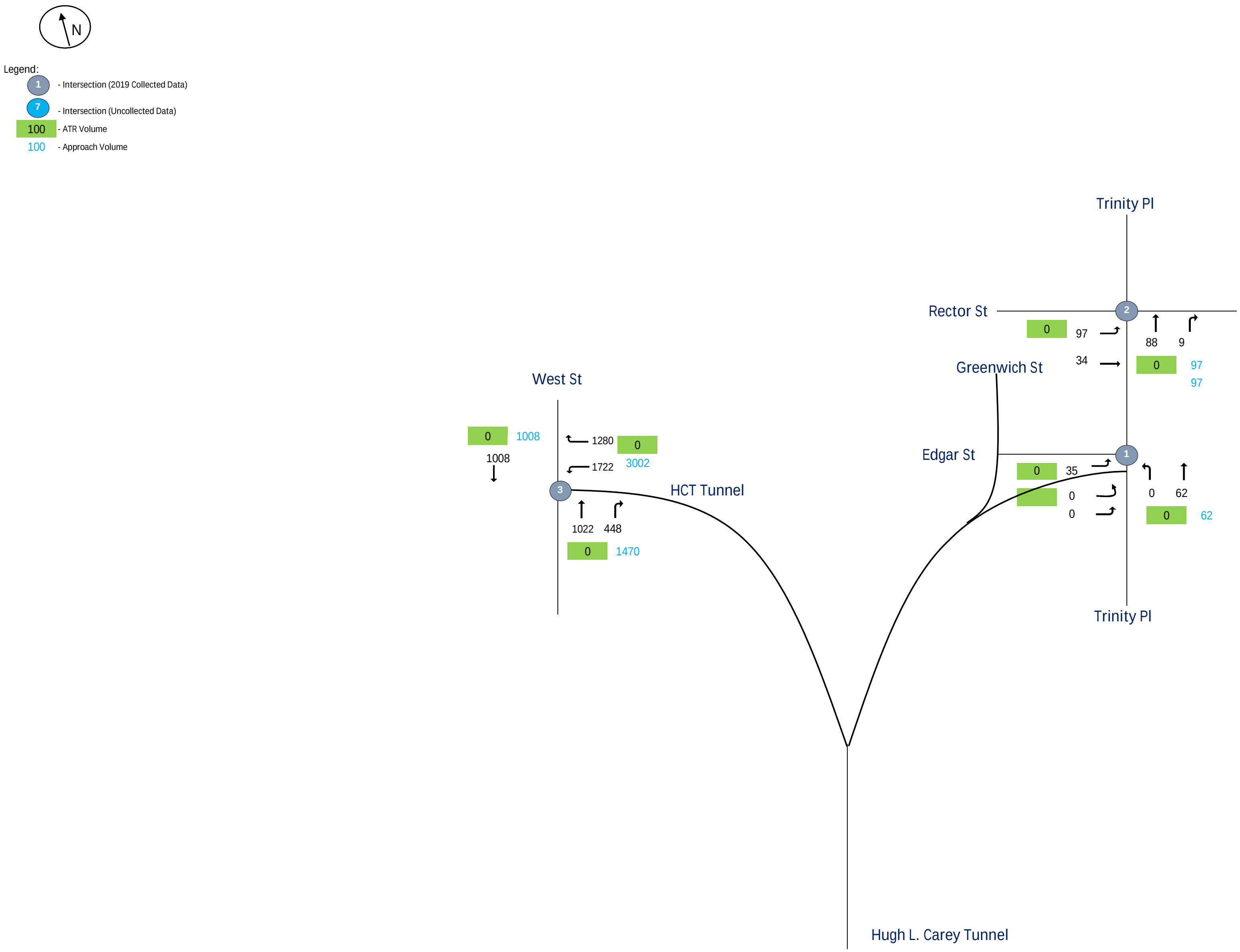
CBD Tolling
LIC - Traffic Flowmap #5
AM With Action



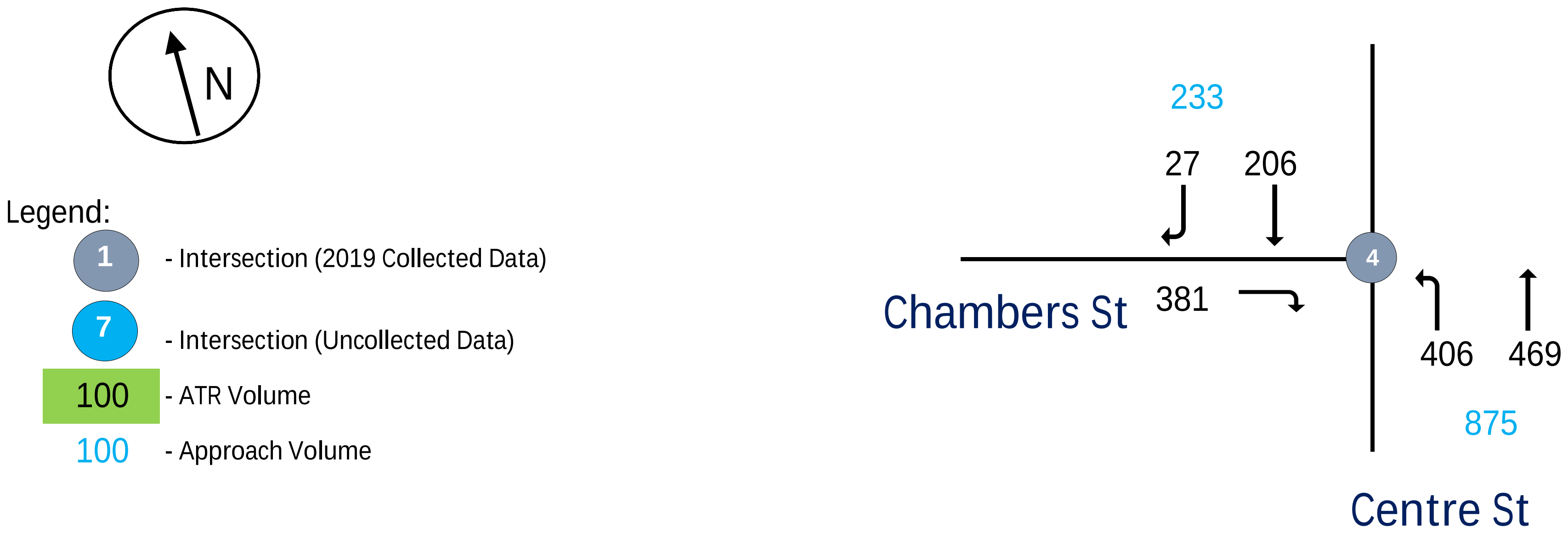
CBD Tolling
LIC - Traffic Flowmap #6
AM With Action



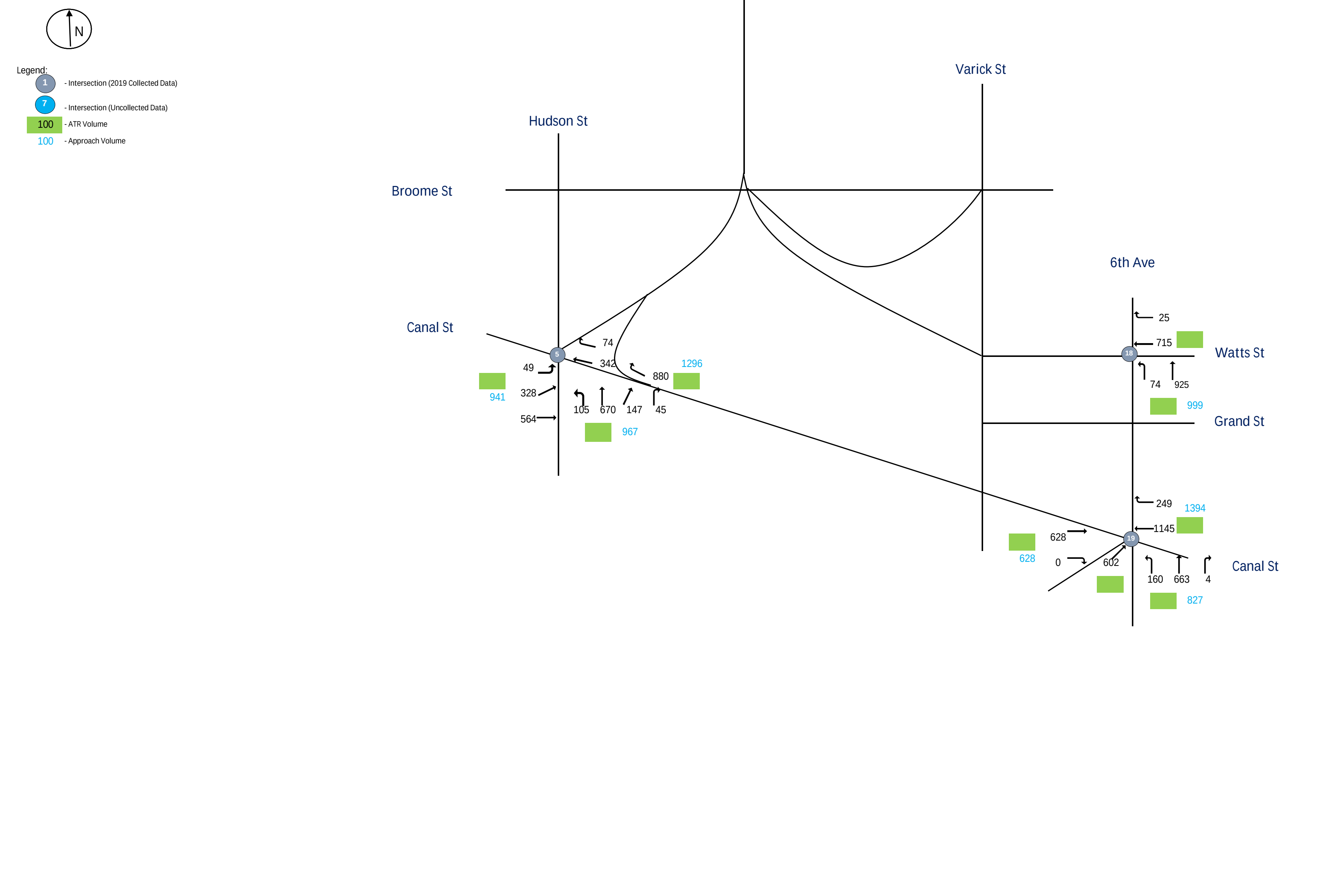
CBD Tolling
LM - Traffic Flowmap #1
AM With Action



CBD Tolling
LM - Traffic Flowmap #2
AM With Action



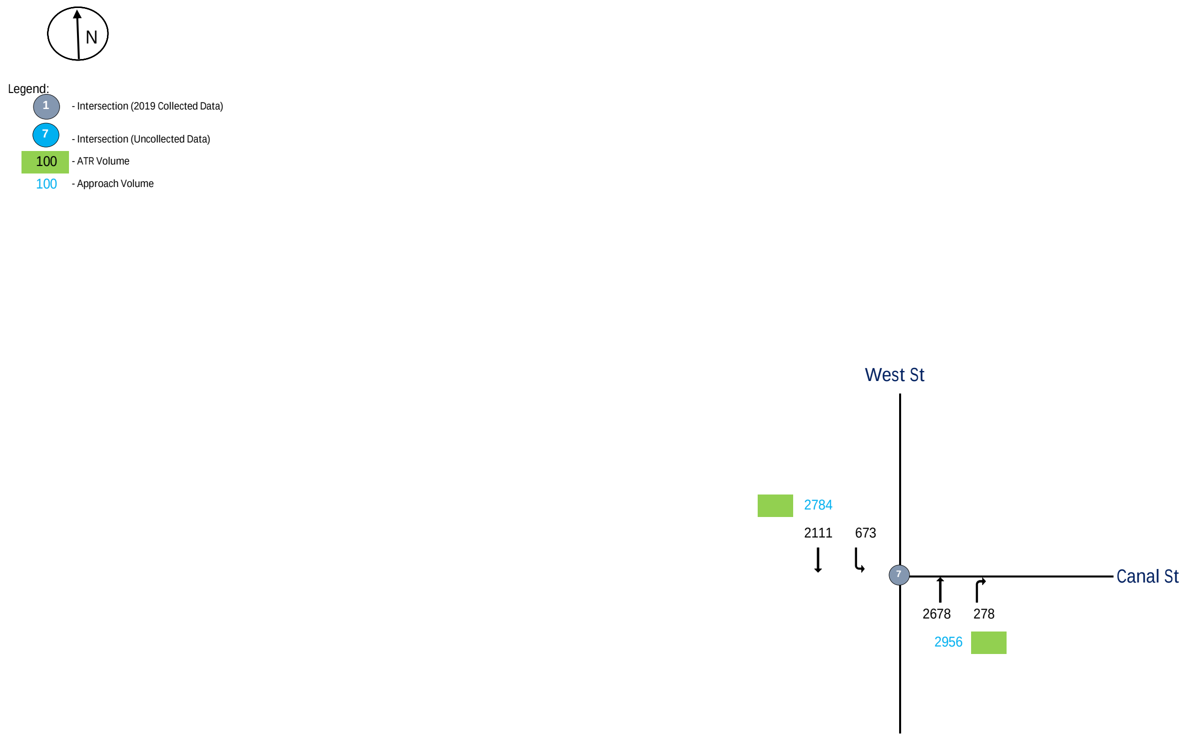
CBD Tolling
LM - Traffic Flowmap #3
AM With Action



CBD Tolling

LM - Traffic Flowmap #4

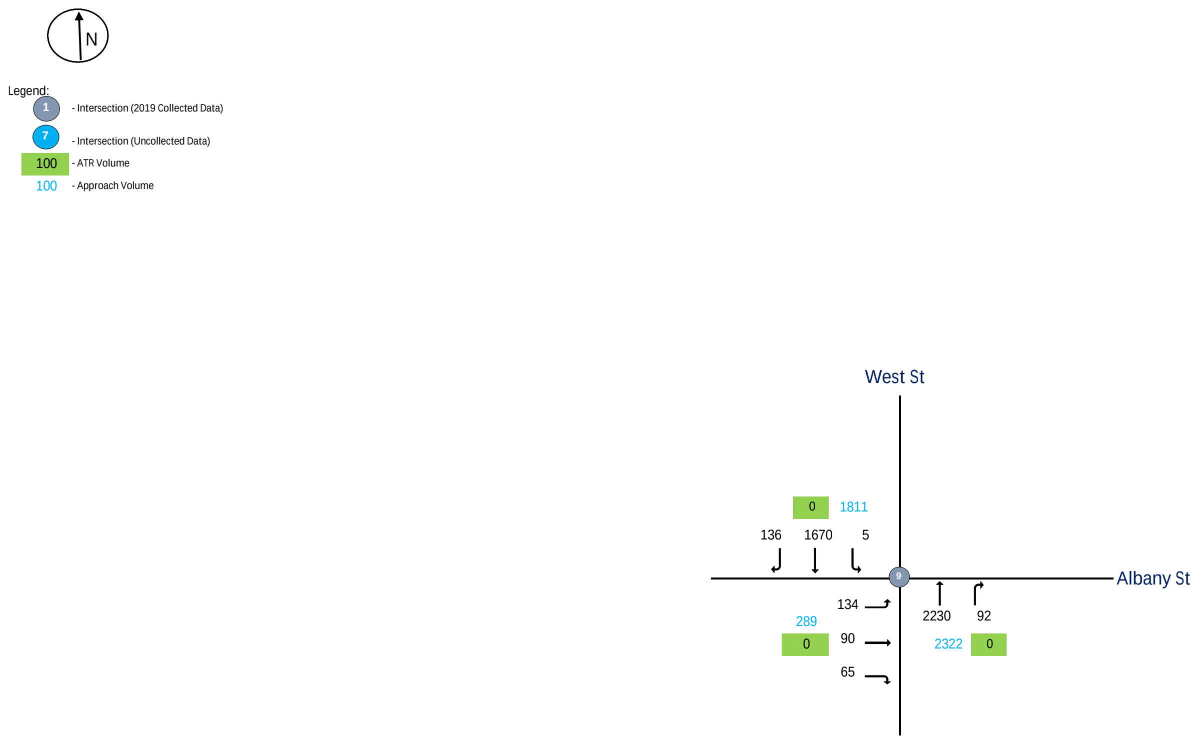
AM With Action



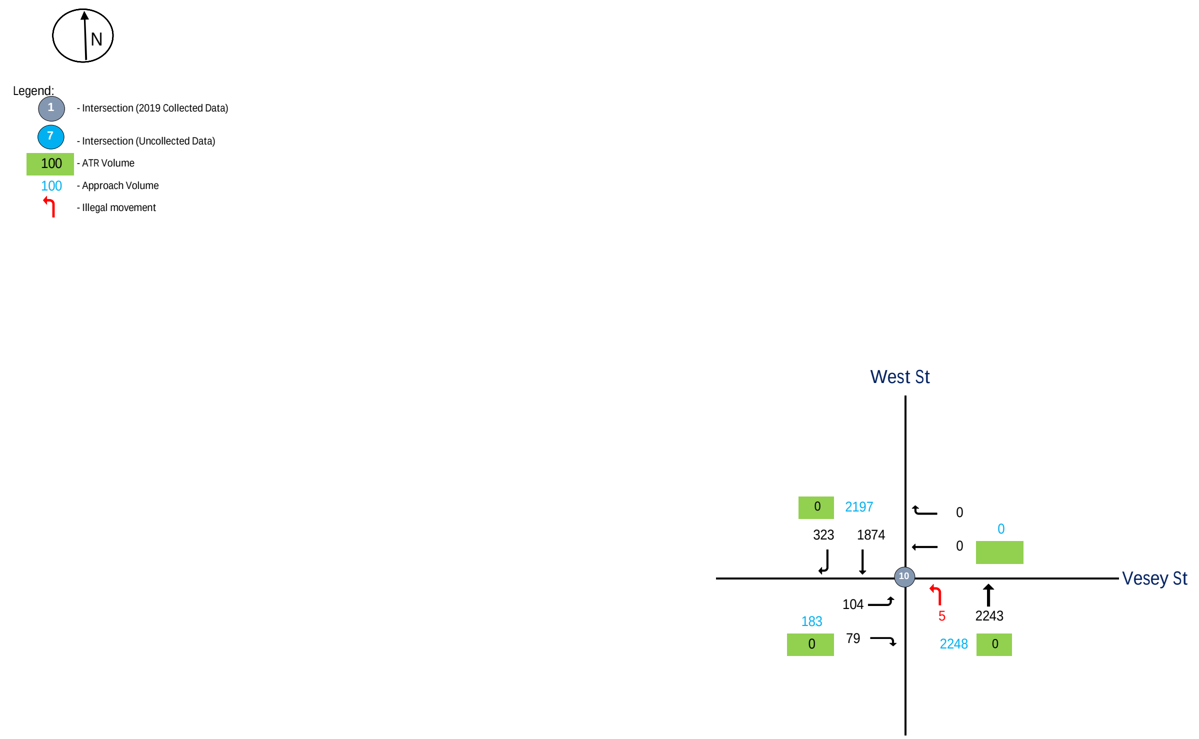
CBD Tolling

LM - Traffic Flowmap #5

AM With Action

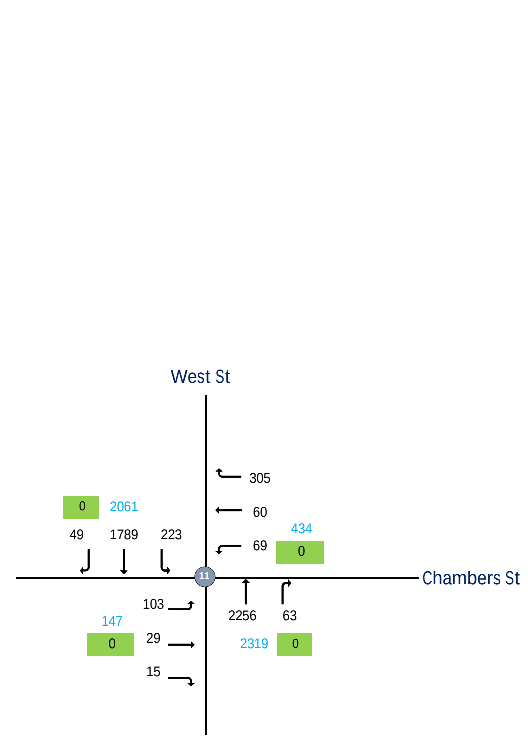


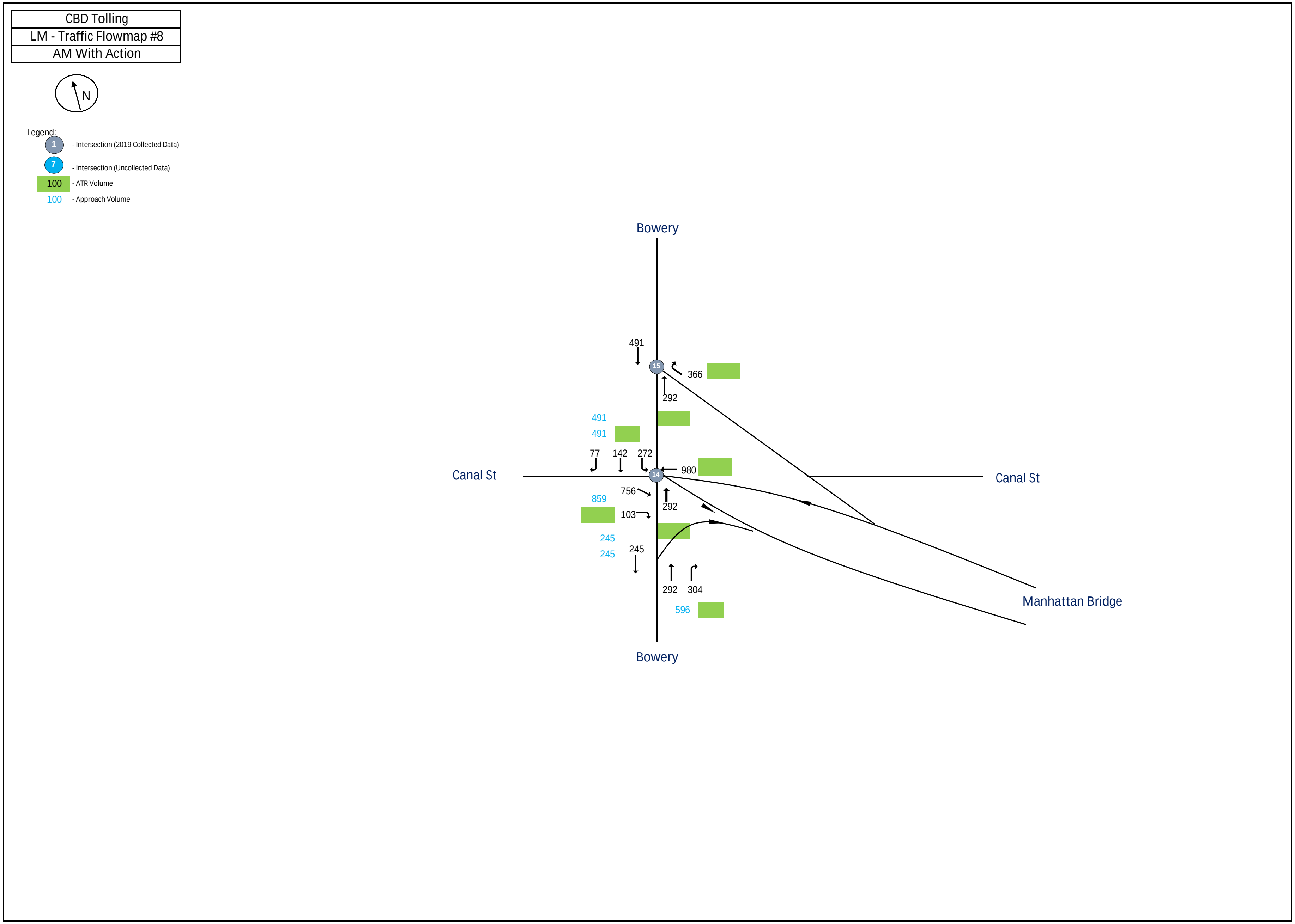
CBD Tolling
LM - Traffic Flowmap #6
AM With Action



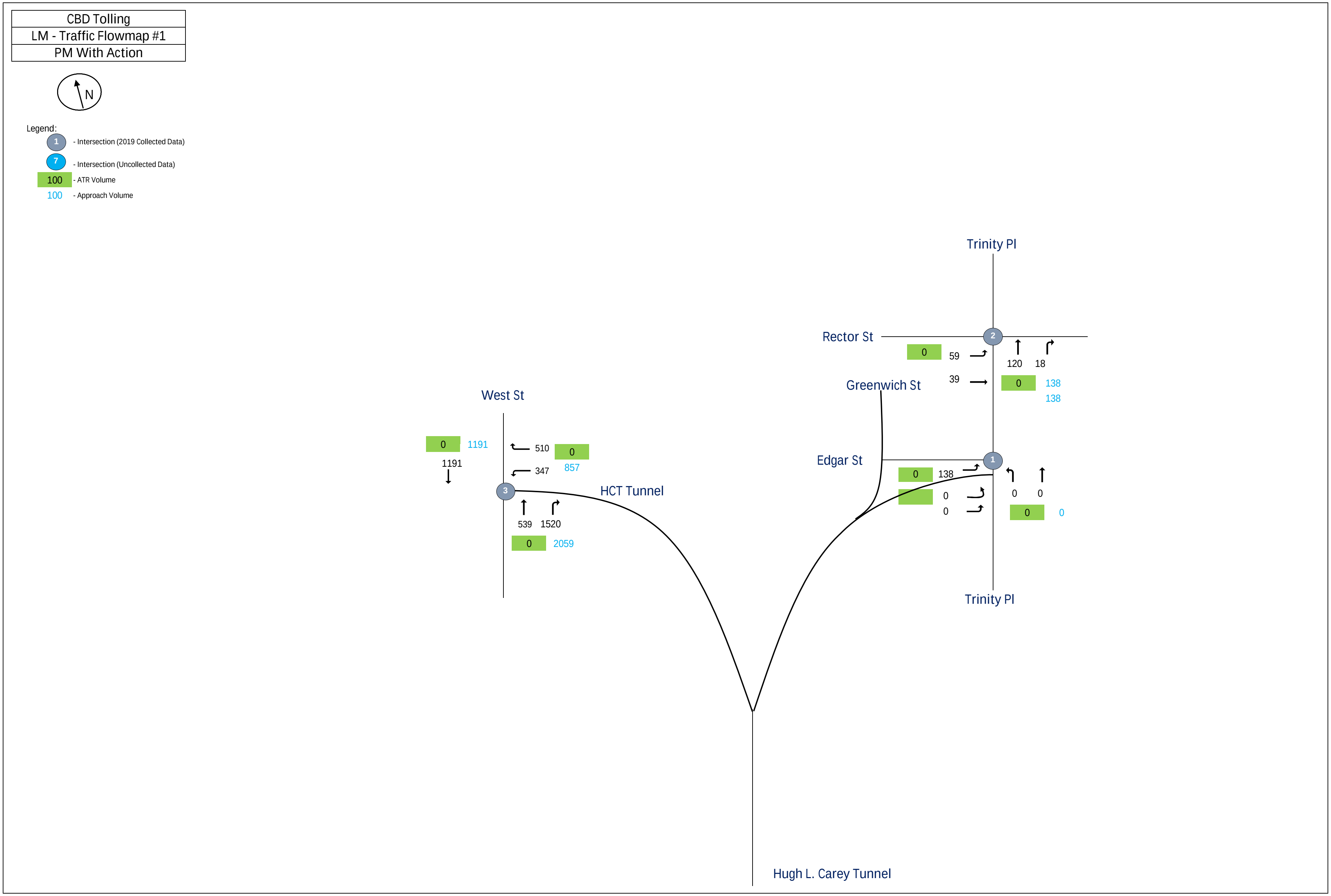
CBD Tolling
LM - Traffic Flowmap #7
AM With Action

Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



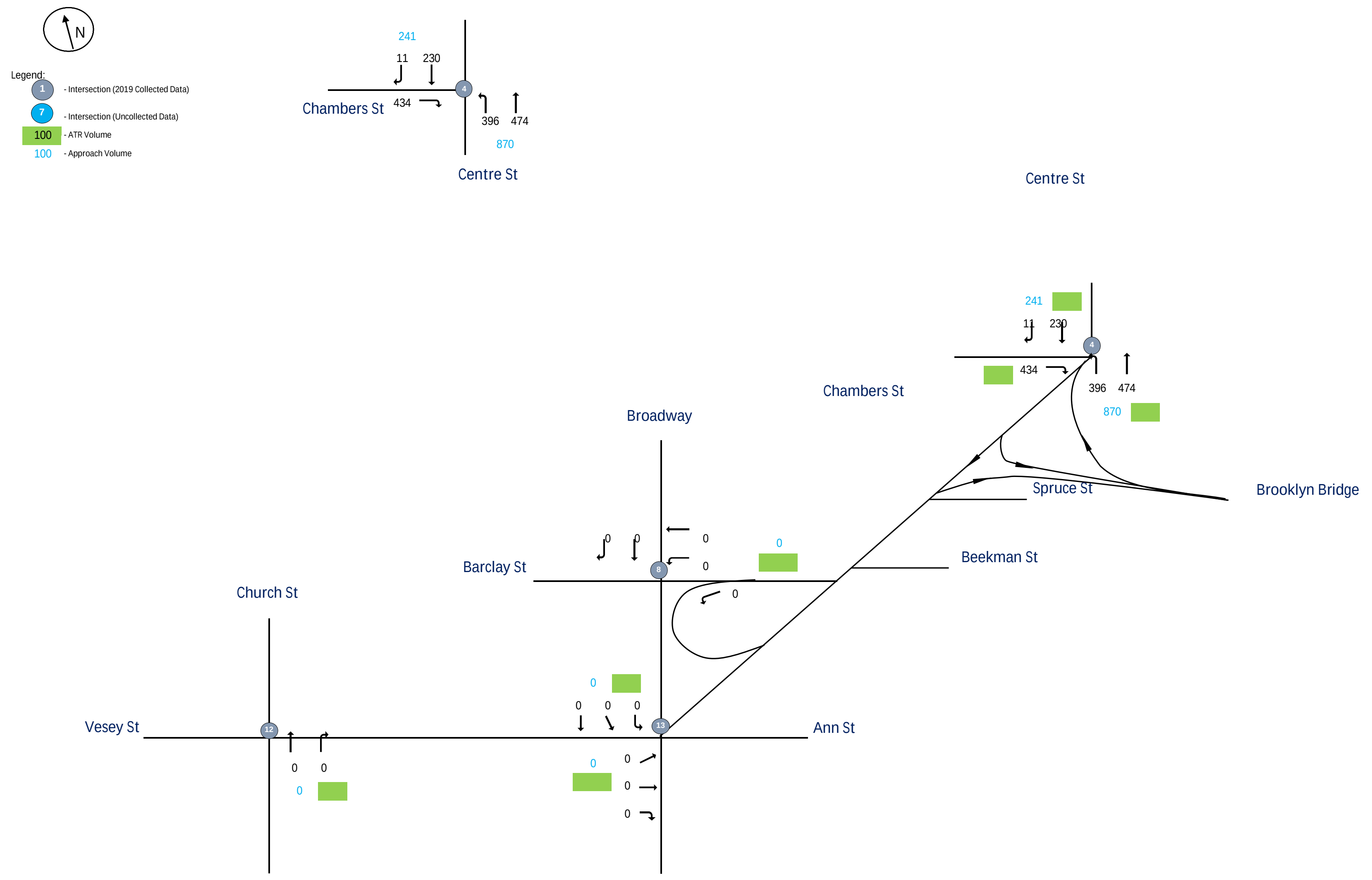


CBD Tolling
LM - Traffic Flowmap #8
AM With Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Bowery
491
15
366
292
491
491
77
142
272
980
Canal St
14
Canal St
756
859
292
103
245
245
245
292
304
596
Manhattan Bridge
Bowery

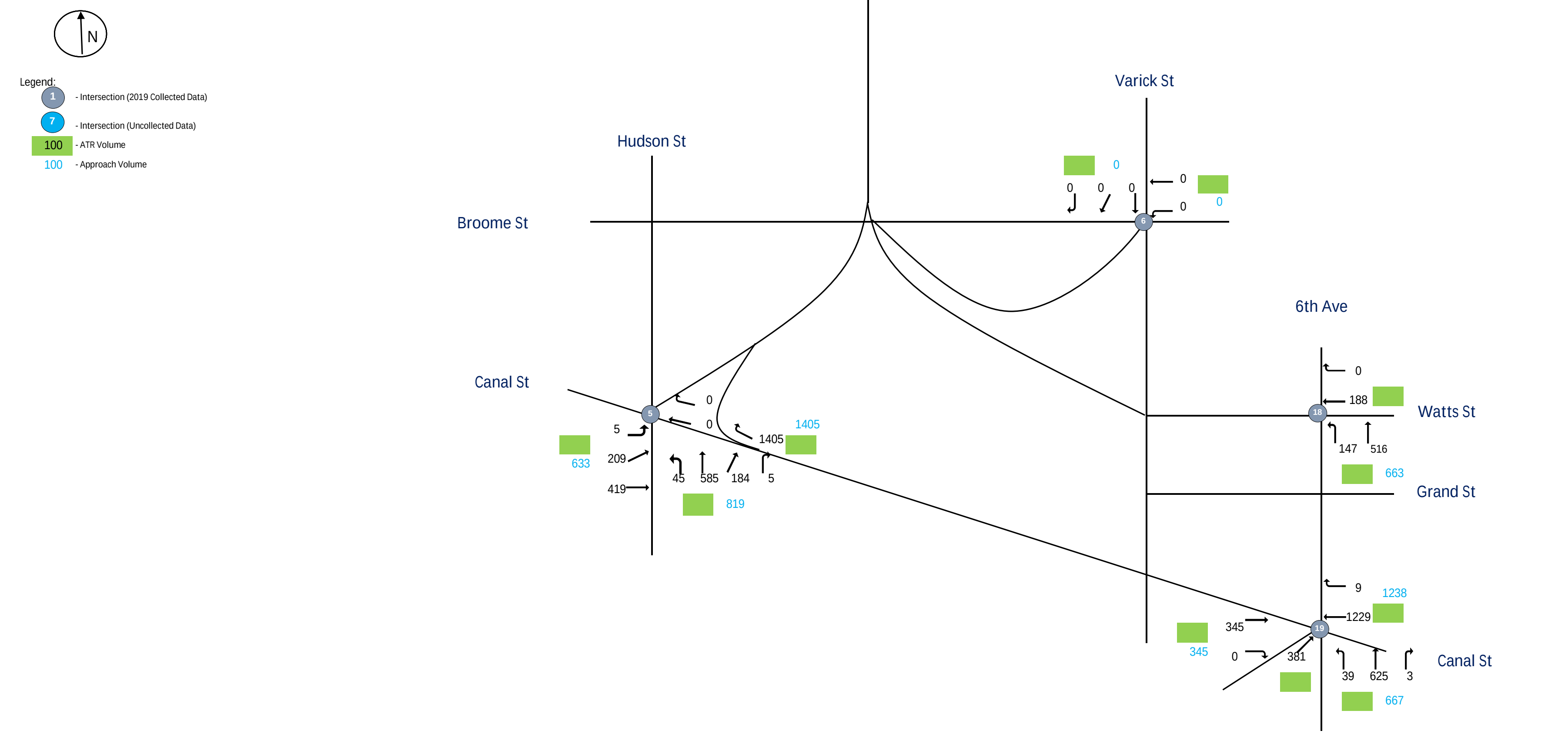


CBD Tolling
LM - Traffic Flowmap #1
PM With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Trinity Pl
Rector St
Greenwich St
Edgar St
West St
HCT Tunnel
Hugh L. Carey Tunnel
0
59
39
120
18
0
138
138
0
1191
1191
510
347
0
857
539
1520
0
2059
0
138
0
0
0
0
0
0

CBD Tolling
LM - Traffic Flowmap #2
PM With Action



CBD Tolling
LM - Traffic Flowmap #3
PM With Action



CBD Tolling

LM - Traffic Flowmap #4

PM With Action

N

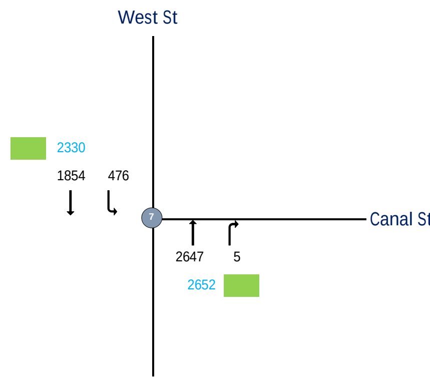
Legend:

1 - Intersection (2019 Collected Data)

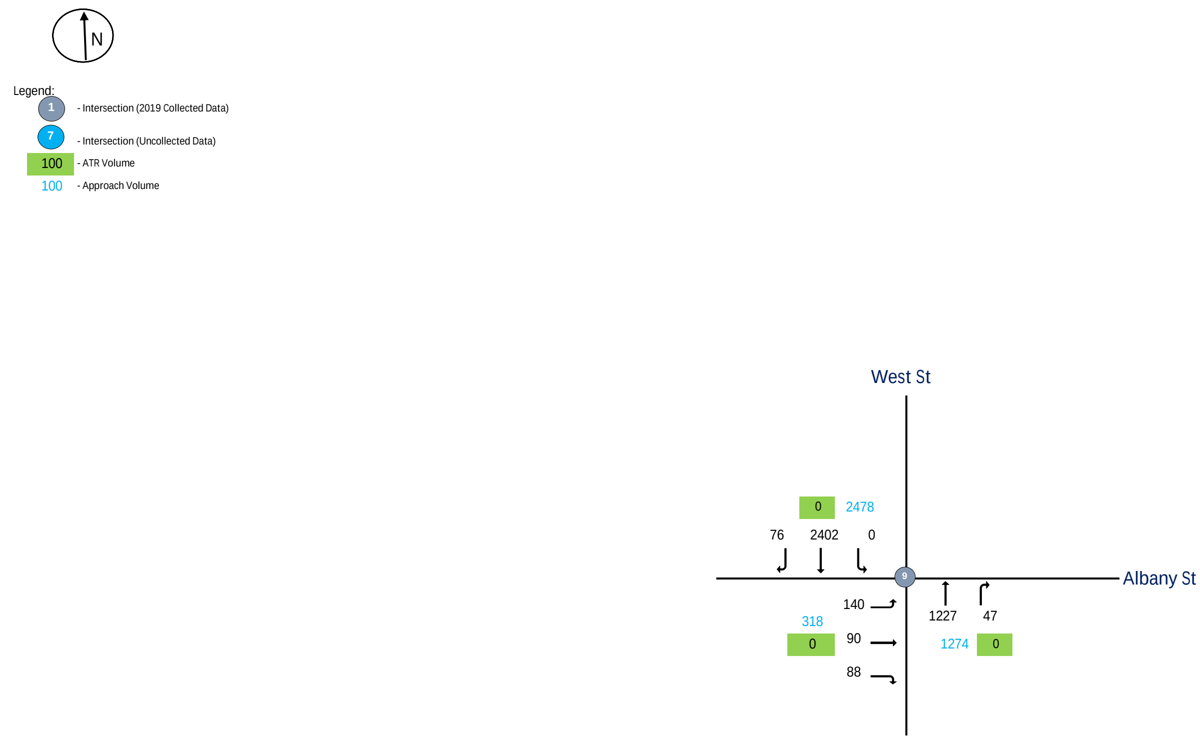
7 - Intersection (Uncollected Data)

100 - ATR Volume

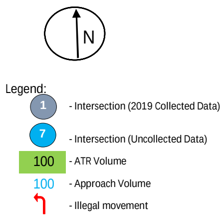
100 - Approach Volume

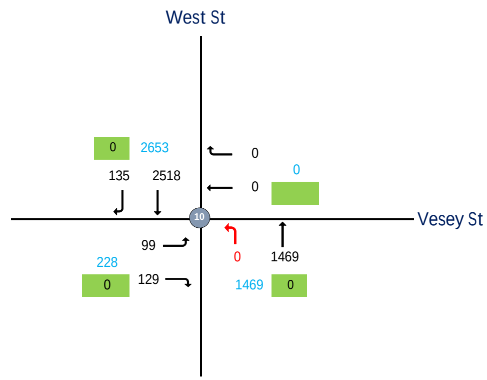


CBD Tolling
LM - Traffic Flowmap #5
PM With Action



CBD Tolling
LM - Traffic Flowmap #6
PM With Action





CBD Tolling
LM - Traffic Flowmap #7
PM With Action

N

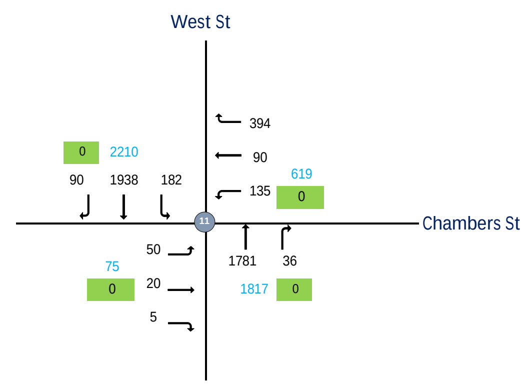
Legend:

1 - Intersection (2019 Collected Data)

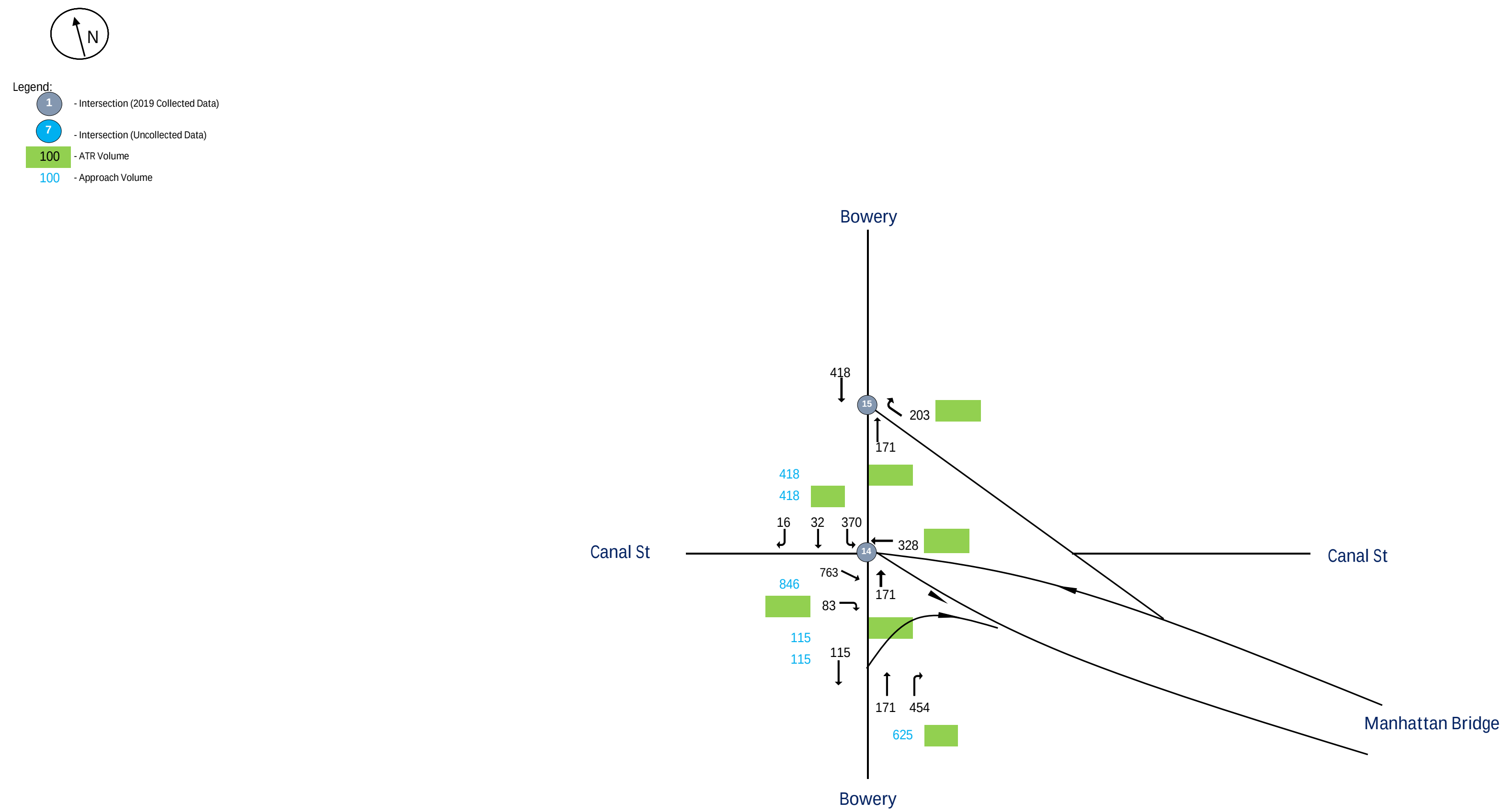
7 - Intersection (Uncollected Data)

100 - ATR Volume

100 - Approach Volume

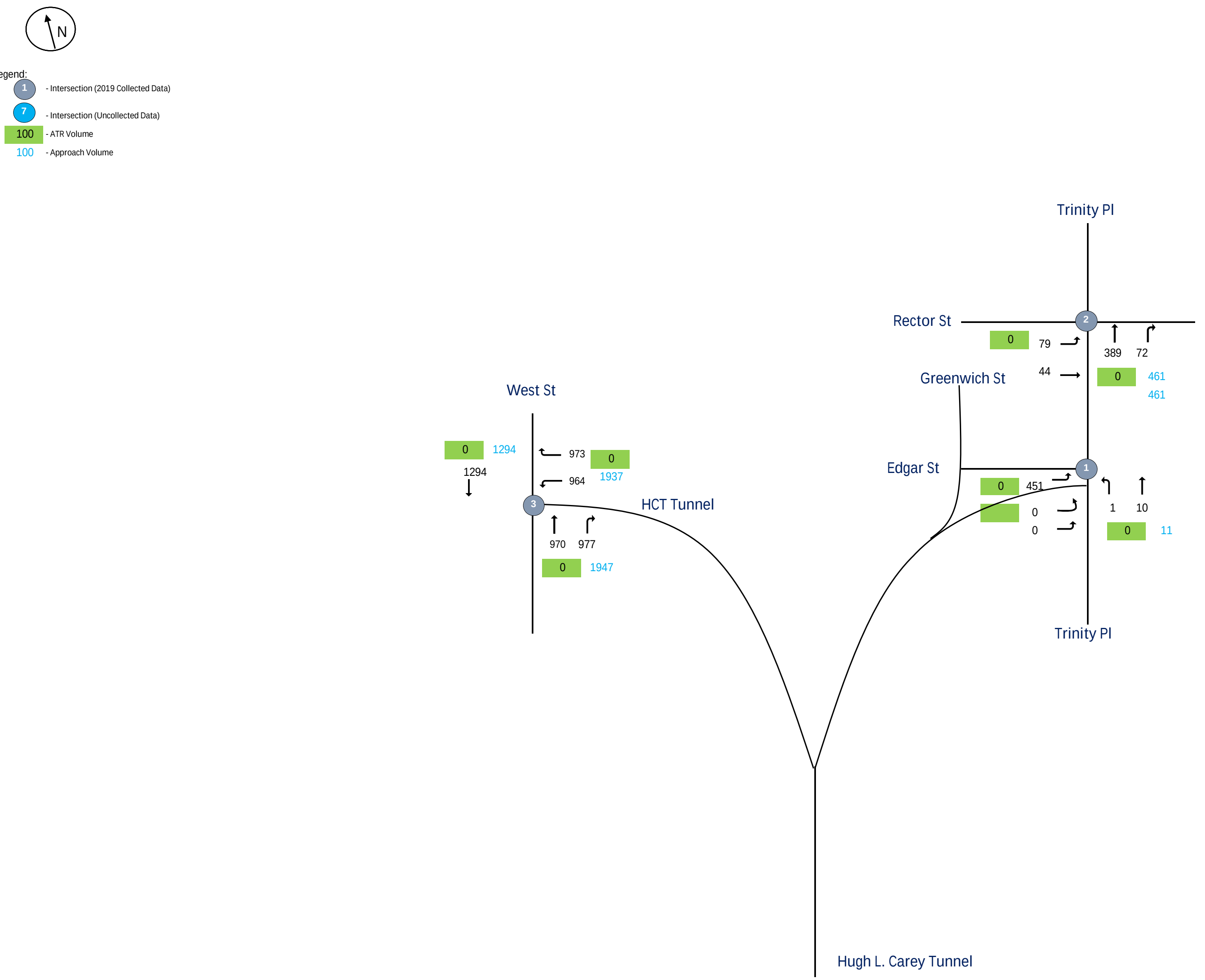


CBD Tolling
LM - Traffic Flowmap #8
PM With Action

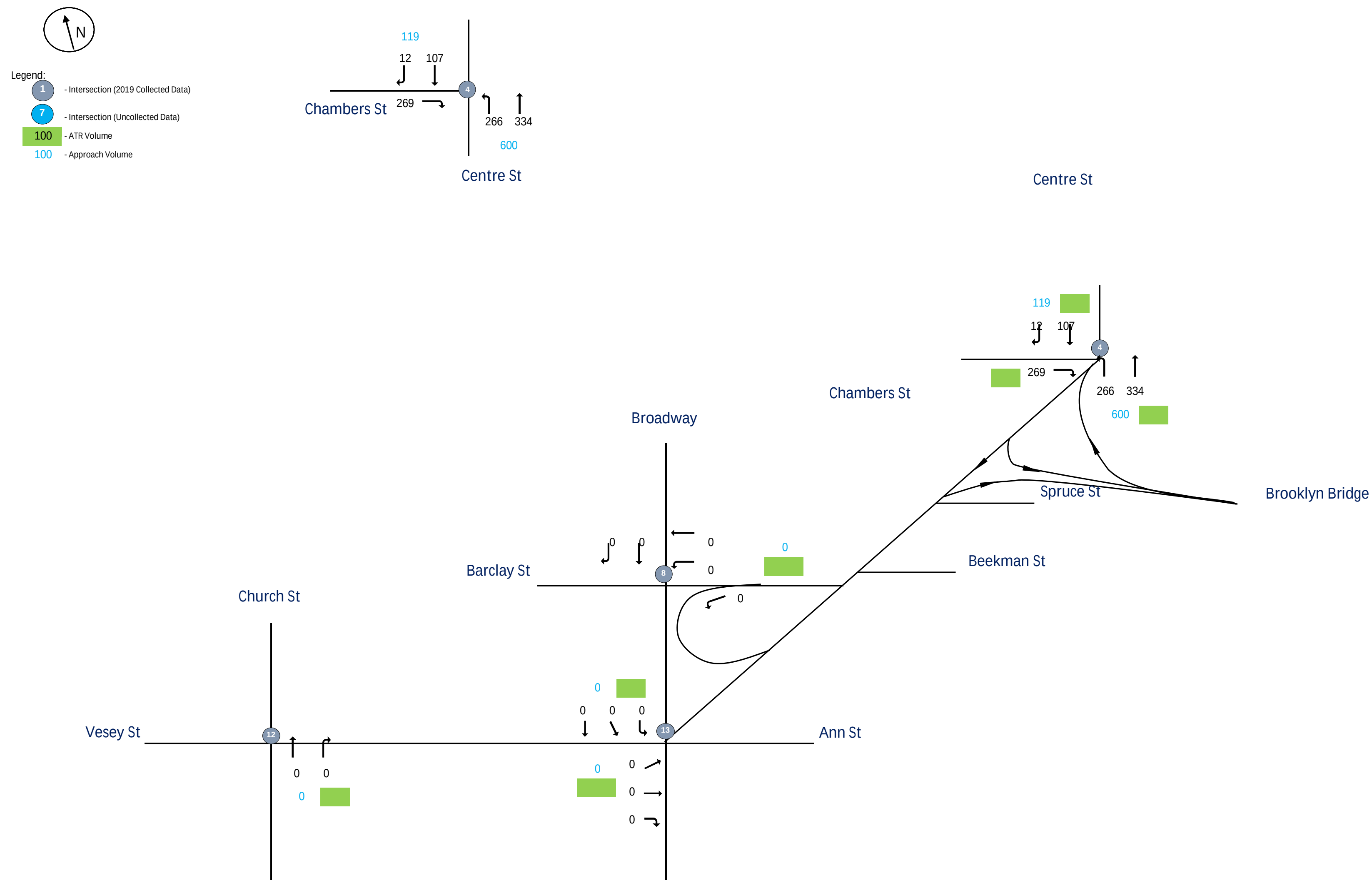


CBD Tolling
LM - Traffic Flowmap #1
MD With Action

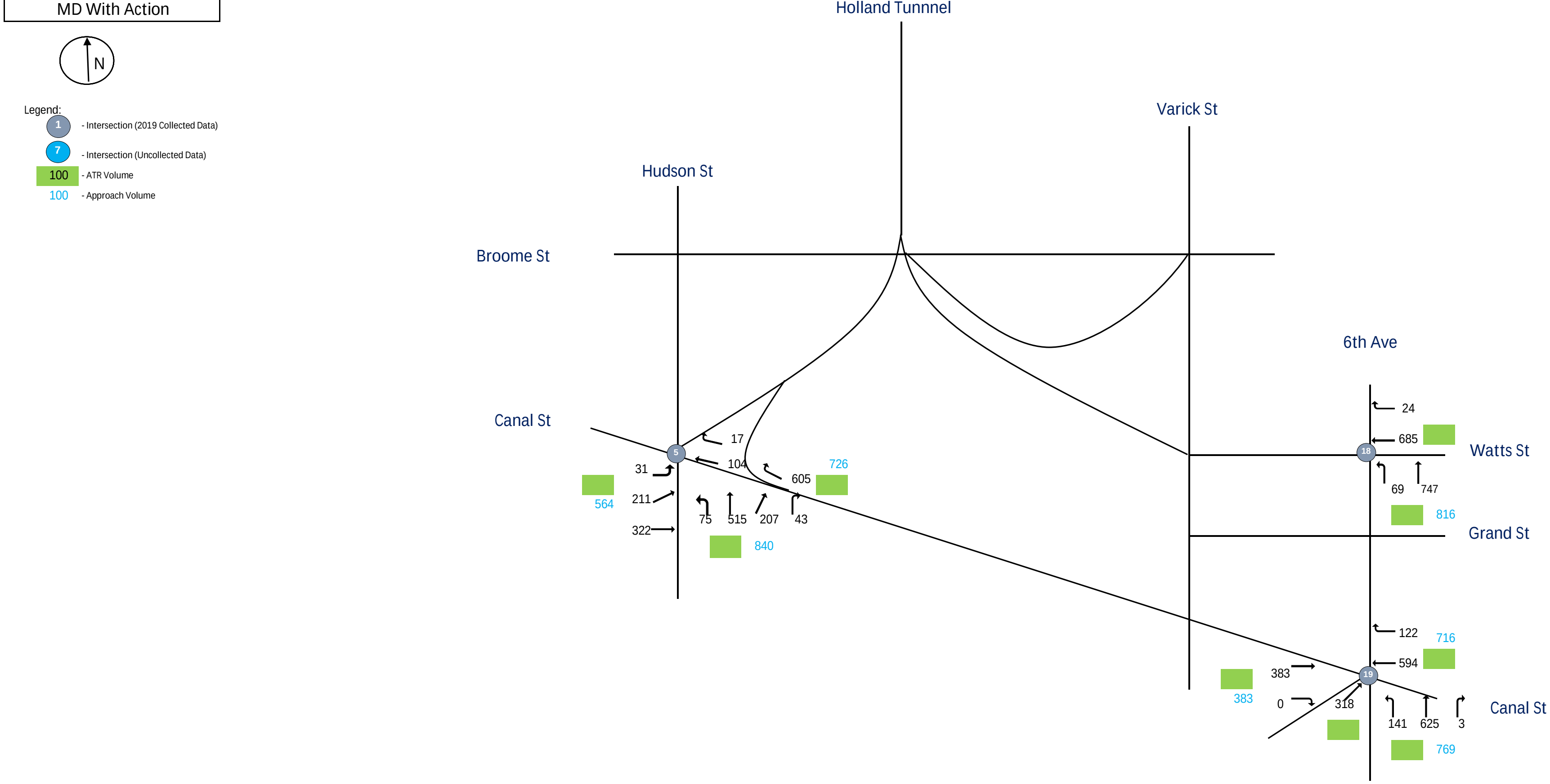
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume



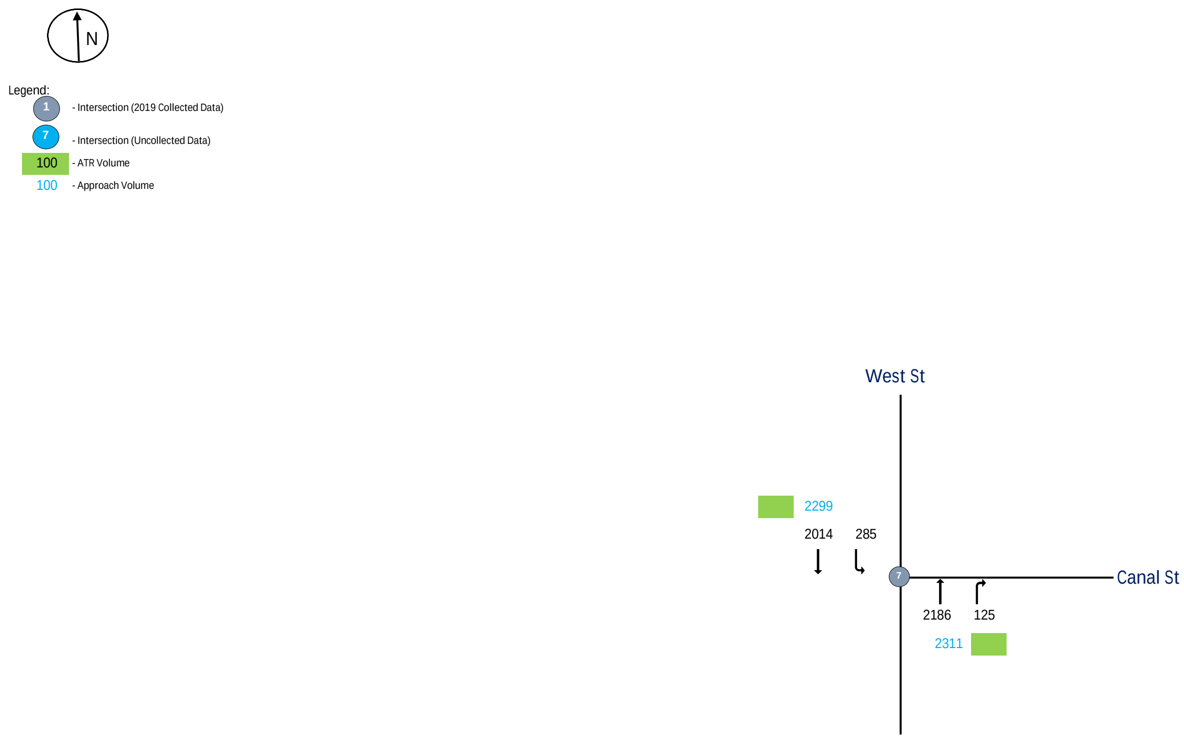
CBD Tolling
LM - Traffic Flowmap #2
MD With Action



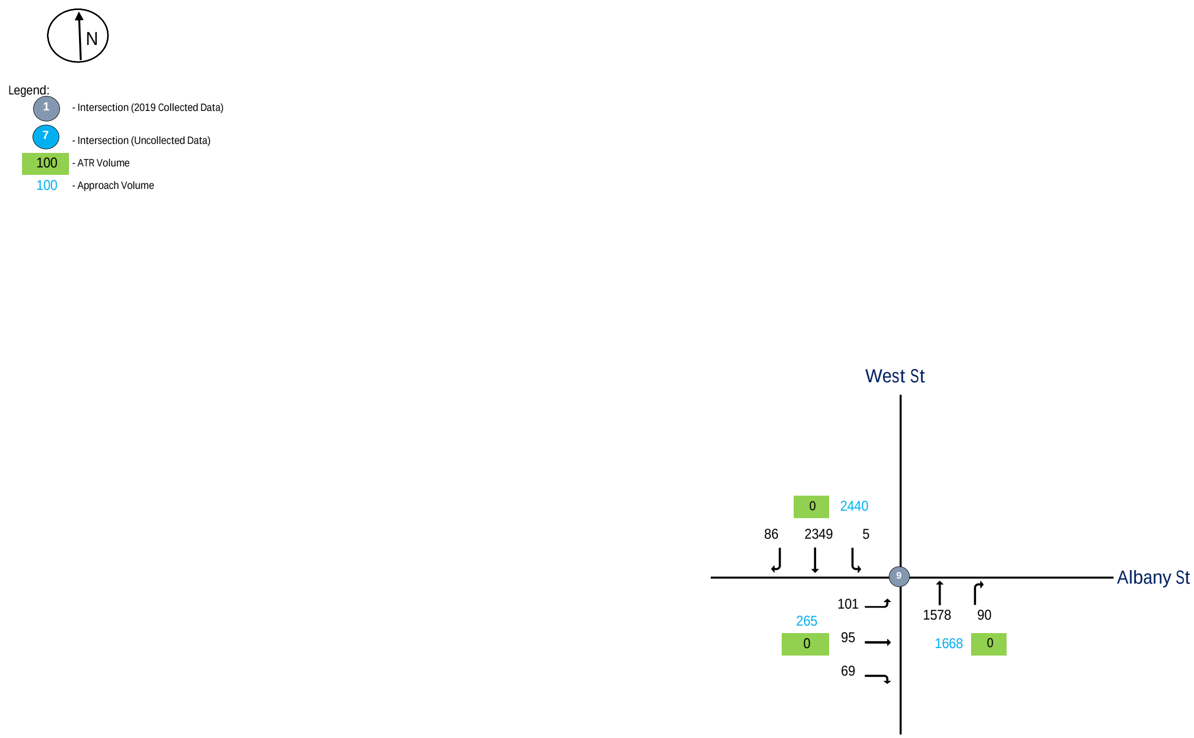
CBD Tolling
LM - Traffic Flowmap #3
MD With Action



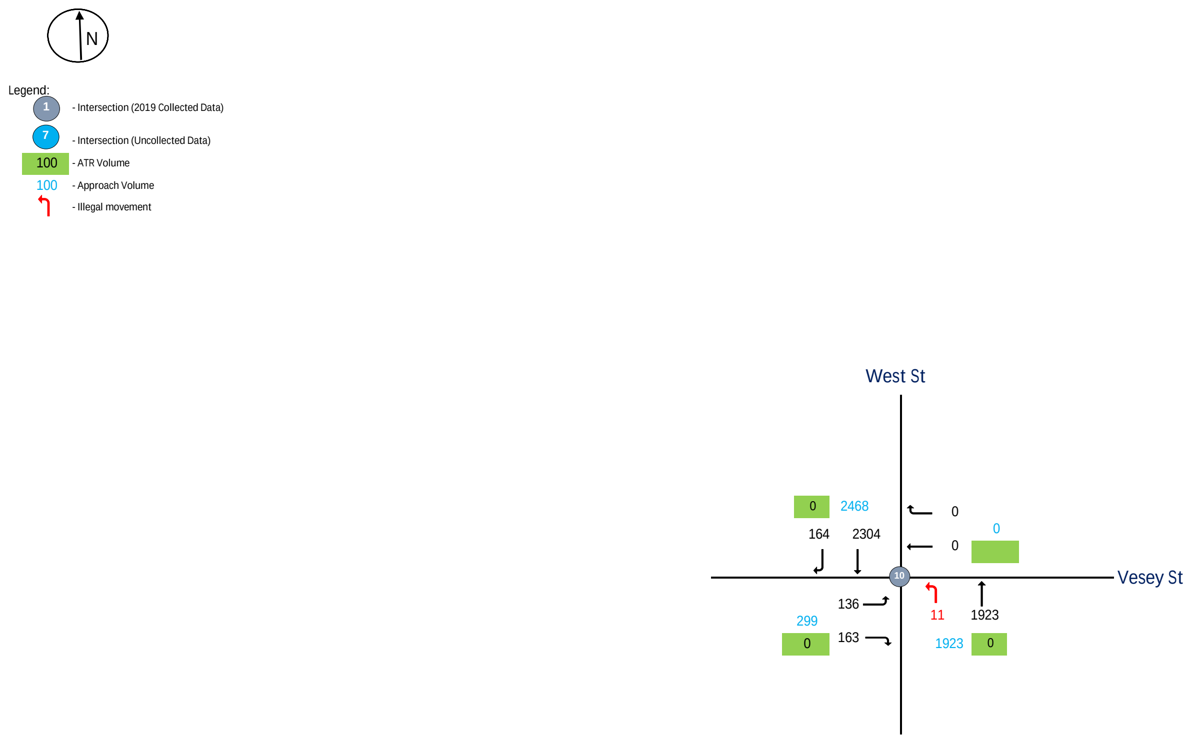
CBD Tolling
LM - Traffic Flowmap #4
MD With Action



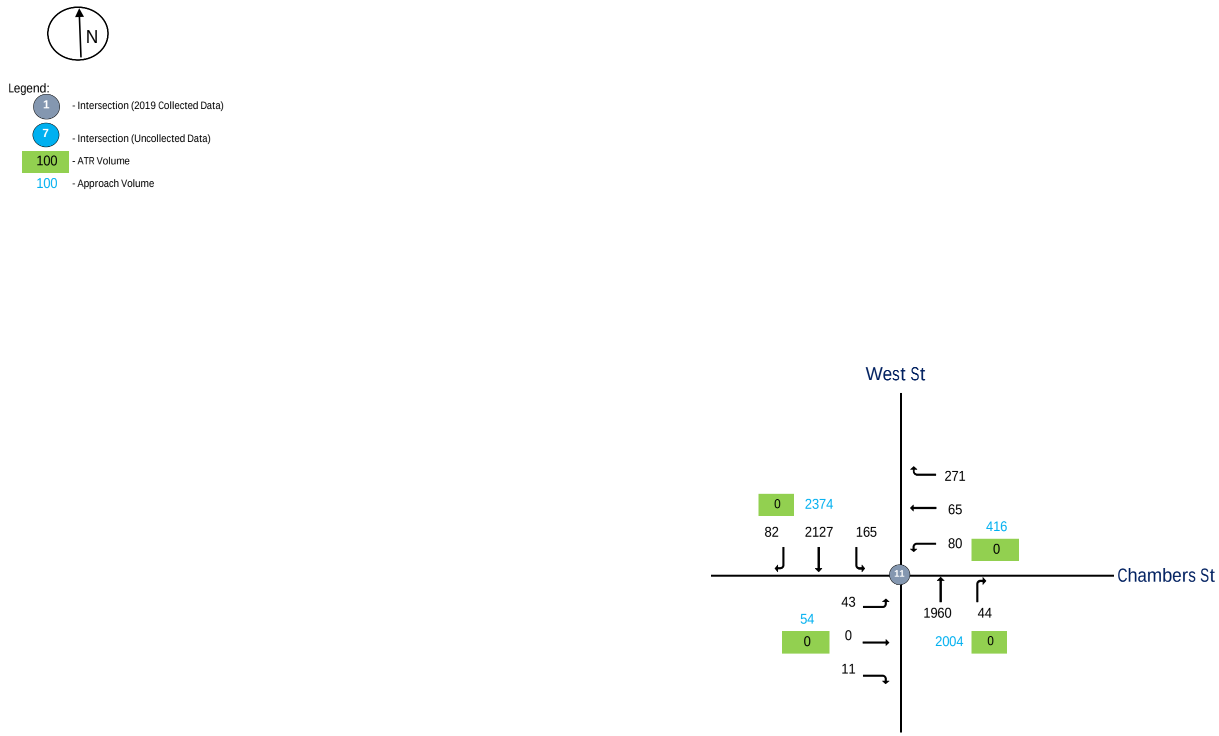
CBD Tolling
LM - Traffic Flowmap #5
MD With Action

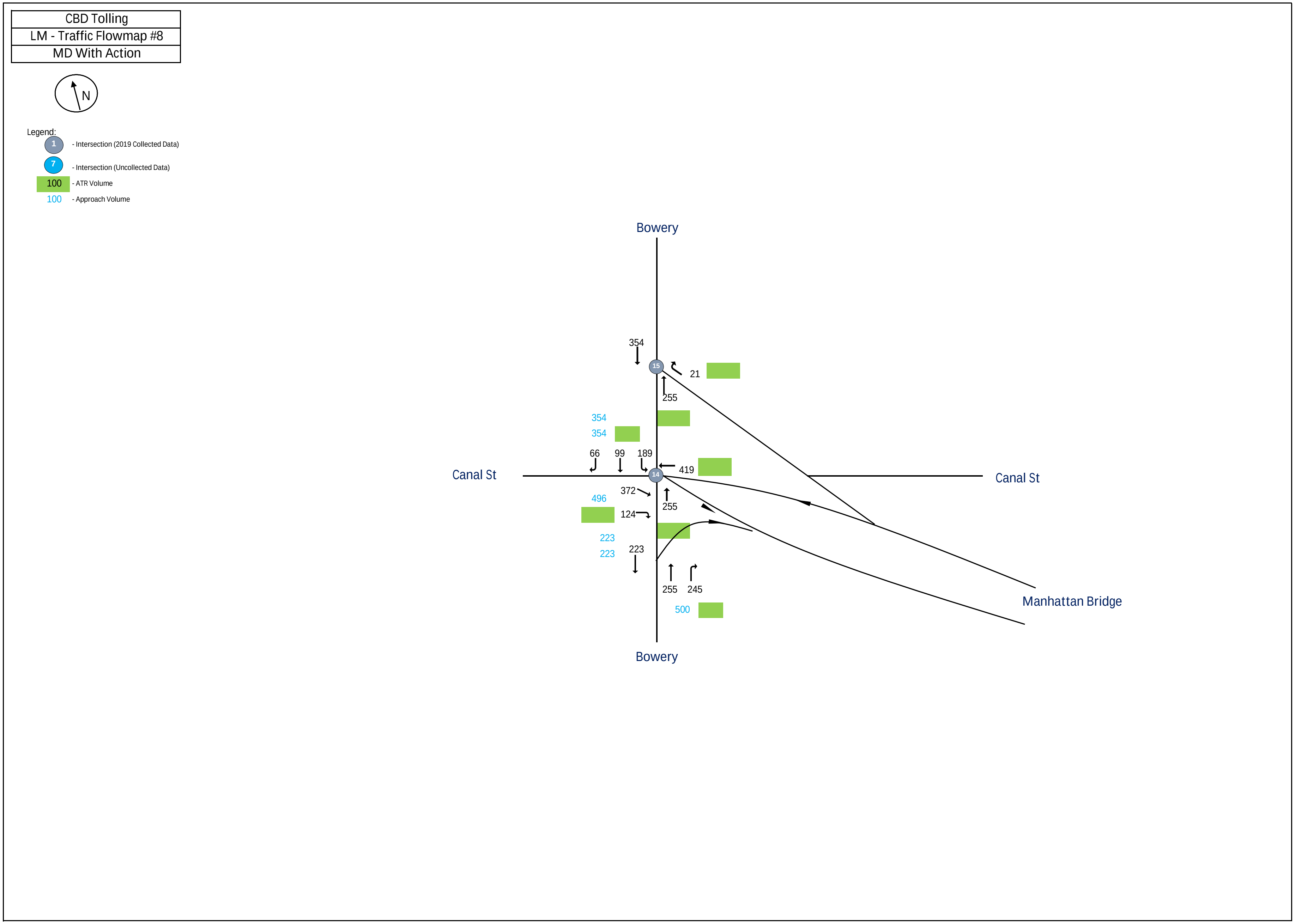


CBD Tolling
LM - Traffic Flowmap #6
MD With Action



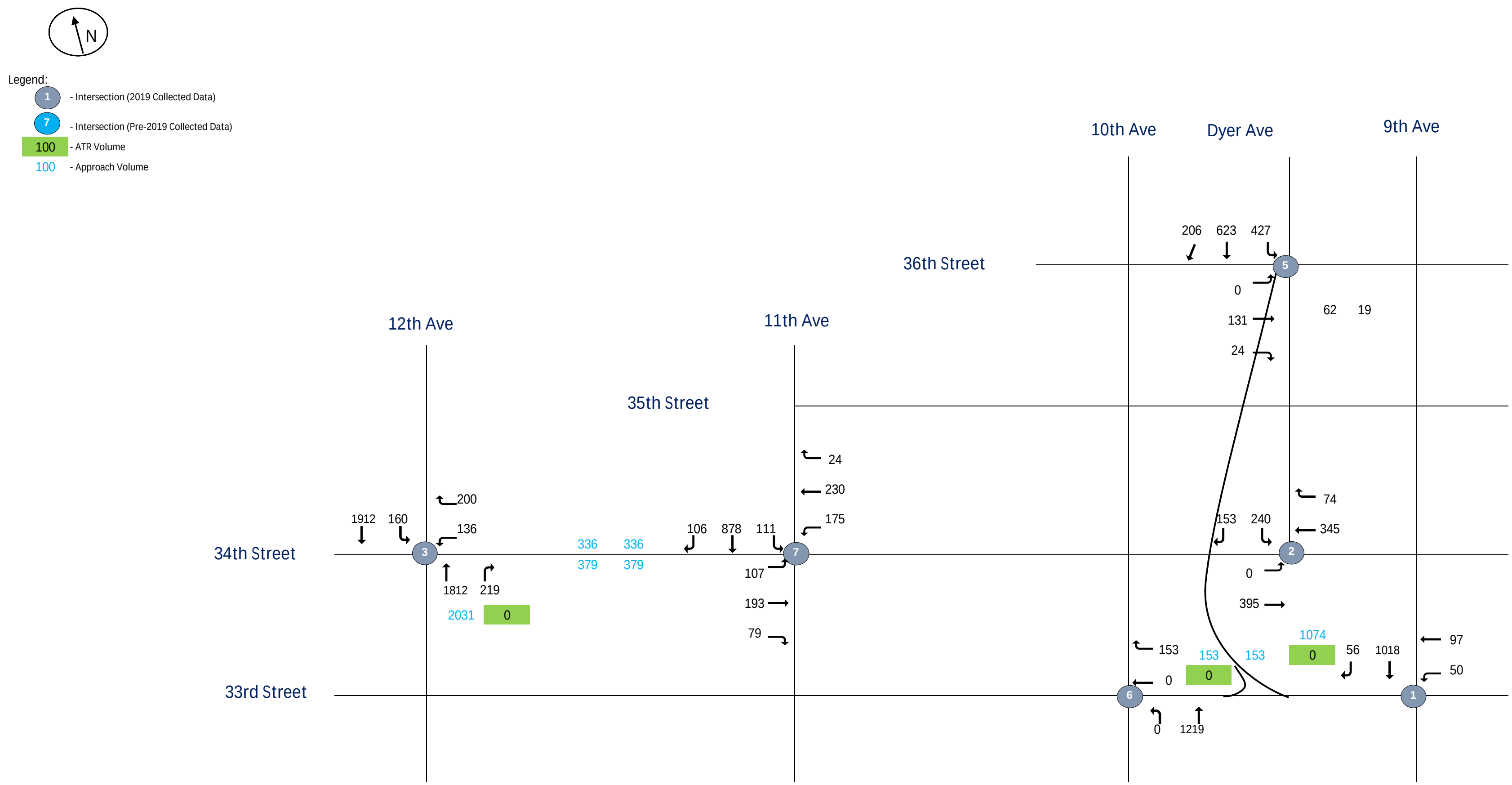
CBD Tolling
LM - Traffic Flowmap #7
MD With Action



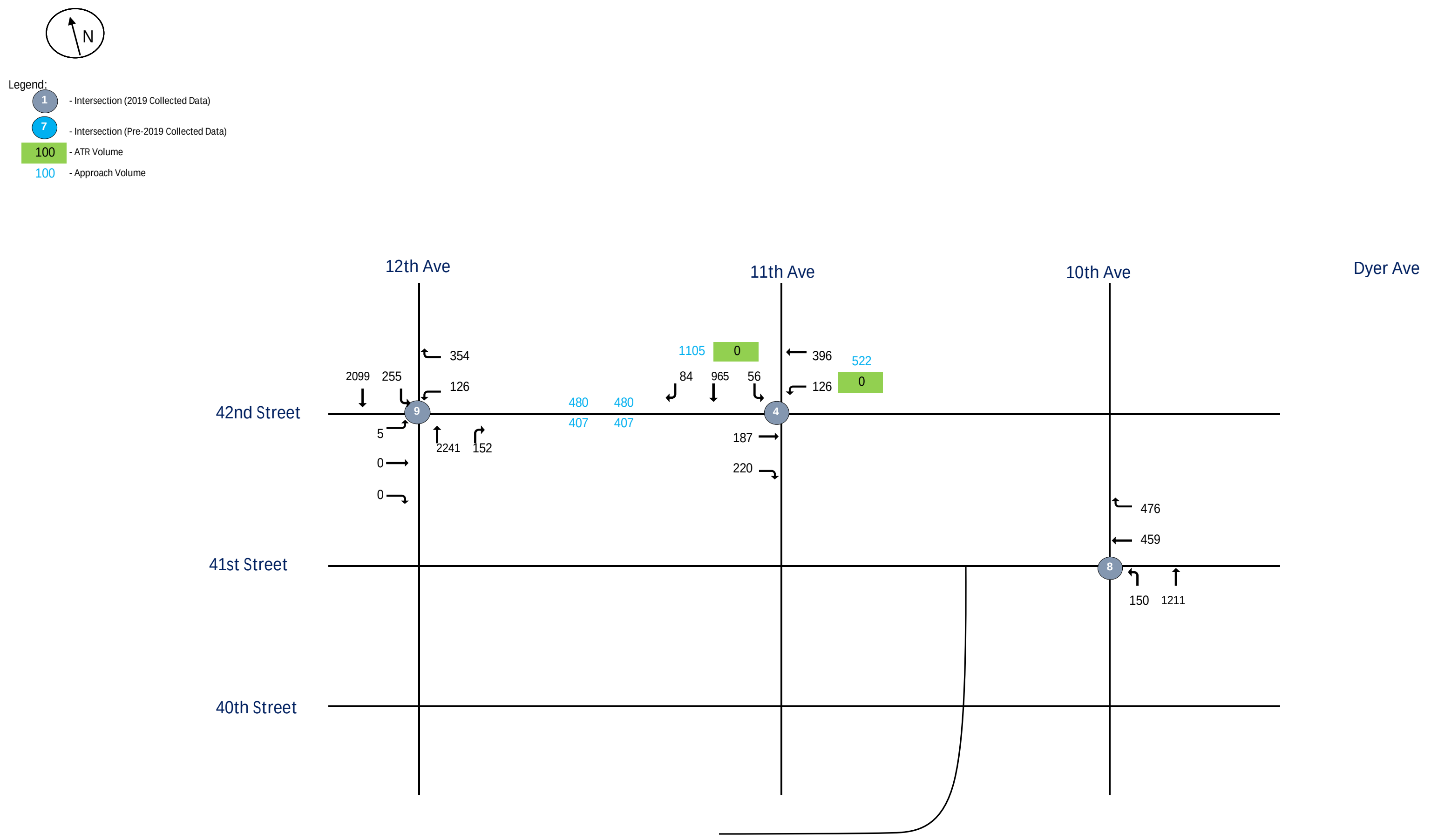


CBD Tolling
LM - Traffic Flowmap #8
MD With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
354
15
21
255
354
354
66
99
189
419
Canal St
14
Canal St
372
496
255
124
223
223
223
255
245
500
Manhattan Bridge
Bowery

CBD Tolling
LT #1 - Traffic Flowmap
AM With-Action



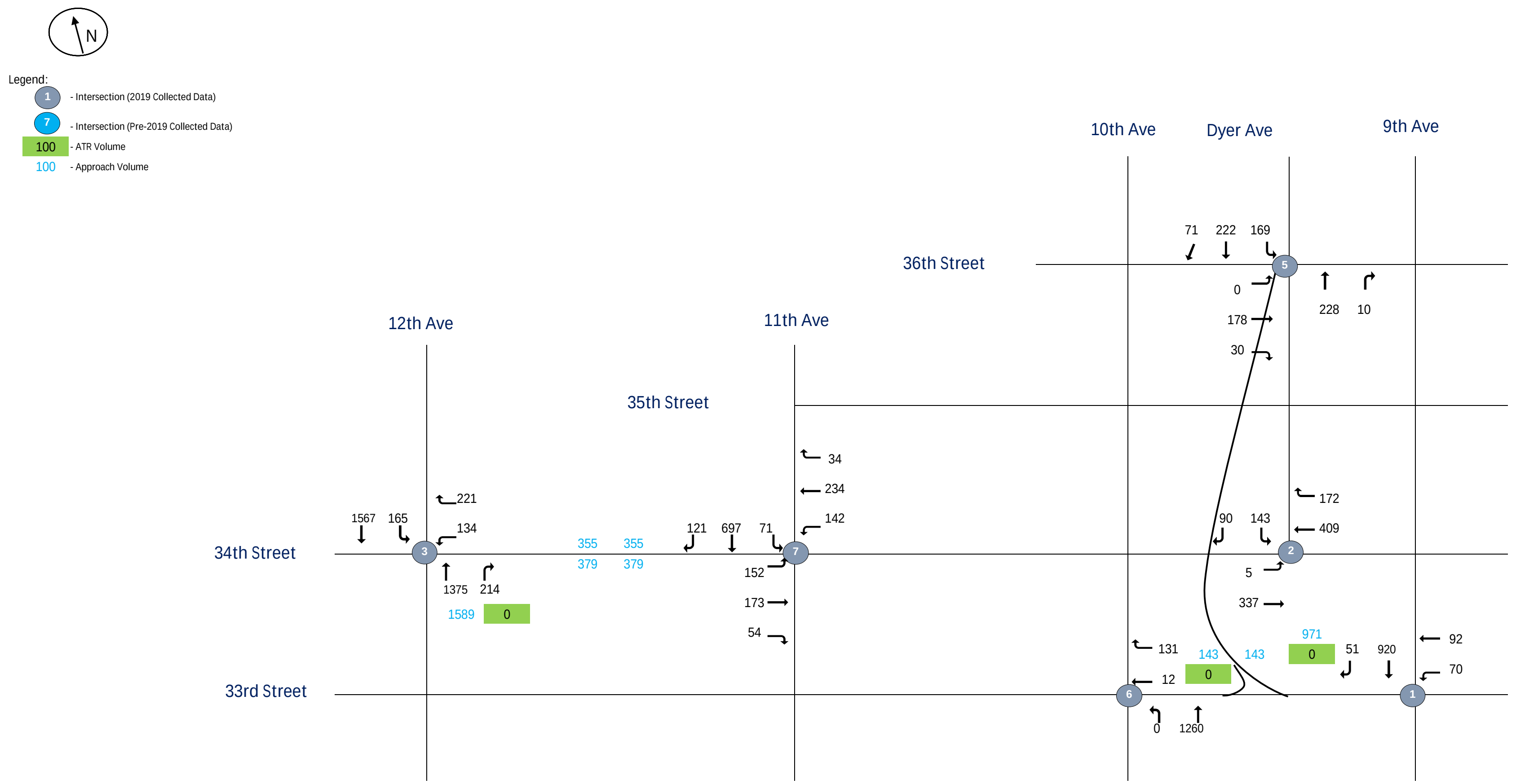
CBD Tolling
LT #2 - Traffic Flowmap
AM With-Action



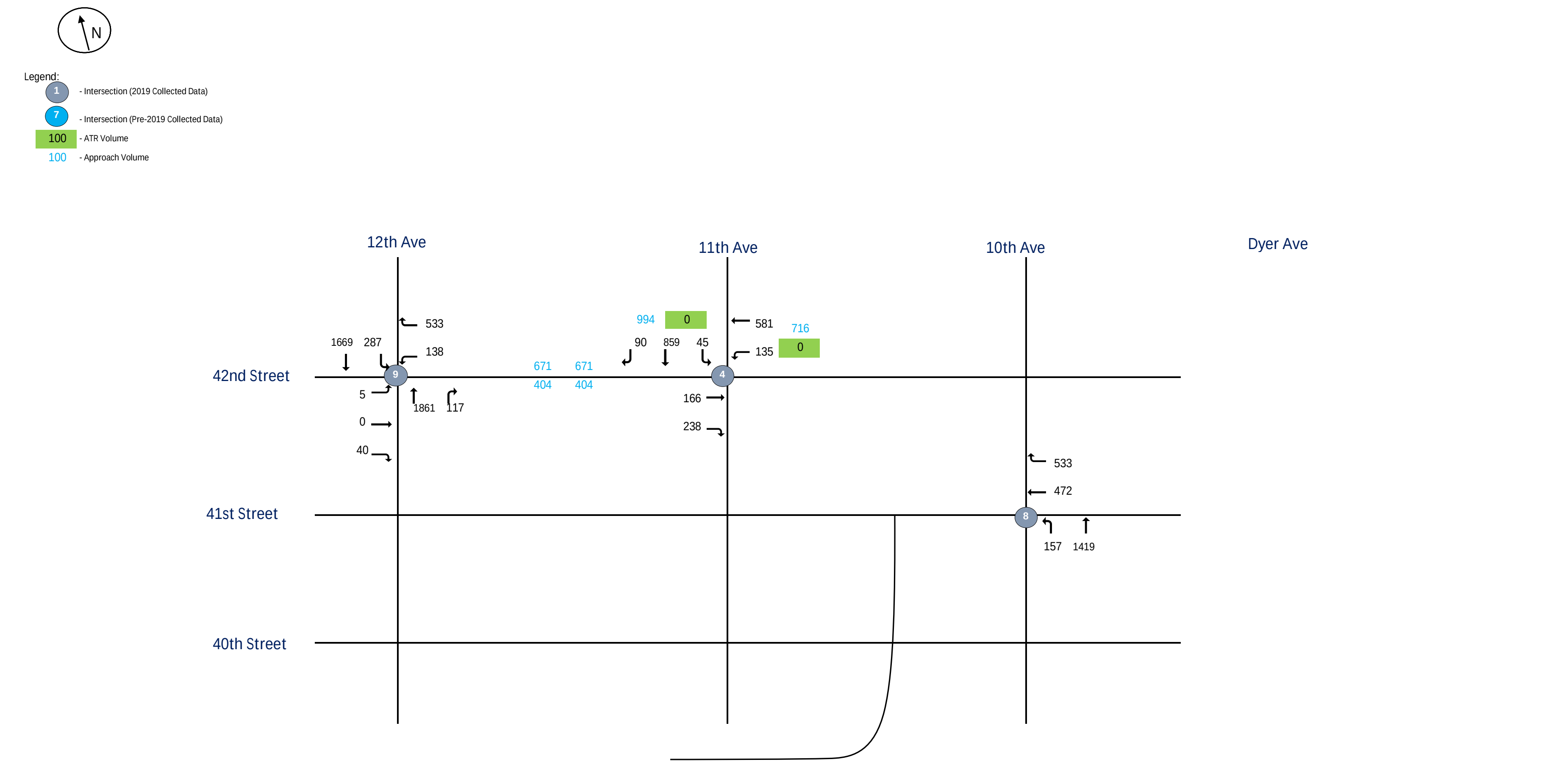
CBD Tolling

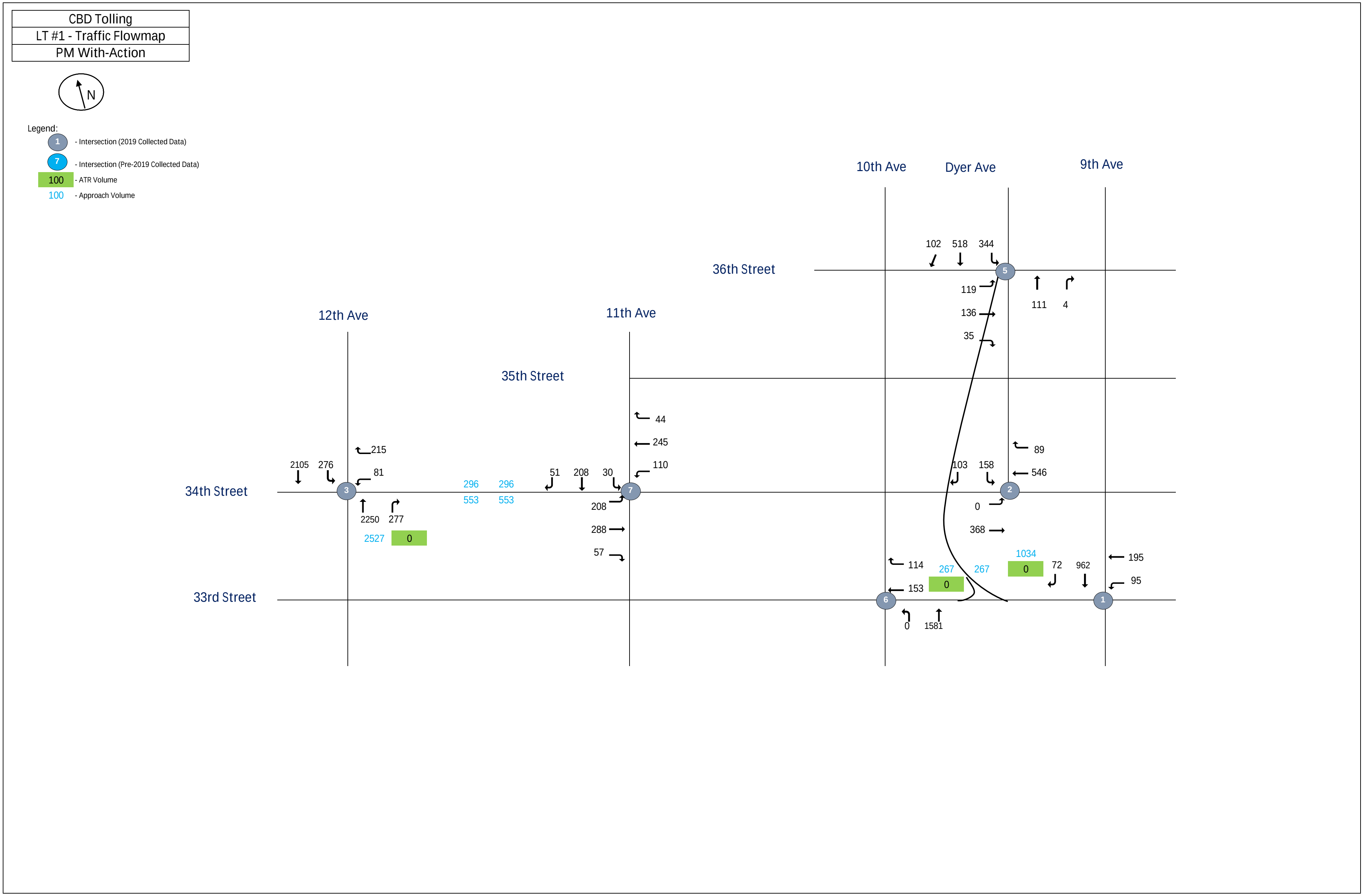
LT #1 - Traffic Flowmap

MD With-Action



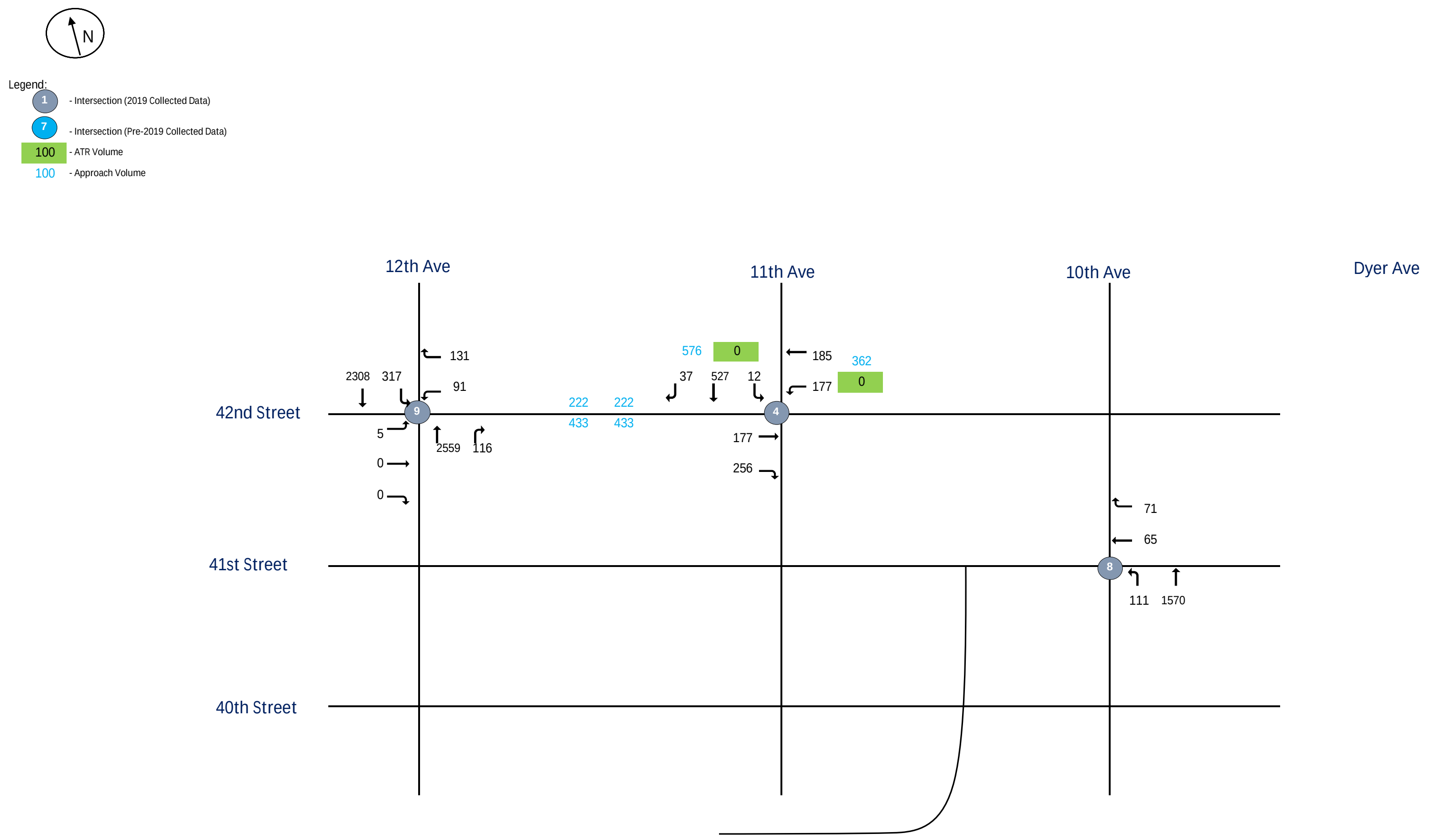
CBD Tolling
LT #2 - Traffic Flowmap
MD With-Action



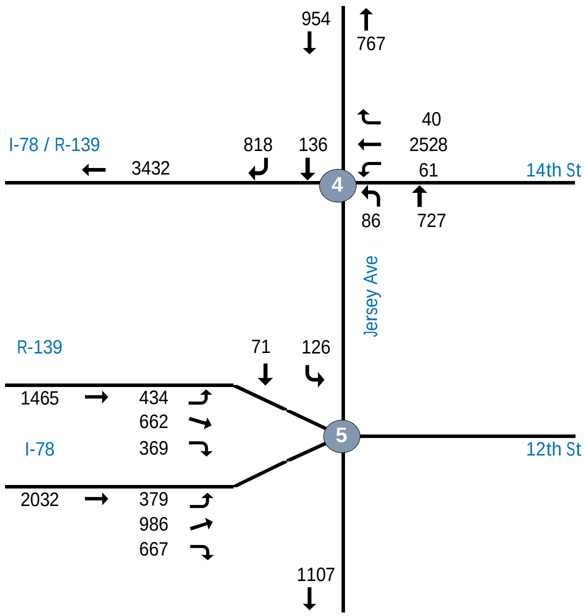


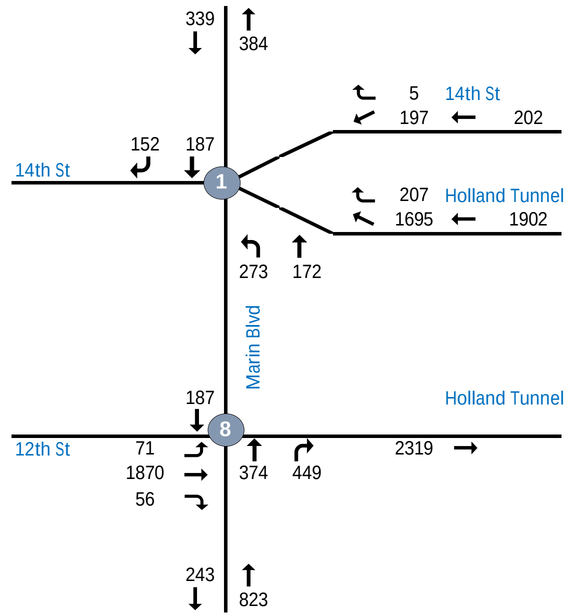
CBD Tolling
LT #1 - Traffic Flowmap
PM With-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Pre-2019 Collected Data)
100 - ATR Volume
100 - Approach Volume
10th Ave
Dyer Ave
9th Ave
36th Street
12th Ave
11th Ave
35th Street
34th Street
33rd Street
102
518
344
119
136
35
111
4
44
245
110
215
81
2105
276
51
208
30
296
296
553
553
2250
277
2527
0
208
288
57
89
546
103
158
0
368
1034
0
72
962
195
95
114
267
267
0
153
0
1581

CBD Tolling
LT #2 - Traffic Flowmap
PM With-Action



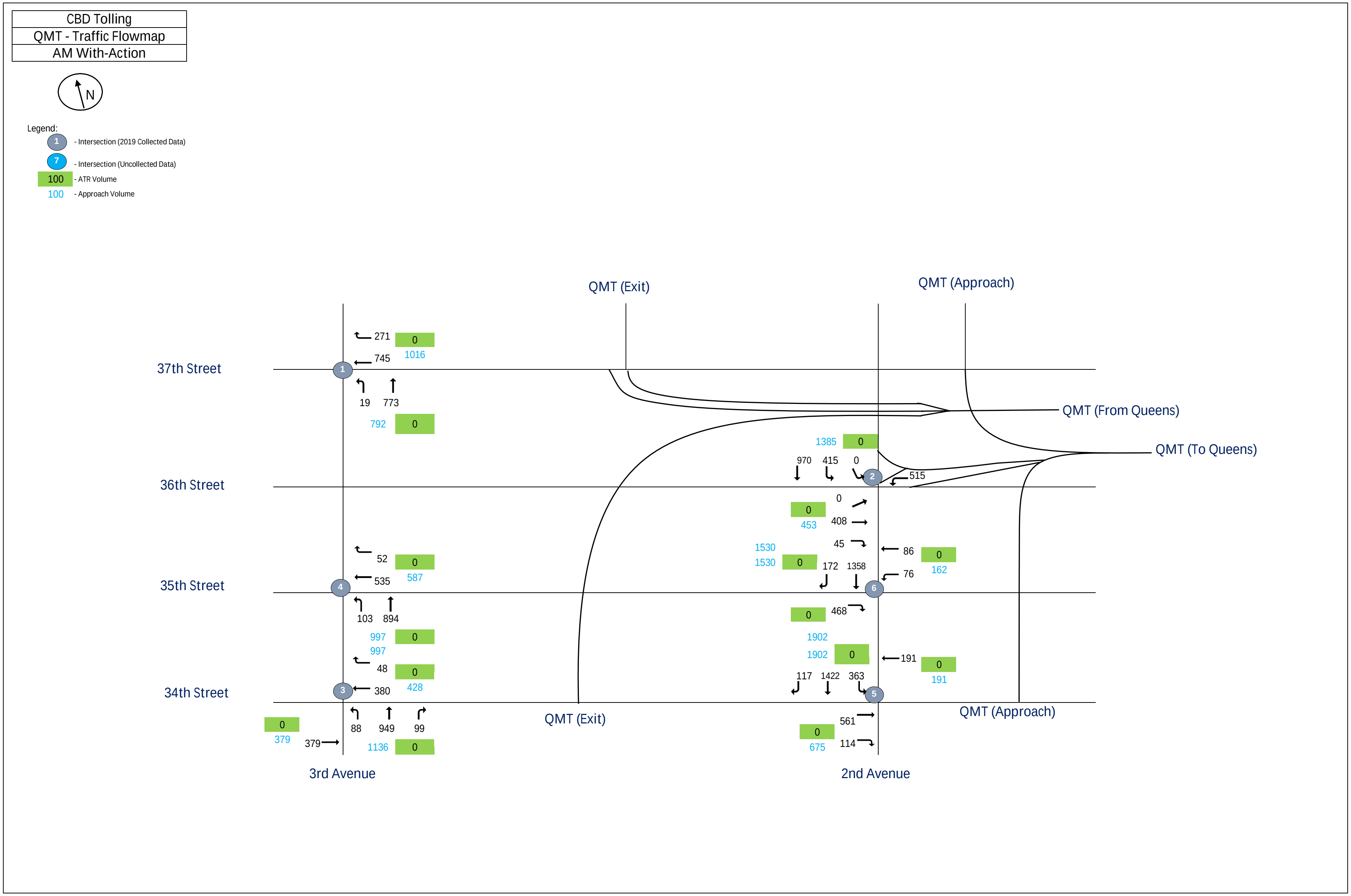
New Jersey
2021 With-Action G6
AM Peak Hour

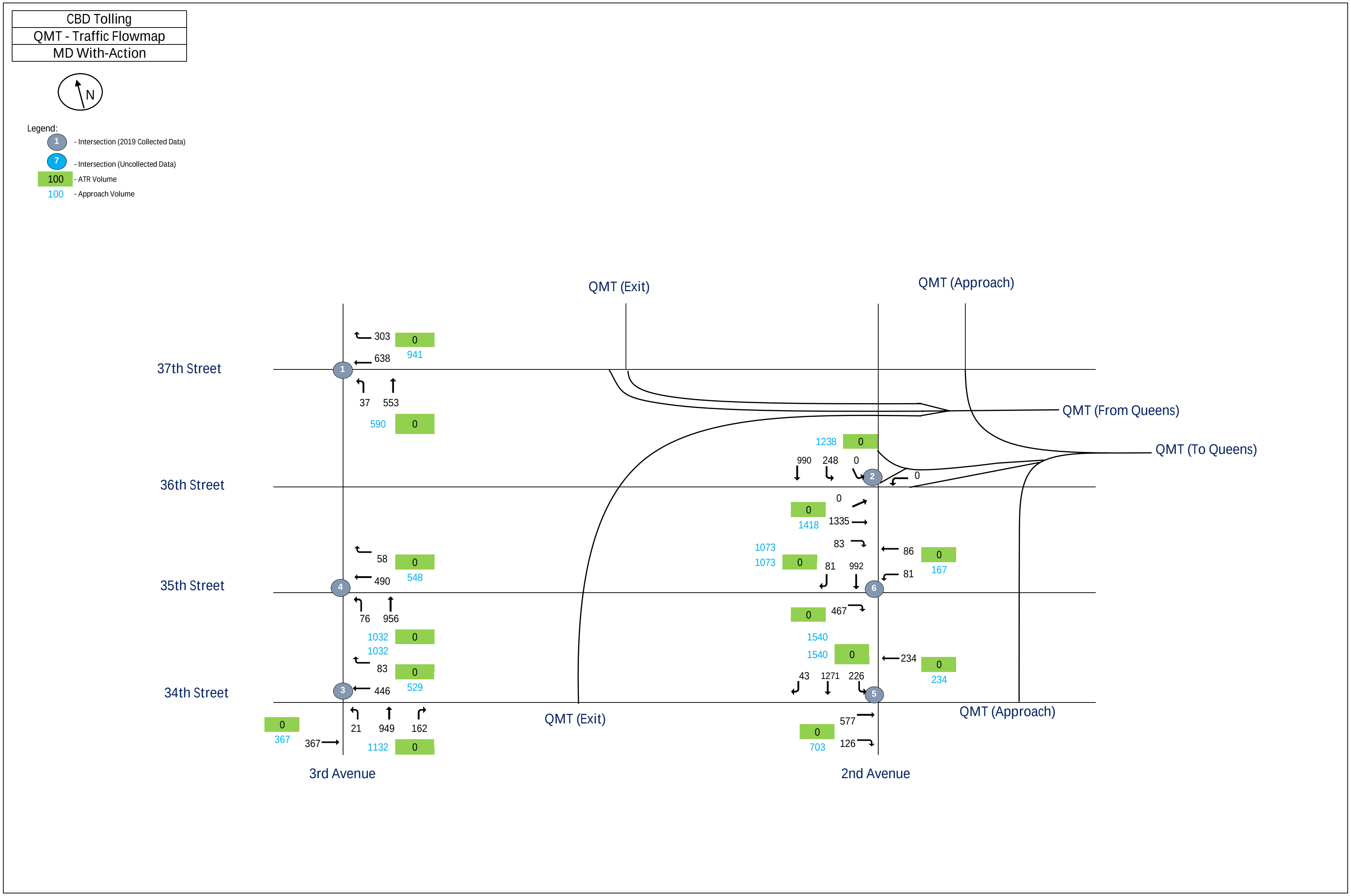




New Jersey
2021 With-Action G6
MD Peak Hour

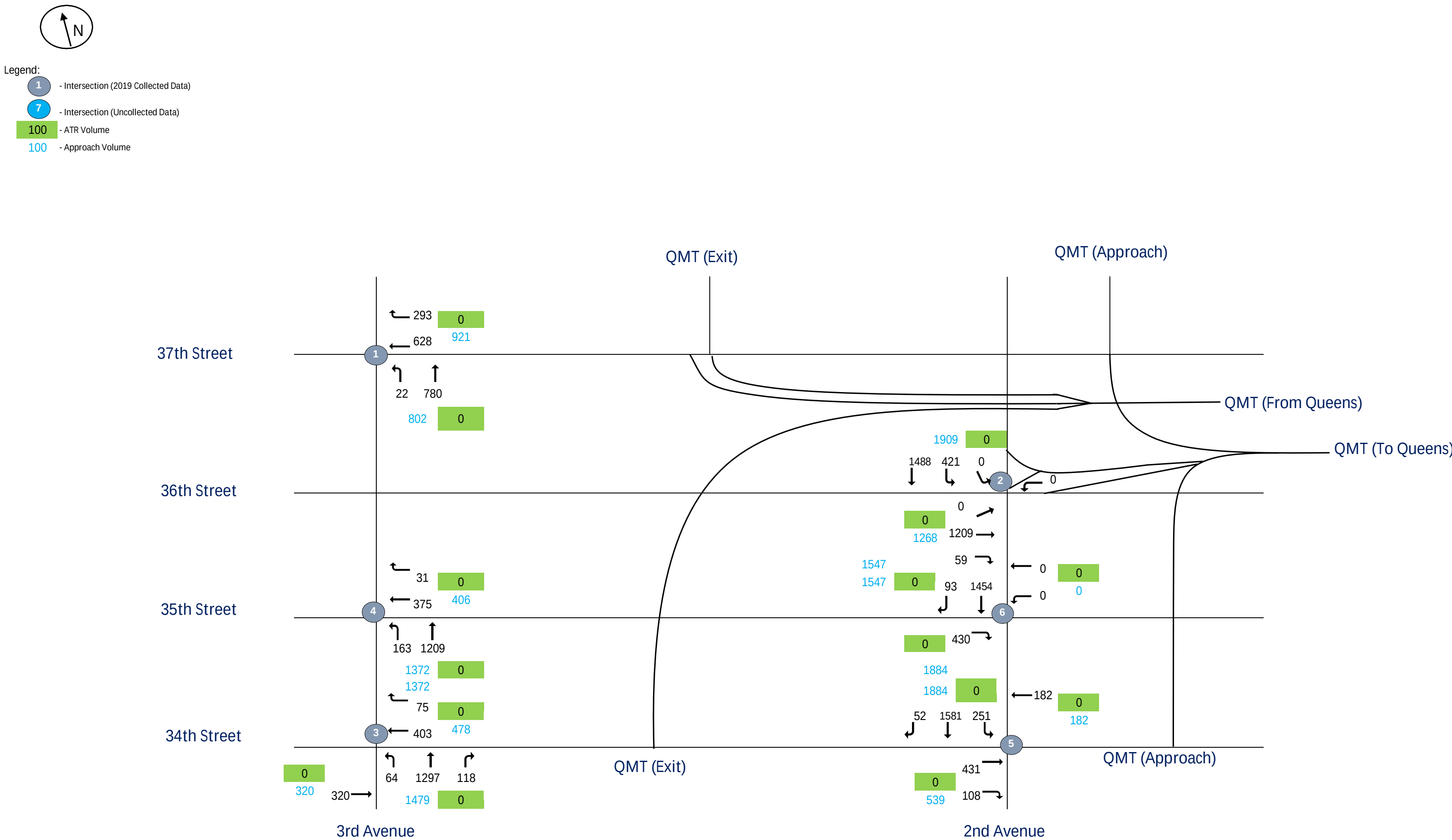
New Jersey
2021 With-Action G6
PM Peak Hour

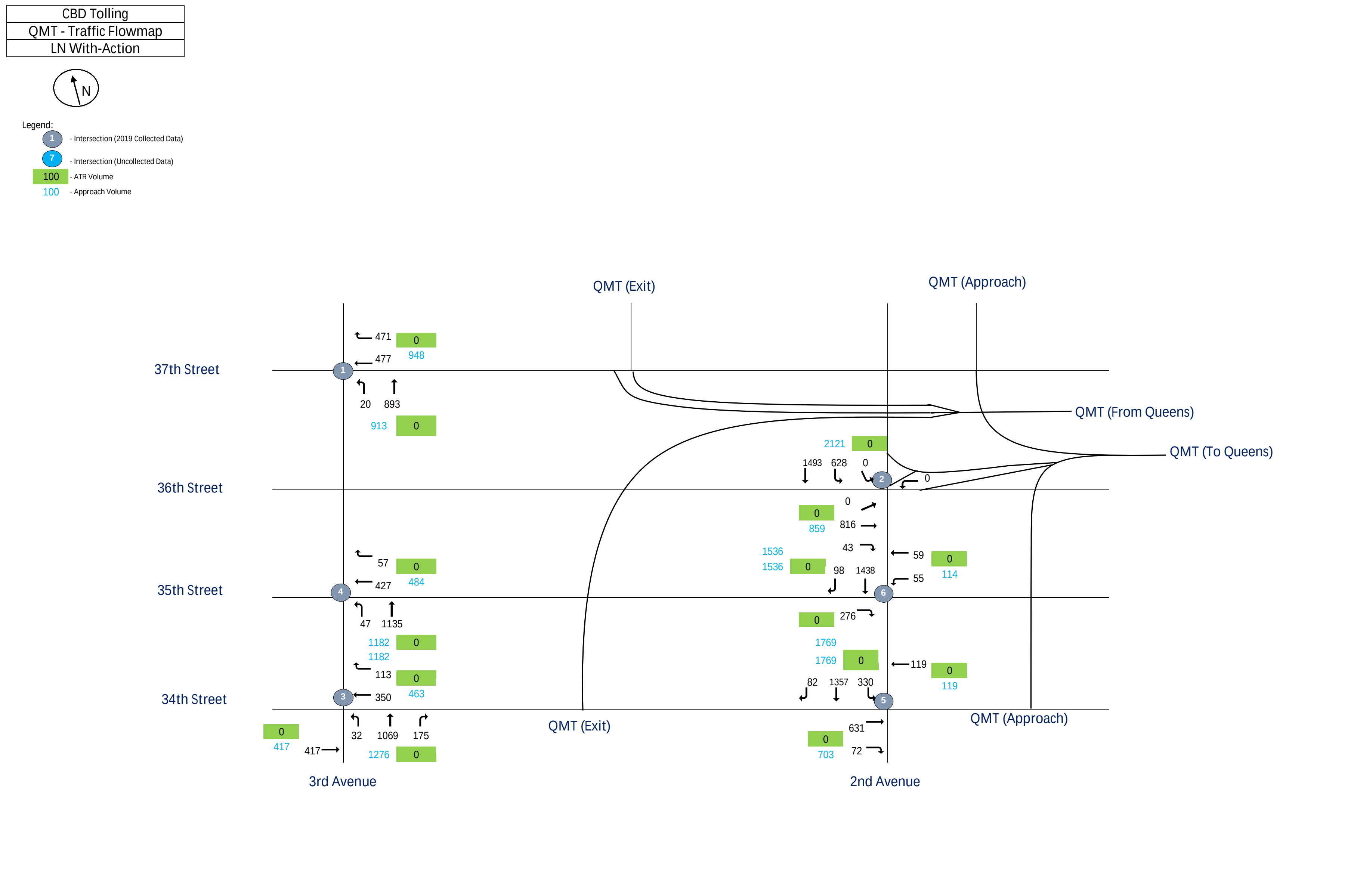

CBD Tolling
QMT - Traffic Flowmap
AM With-Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
QMT (From Queens)
QMT (To Queens)
37th Street
36th Street
35th Street
34th Street
3rd Avenue
2nd Avenue
271
745
1016
19
773
792
1385
970
415
515
453
408
45
1530
172
1358
86
76
162
52
535
587
103
894
997
468
1902
191
48
380
428
117
1422
363
561
114
675
88
949
99
379
1136

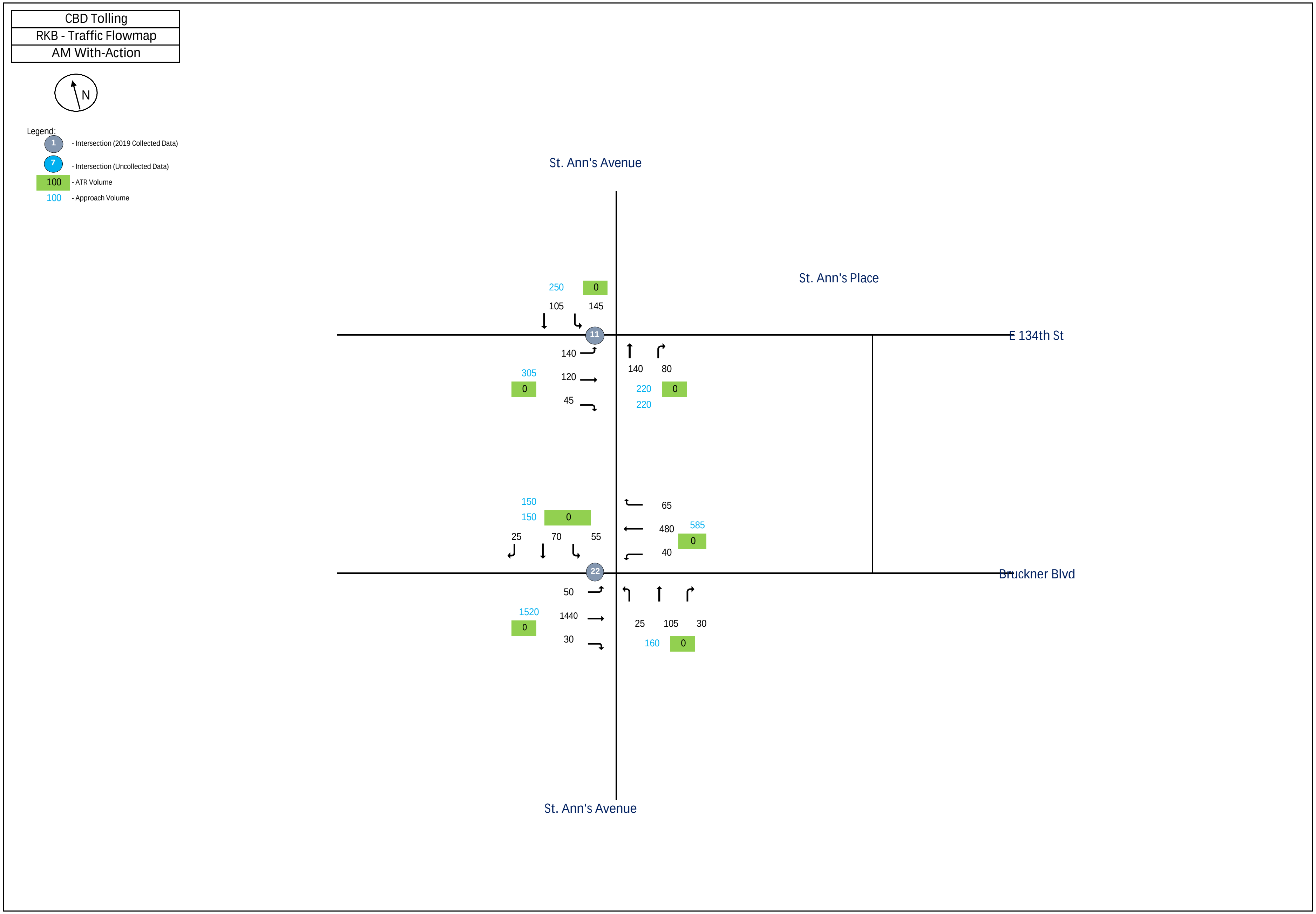


CBD Tolling
QMT - Traffic Flowmap
MD With-Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
QMT (From Queens)
QMT (To Queens)
37th Street
36th Street
35th Street
34th Street
3rd Avenue
2nd Avenue
QMT (Exit)
QMT (Approach)

CBD Tolling
QMT - Traffic Flowmap
PM With-Action

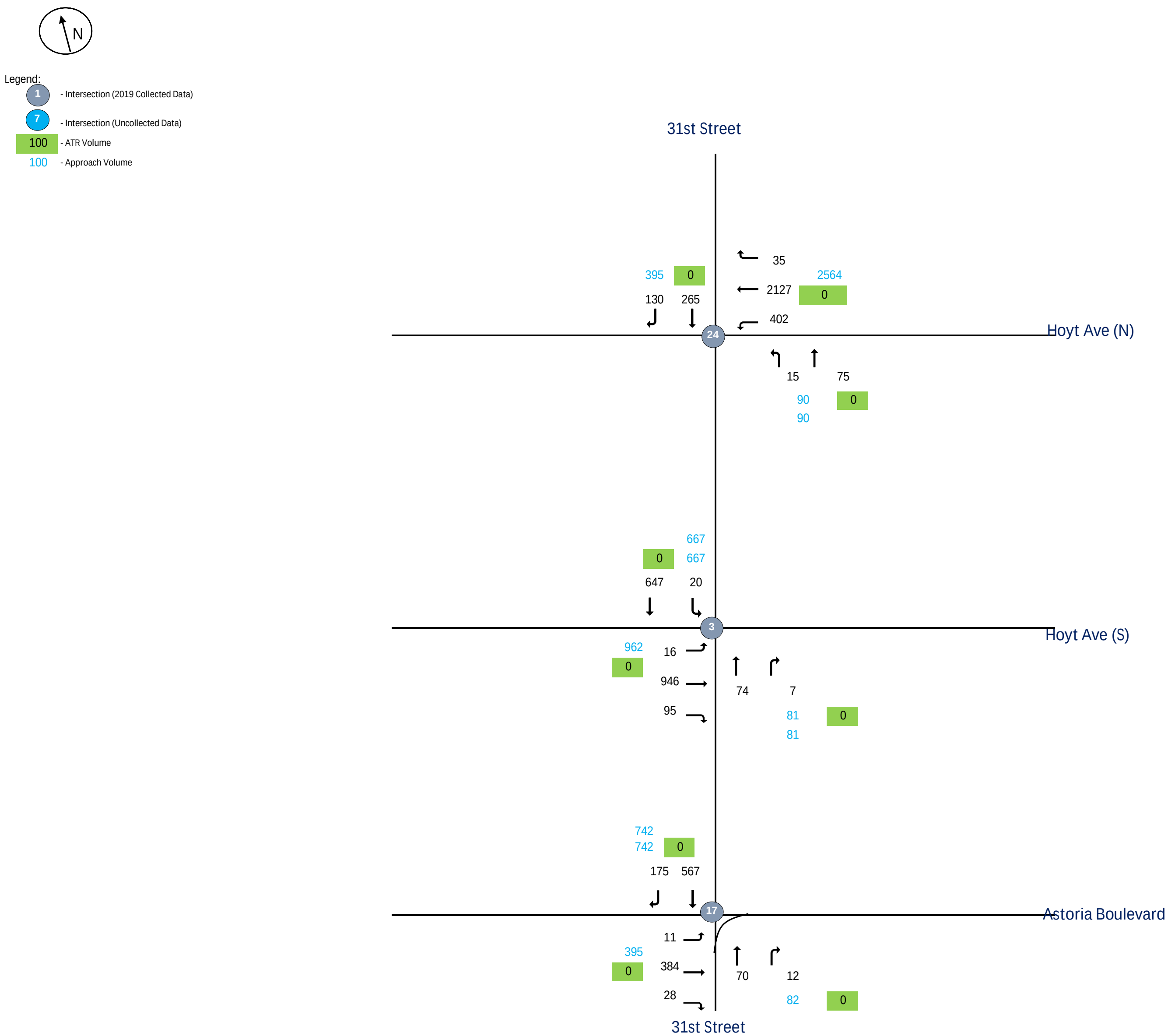



CBD Tolling
QMT - Traffic Flowmap
LN With-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
QMT (Exit)
QMT (Approach)
37th Street
36th Street
35th Street
34th Street
QMT (From Queens)
QMT (To Queens)
QMT (Exit)
QMT (Approach)
3rd Avenue
2nd Avenue
471
477
0
948
20
893
913
0
2121
0
1493
628
0
0
0
816
859
43
1536
1536
0
98
1438
59
0
114
55
57
0
427
484
47
1135
1182
0
1182
113
0
350
463
276
0
1769
1769
0
119
0
119
82
1357
330
32
1069
175
0
417
417
1276
0
631
0
703
72

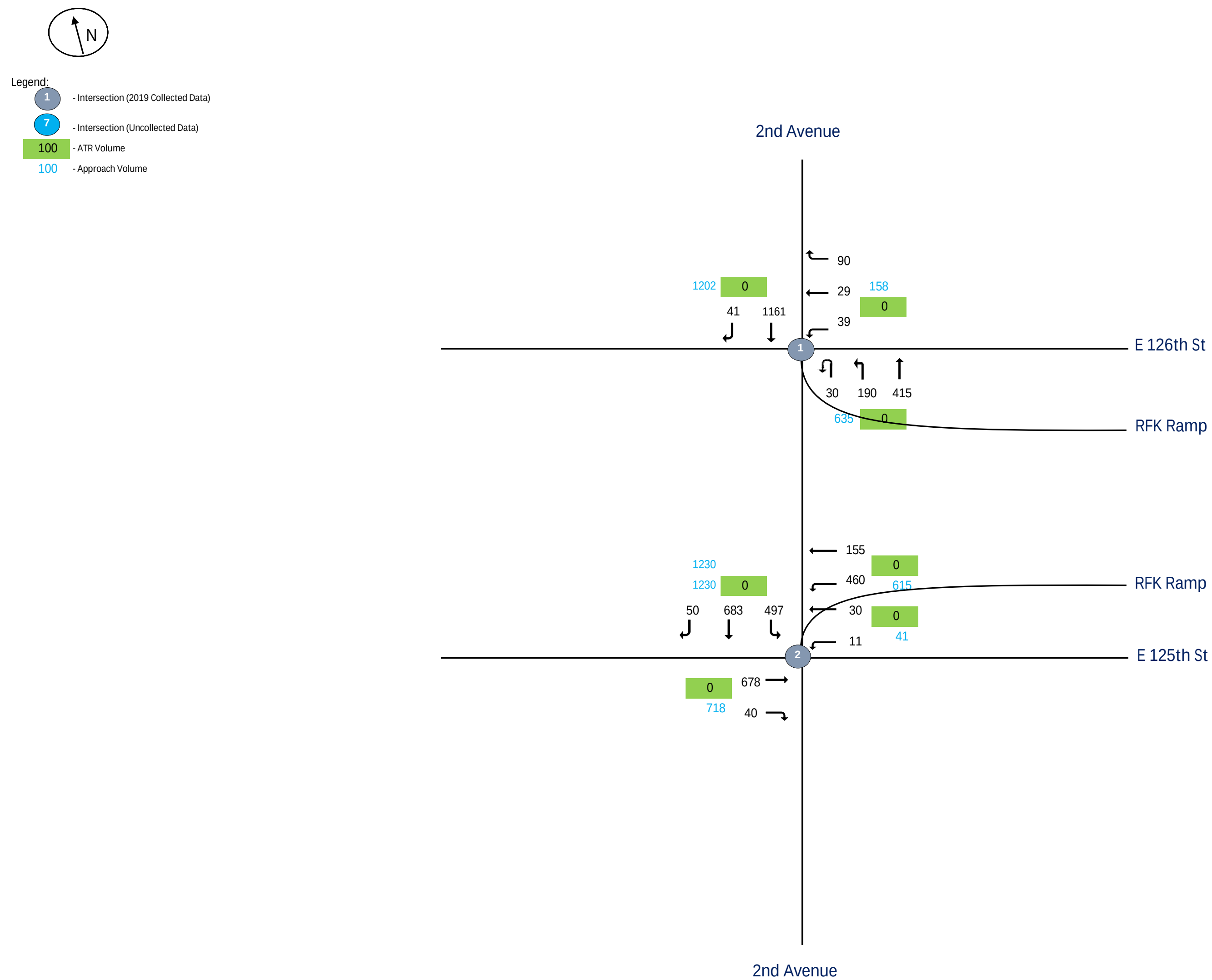


CBD Tolling
RKB - Traffic Flowmap
AM With-Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
St. Ann's Avenue
St. Ann's Place
E 134th St
Bruckner Blvd
St. Ann's Avenue
11
22
250
0
105
145
140
120
45
305
0
140
80
220
0
220
150
150
0
25
70
55
65
480
40
585
0
50
1440
30
1520
0
25
105
30
160
0

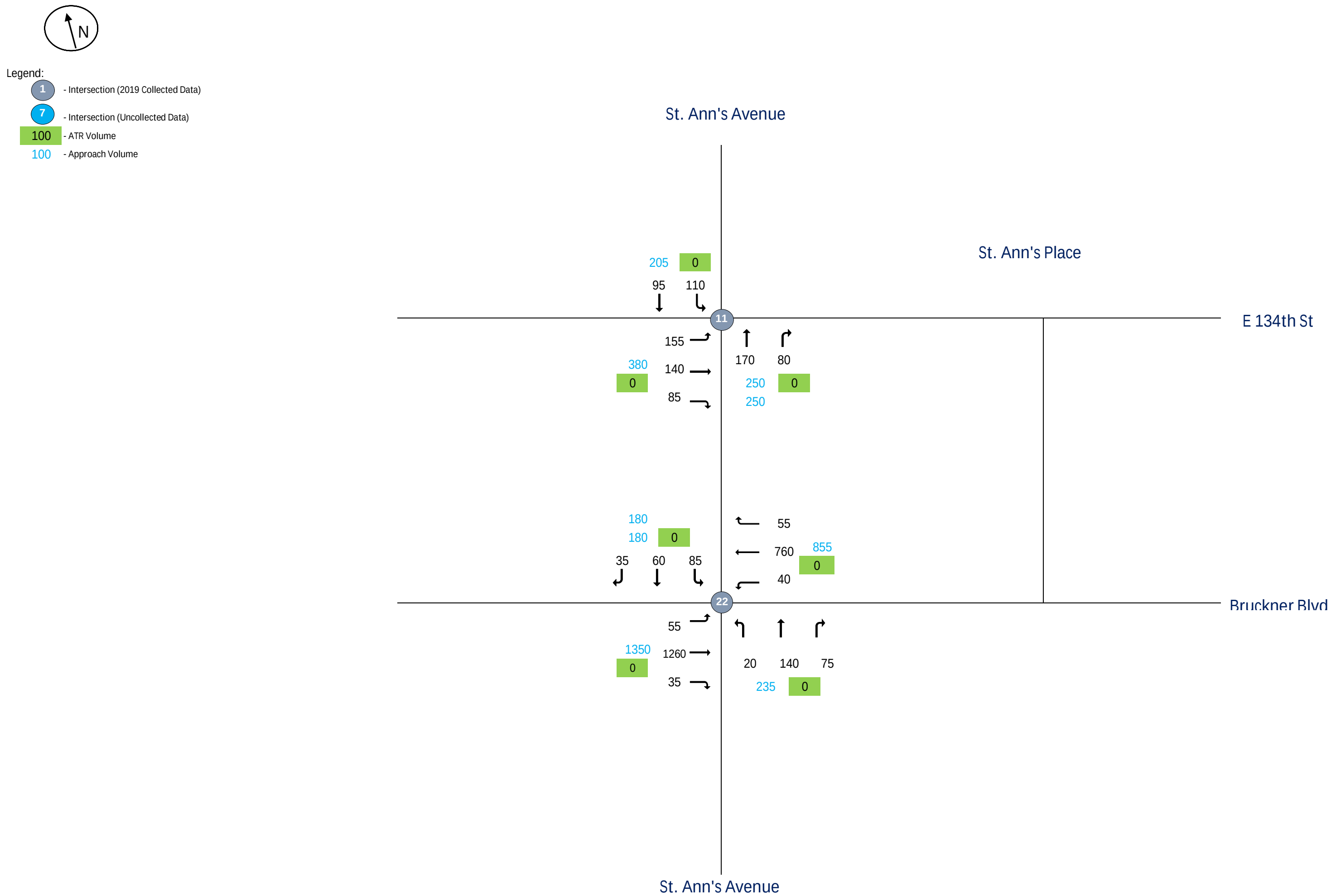
CBD Tolling
AS - Traffic Flowmap
AM With-Action



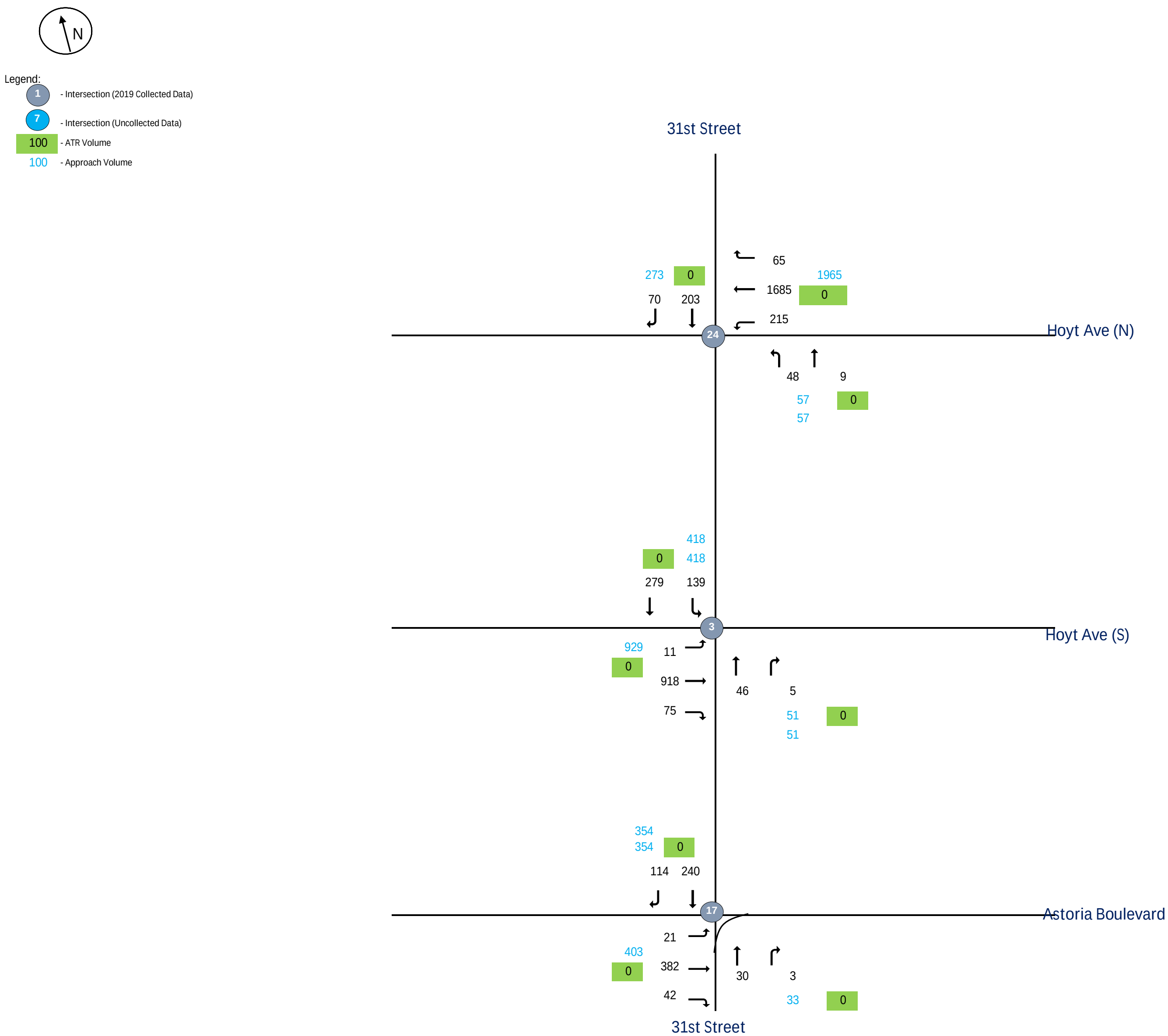
CBD Tolling
RKM - Traffic Flowmap
AM With-Action



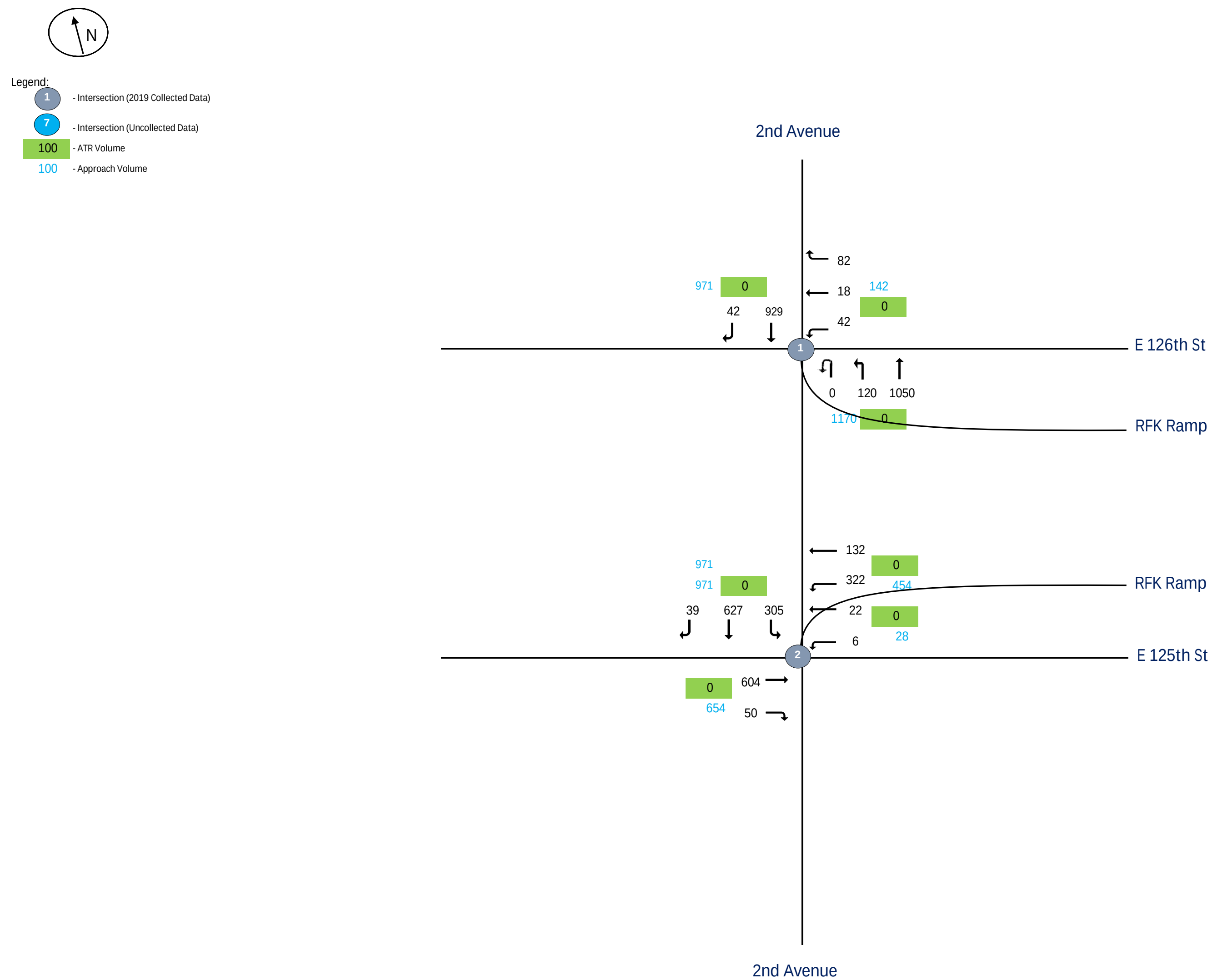
CBD Tolling
RKB - Traffic Flowmap
MD With-Action



CBD Tolling
AS - Traffic Flowmap
MD With-Action



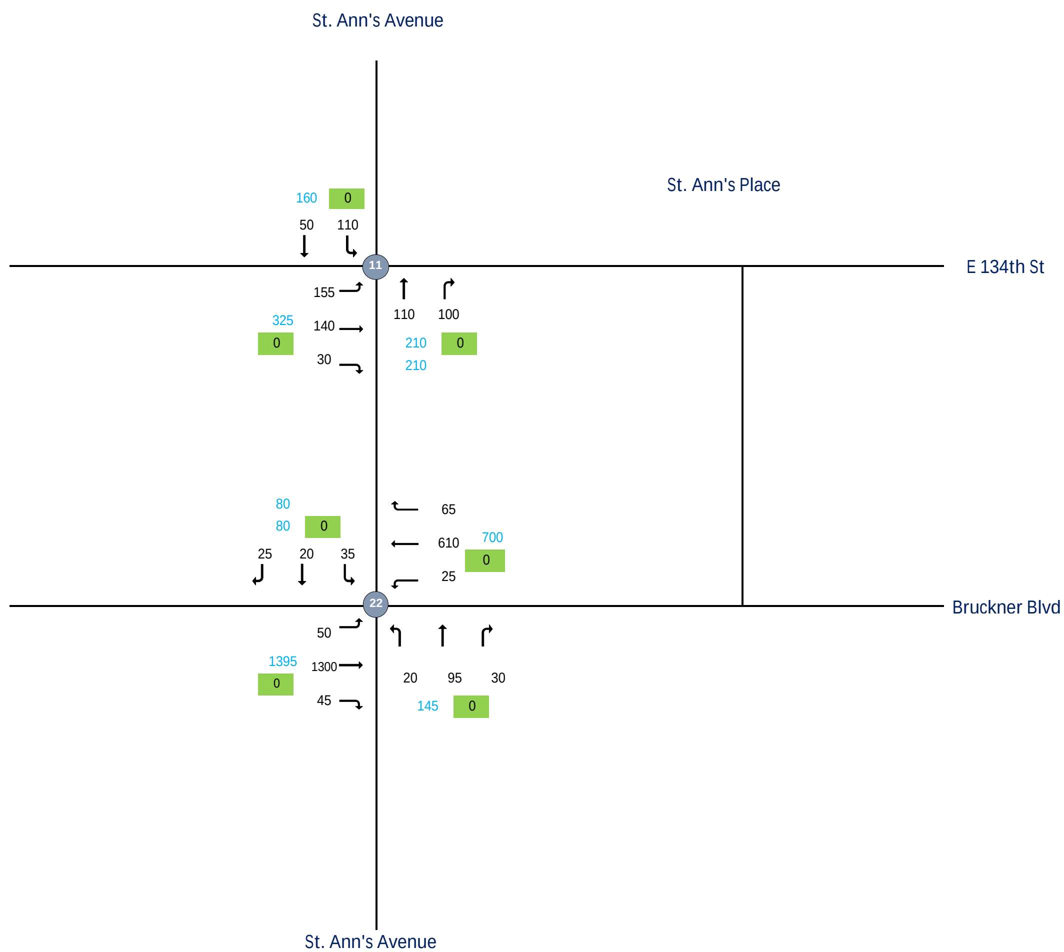
CBD Tolling
RKM - Traffic Flowmap
MD With-Action

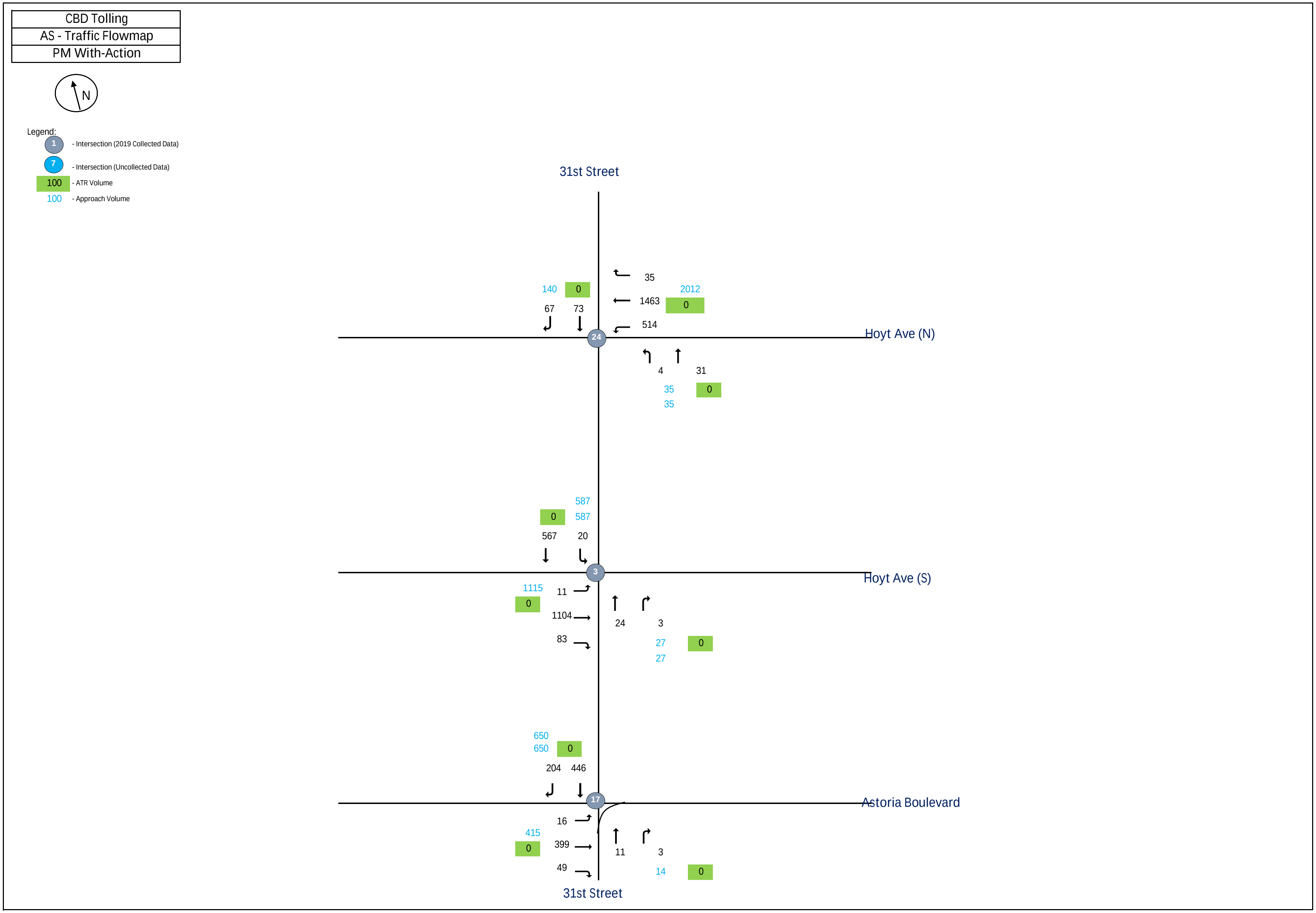


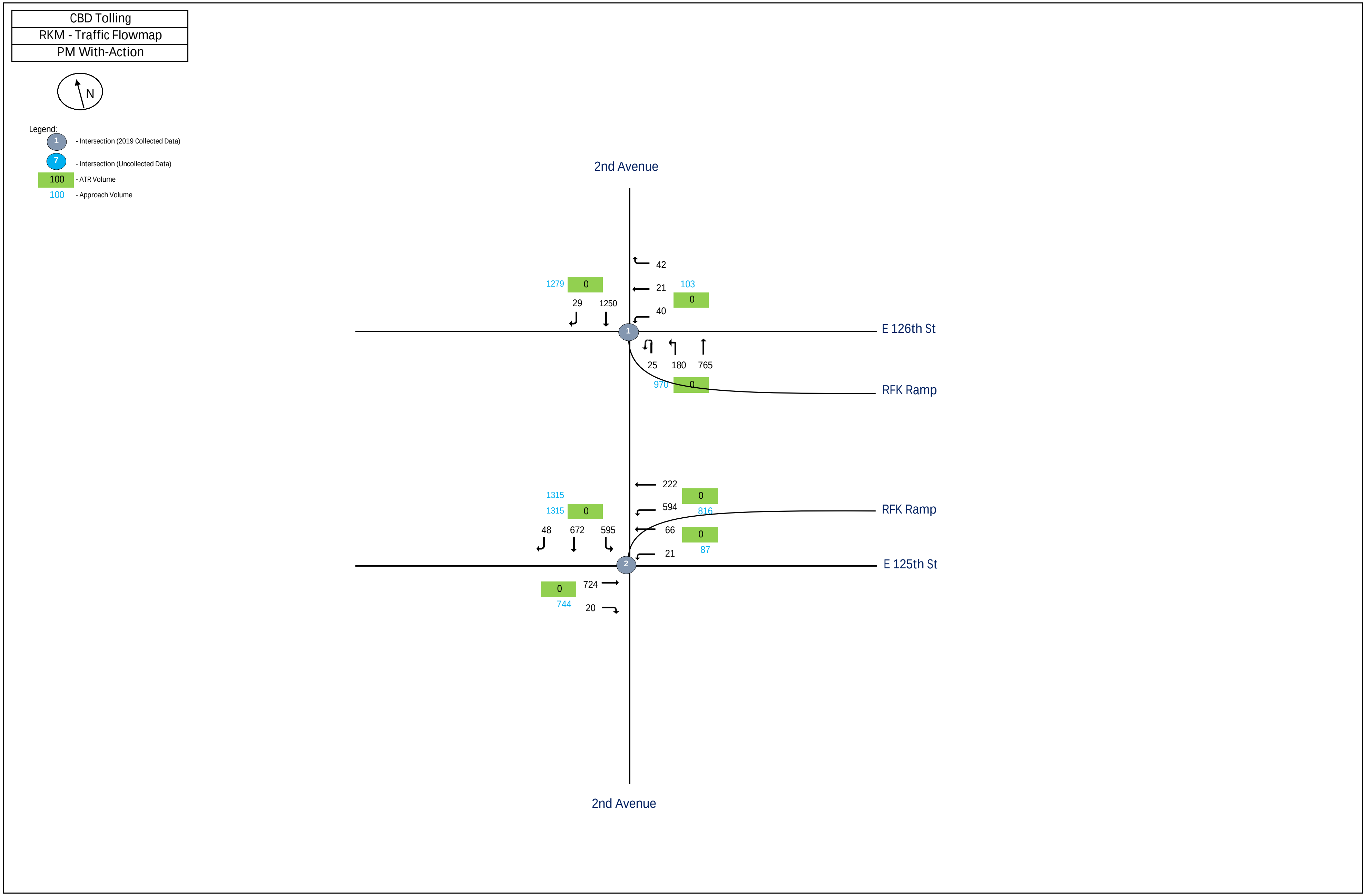
CBD Tolling
RKB - Traffic Flowmap
PM With-Action

N

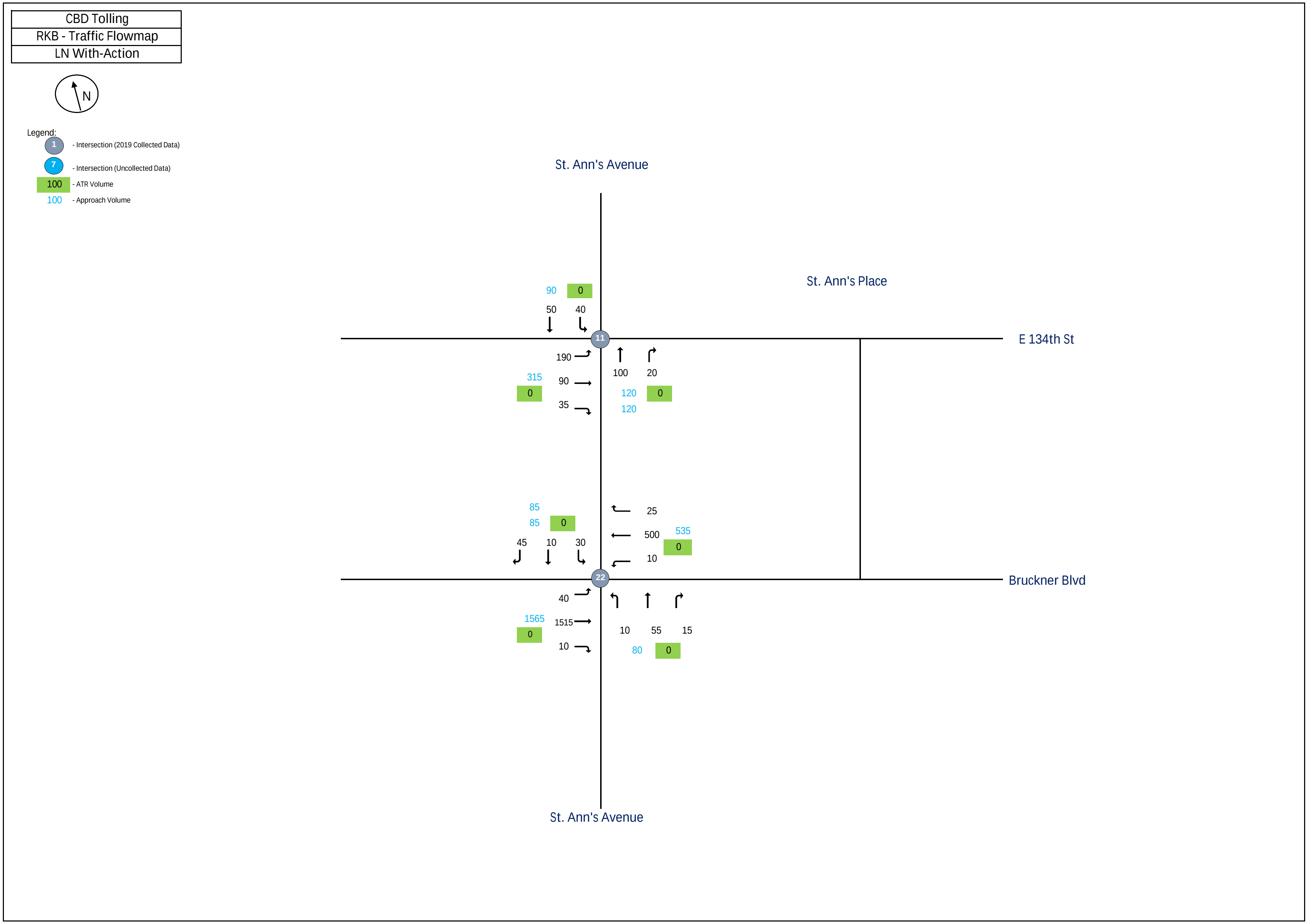
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume

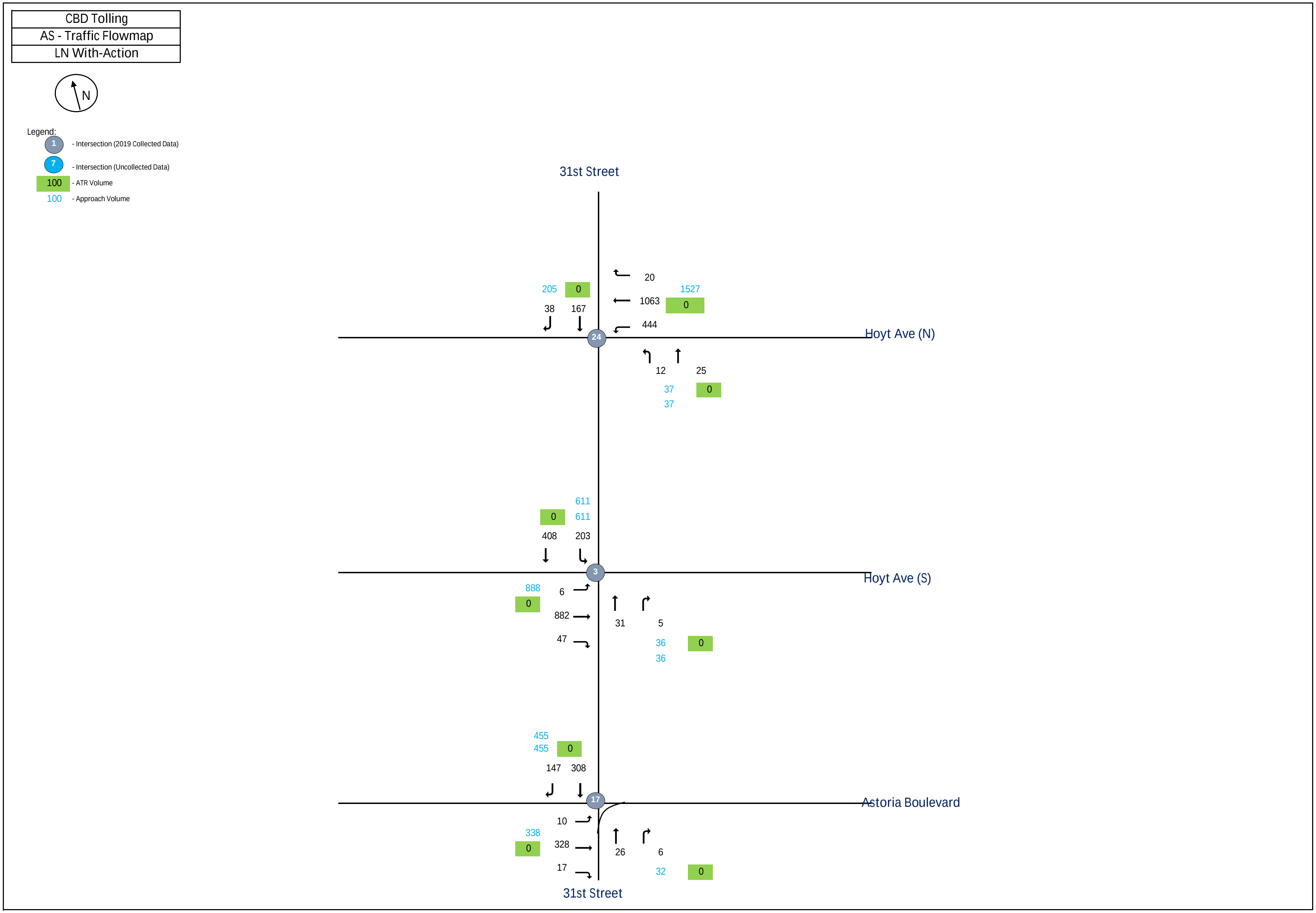



CBD Tolling
AS - Traffic Flowmap
PM With-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
140
0
67
73
35
1463
514
2012
0
24
Hoyt Ave (N)
4
31
35
35
0
587
587
0
567
20
3
Hoyt Ave (S)
1115
0
11
1104
83
24
3
27
27
0
650
650
0
204
446
17
Astoria Boulevard
16
415
0
399
49
11
3
14
0
31st Street

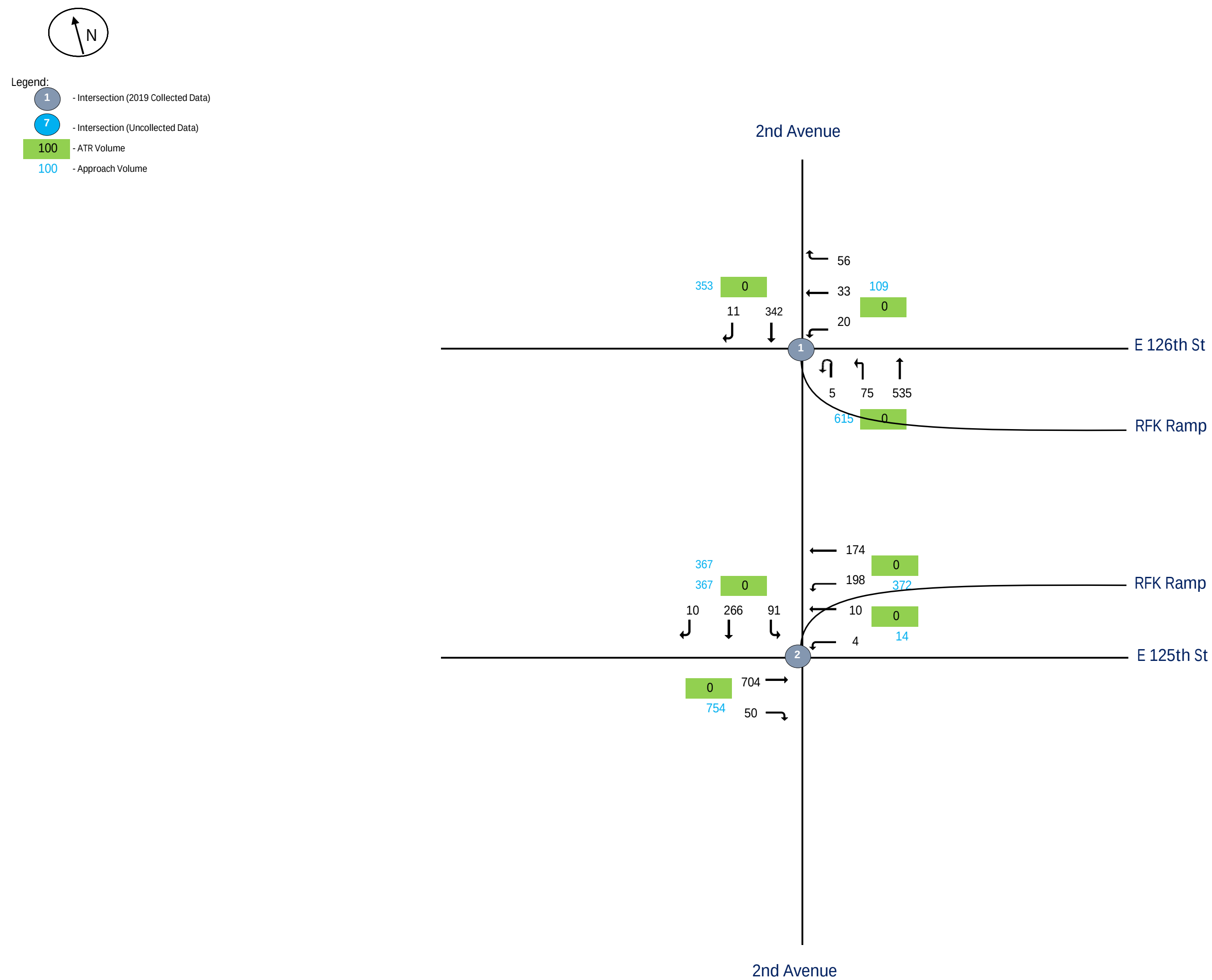


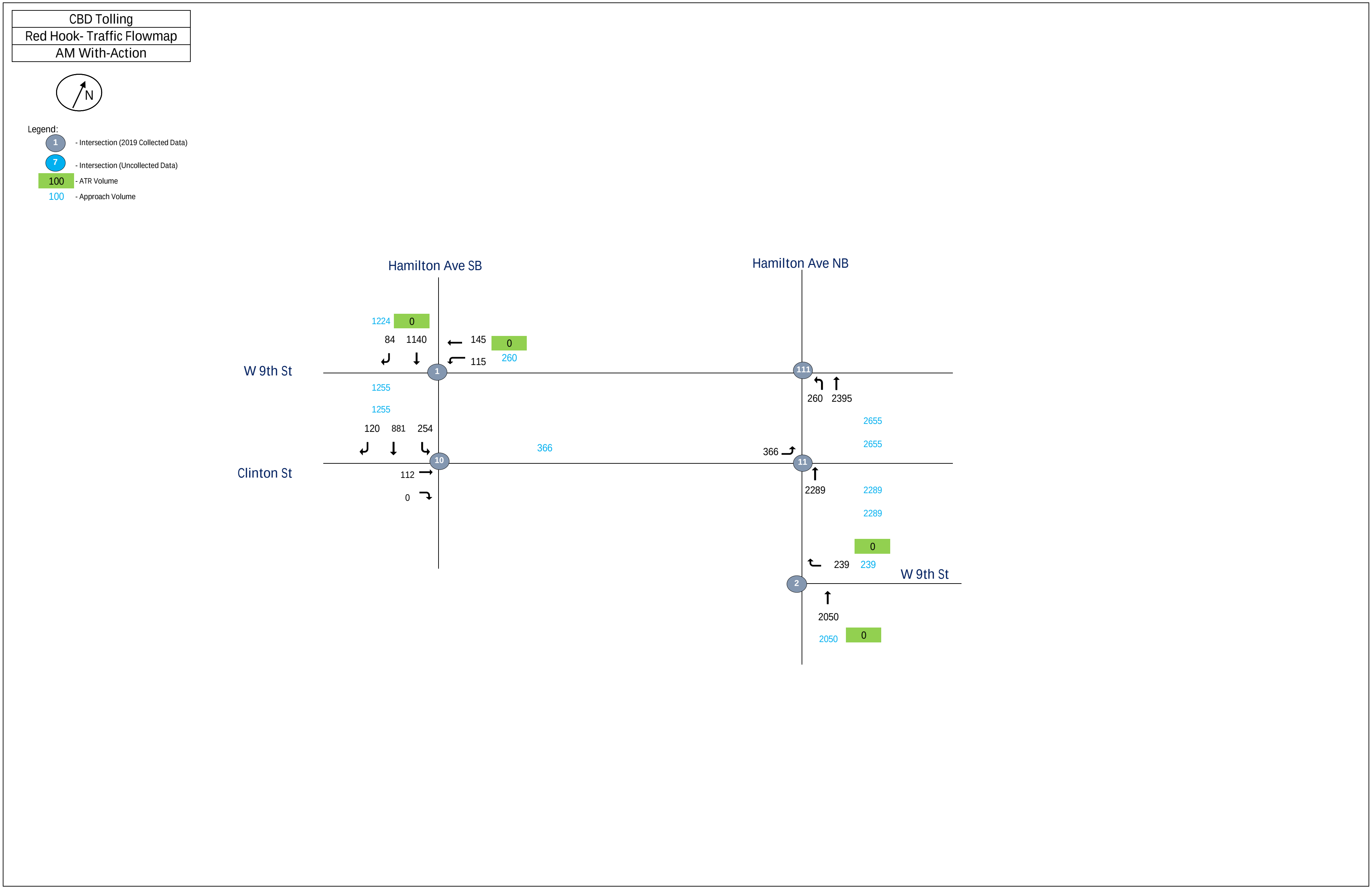
CBD Tolling
RKM - Traffic Flowmap
PM With-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
2nd Avenue
42
1279
0
21
103
0
29
1250
40
1
E 126th St
25
180
765
970
0
RFK Ramp
222
1315
0
1315
0
594
816
RFK Ramp
48
672
595
66
0
87
21
2
E 125th St
0
724
744
20
2nd Avenue


CBD Tolling
RKB - Traffic Flowmap
LN With-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
St. Ann's Avenue
St. Ann's Place
E 134th St
Bruckner Blvd
St. Ann's Avenue
11
22
90
0
50
40
190
315
0
90
35
100
20
120
0
120
85
85
0
45
10
30
25
500
535
0
10
40
1565
0
1515
10
10
55
15
80
0

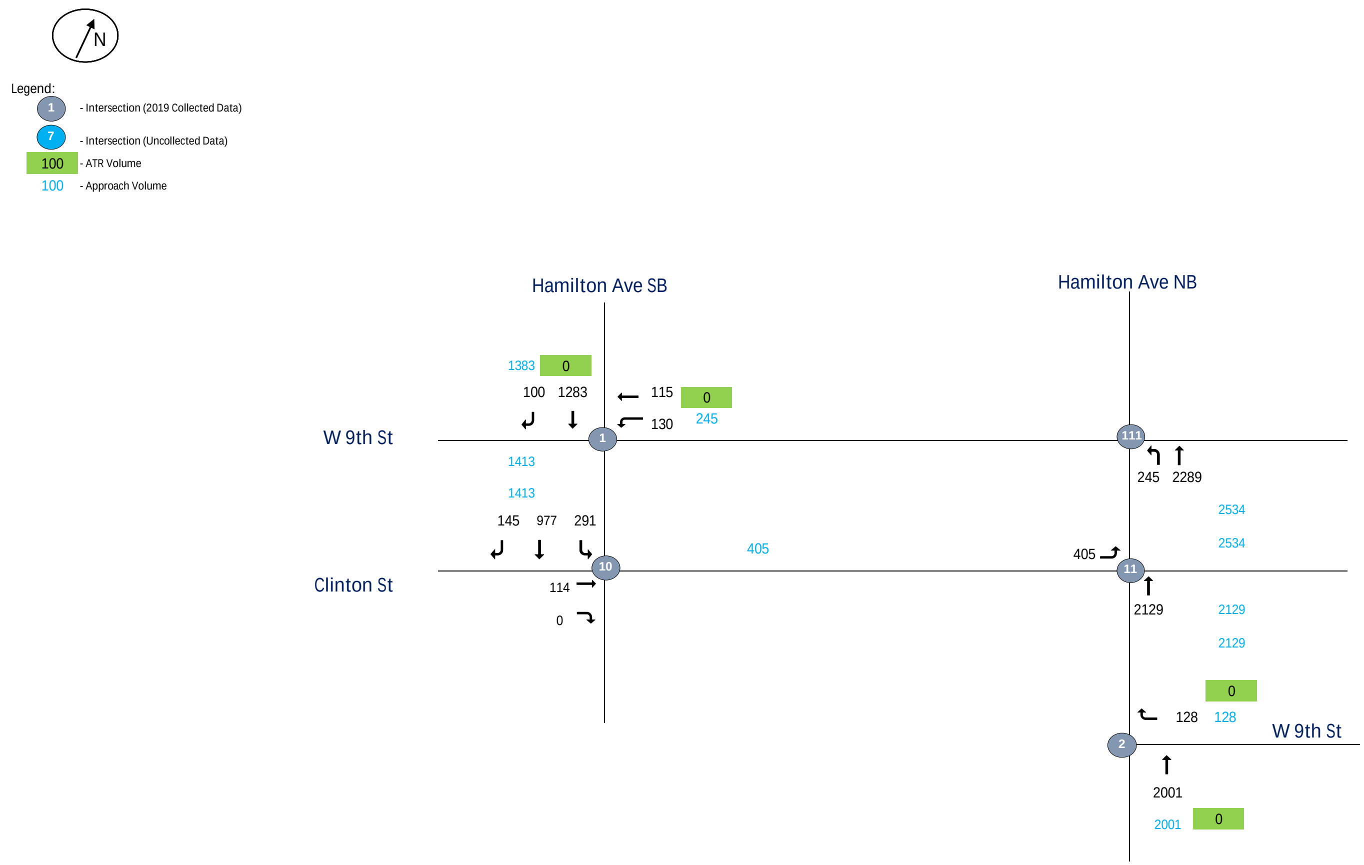

CBD Tolling
AS - Traffic Flowmap
LN With-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
31st Street
205
0
38
167
20
1527
1063
0
444
24
Hoyt Ave (N)
12
25
37
0
37
611
0
611
408
203
3
Hoyt Ave (S)
888
6
0
882
31
5
47
36
0
36
455
455
0
147
308
17
Astoria Boulevard
10
338
328
26
6
0
17
32
0
31st Street

CBD Tolling
RKM - Traffic Flowmap
LN With-Action

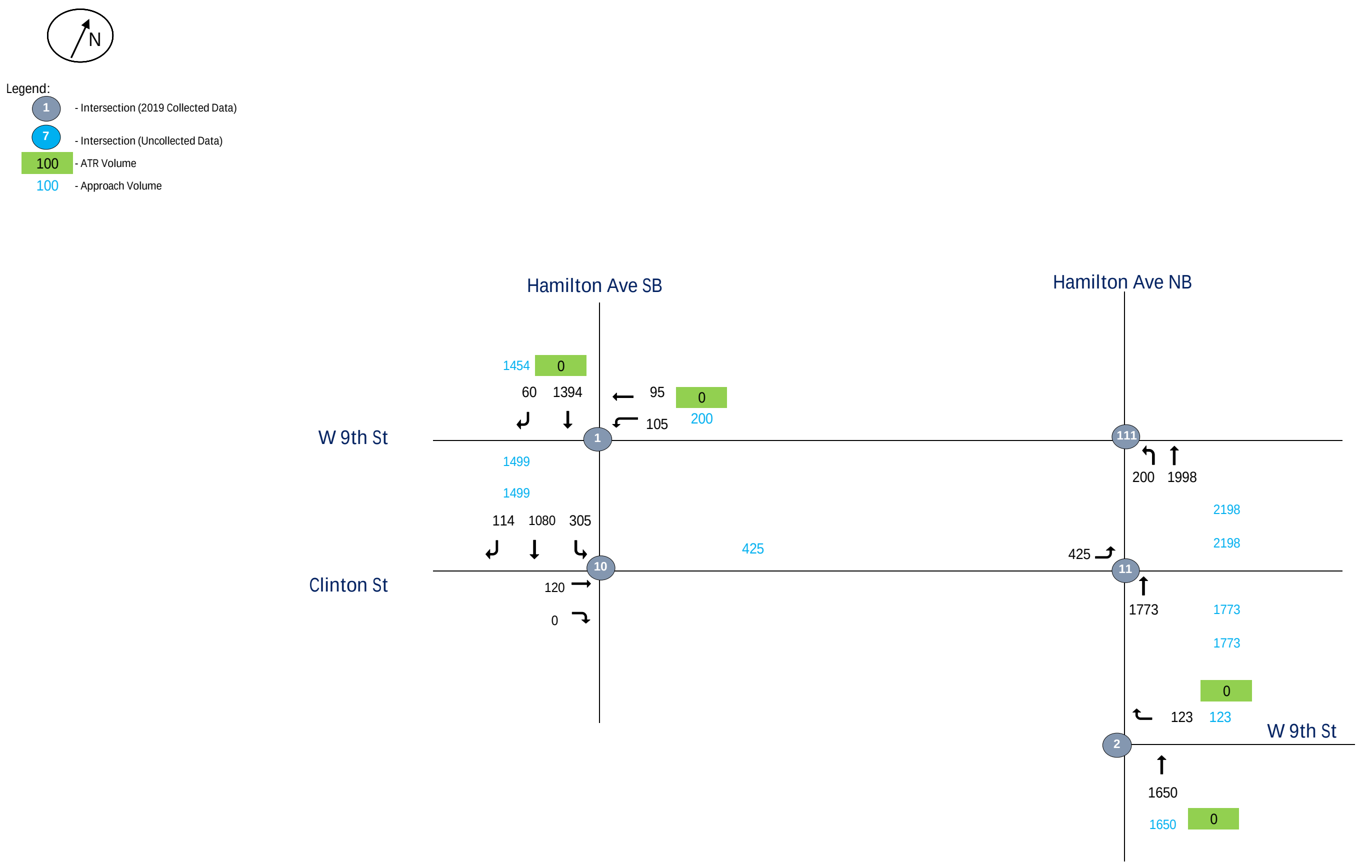



CBD Tolling
Red Hook- Traffic Flowmap
AM With-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Hamilton Ave SB
Hamilton Ave NB
W 9th St
Clinton St
W 9th St
1224
0
84
1140
145
0
115
260
1
111
260
2395
1255
1255
120
881
254
2655
2655
366
366
10
11
112
0
2289
2289
2289
0
239
239
2
2050
2050
0

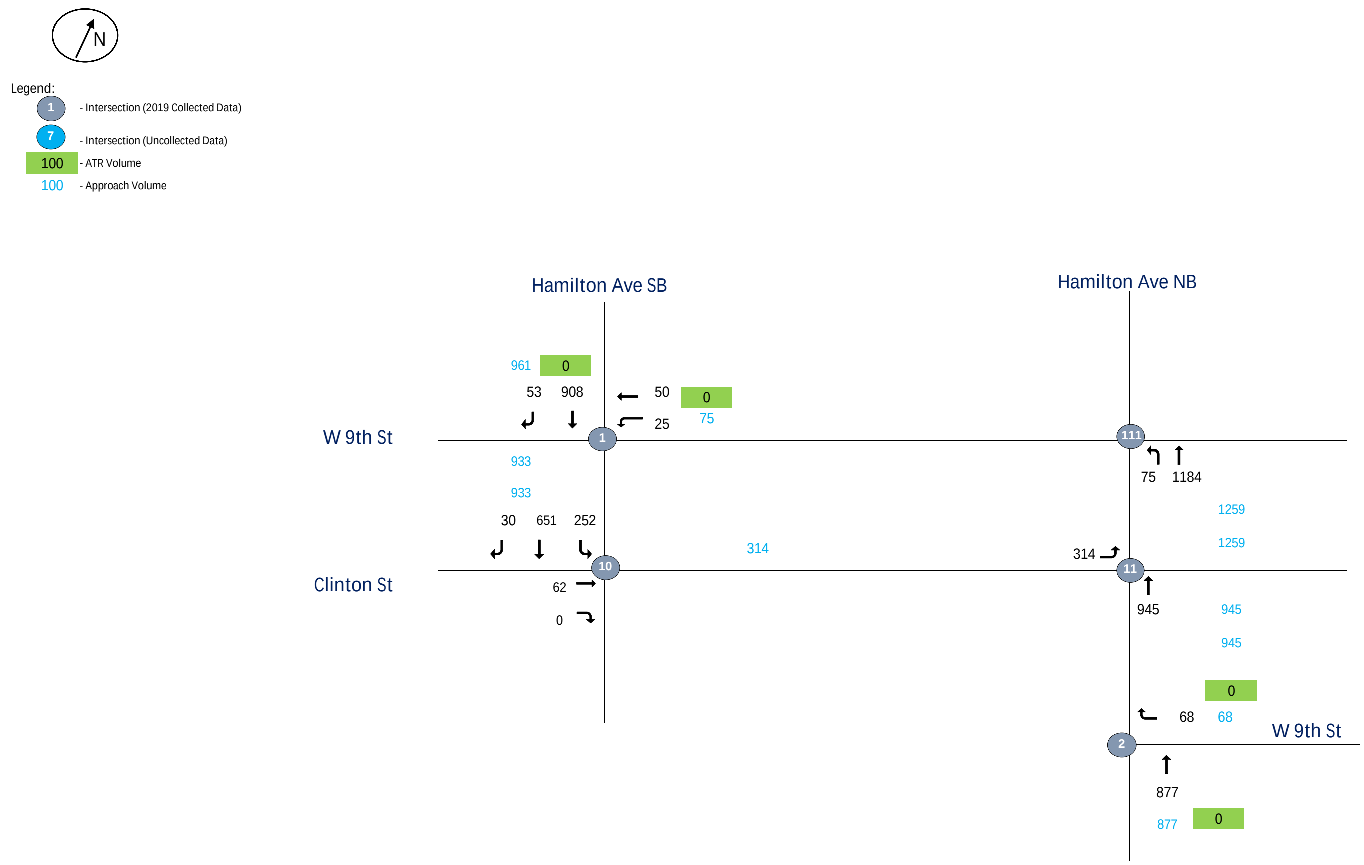
CBD Tolling
Red Hook- Traffic Flowmap
MD With-Action

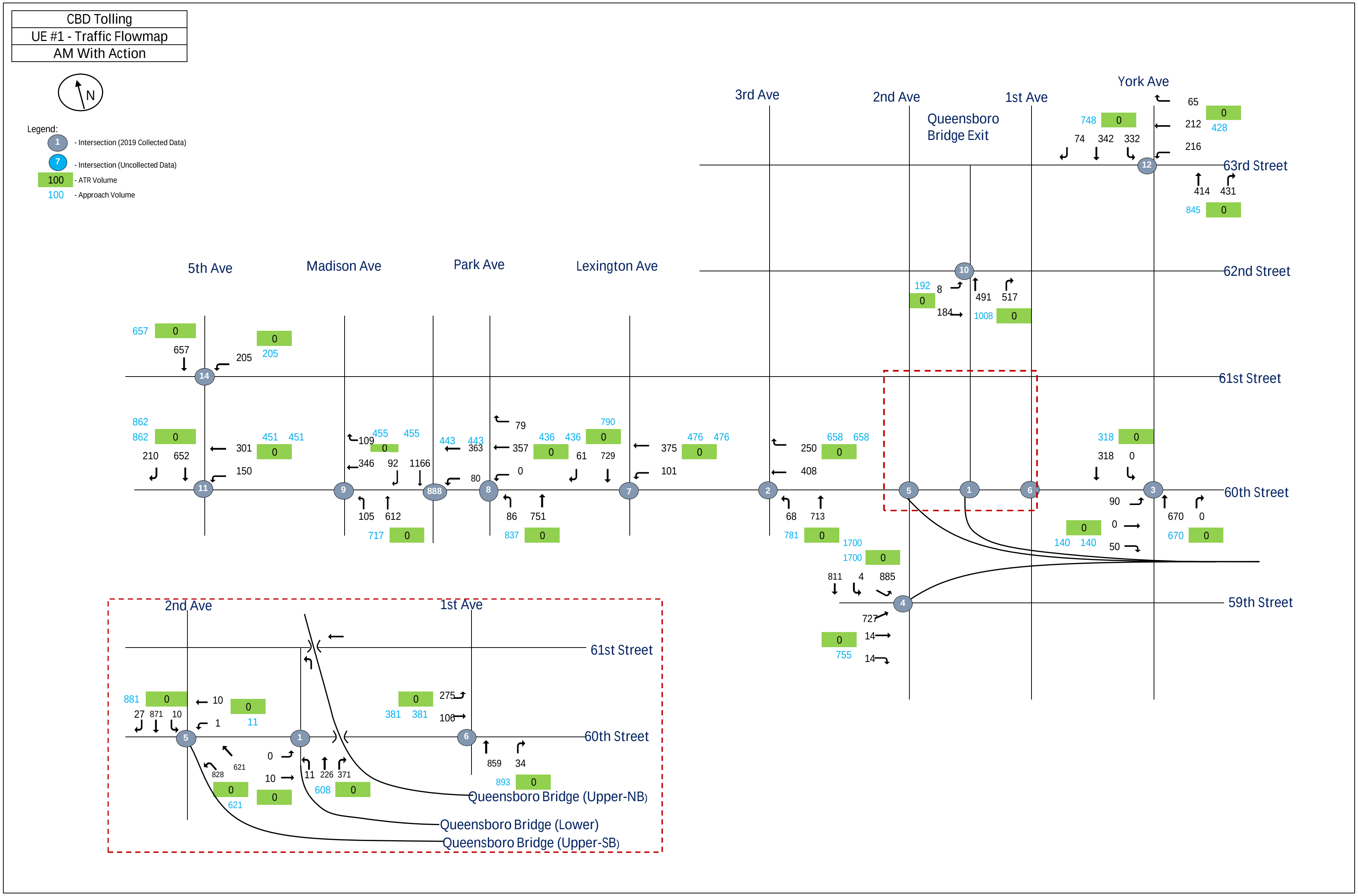


CBD Tolling
Red Hook- Traffic Flowmap
PM With-Action

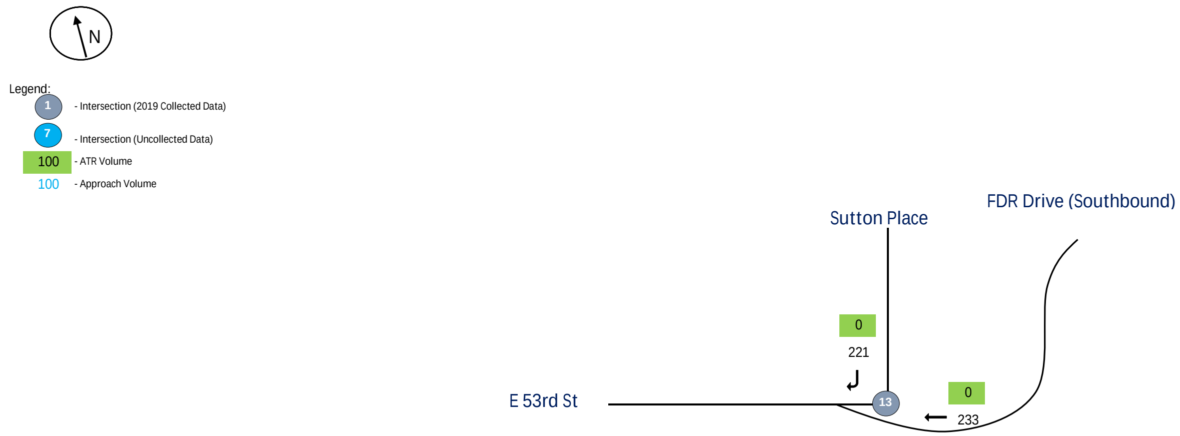


CBD Tolling
Red Hook- Traffic Flowmap
LN With-Action

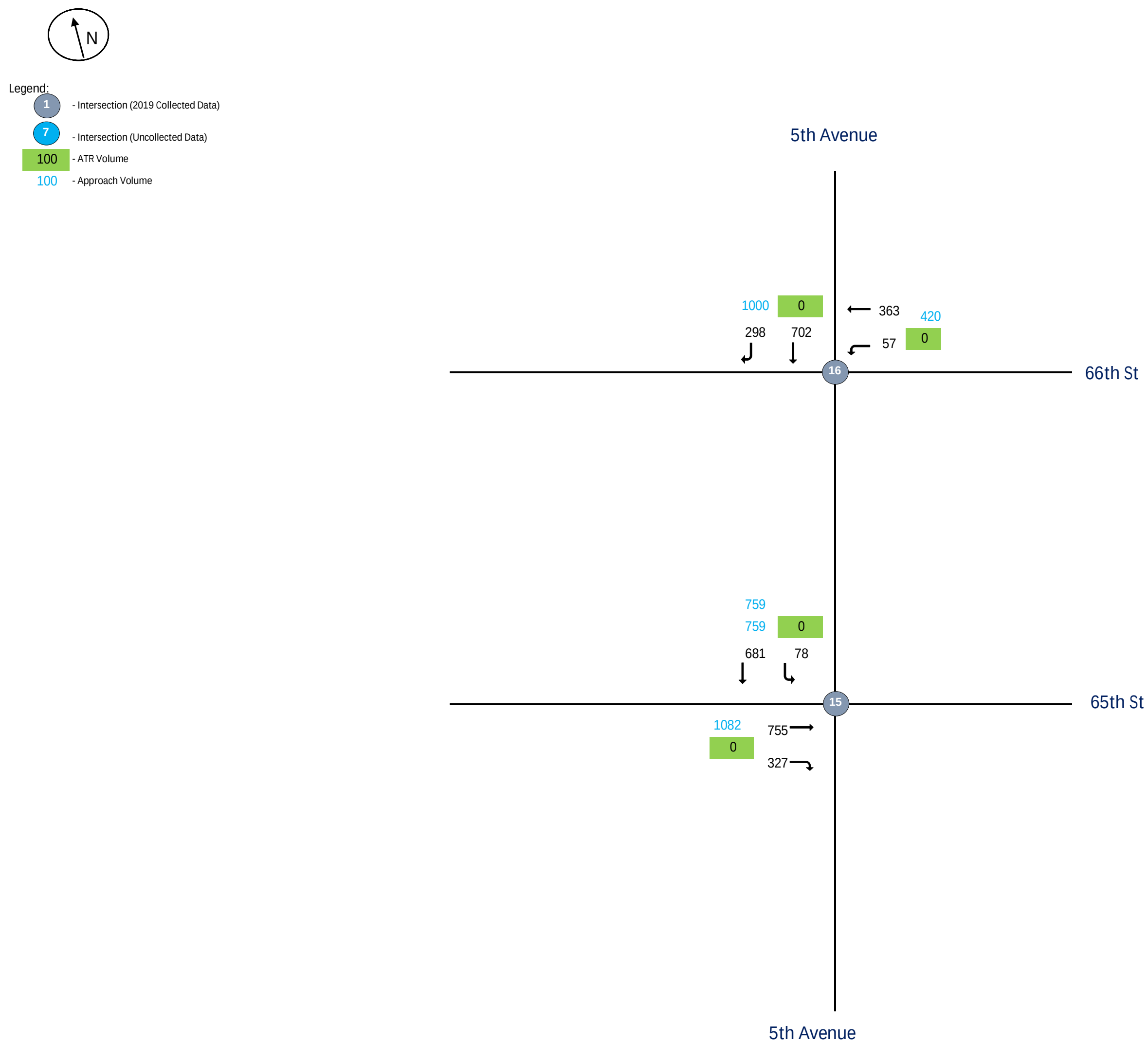



CBD Tolling
UE #1 - Traffic Flowmap
AM With Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

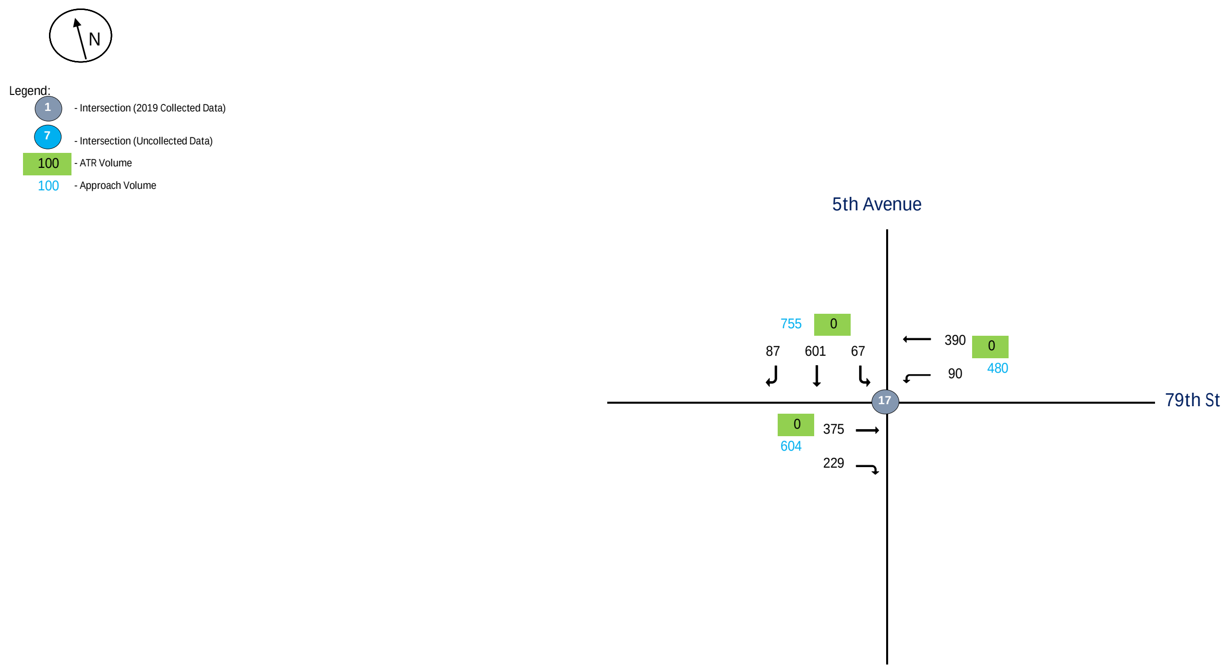
CBD Tolling
UE #2 - Traffic Flowmap
AM With Action



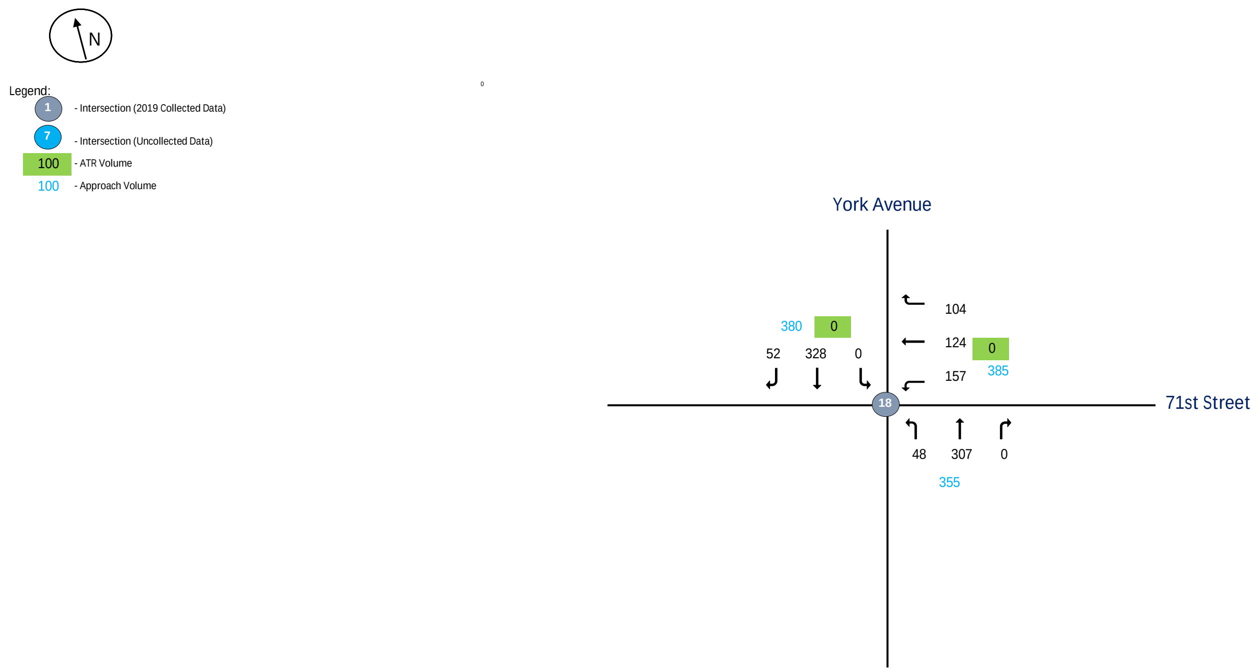
CBD Tolling
UE #3 - Traffic Flowmap
AM With Action

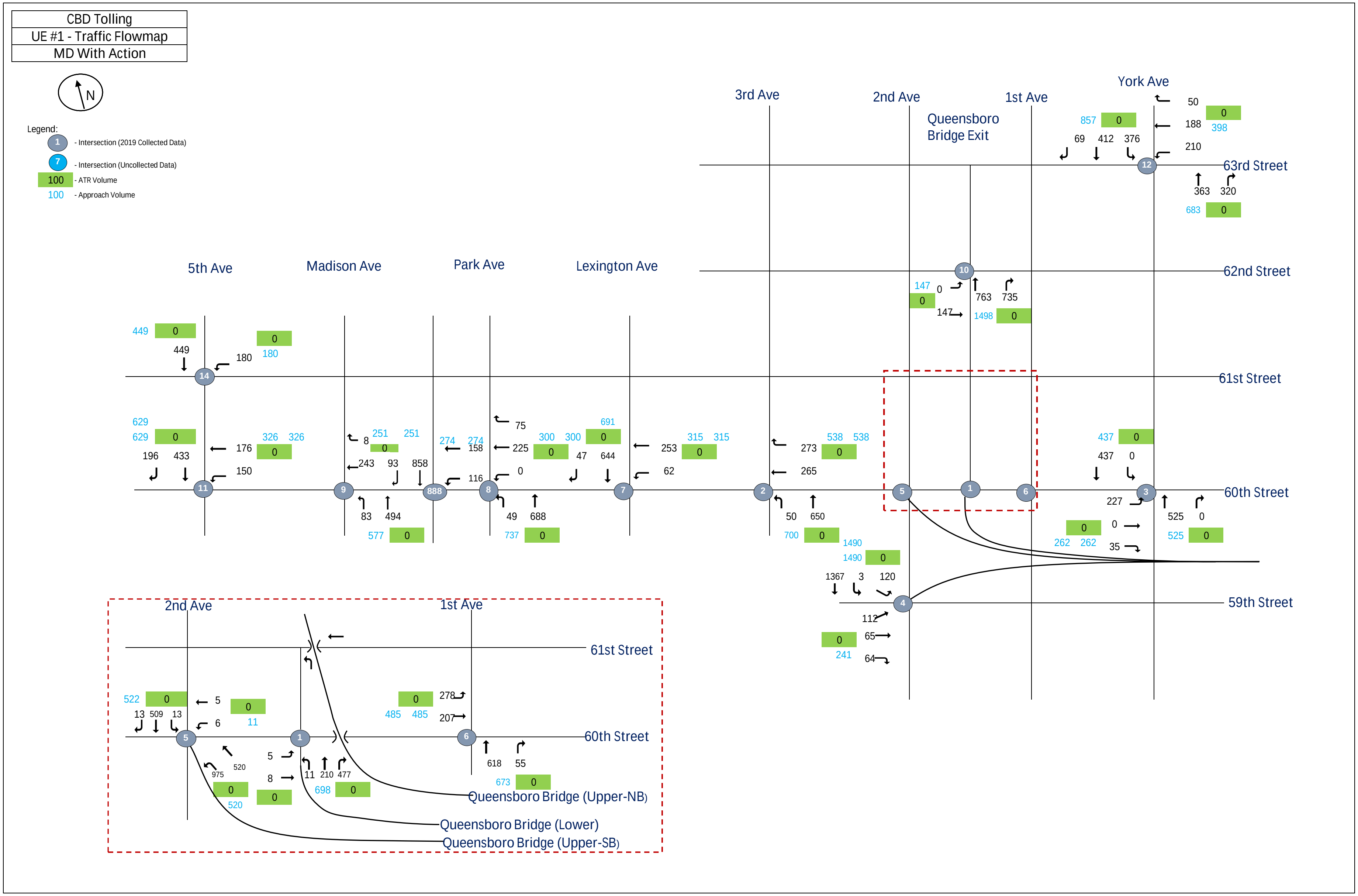


CBD Tolling
UE #3 - Traffic Flowmap
AM With Action



CBD Tolling
UE #4 - Traffic Flowmap
AM With Action

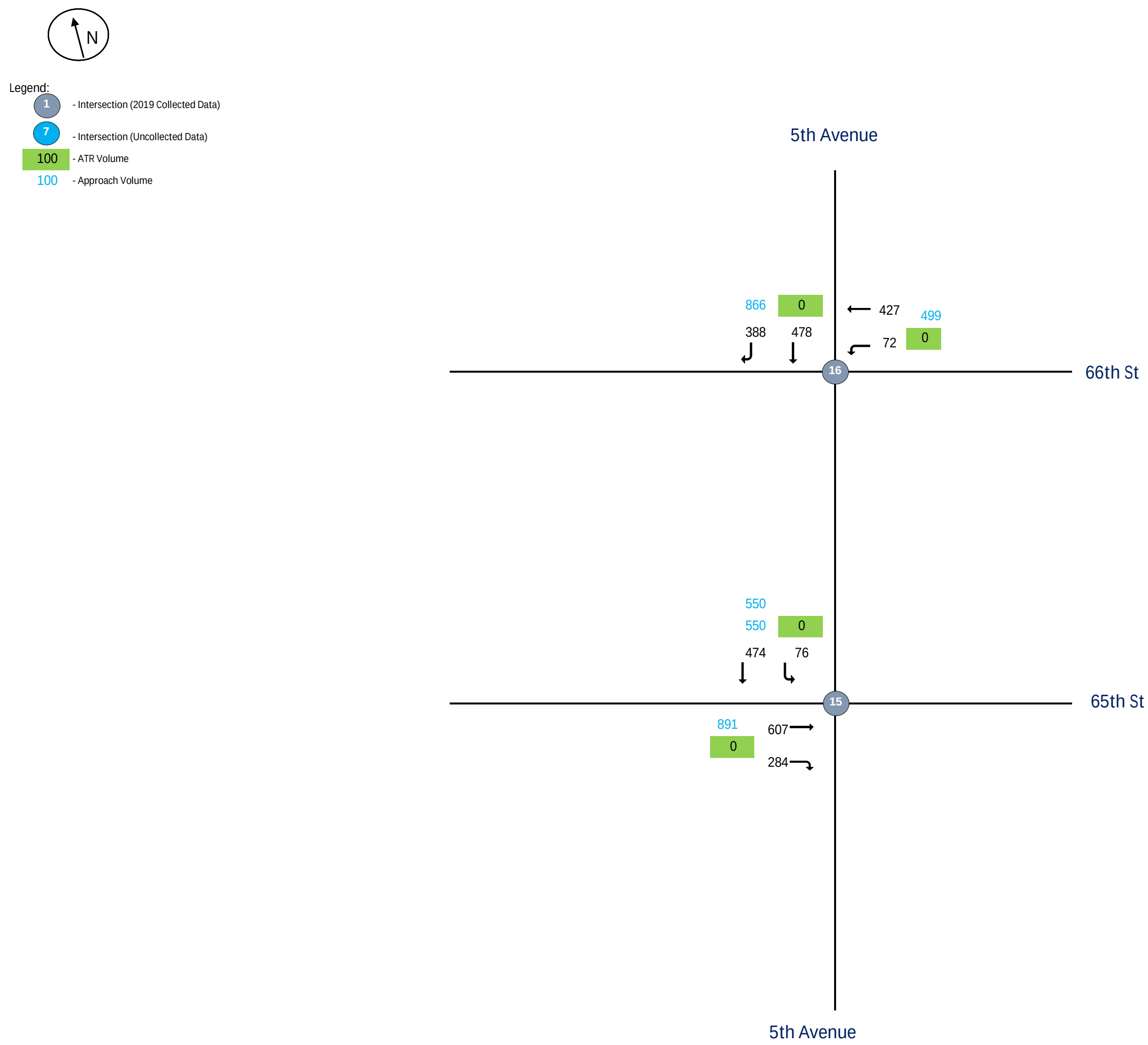




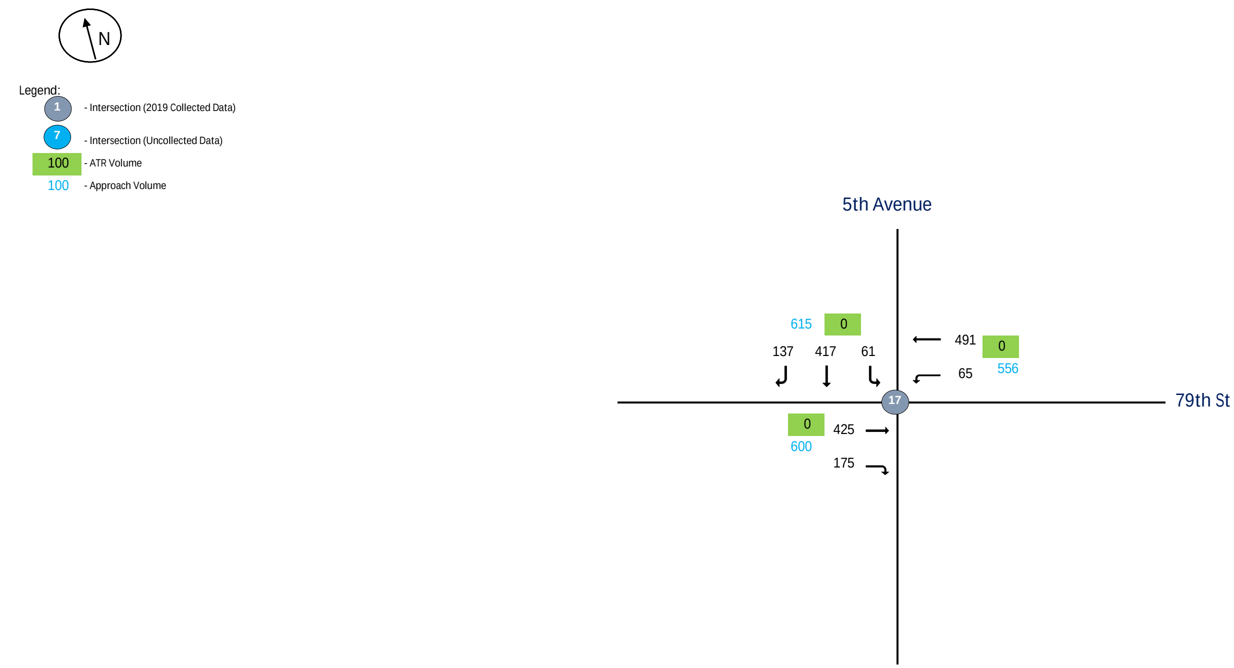
CBD Tolling
UE #1 - Traffic Flowmap
MD With Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
MD With Action

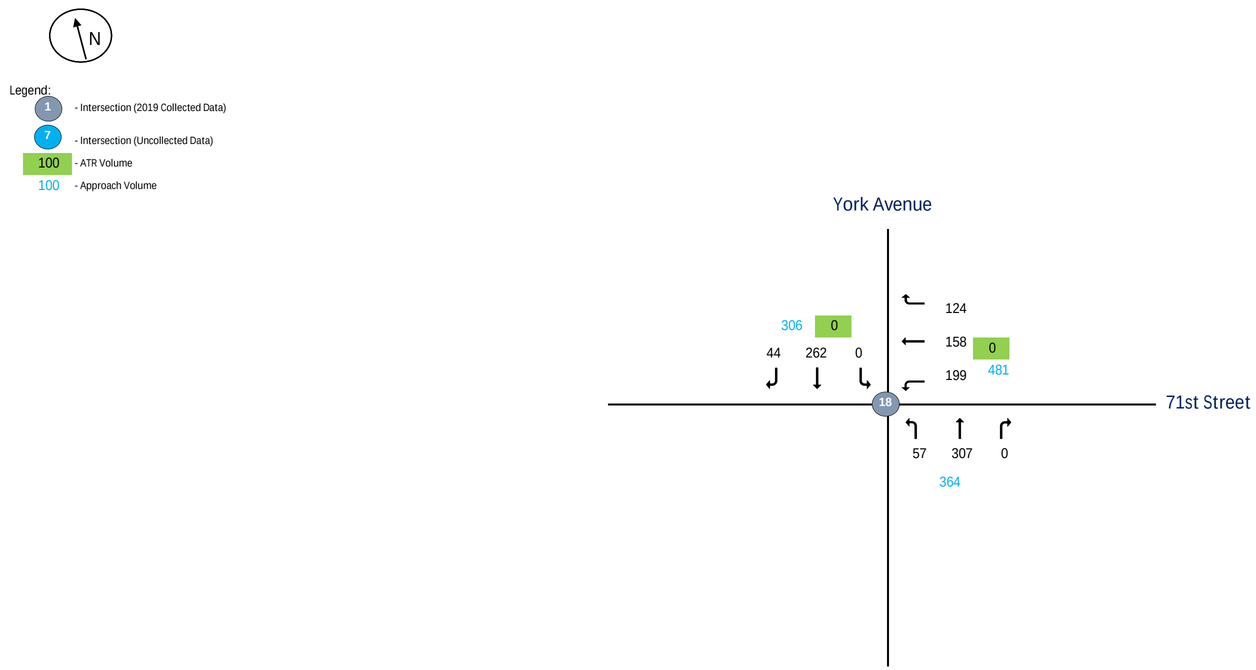
CBD Tolling
UE #3 - Traffic Flowmap
MD With Action

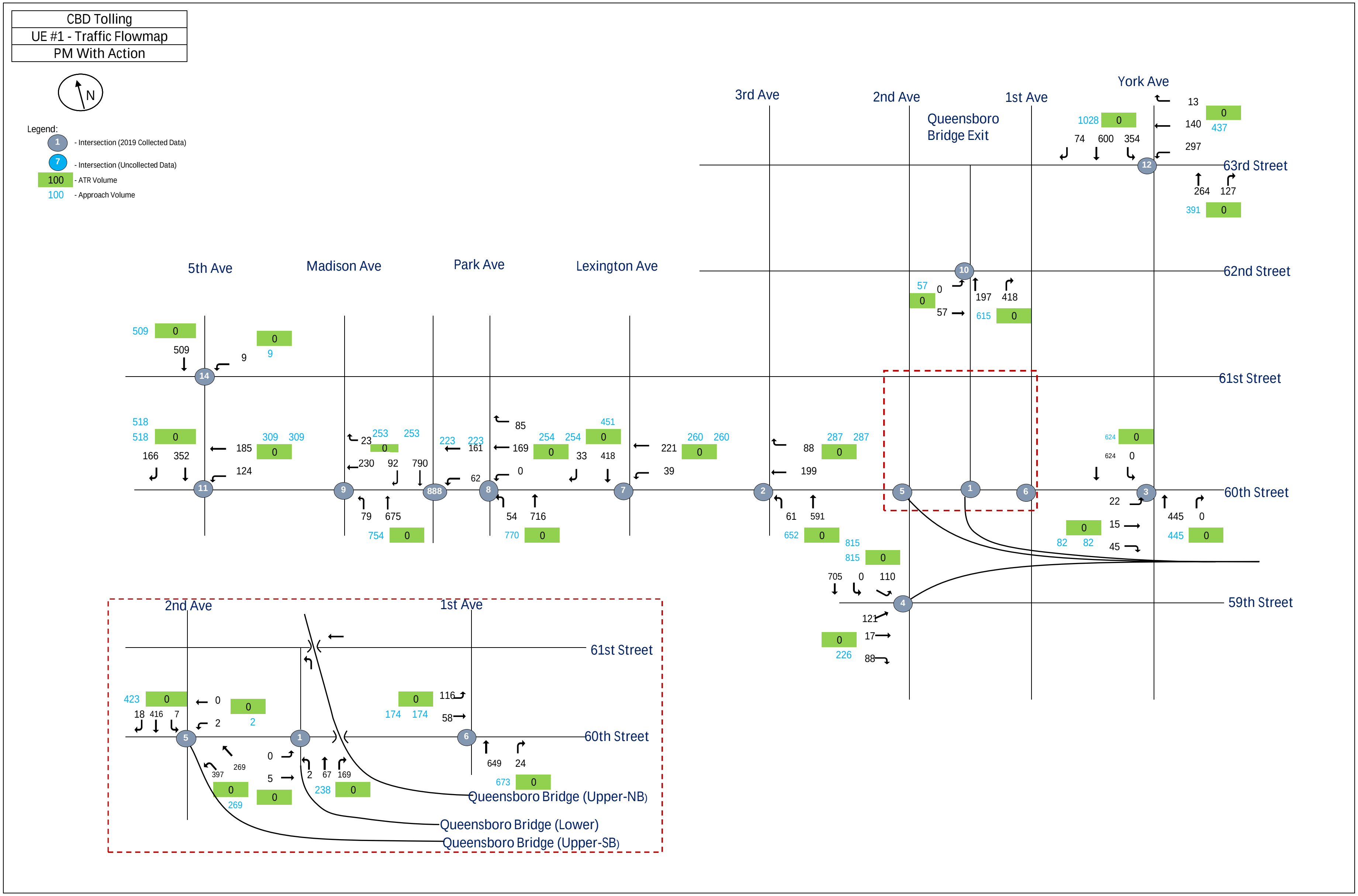


CBD Tolling
UE #3 - Traffic Flowmap
MD With Action



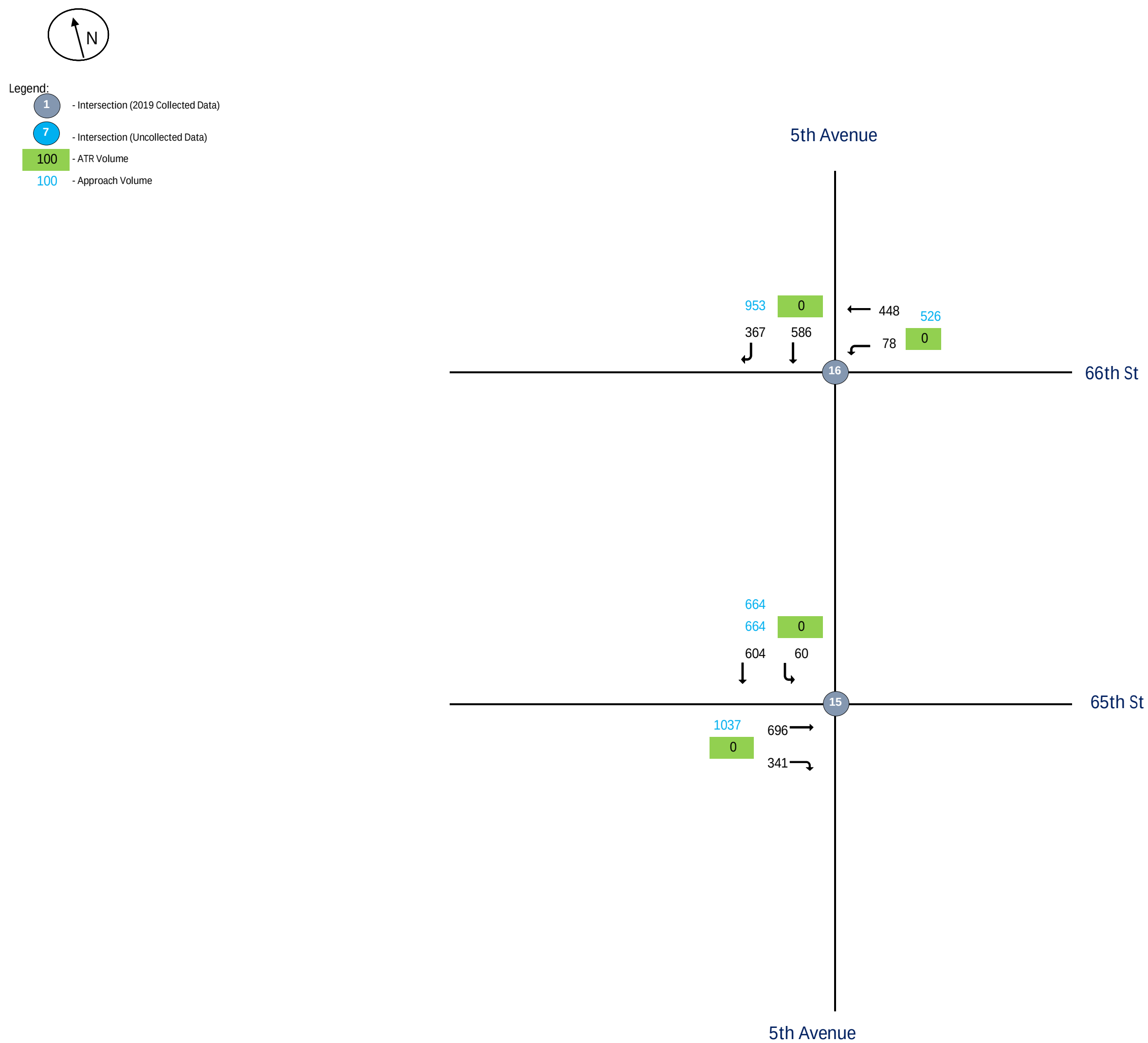
CBD Tolling
UE #4 - Traffic Flowmap
MD With Action



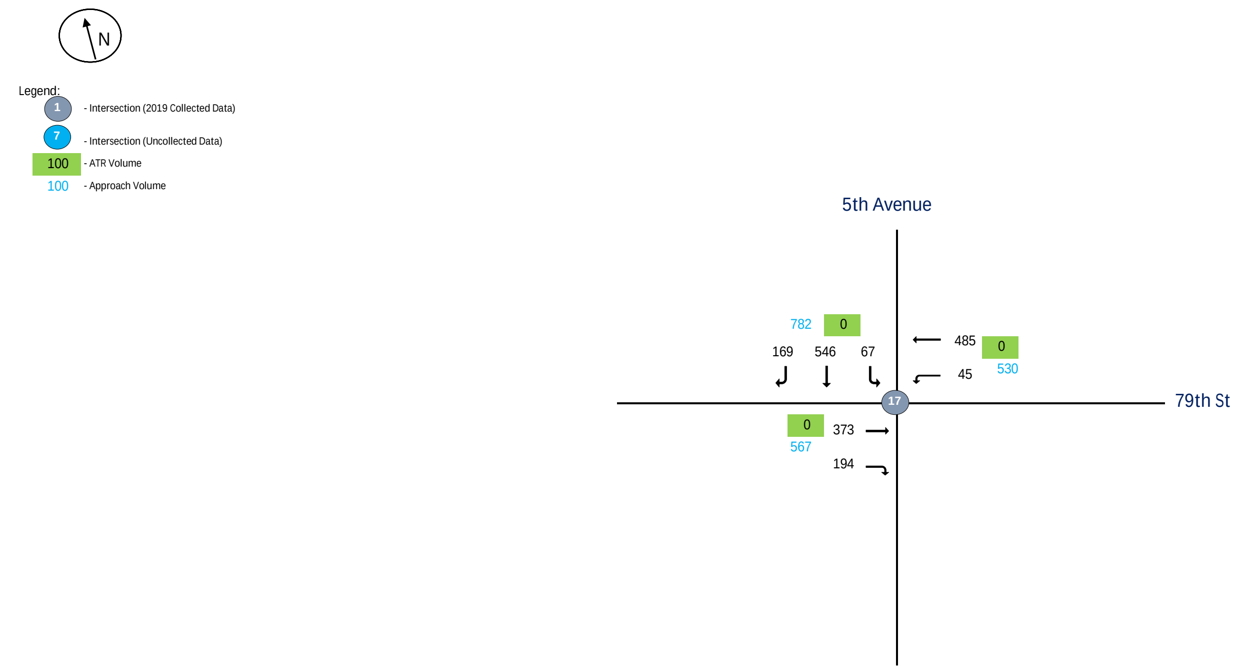

CBD Tolling
UE #1 - Traffic Flowmap
PM With Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
York Ave
3rd Ave
2nd Ave
1st Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
5th Ave
Madison Ave
Park Ave
Lexington Ave
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
PM With Action

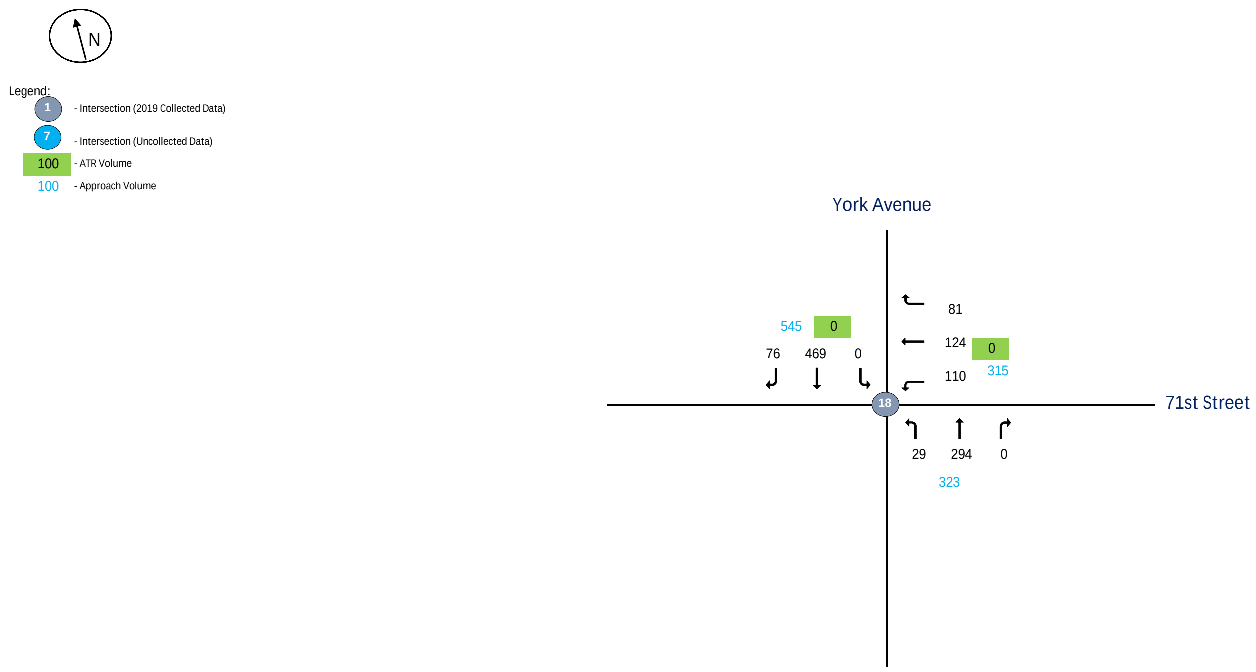
CBD Tolling
UE #3 - Traffic Flowmap
PM With Action

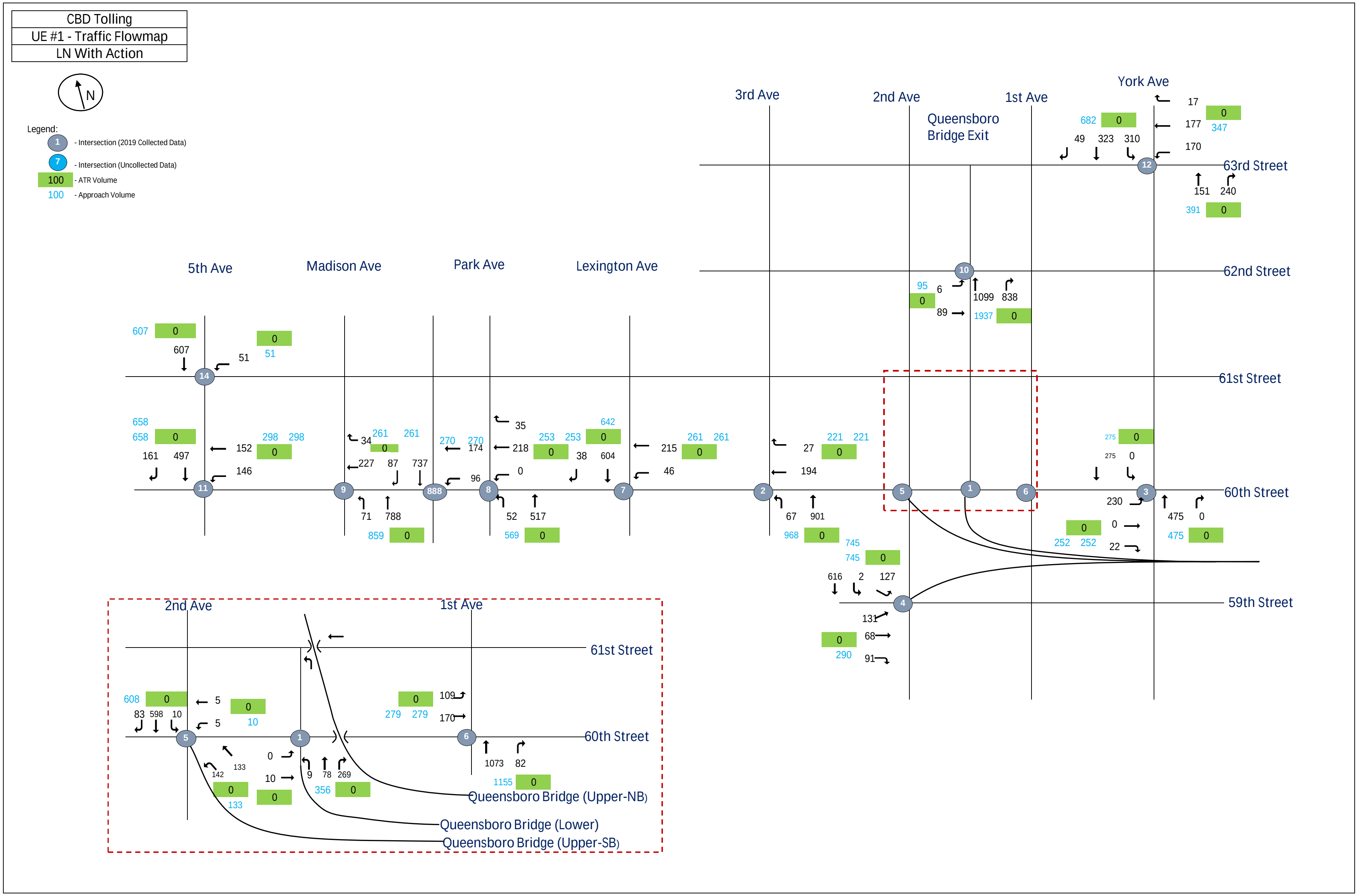


CBD Tolling
UE #3 - Traffic Flowmap
PM With Action



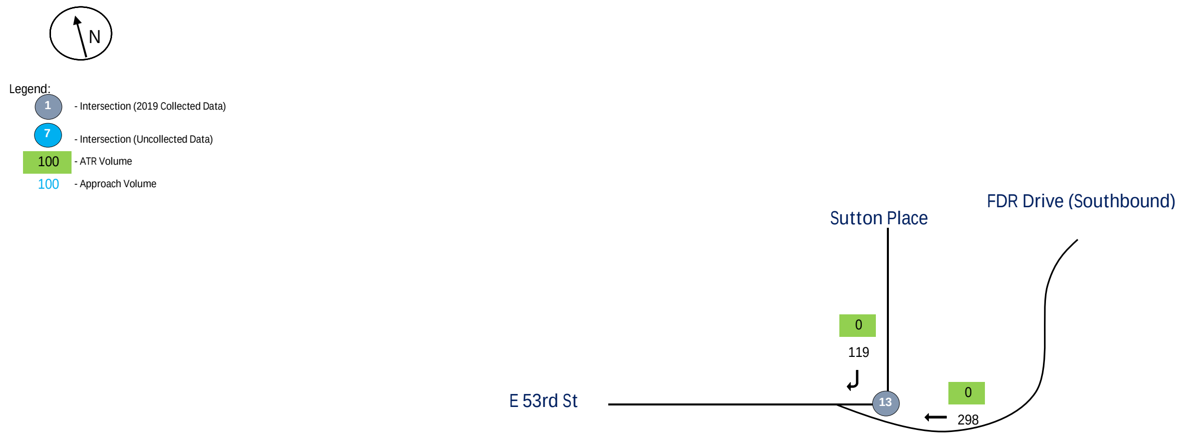
CBD Tolling
UE #4 - Traffic Flowmap
PM With Action

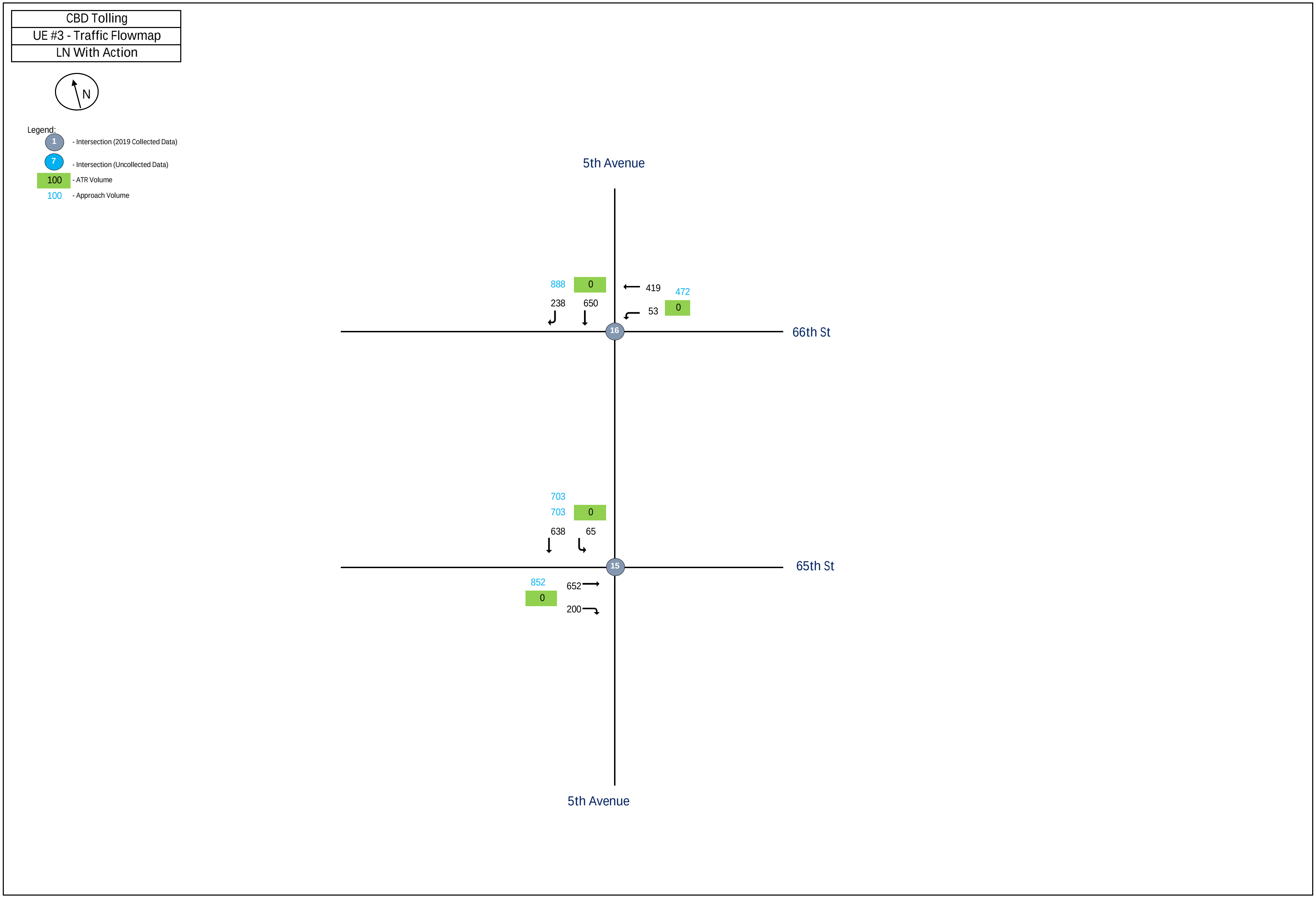




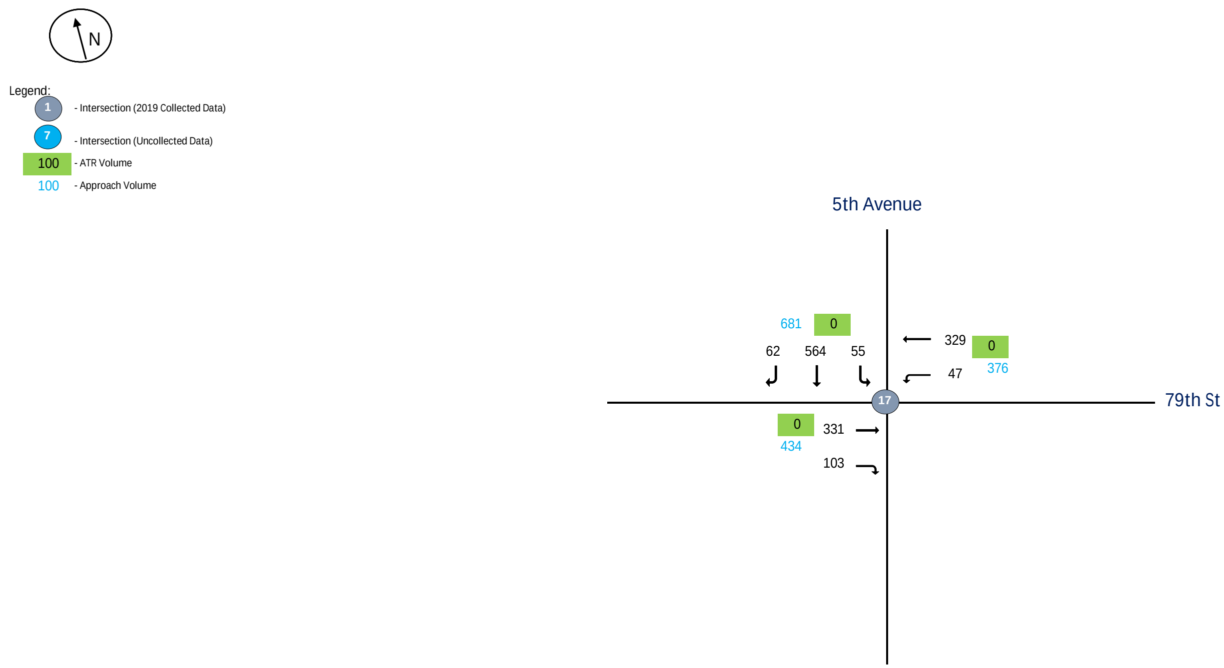
CBD Tolling
UE #1 - Traffic Flowmap
LN With Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
5th Ave
Madison Ave
Park Ave
Lexington Ave
3rd Ave
2nd Ave
1st Ave
York Ave
Queensboro Bridge Exit
63rd Street
62nd Street
61st Street
60th Street
59th Street
Queensboro Bridge (Upper-NB)
Queensboro Bridge (Lower)
Queensboro Bridge (Upper-SB)

CBD Tolling
UE #2 - Traffic Flowmap
LN With Action

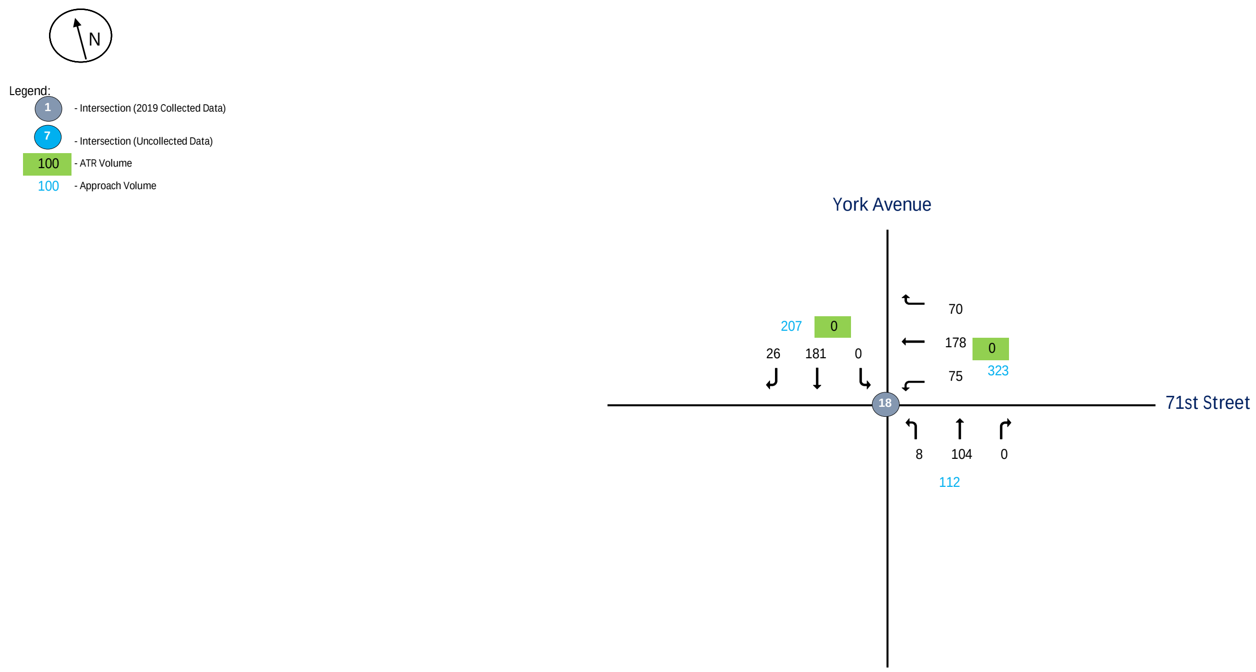



CBD Tolling
UE #3 - Traffic Flowmap
LN With Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
5th Avenue
888
0
419
472
238
650
53
0
16
66th St
703
703
0
638
65
15
65th St
852
652
0
200
5th Avenue

CBD Tolling
UE #3 - Traffic Flowmap
LN With Action



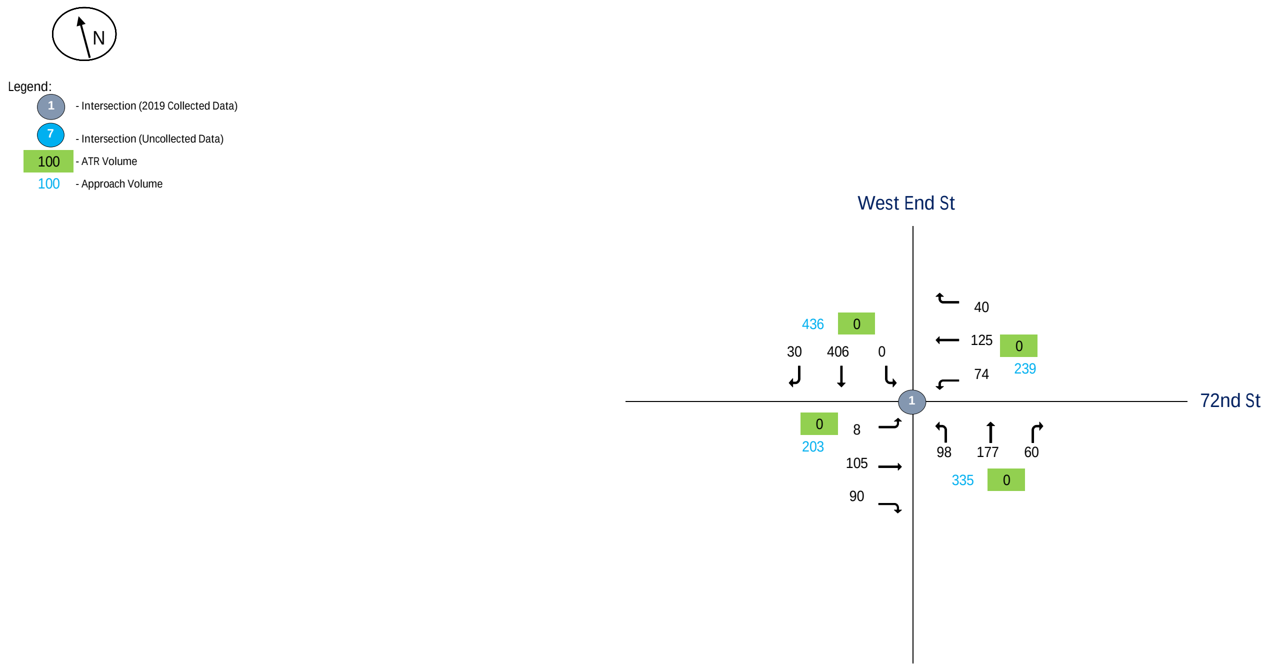
CBD Tolling
UE #4 - Traffic Flowmap
LN With Action



CBD Tolling

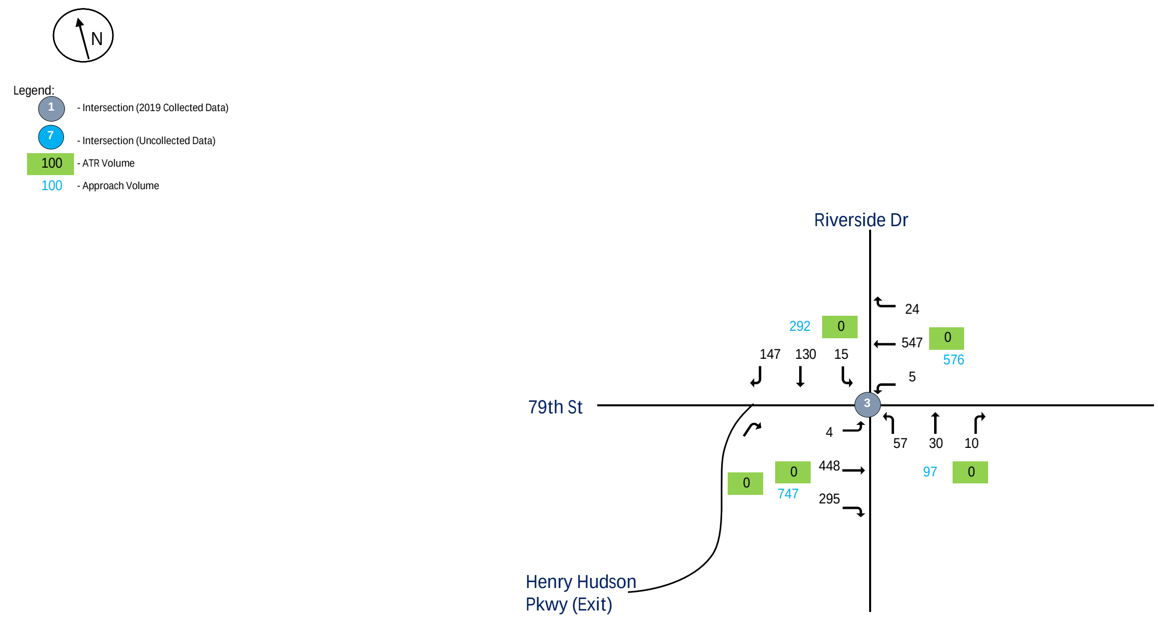
UW #1 - Traffic Flowmap

AM With Action

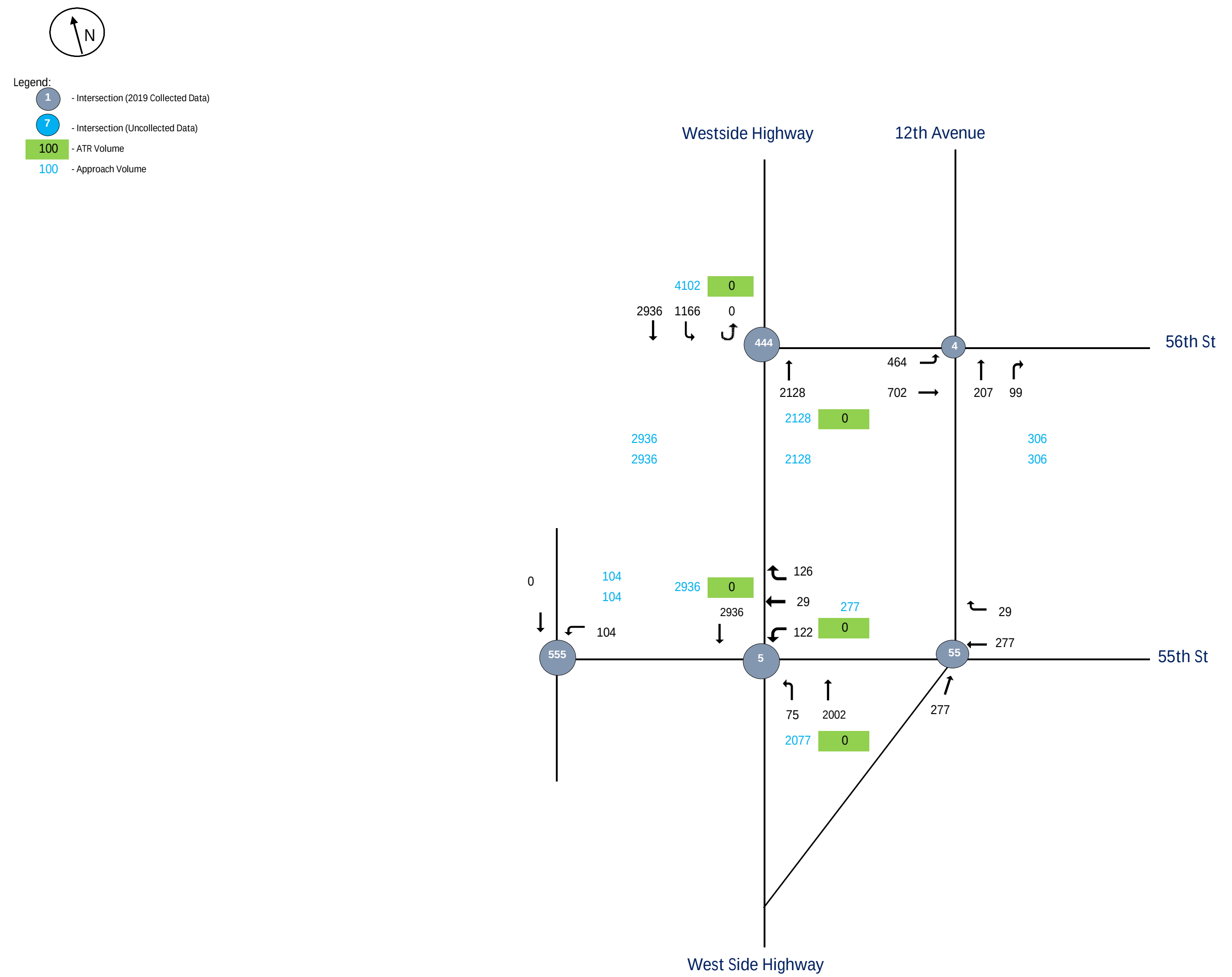


CBD Tolling
UW #2 - Traffic Flowmap
AM With Action

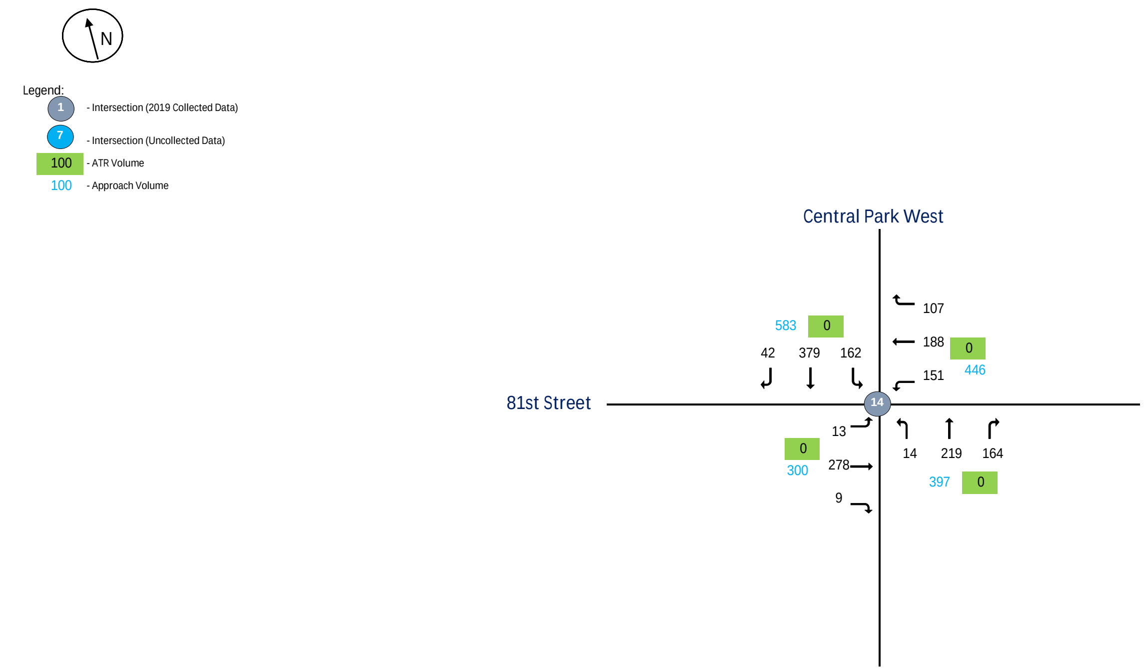
CBD Tolling
UW #3 - Traffic Flowmap
AM With Action



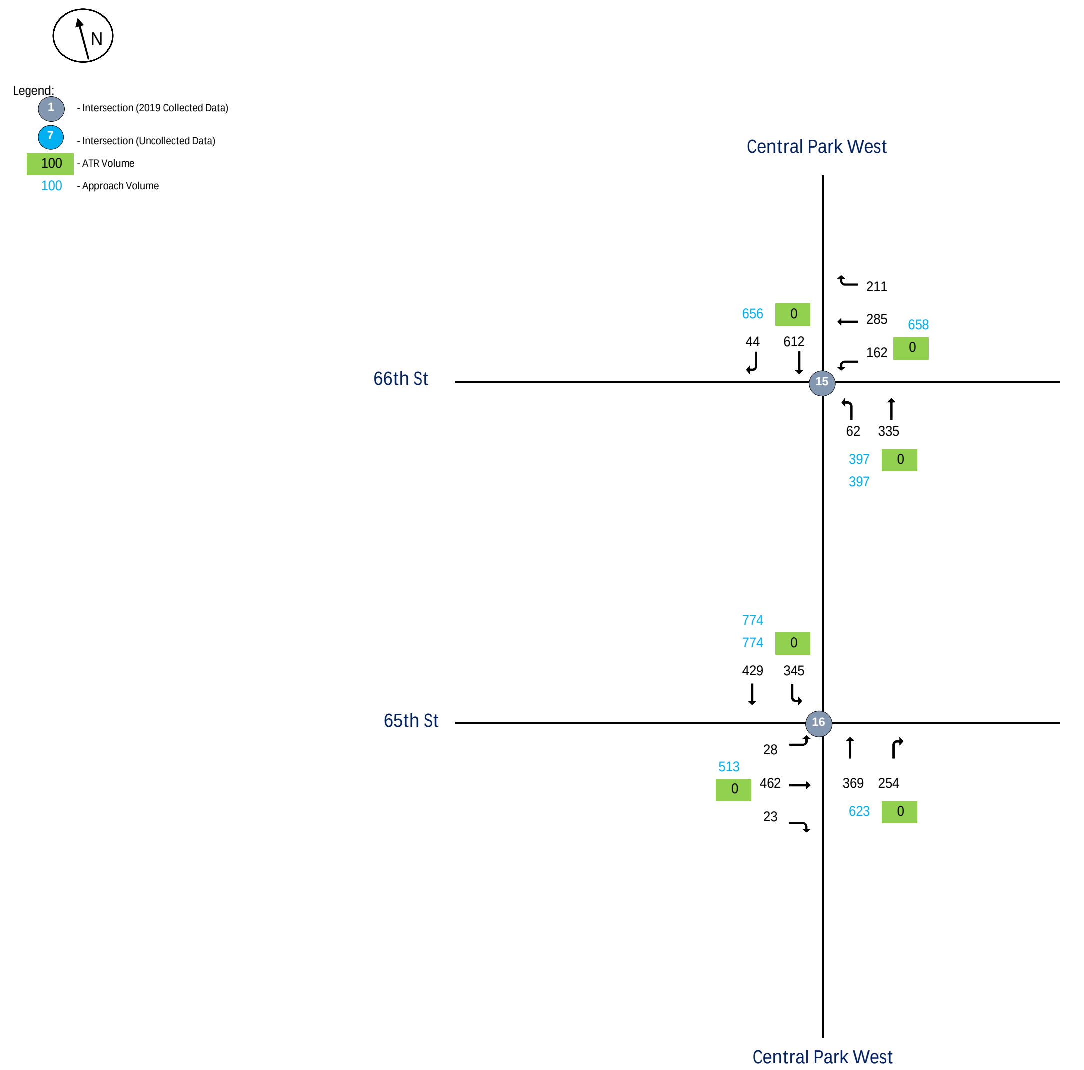
CBD Tolling
UW #4 - Traffic Flowmap
AM With Action



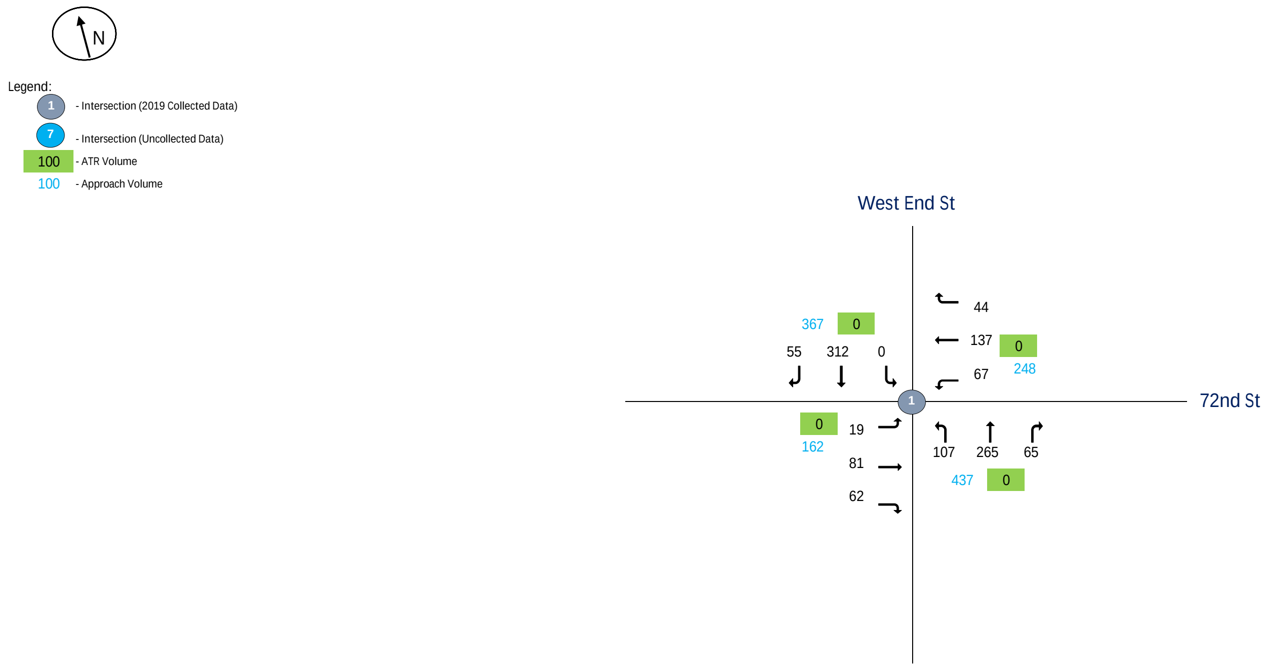
CBD Tolling
UW #5 - Traffic Flowmap
AM With Action



CBD Tolling
UW #6 - Traffic Flowmap
AM With Action

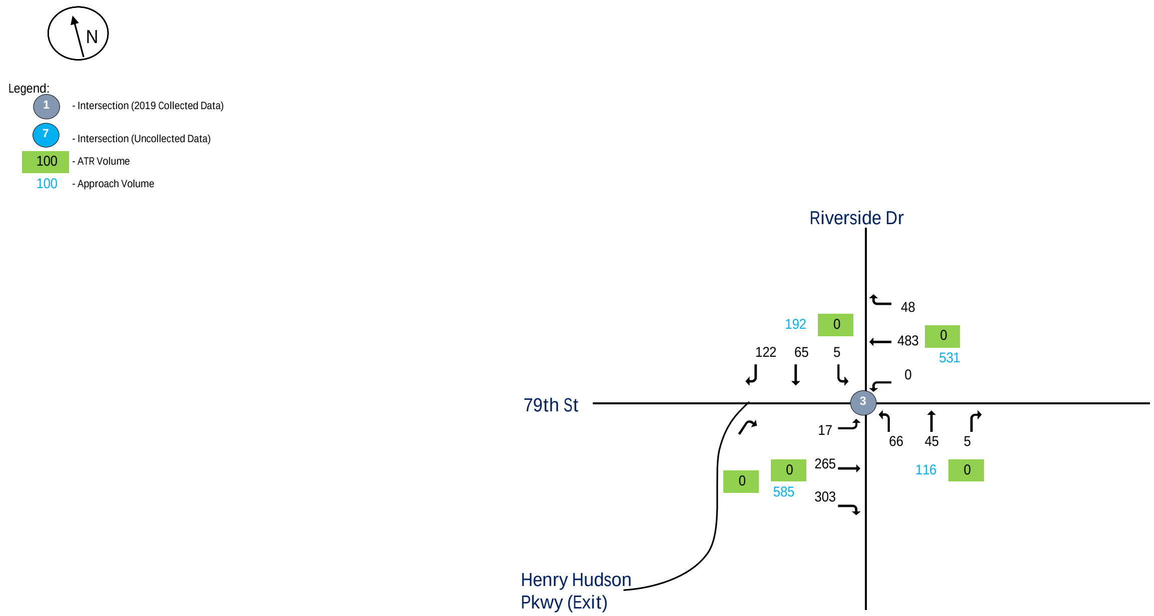


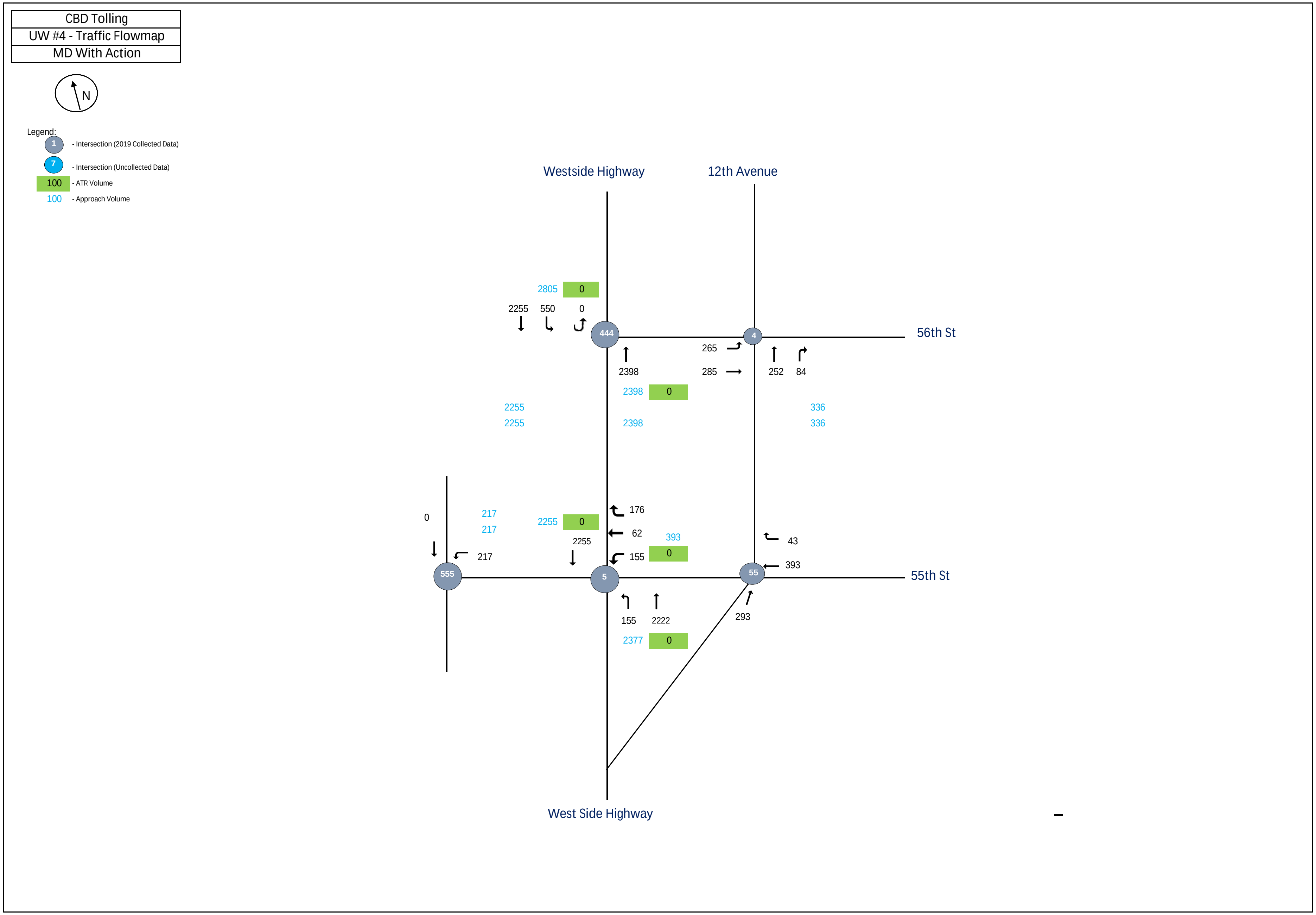
CBD Tolling
UW #1 - Traffic Flowmap
MD With Action



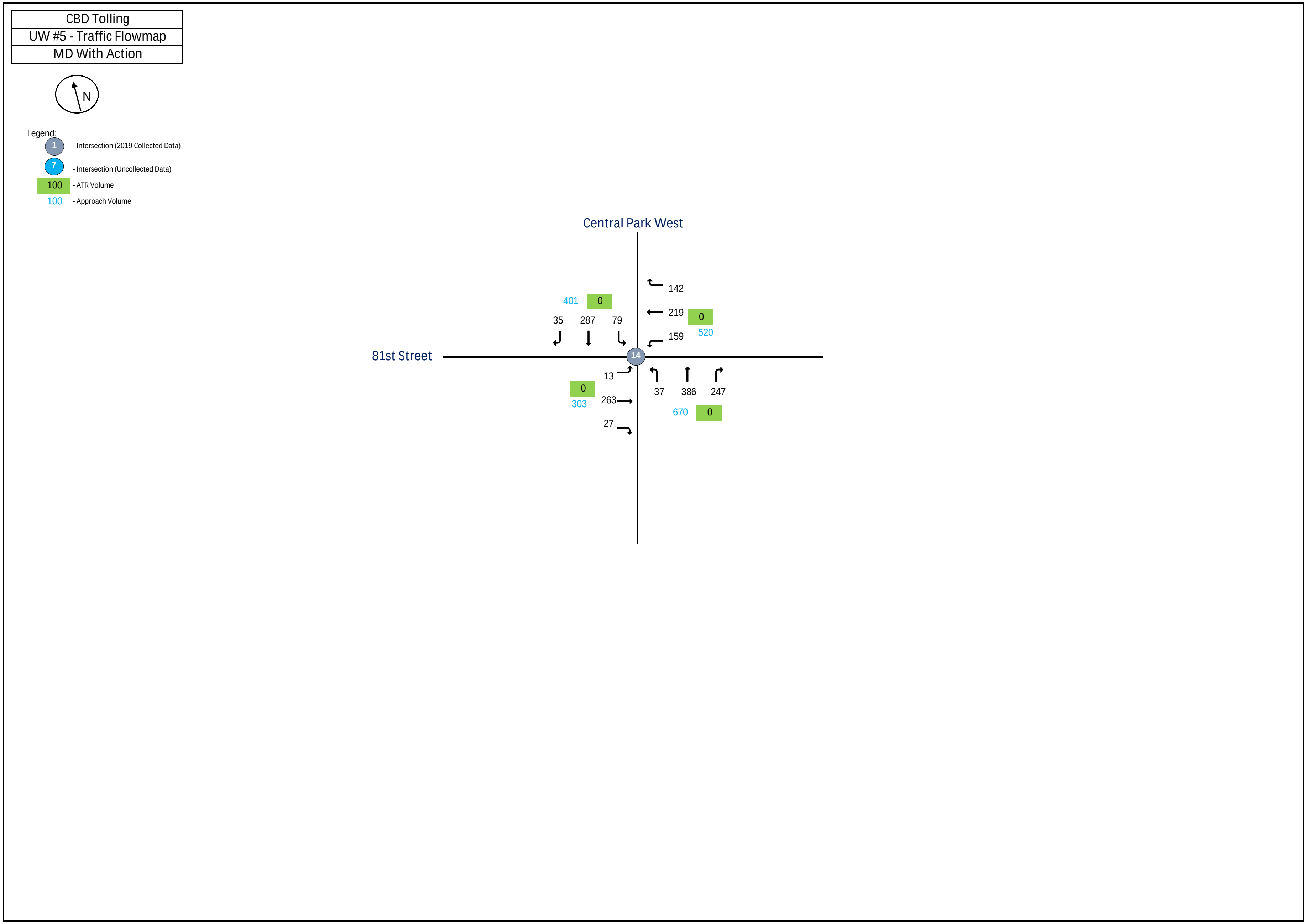
CBD Tolling
UW #2 - Traffic Flowmap
MD With Action

CBD Tolling
UW #3 - Traffic Flowmap
MD With Action

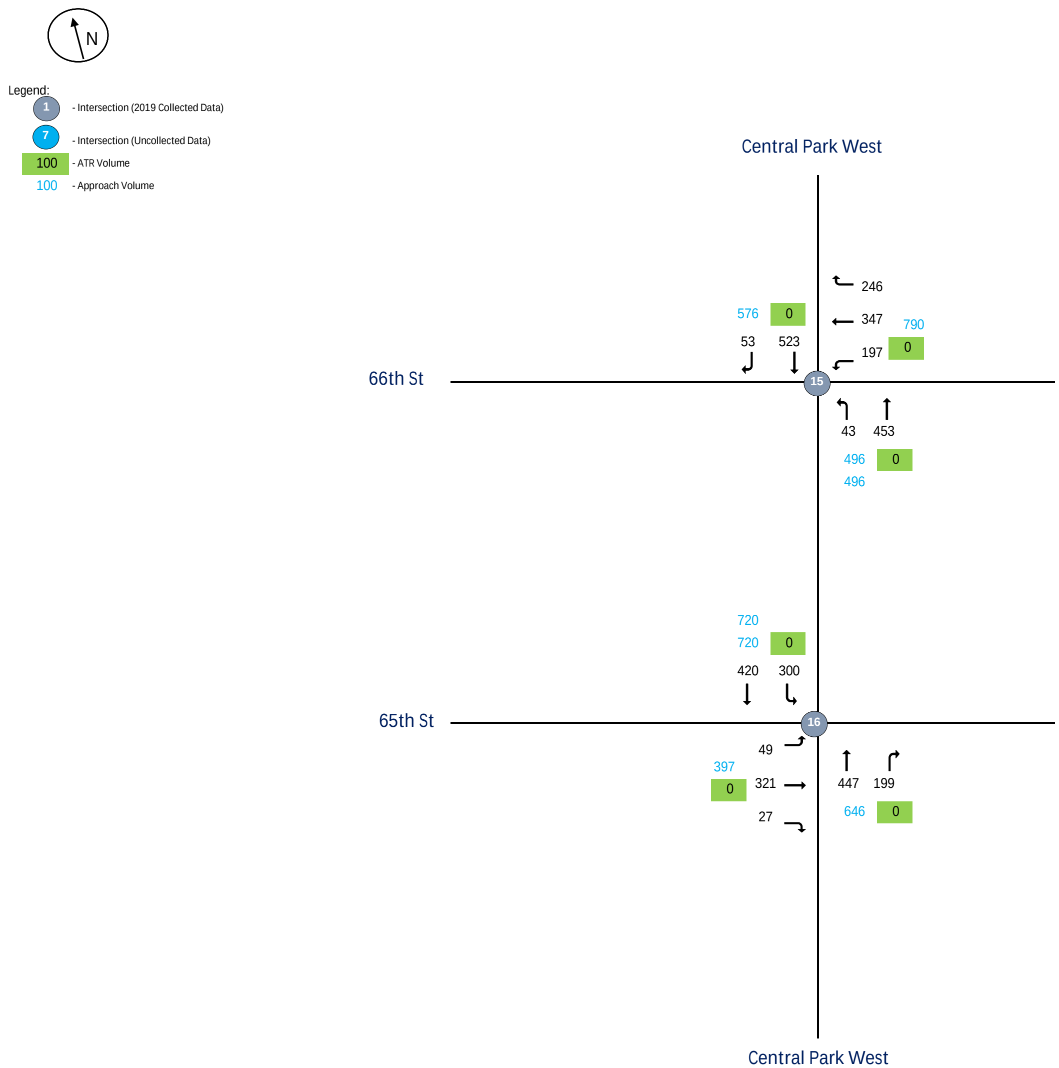




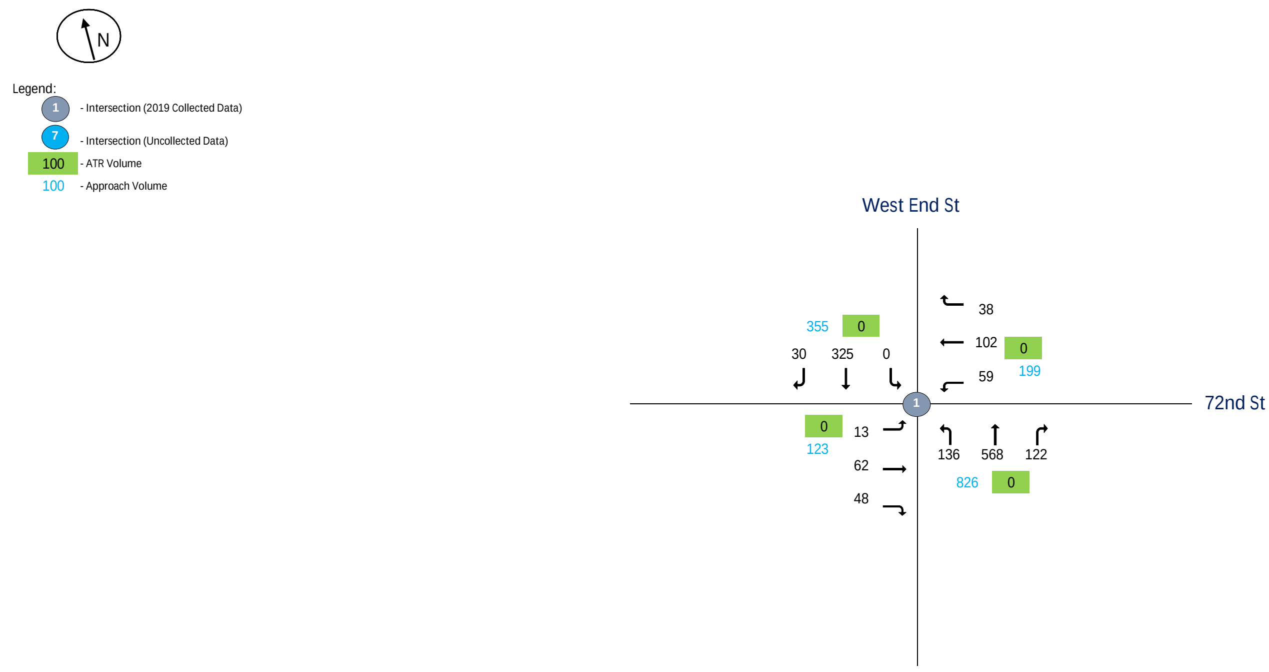
CBD Tolling
UW #4 - Traffic Flowmap
MD With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
2805
0
2255
550
0
444
4
265
285
2398
252
84
2398
0
2255
2255
2398
336
336
0
217
217
2255
0
176
62
393
2255
155
0
43
393
217
555
5
55
155
2222
293
2377
0

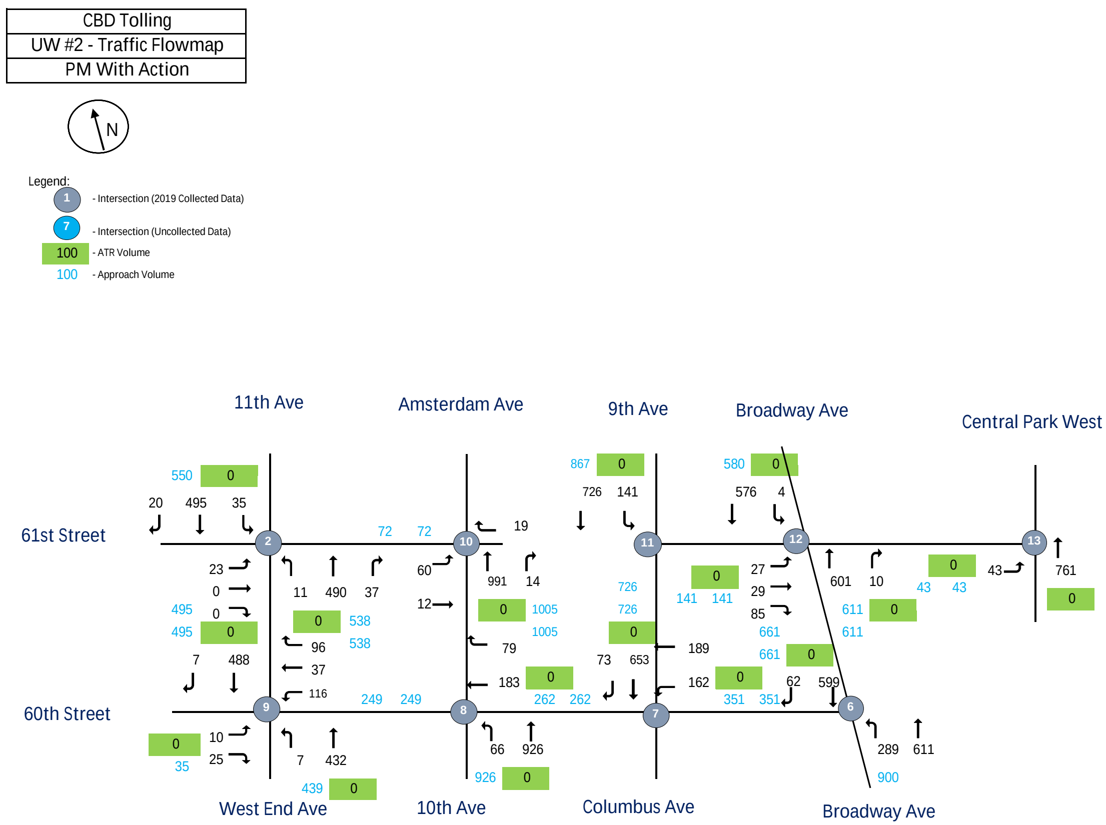

CBD Tolling
UW #5 - Traffic Flowmap
MD With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Central Park West
81st Street
14
401
0
35
287
79
142
219
0
520
159
13
0
303
263
27
37
386
247
670
0

CBD Tolling
UW #6 - Traffic Flowmap
MD With Action

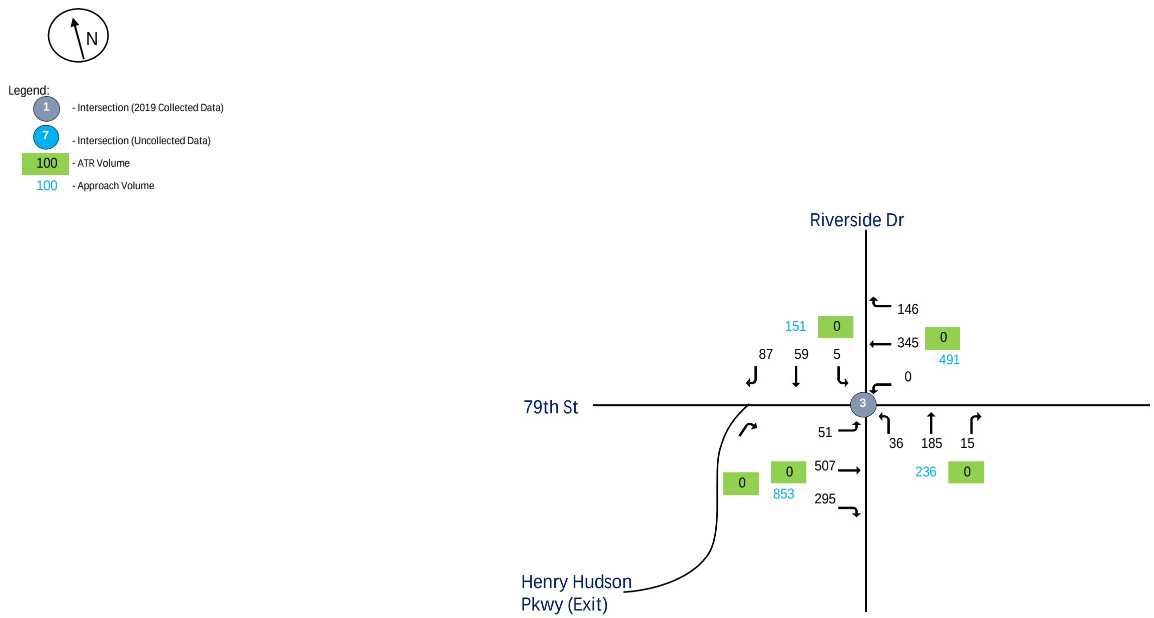


CBD Tolling
UW #1 - Traffic Flowmap
PM With Action

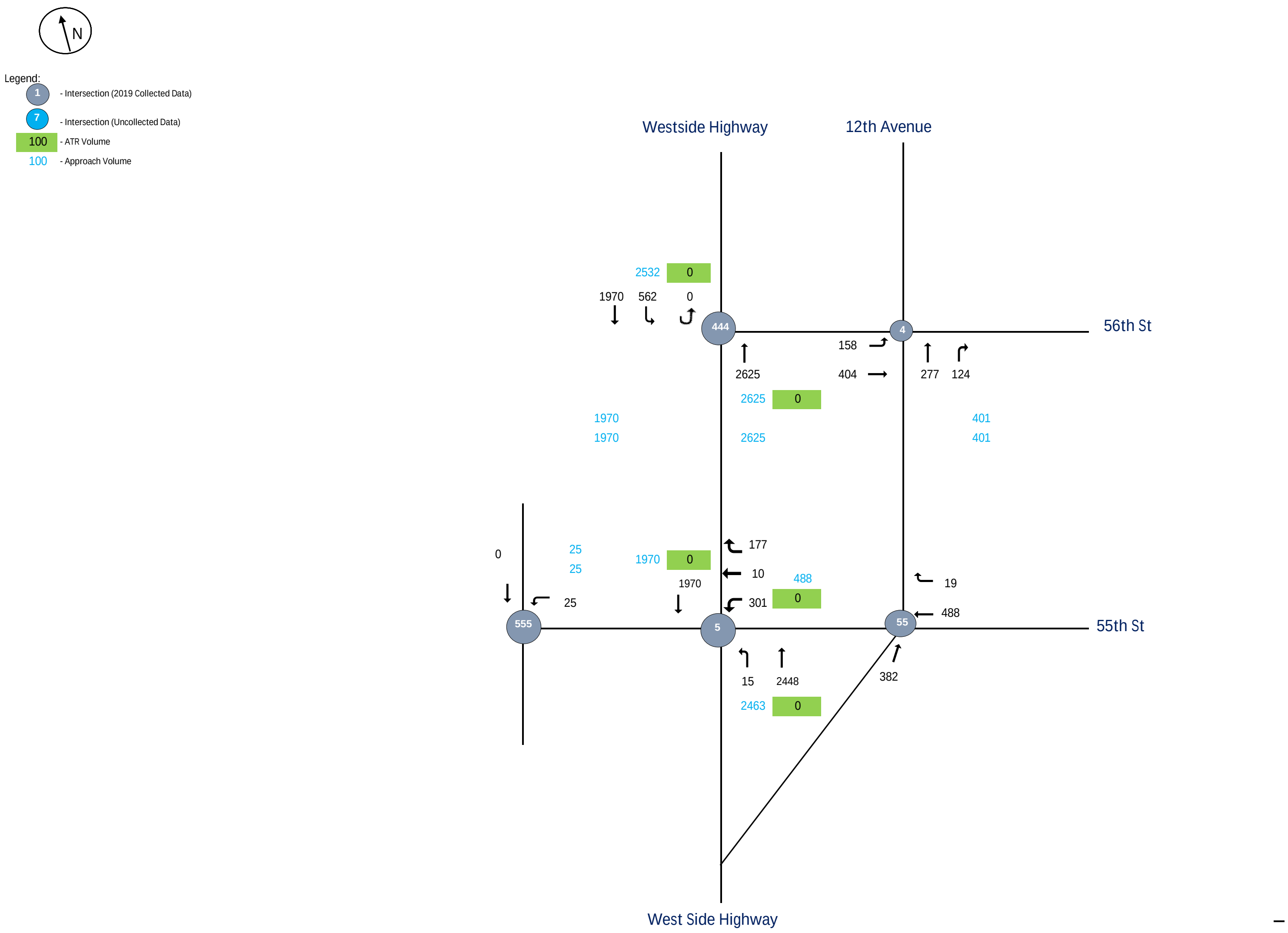



CBD Tolling
UW #2 - Traffic Flowmap
PM With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
11th Ave
Amsterdam Ave
9th Ave
Broadway Ave
Central Park West
61st Street
60th Street
West End Ave
10th Ave
Columbus Ave
Broadway Ave

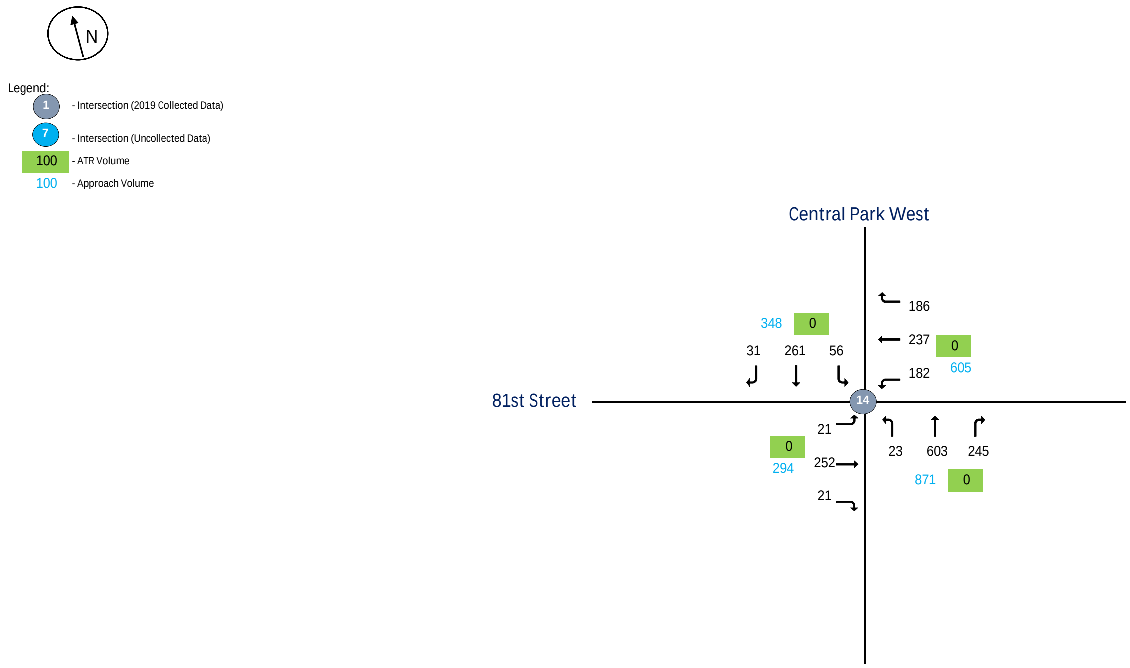
CBD Tolling
UW #3 - Traffic Flowmap
PM With Action



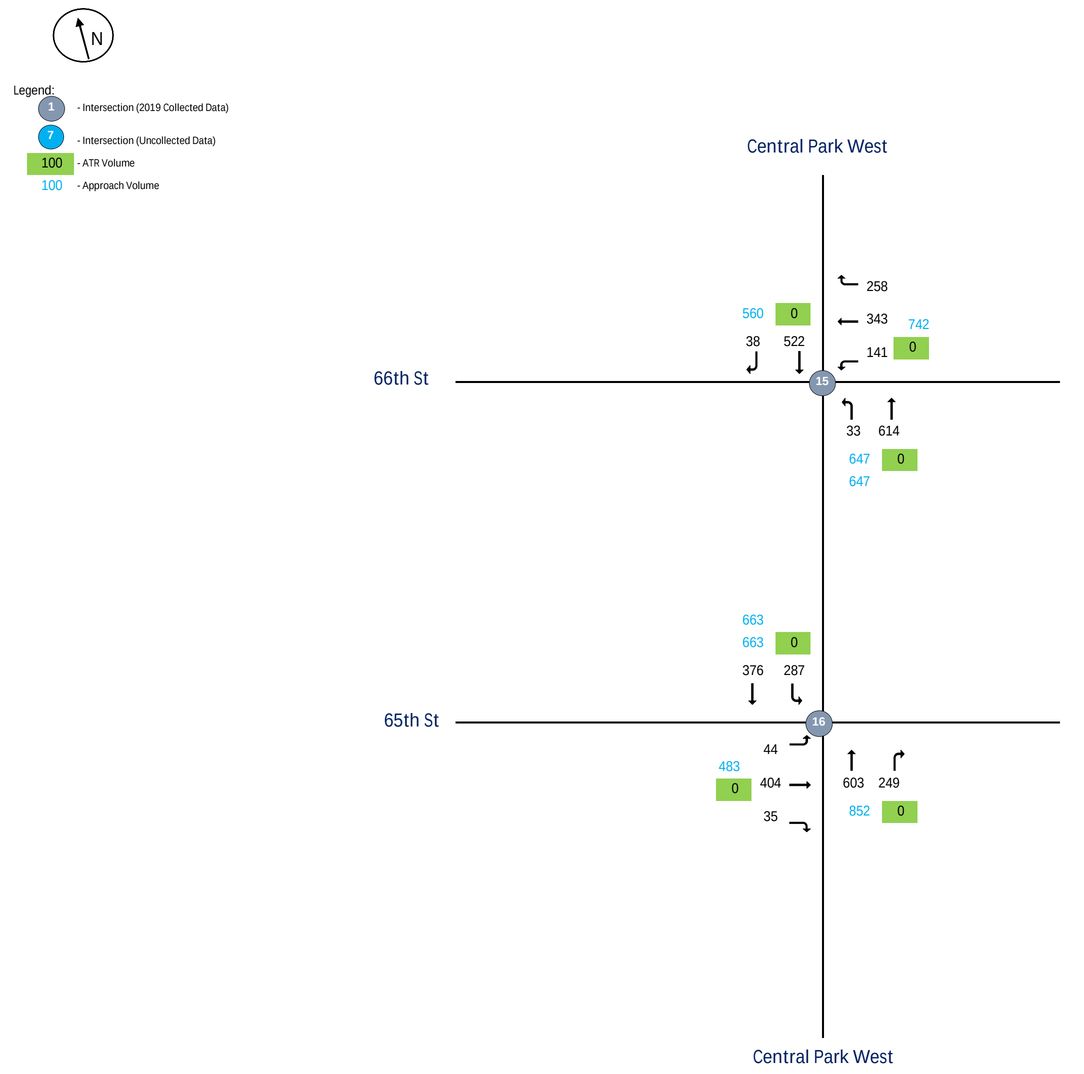
CBD Tolling
UW #4 - Traffic Flowmap
PM With Action



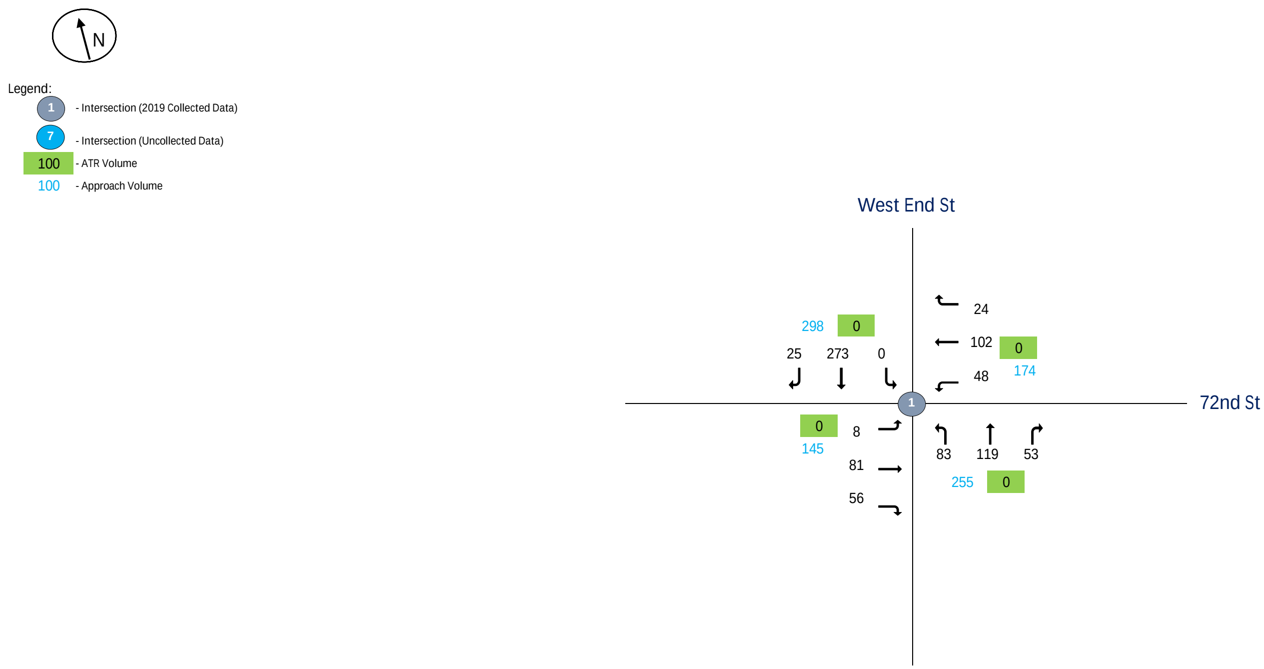
CBD Tolling
UW #5 - Traffic Flowmap
PM With Action



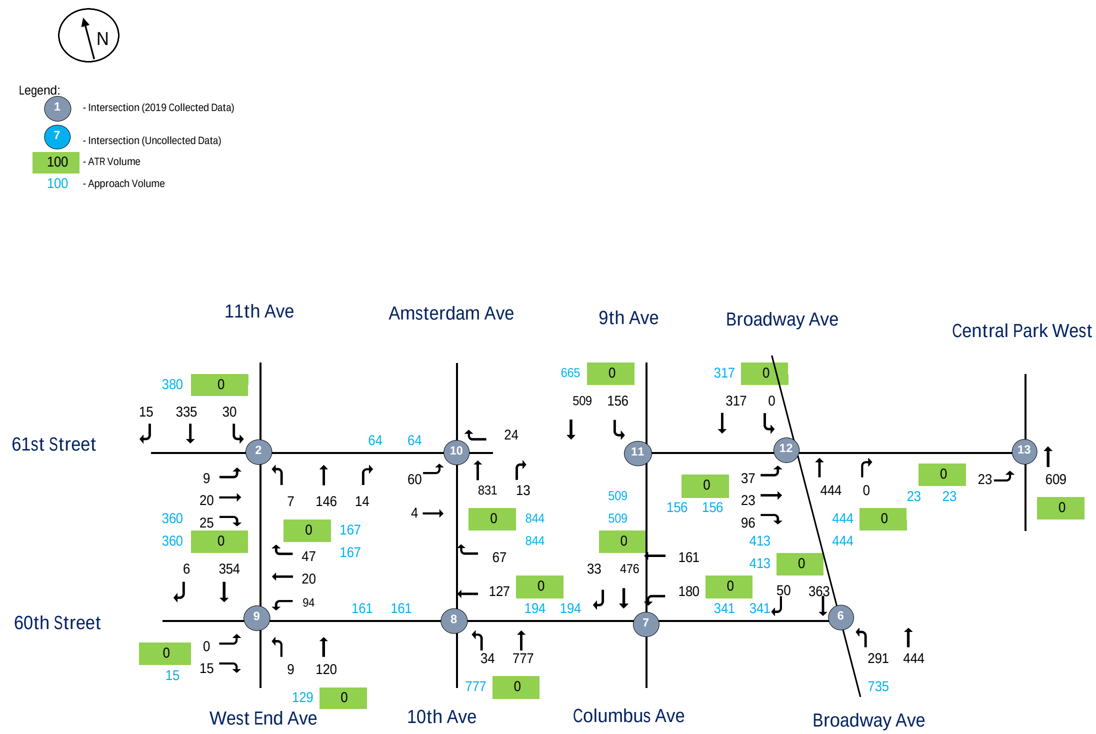
CBD Tolling
UW #6 - Traffic Flowmap
PM With Action



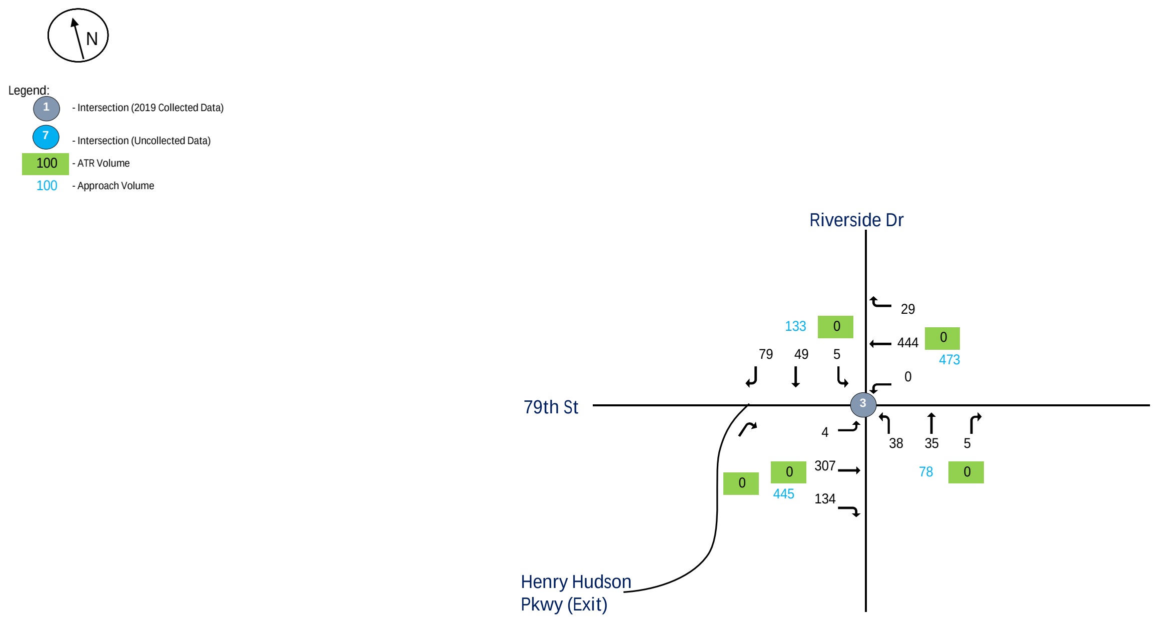
CBD Tolling
UW #1 - Traffic Flowmap
LN With Action

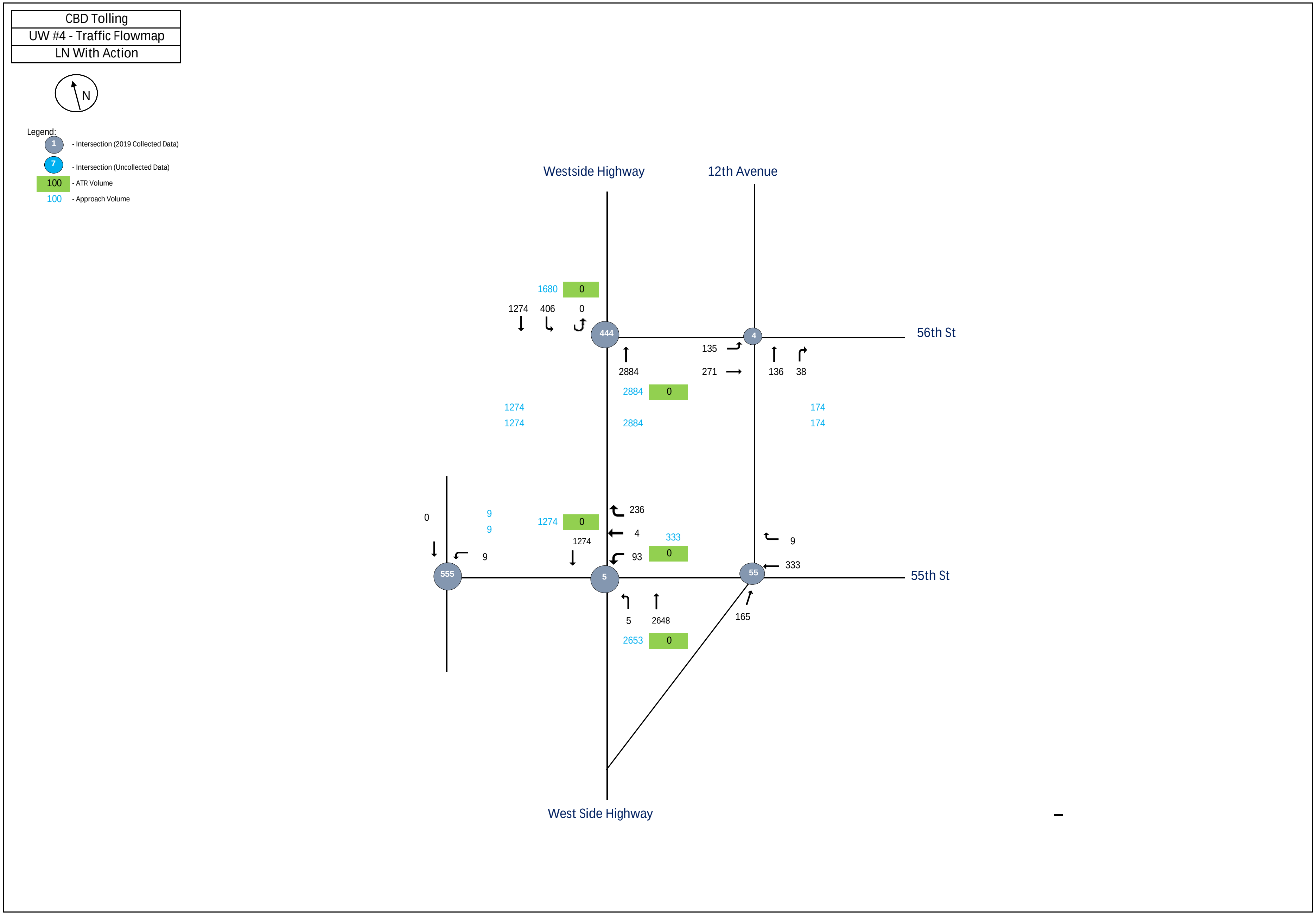


CBD Tolling
UW #2 - Traffic Flowmap
LN With Action



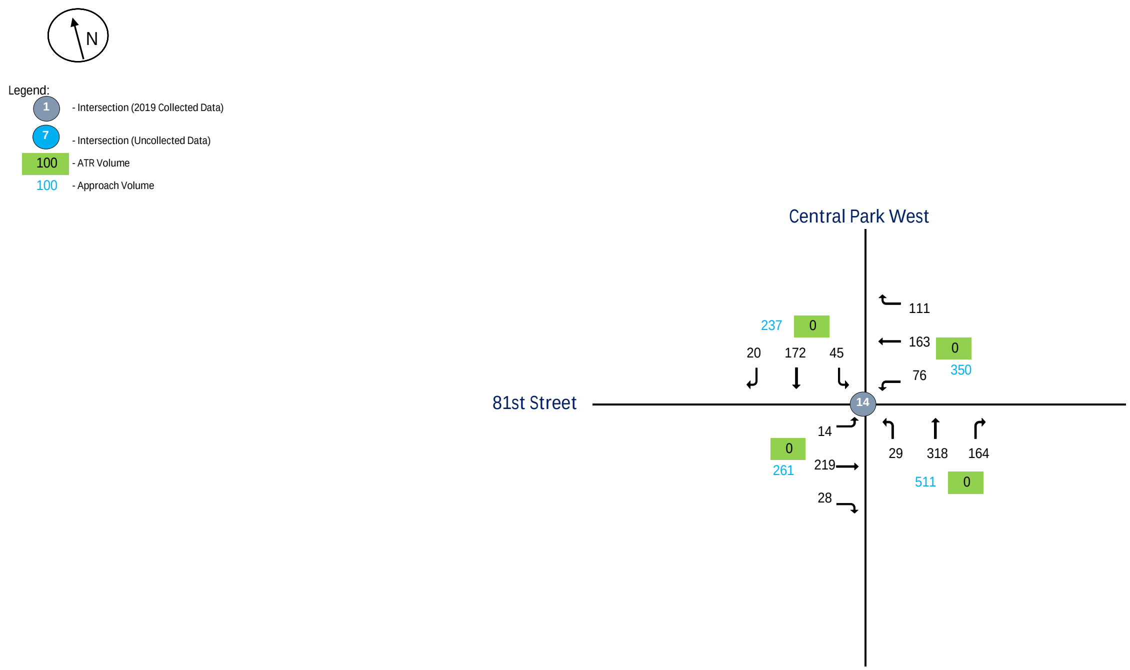
CBD Tolling
UW #3 - Traffic Flowmap
LN With Action

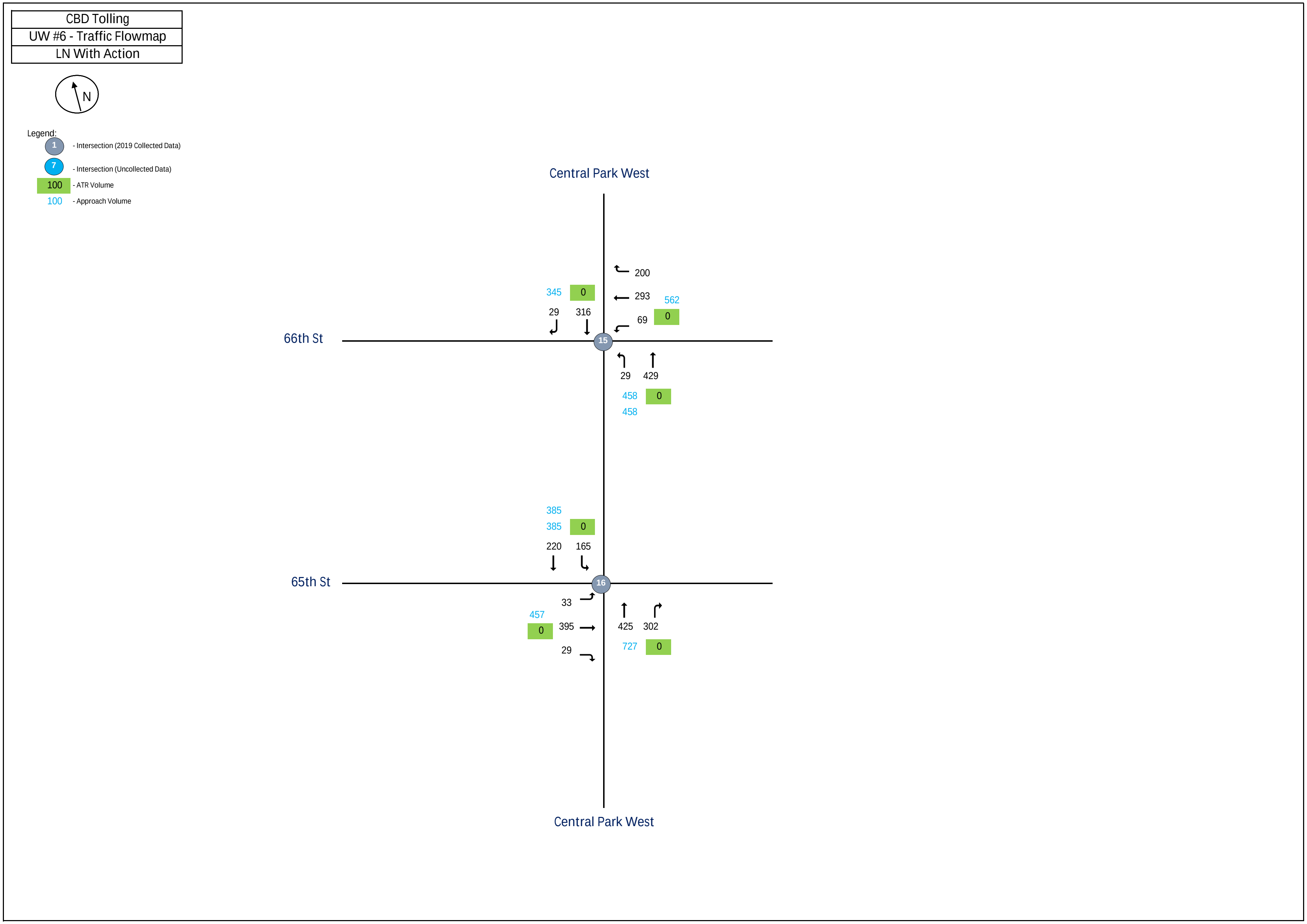




CBD Tolling
UW #4 - Traffic Flowmap
LN With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Westside Highway
12th Avenue
56th St
55th St
West Side Highway
1680
0
1274
406
0
444
4
135
271
2884
136
38
2884
0
1274
1274
2884
174
174
0
9
9
1274
0
236
4
1274
333
0
93
9
9
333
555
5
55
5
2648
165
2653
0

CBD Tolling
UW #5 - Traffic Flowmap
LN With Action



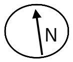


CBD Tolling
UW #6 - Traffic Flowmap
LN With Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Central Park West
66th St
200
293
562
0
69
345
0
29
316
15
29
429
458
0
458
385
385
0
220
165
65th St
16
33
457
0
395
29
425
302
727
0
Central Park West

CBD Tolling

LDR - Traffic Flowmap

AM Existing



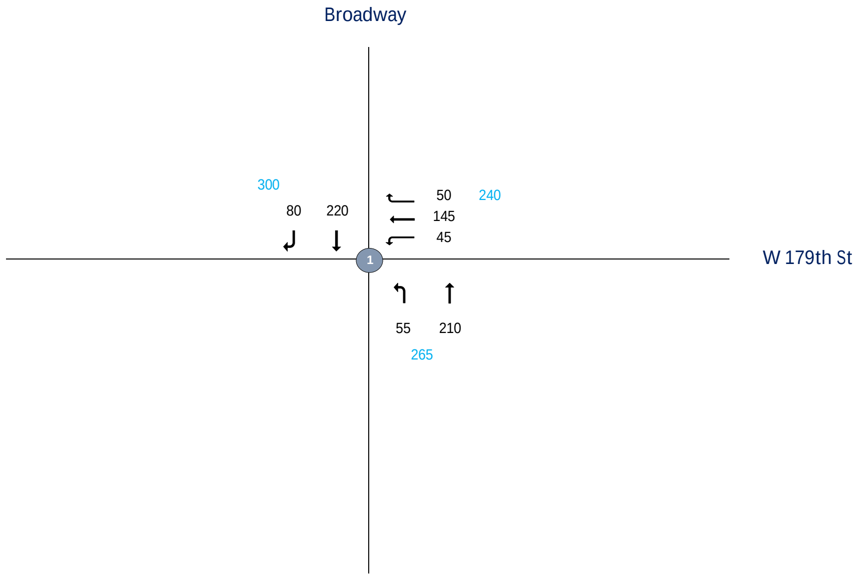
Legend:

1 - Intersection (2019 Collected Data)

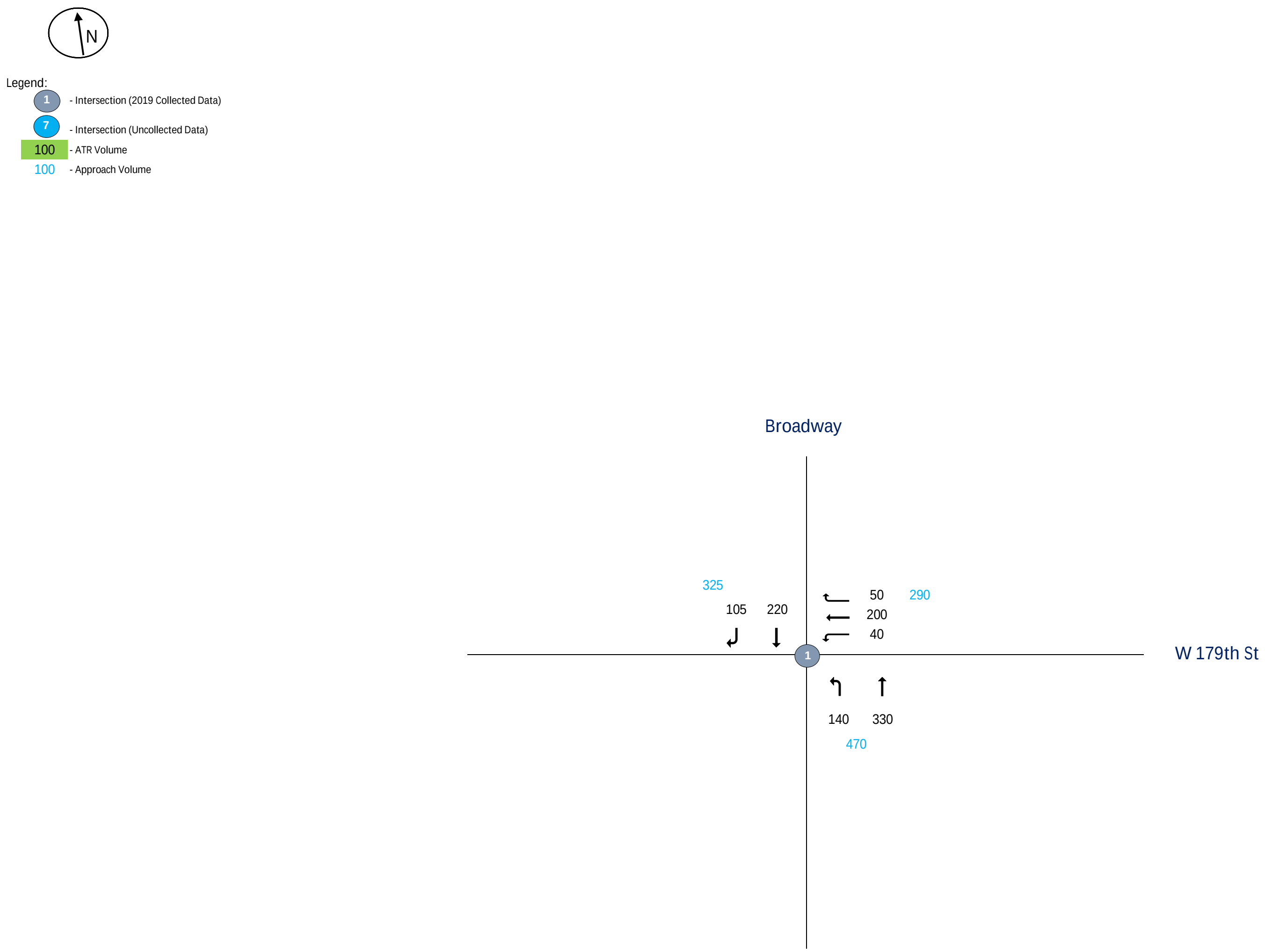
7 - Intersection (Uncollected Data)

100 - ATR Volume

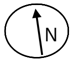
100 - Approach Volume



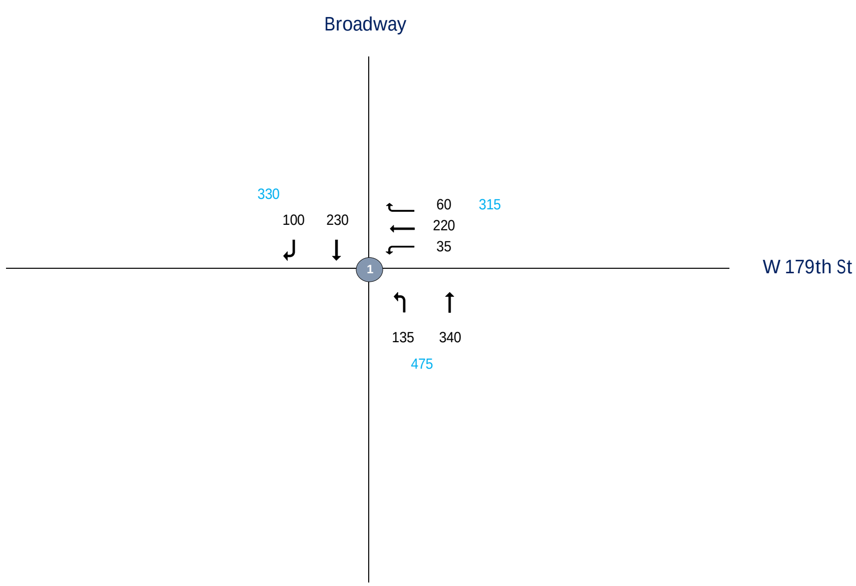
CBD Tolling
LDR - Traffic Flowmap
MD Existing



CBD Tolling
LDR - Traffic Flowmap
PM Existing

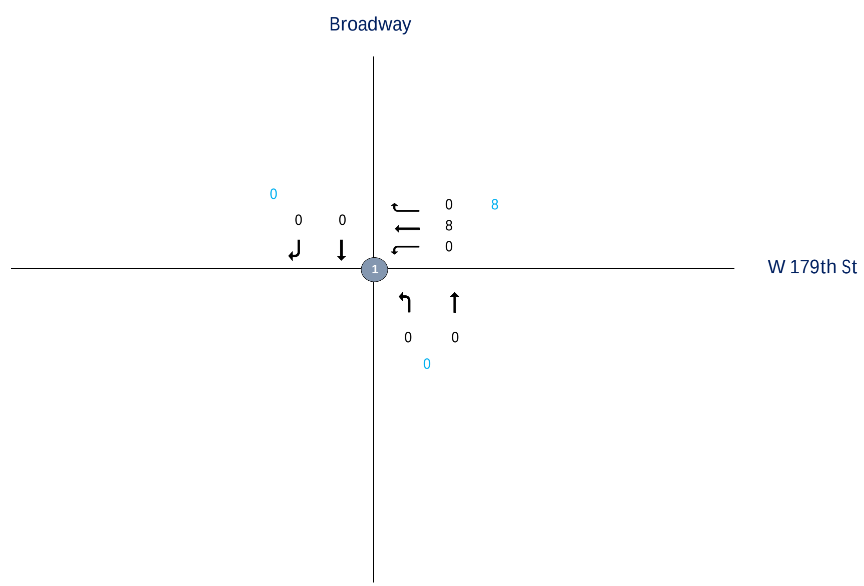


Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



CBD Tolling
LDR - Traffic Flowmap
AM No-Action Increment

Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



CBD Tolling

LDR - Traffic Flowmap

AM No-Action

N

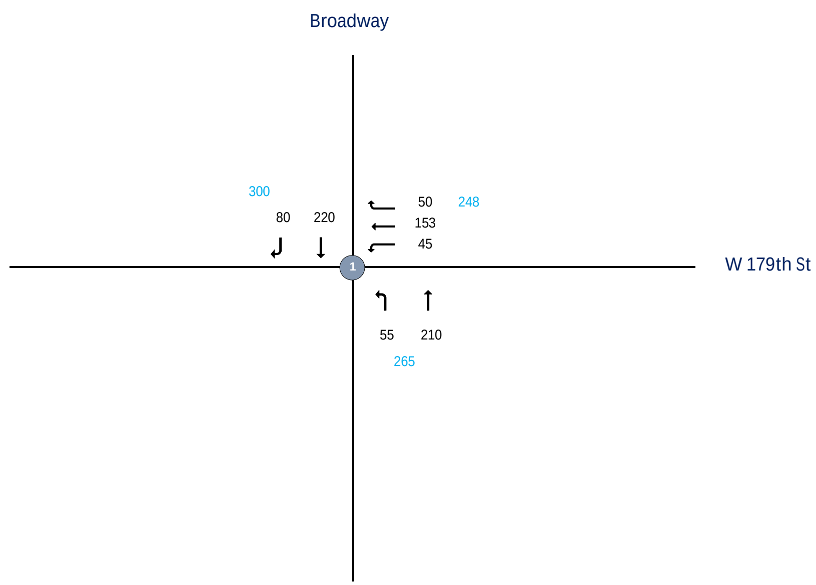
Legend:

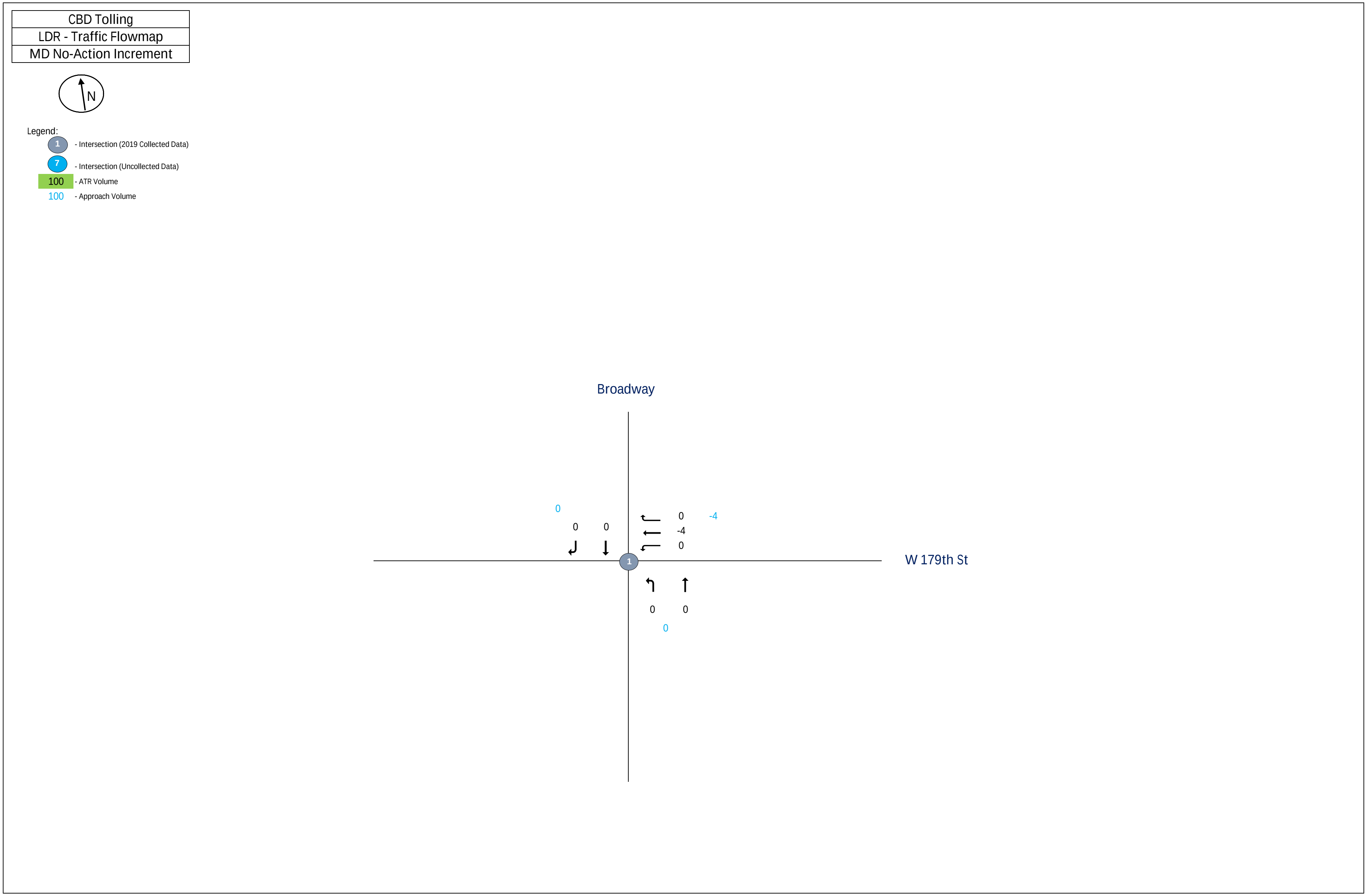
1 - Intersection (2019 Collected Data)

7 - Intersection (Uncollected Data)

100 - ATR Volume

100 - Approach Volume

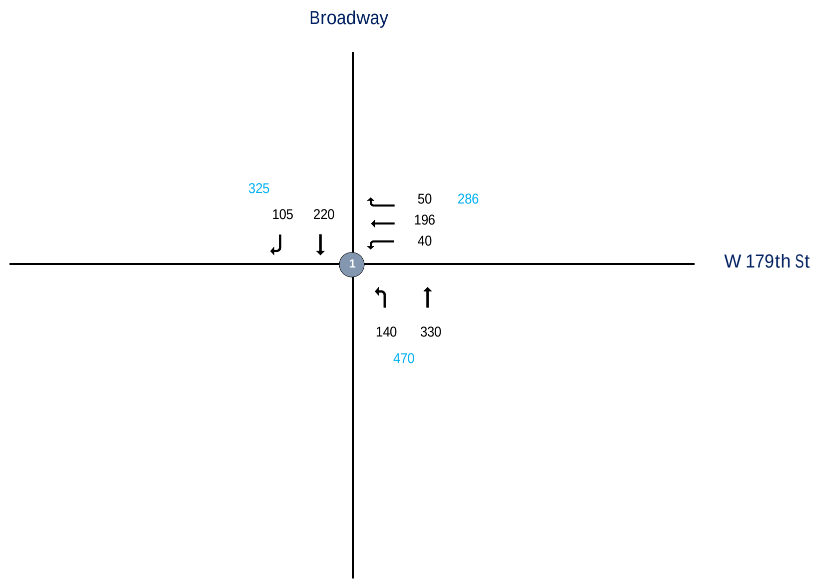



CBD Tolling
LDR - Traffic Flowmap
MD No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Broadway
W 179th St
0
0
0
0
-4
0
-4
0
1
0
0
0

CBD Tolling
LDR - Traffic Flowmap
MD No-Action

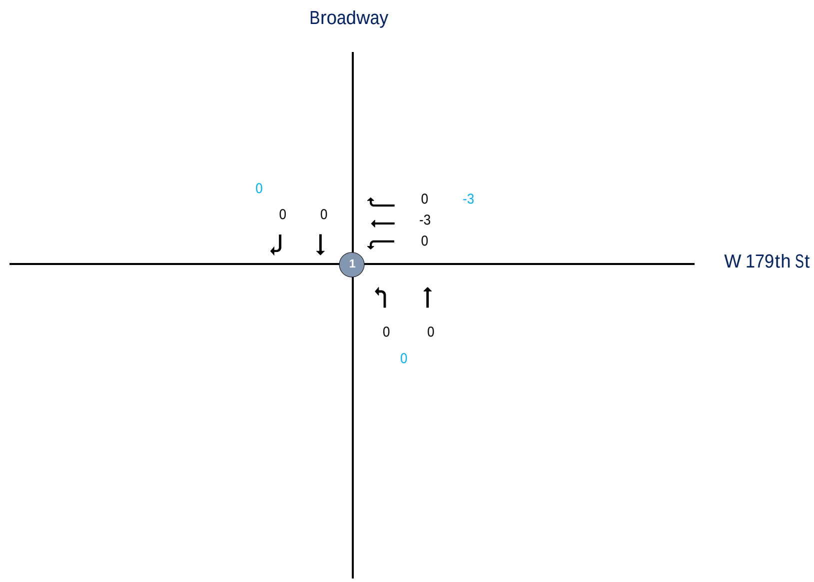
Legend:

- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume



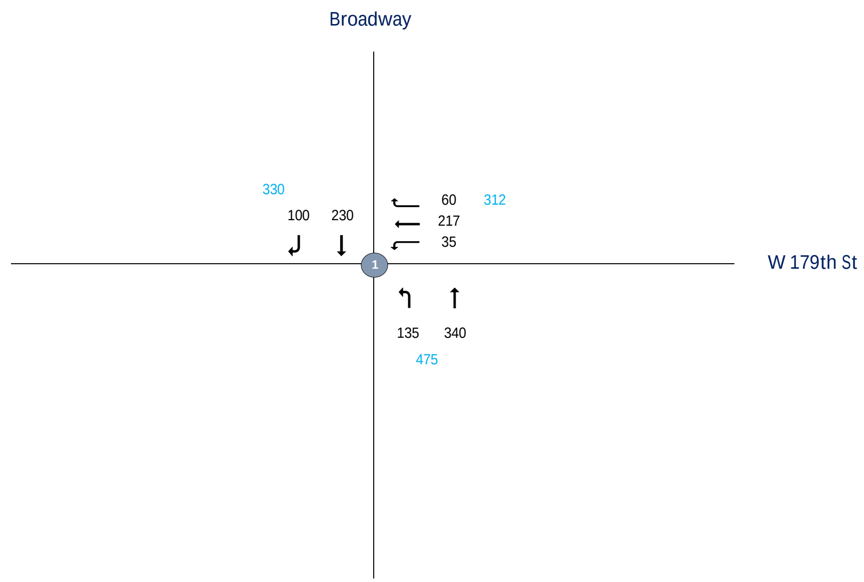
CBD Tolling
LDR - Traffic Flowmap
PM No-Action Increment

Legend:
- 1 - Intersection (2019 Collected Data)
- 7 - Intersection (Uncollected Data)
- 100 - ATR Volume
- 100 - Approach Volume

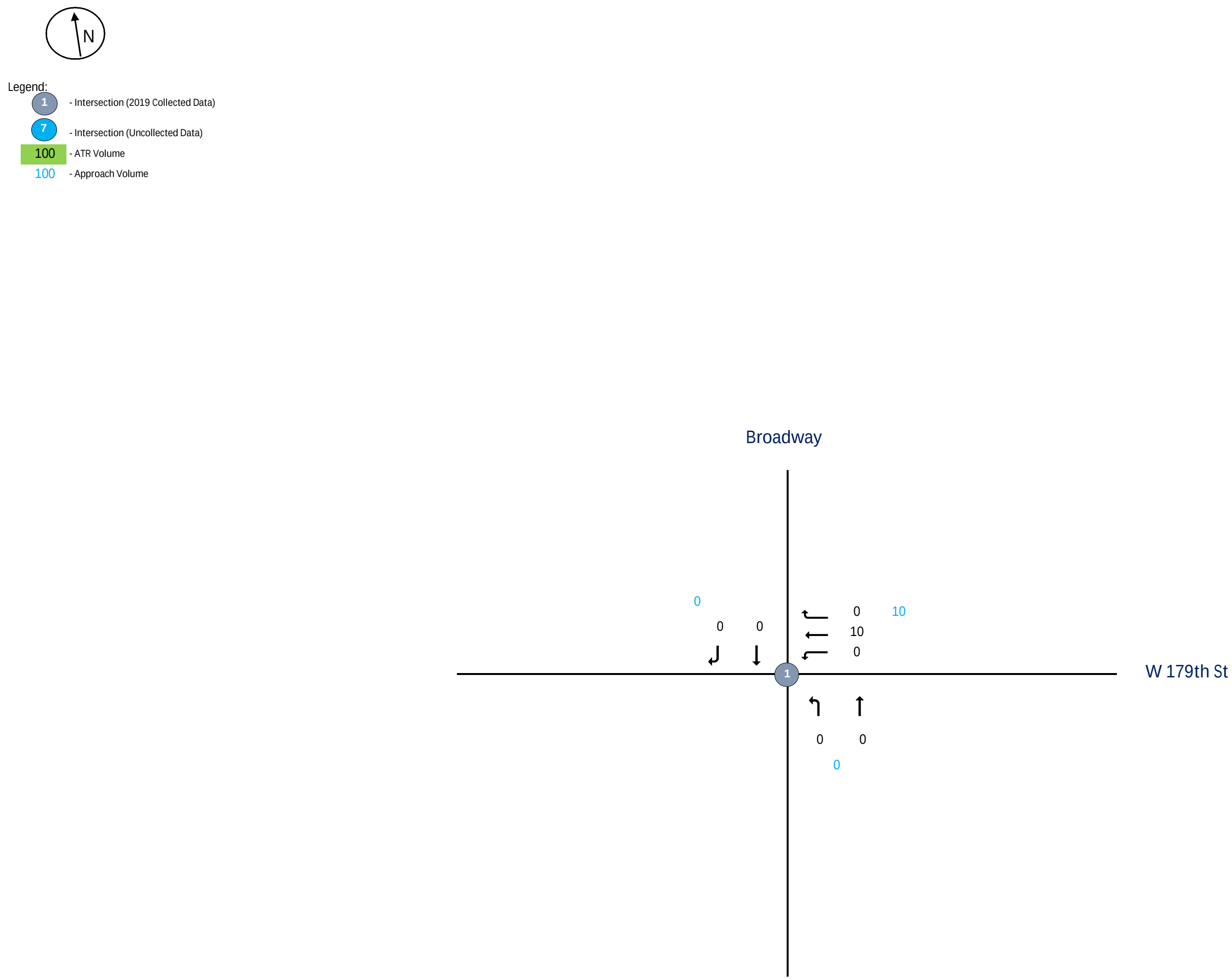


CBD Tolling
LDR - Traffic Flowmap
PM No-Action

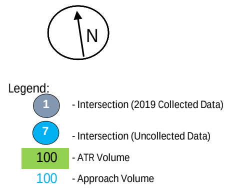
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume

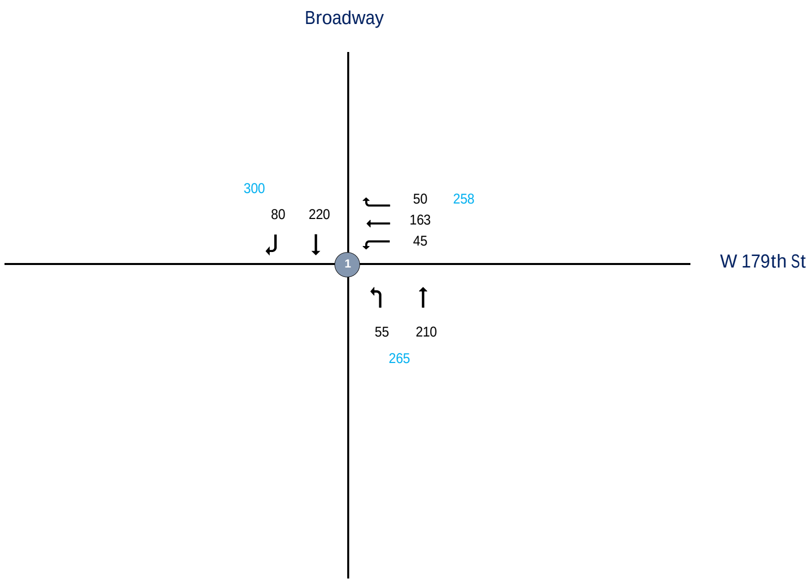


CBD Tolling
LDR - Traffic Flowmap
AM With-Action Increment



CBD Tolling
LDR - Traffic Flowmap
AM With-Action





CBD Tolling

LDR - Traffic Flowmap

MD With-Action Increment

N

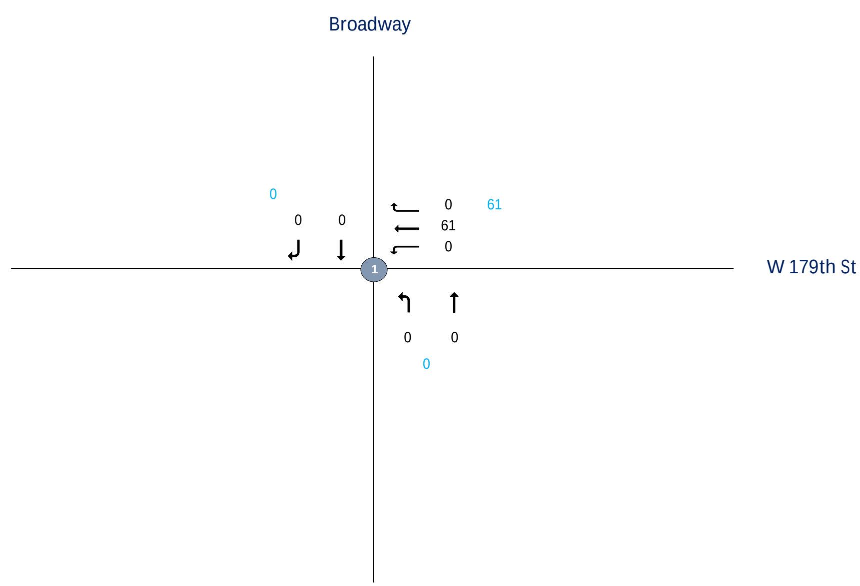
Legend:

1 - Intersection (2019 Collected Data)

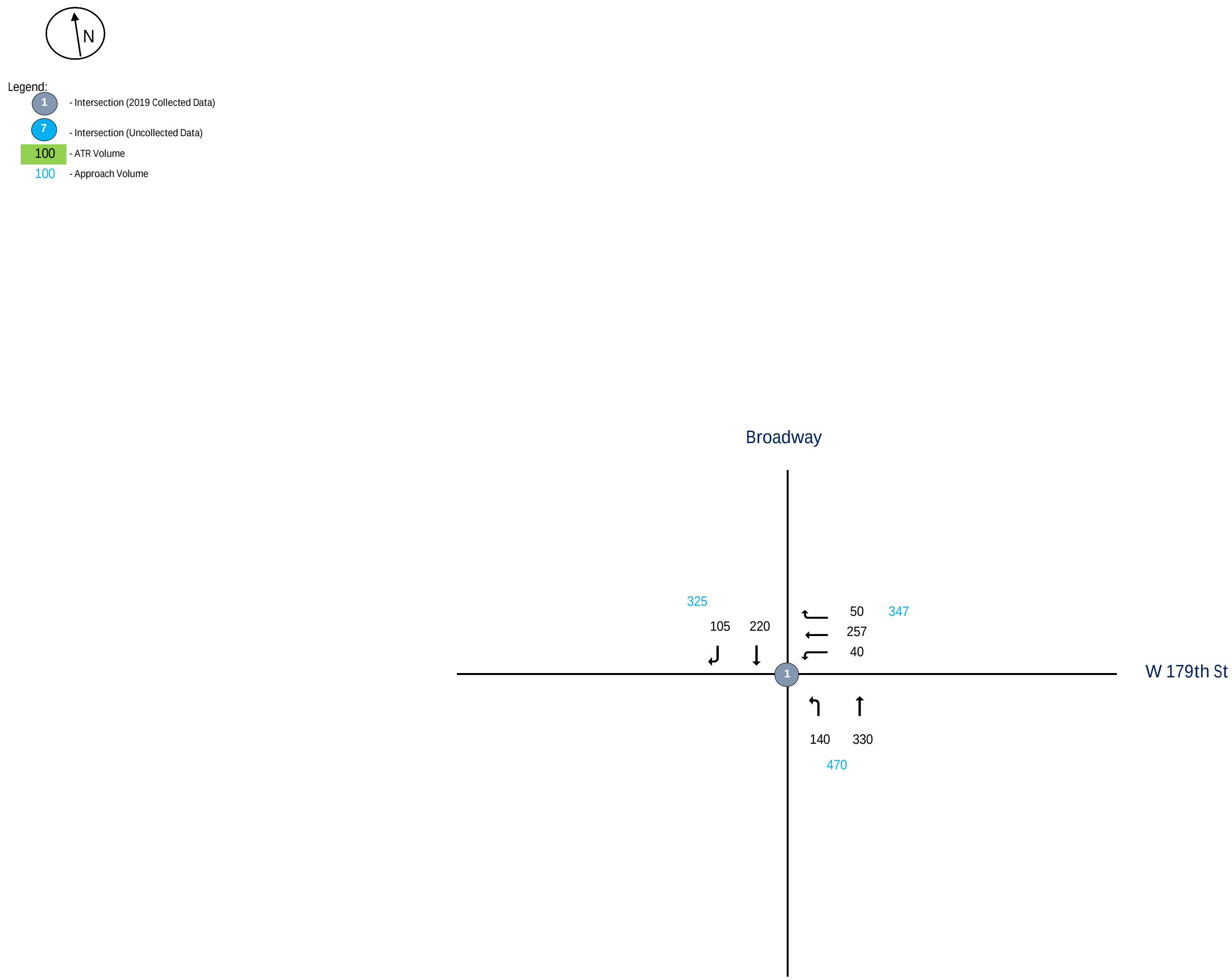
7 - Intersection (Uncollected Data)

100 - ATR Volume

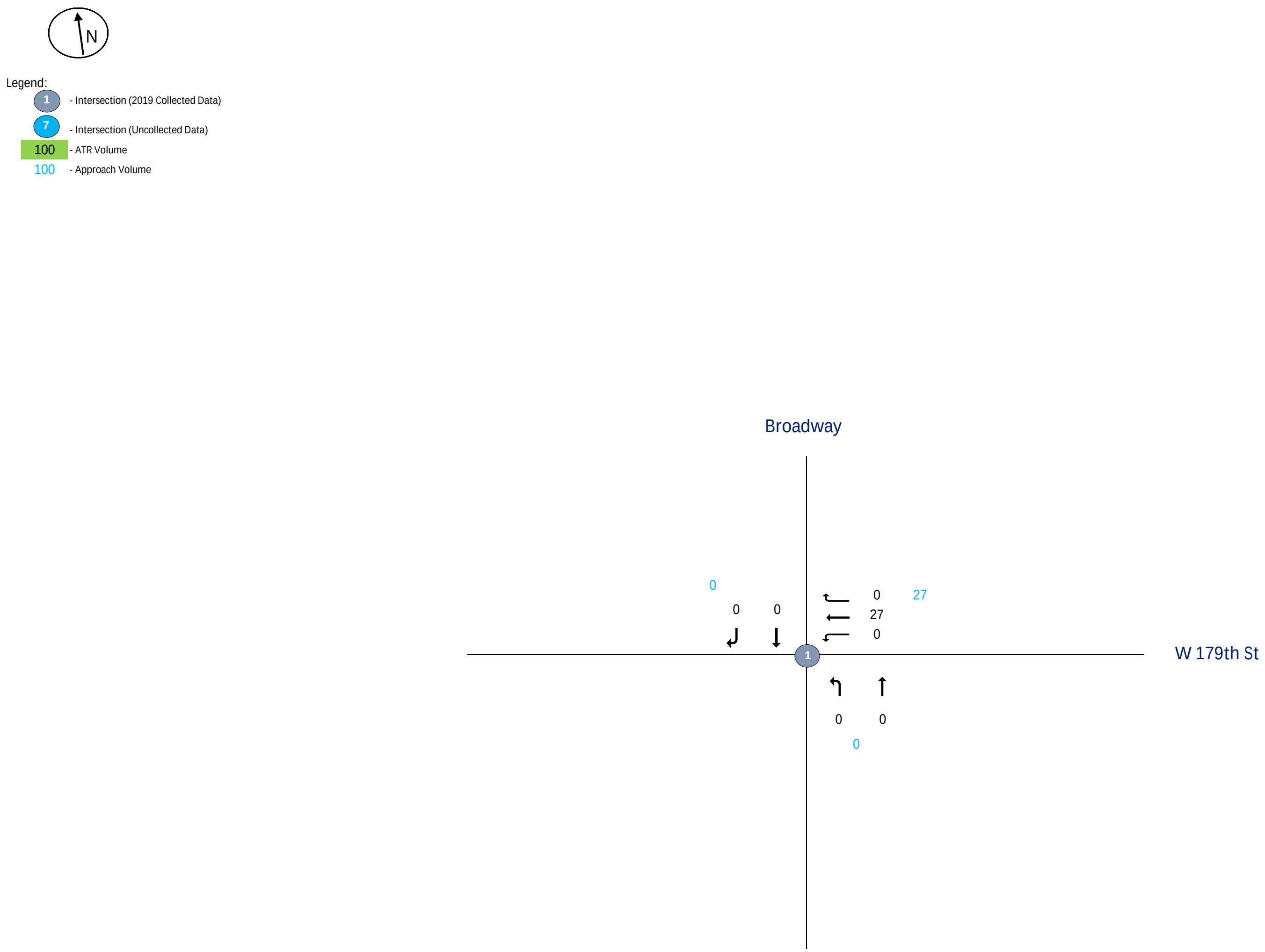
100 - Approach Volume



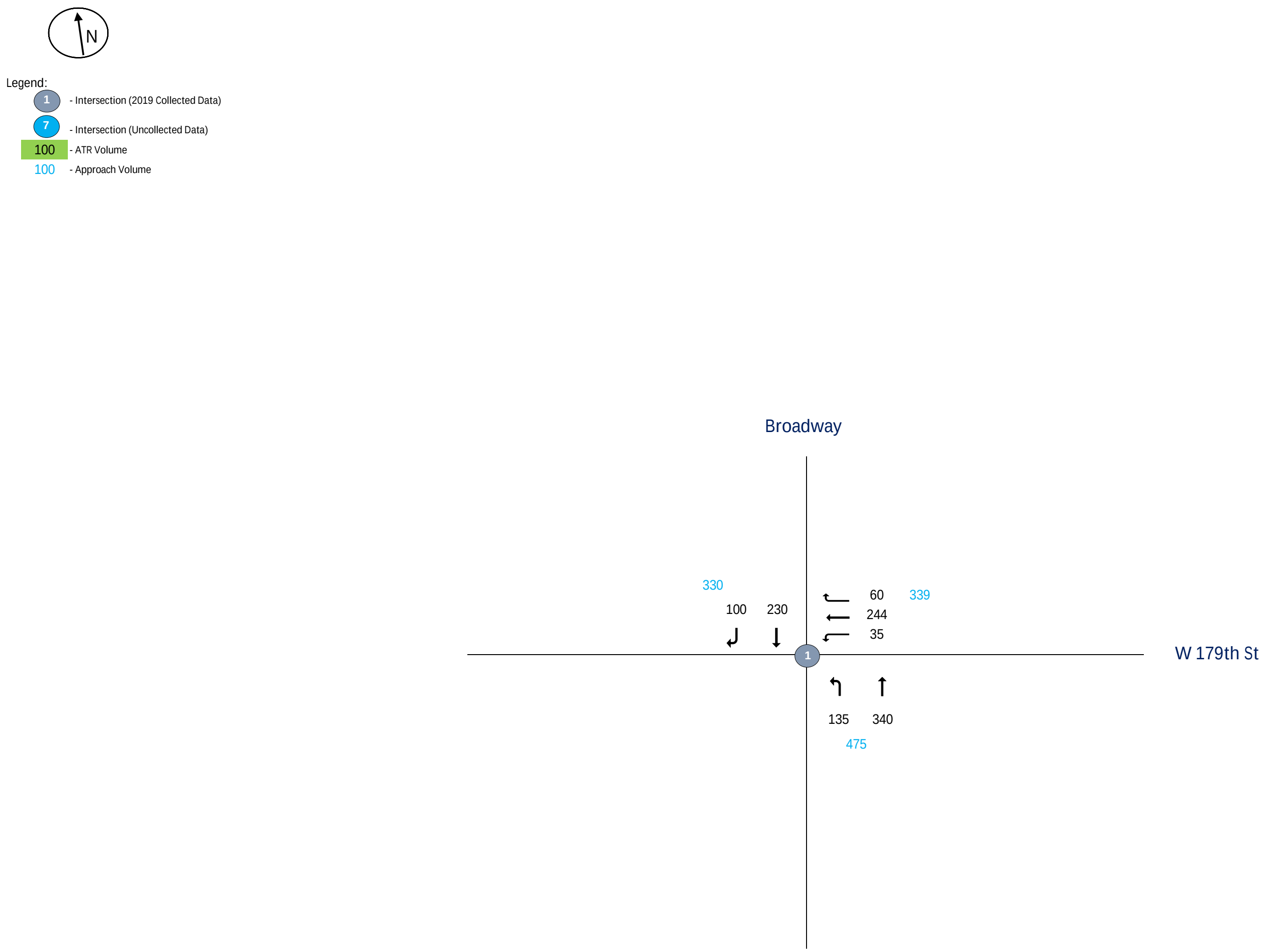
CBD Tolling
LDR - Traffic Flowmap
MD With-Action

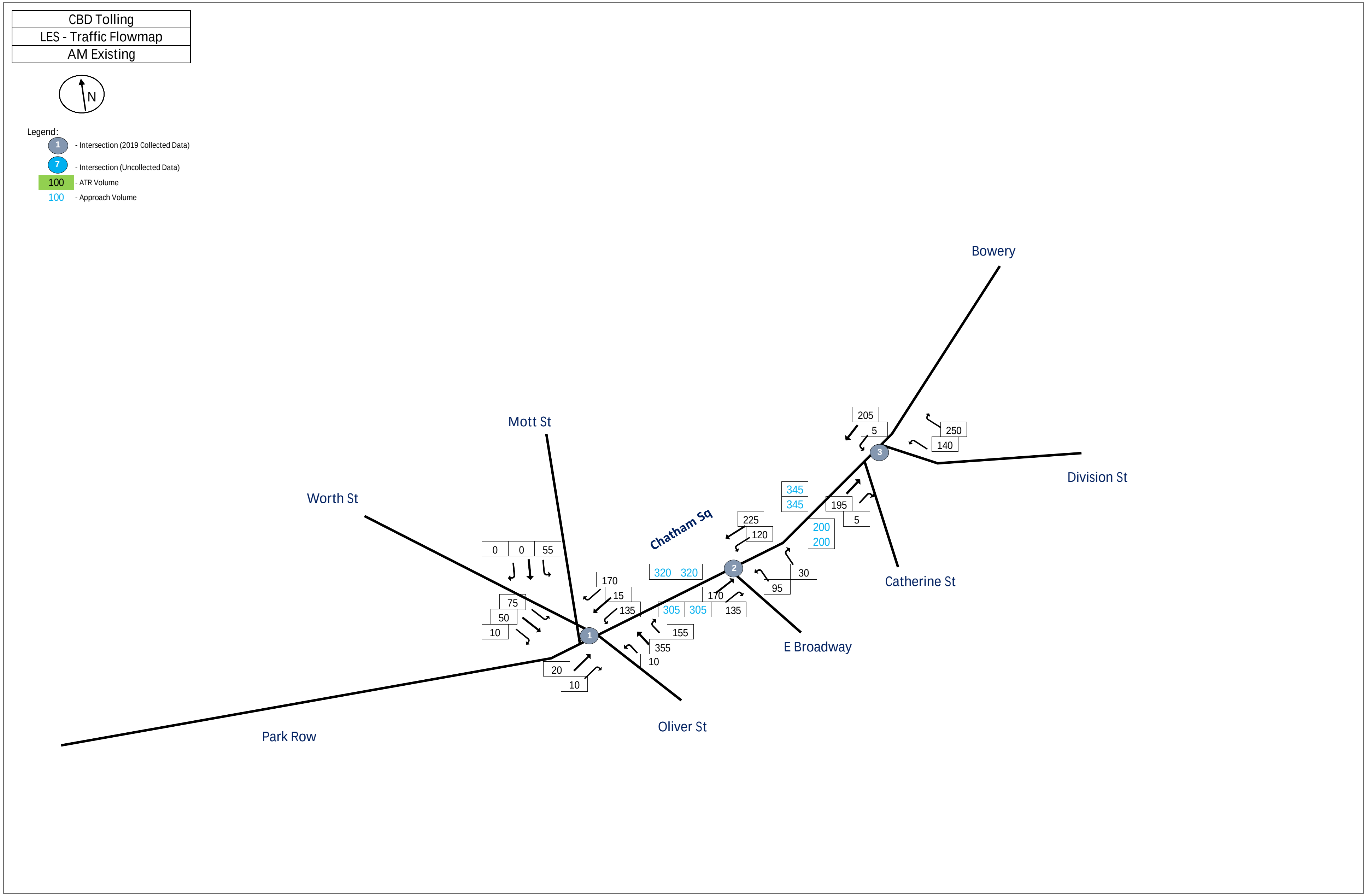


CBD Tolling
LDR - Traffic Flowmap
PM With-Action Increment

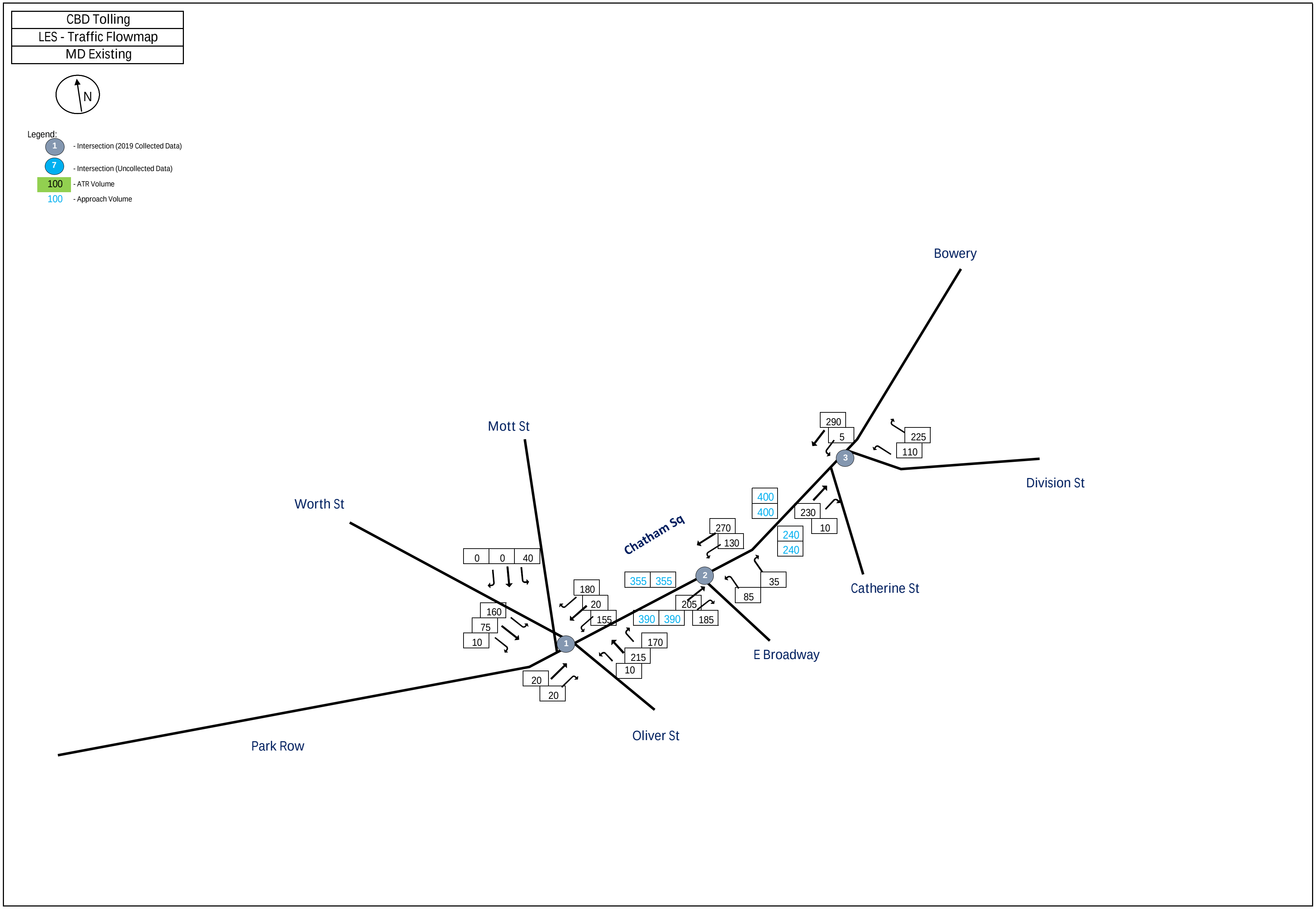


CBD Tolling
LDR - Traffic Flowmap
PM With-Action

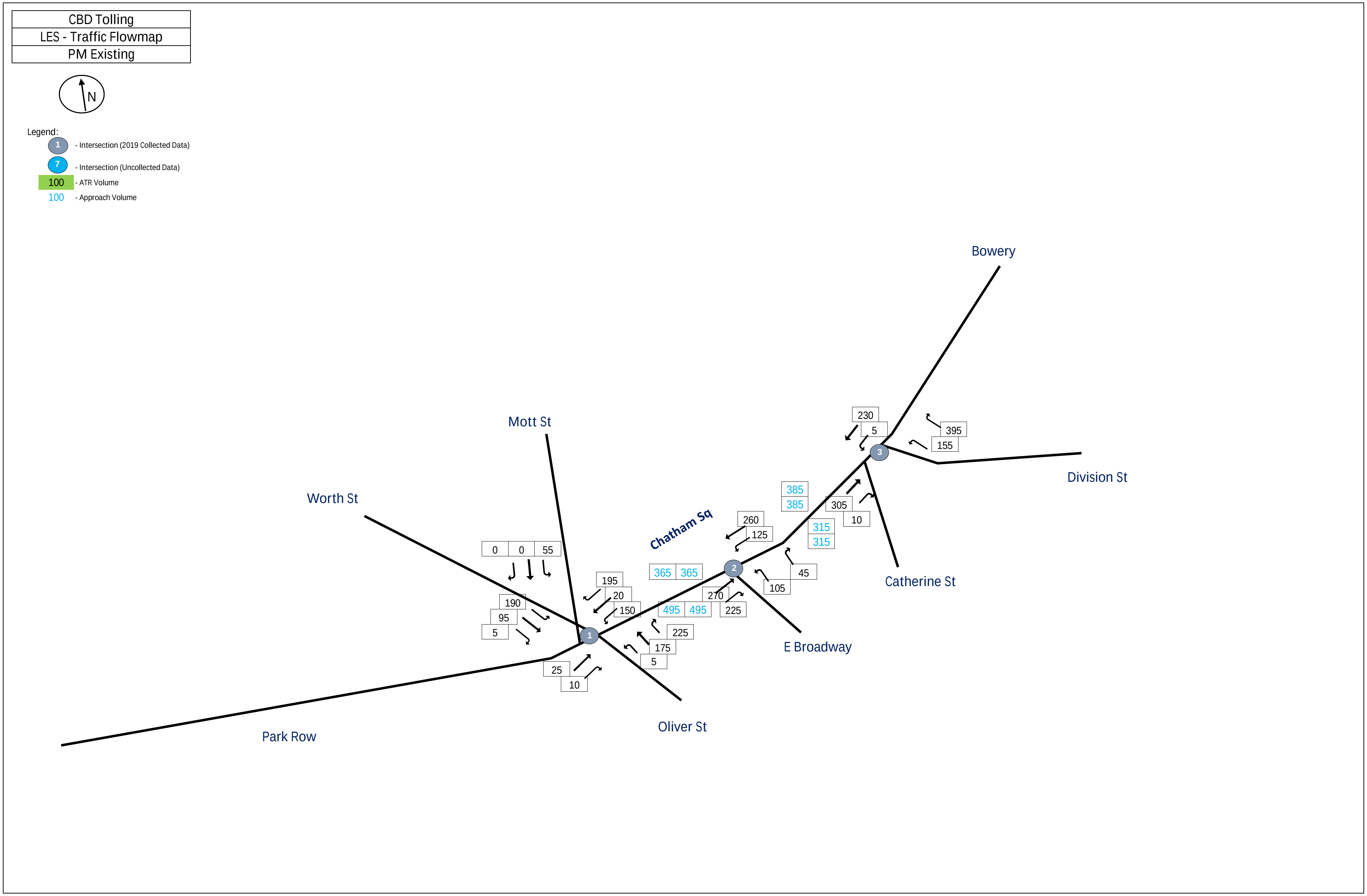




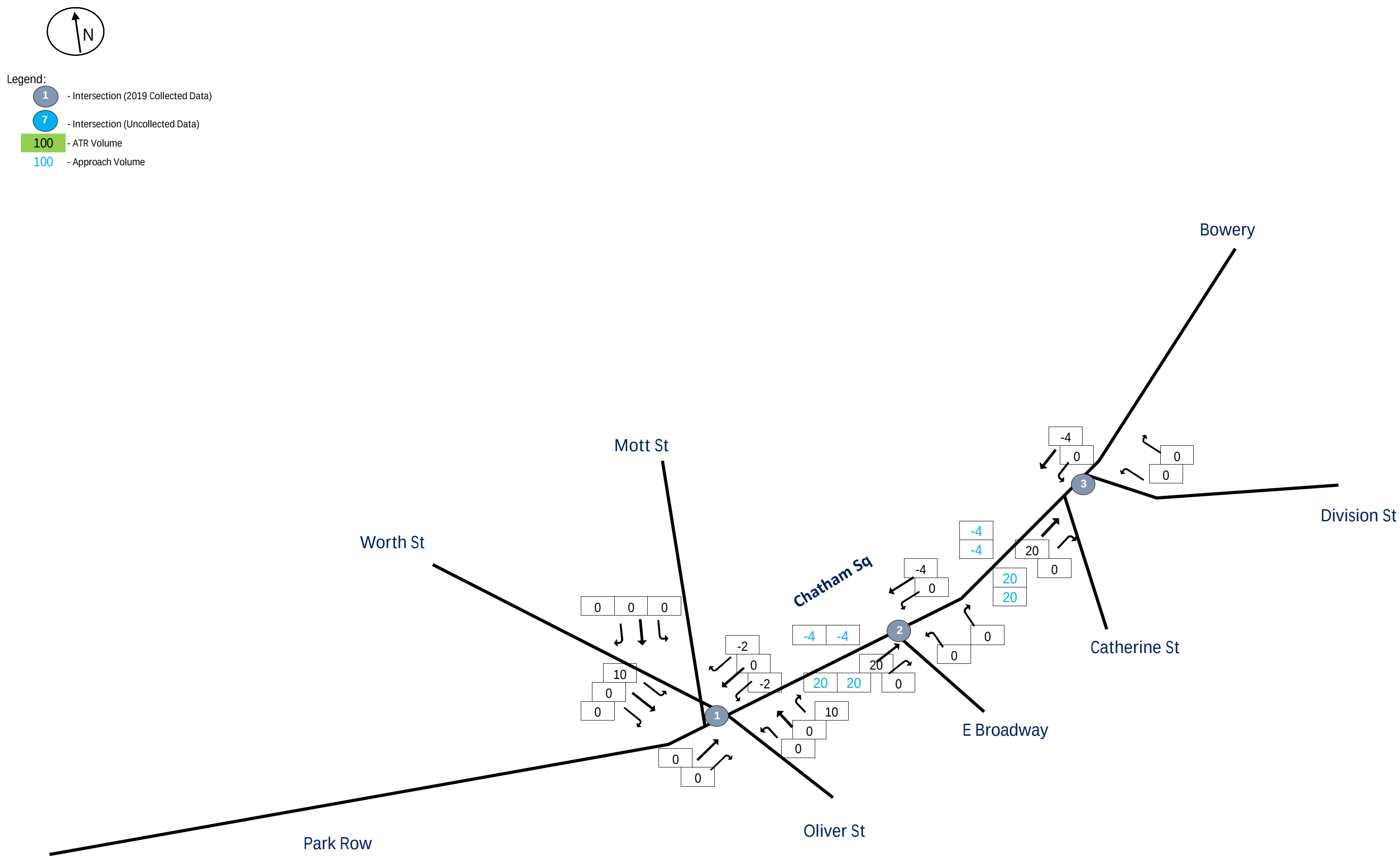
CBD Tolling
LES - Traffic Flowmap
AM Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Mott St
Worth St
Chatham Sq
Division St
Catherine St
E Broadway
Oliver St
Park Row
205
5
250
140
345
345
195
5
225
120
200
200
30
95
320
320
170
135
305
305
0
0
55
170
15
135
75
50
10
155
355
10
20
10
1
2
3

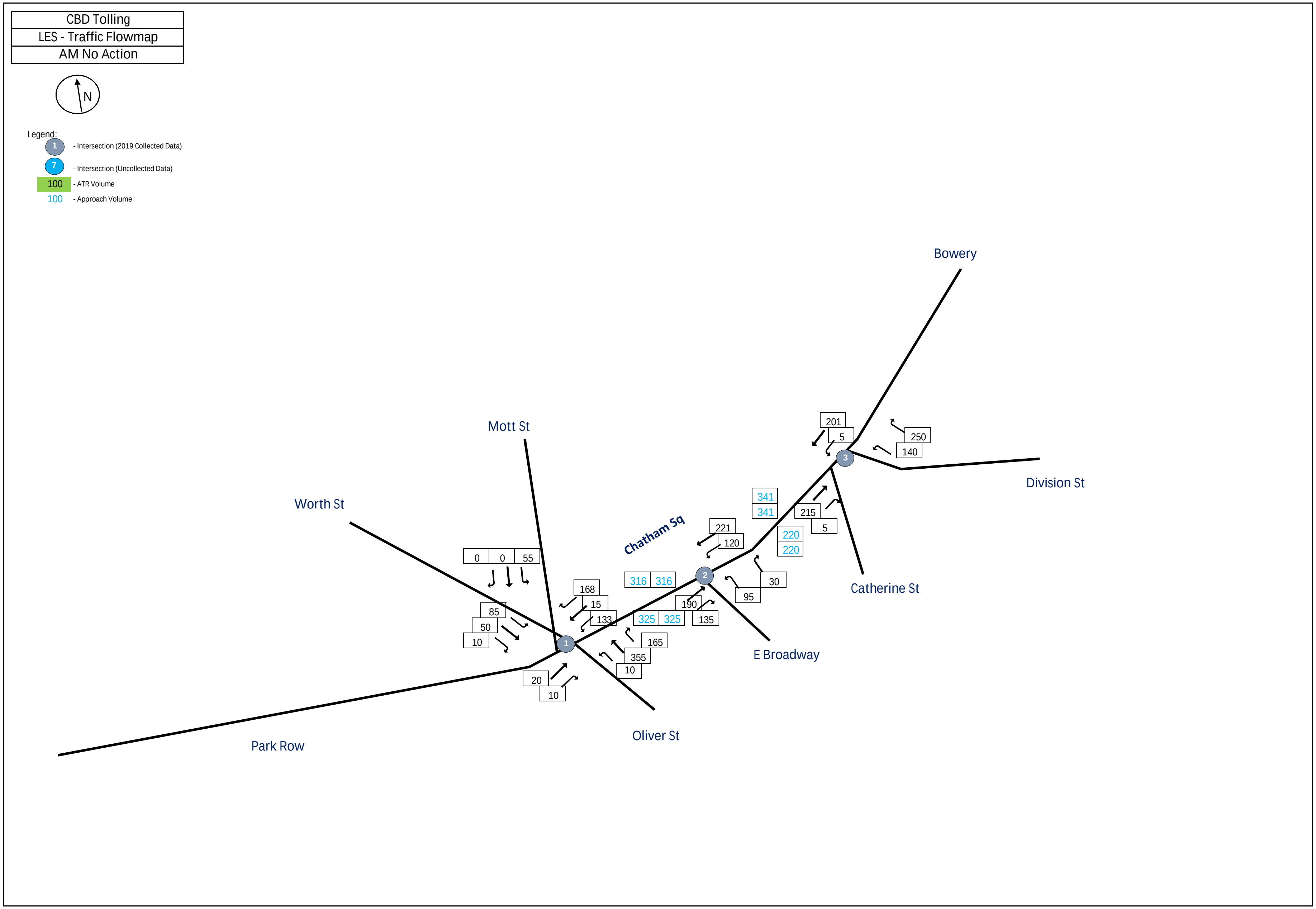


CBD Tolling
LES - Traffic Flowmap
MD Existing
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Mott St
Worth St
Chatham Sq
Division St
Catherine St
E Broadway
Oliver St
Park Row
290
5
225
110
400
400
230
10
240
240
270
130
355
355
35
85
205
390
390
185
0
0
40
180
20
155
160
75
10
170
215
10
20
20
1
2
3

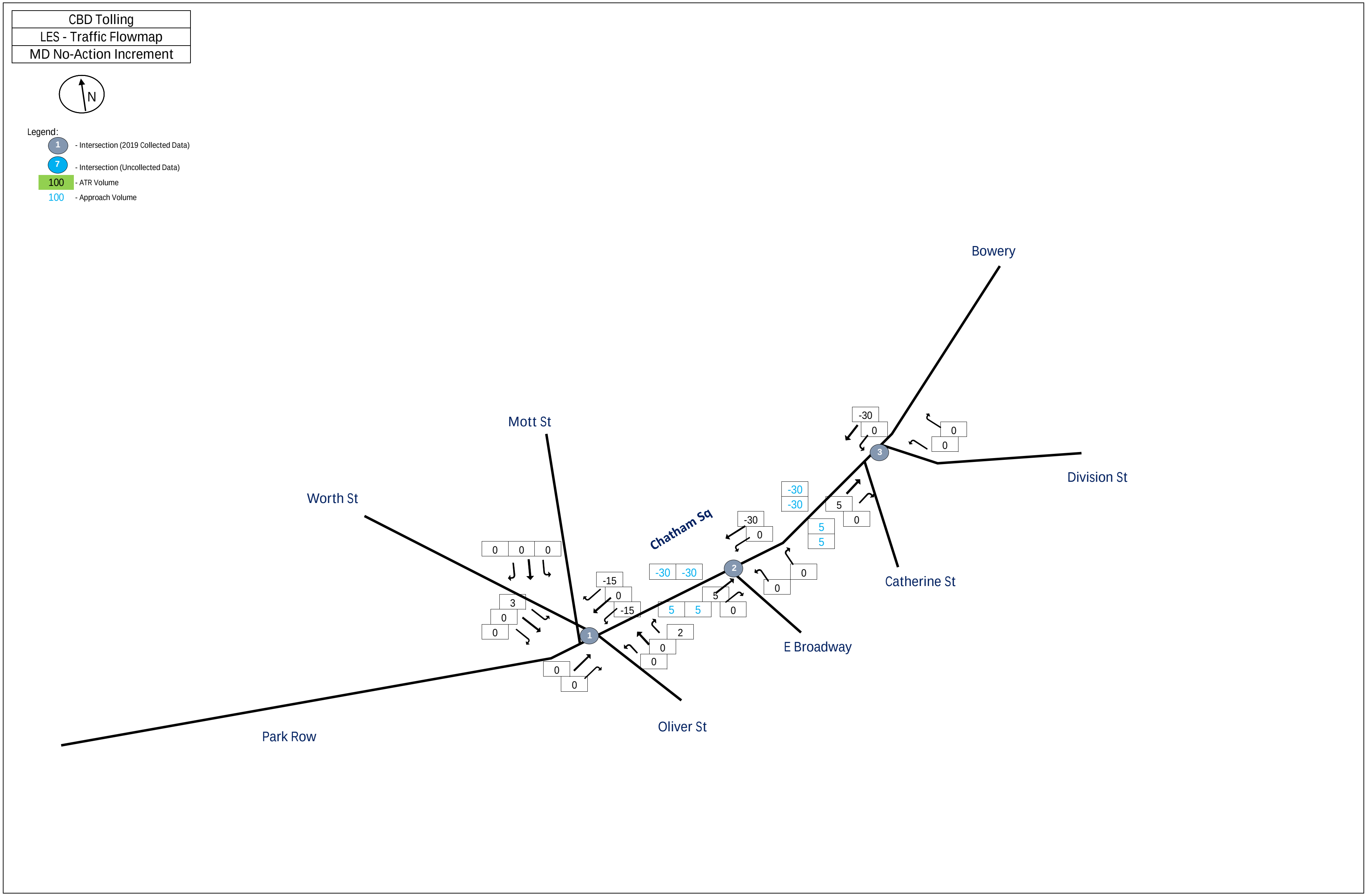

CBD Tolling
LES - Traffic Flowmap
PM Existing
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Division St
Catherine St
E Broadway
Chatham Sq
Mott St
Worth St
Oliver St
Park Row
230
5
395
155
385
385
305
10
315
315
260
125
45
105
365
365
270
225
495
495
195
20
150
0
0
55
190
95
5
225
175
5
25
10

CBD Tolling
LES - Traffic Flowmap
AM No-Action Increment



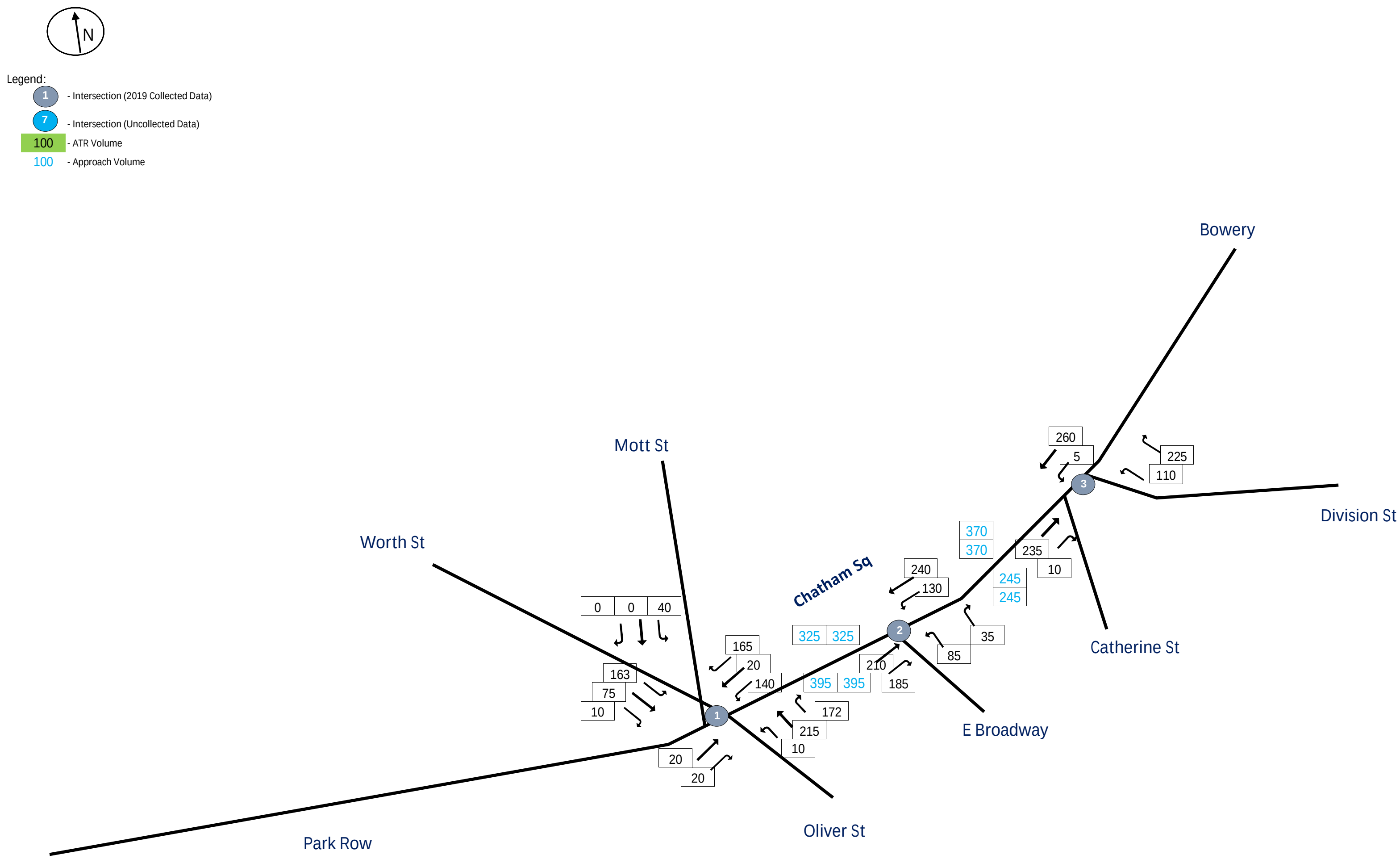


CBD Tolling
LES - Traffic Flowmap
AM No Action
N
Legend:
1
- Intersection (2019 Collected Data)
7
- Intersection (Uncollected Data)
100
- ATR Volume
100
- Approach Volume
Bowery
Division St
Catherine St
E Broadway
Chatham Sq
Mott St
Worth St
Oliver St
Park Row
201
5
250
140
341
341
215
5
220
220
221
120
30
95
316
316
190
135
325
325
0
0
55
168
15
133
85
50
10
165
355
10
20
10

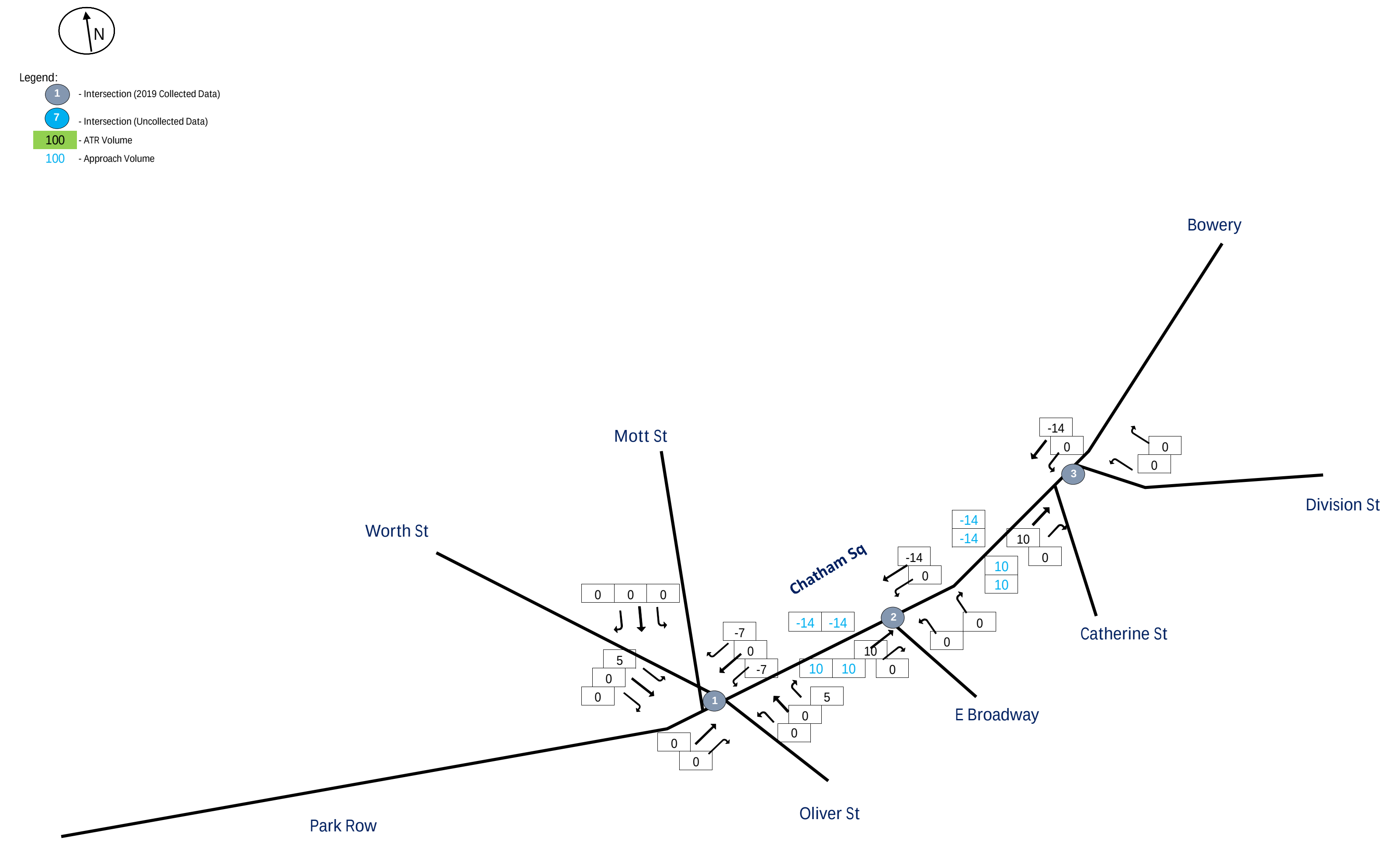


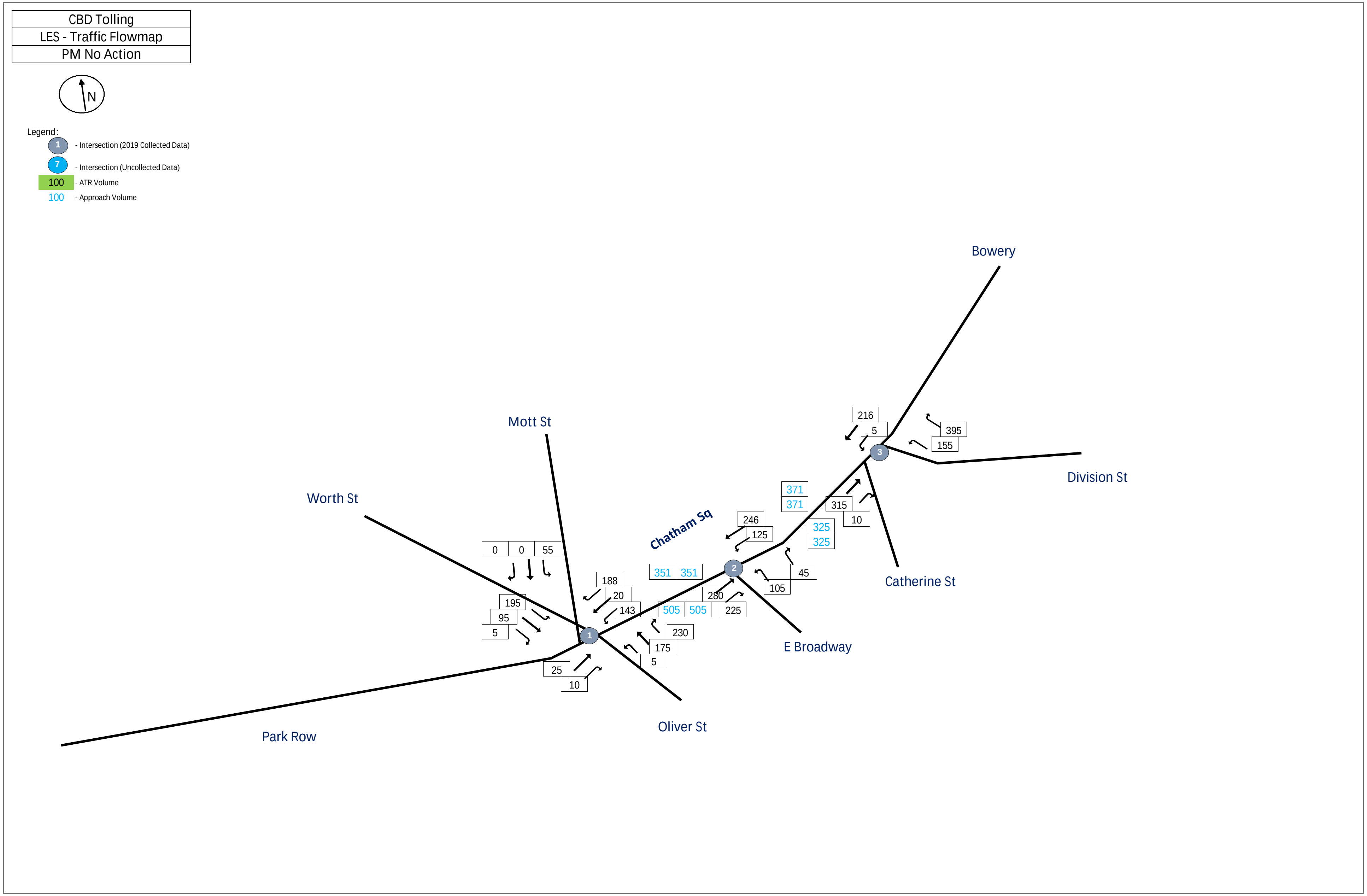
CBD Tolling
LES - Traffic Flowmap
MD No-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Mott St
Worth St
Division St
Chatham Sq
Catherine St
E Broadway
Oliver St
Park Row
-30
0
0
0
-30
-30
5
0
-30
0
5
5
0
0
0
-15
0
-30
-30
3
-15
5
5
5
0
0
2
0
0
0
0
0

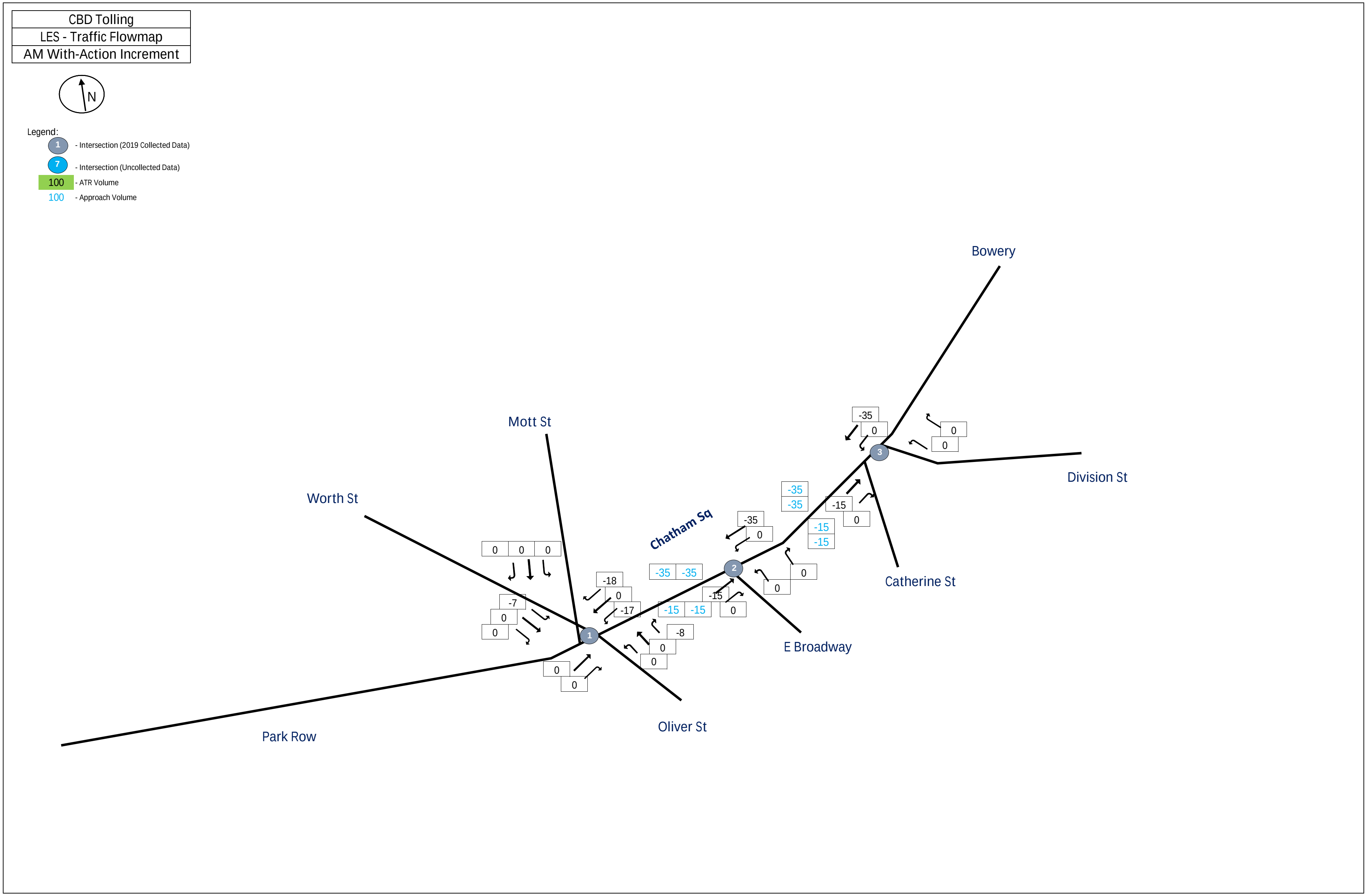
CBD Tolling
LES - Traffic Flowmap
MD No Action



CBD Tolling
LES - Traffic Flowmap
PM No-Action Increment




CBD Tolling
LES - Traffic Flowmap
PM No Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Mott St
Worth St
Chatham Sq
Division St
Catherine St
E Broadway
Oliver St
Park Row
216
5
395
155
371
371
315
10
246
125
325
325
45
105
351
351
0
0
55
188
20
143
280
225
505
505
195
95
5
230
175
5
25
10
1
2
3


CBD Tolling
LES - Traffic Flowmap
AM With-Action Increment
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Mott St
Worth St
Chatham Sq
Division St
Catherine St
E Broadway
Oliver St
Park Row
-35
0
0
0
-35
-35
-15
0
-35
0
-15
-15
0
0
0
0
0
-18
0
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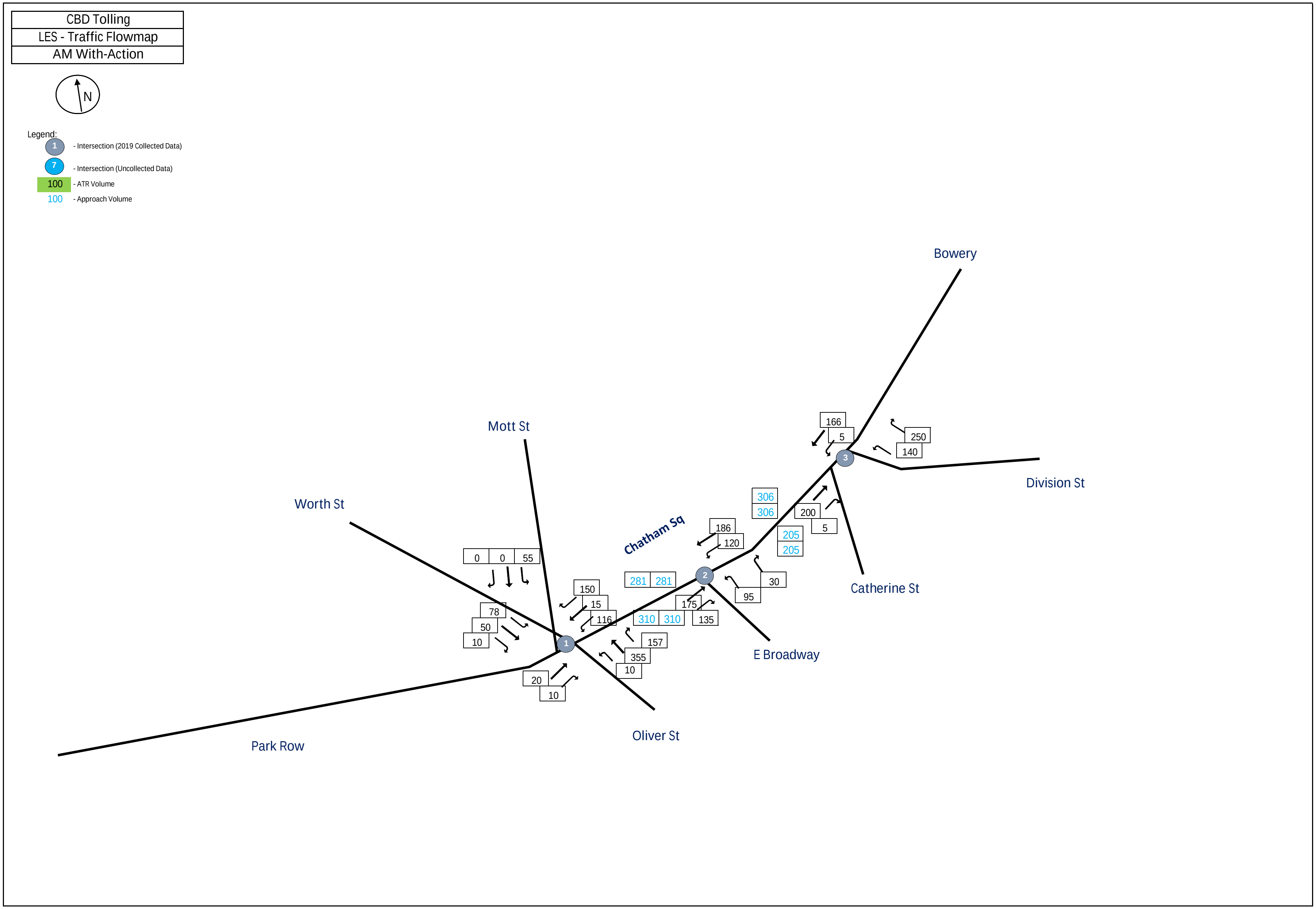
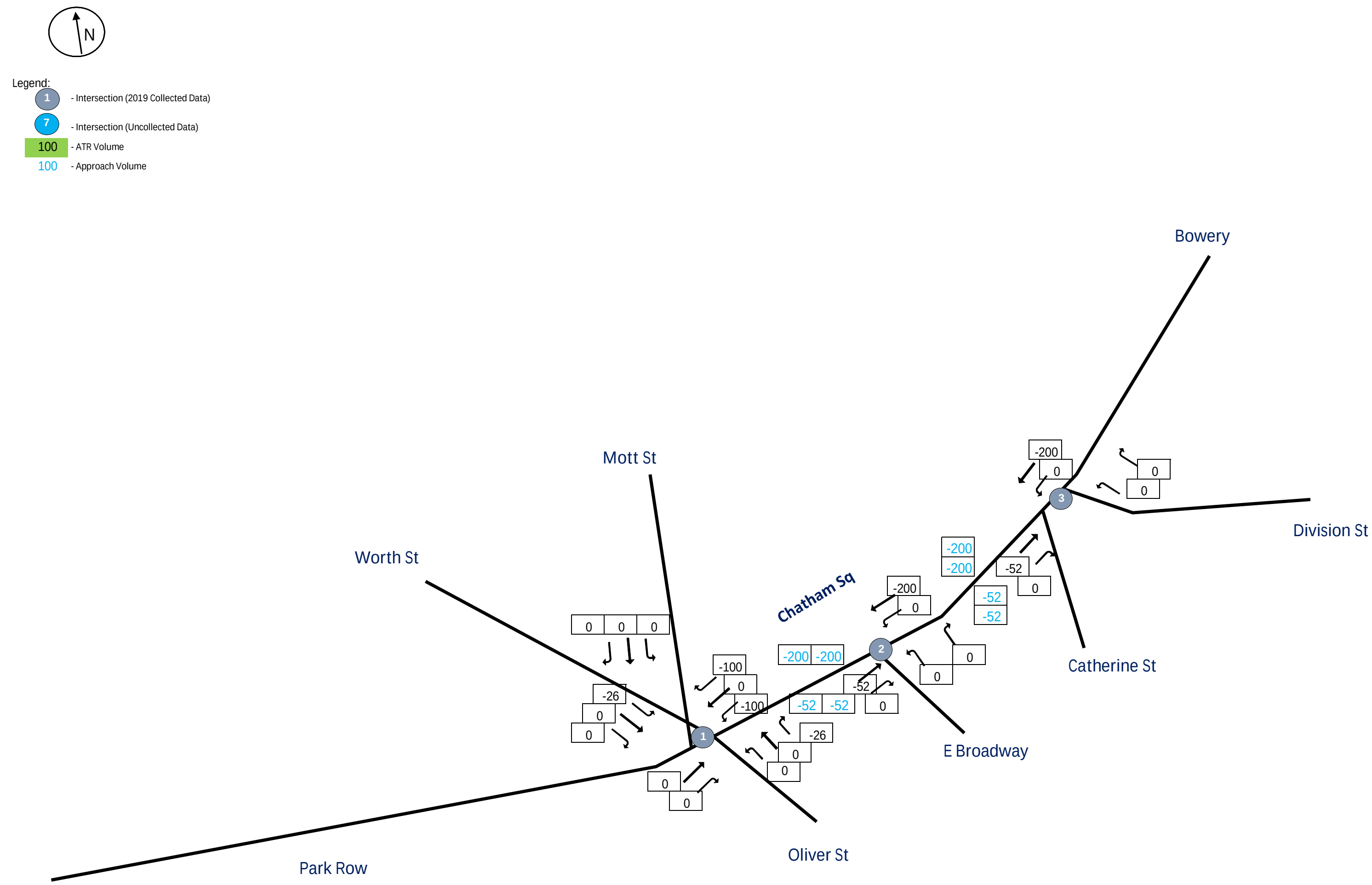
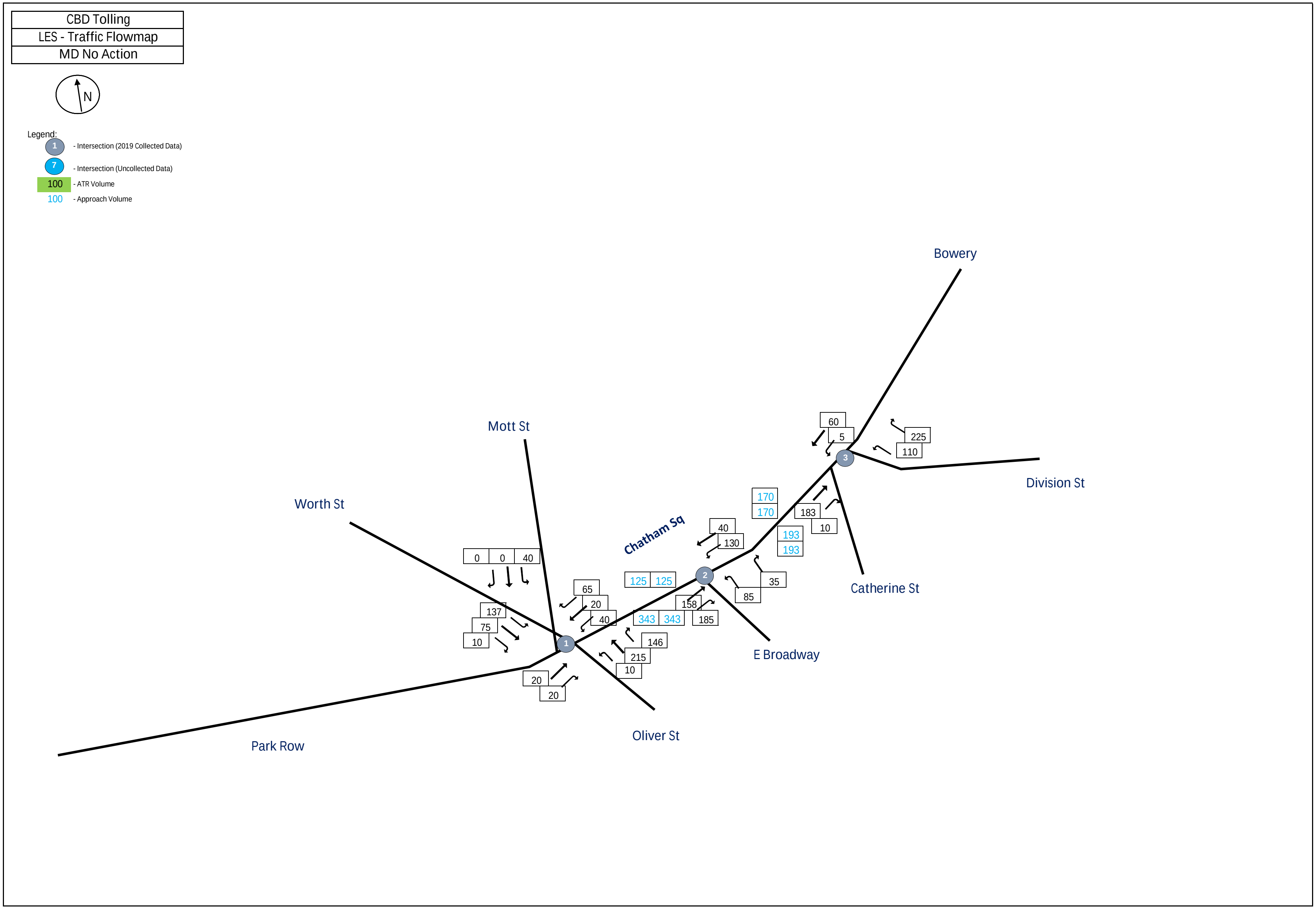
0
0
1
2
3


CBD Tolling
LES - Traffic Flowmap
AM With-Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Division St
Catherine St
E Broadway
Chatham Sq
Mott St
Worth St
Oliver St
Park Row
166
5
250
140
306
306
200
5
205
205
186
120
30
95
281
281
175
135
310
310
157
355
10
0
0
55
150
15
116
78
50
10
20
10

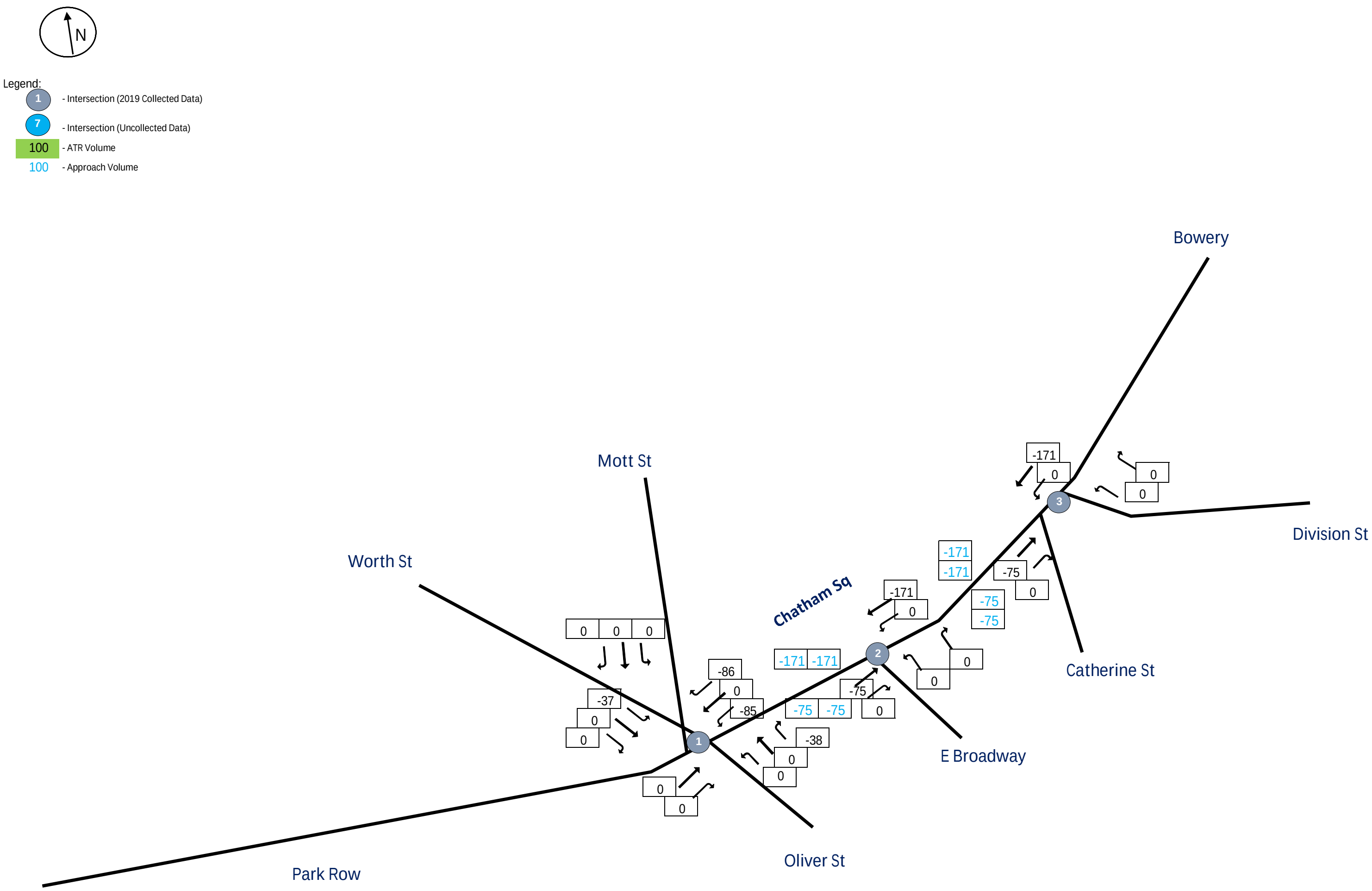
CBD Tolling
LES - Traffic Flowmap
MD With-Action Increment

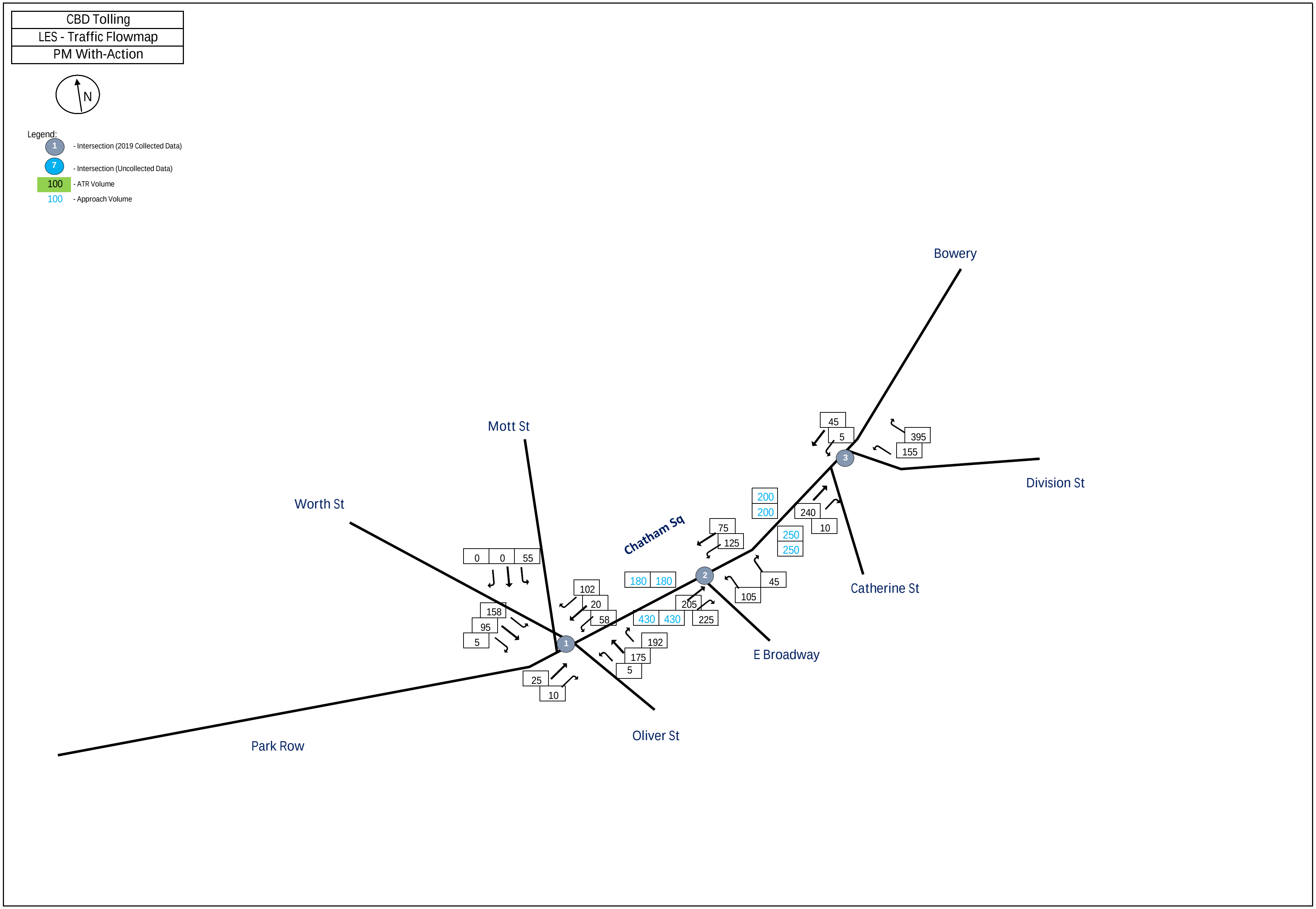




CBD Tolling
LES - Traffic Flowmap
MD No Action
N
Legend:
1 - Intersection (2019 Collected Data)
7 - Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Mott St
Worth St
Chatham Sq
Division St
Catherine St
E Broadway
Oliver St
Park Row
60
5
225
110
170
170
183
10
193
193
40
130
35
85
125
125
158
343
343
185
146
215
10
0
0
40
65
20
40
137
75
10
20
20
1
2
3

CBD Tolling
LES - Traffic Flowmap
PM With-Action Increment





CBD Tolling
LES - Traffic Flowmap
PM With-Action
N
Legend:
- Intersection (2019 Collected Data)
- Intersection (Uncollected Data)
100 - ATR Volume
100 - Approach Volume
Bowery
Mott St
Worth St
Chatham Sq
Division St
Catherine St
E Broadway
Oliver St
Park Row
45
5
395
155
200
200
240
10
75
125
250
250
0
0
55
180
180
45
105
102
20
58
205
225
430
430
158
95
5
192
175
5
25
10
1
2
3
7

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.3, Transportation:

Traffic LOS: Existing And No Action Alternative

August 2022

9A Study Area - No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Existing Volume	No-Action Volume	V/C		Delay		LOS	
							Existing	No-Action	Existing	No-Action	Existing	No-Action
1	24th Street & 12th Ave	NB	TR	T	1865	1874	0.71	0.71	19.1	19.2	B	B
				R	20	20	-	-	-	-	-	-
		SB	L	L	110	109	0.97	0.96	135.5	133.8	F	F
			T	T	1775	1765	0.61	0.60	16.4	16.4	B	B
		WB	L	L	200	200	0.71	0.71	71.3	71.3	E	E
			R	R	165	165	0.92	0.92	116.4	116.4	F	F
		Intersection					-	-	27.9	27.9	C	C

9A Study Area - No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Existing Volume	No-Action Volume	V/C		Delay		LOS	
							Existing	No-Action	Existing	No-Action	Existing	No-Action
1	24th Street & 12th Ave	NB	TR	T	1505	1523	0.68	0.69	21.2	21.4	C	C
				R	20	20	-	-	-	-	-	-
		SB	L	L	80	80	0.78	0.78	91.3	91.3	F	F
			T	T	1540	1536	0.64	0.64	20.3	20.2	C	C
		WB	L	L	130	130	0.45	0.45	43.7	43.7	D	D
			R	R	195	195	0.54	0.54	51.7	51.7	D	D
		Intersection					-	-	25.1	25.1	C	C

9A Study Area - No-Action - PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Exisiting Volume	No-Action Volume	V/C		Delay		LOS	
							Existing	No-Action	Existing	No-Action	Existing	No-Action
1	24th Street & 12th Ave	NB	TR	T	2365	2323	0.81	0.80	24.3	23.6	C	C
				R	10	10	-	-	-	-	-	-
		SB	L	L	85	85	0.80	0.80	105.1	105.1	F	F
			T	T	2060	2048	0.70	0.69	20.1	20.0	C	B
		WB	L	L	235	235	0.80	0.80	72.4	72.4	E	E
			R	R	275	275	0.88	0.88	96.6	96.6	F	F
		Intersection					-	-	30.3	30.1	C	C

9A Study Area - No-Action - Late Night Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Existing Volume	No-Action Volume	V/C		Delay		LOS	
							Existing	No-Action	Existing	No-Action	Existing	No-Action
1	24th Street & 12th Ave	NB	TR	T	1630	1605	0.67	0.66	20.8	20.6	C	C
				R	15	15	-	-	-	-	-	-
		SB	L	L	45	45	0.39	0.39	60.4	60.4	E	E
			T	T	1240	1240	0.49	0.49	17.4	17.4	B	B
		WB	L	L	135	135	0.43	0.43	43.2	43.2	D	D
			R	R	195	195	0.48	0.48	48.5	48.5	D	D
		Intersection					-	-	22.8	22.7	C	C

Downtown Brooklyn Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	570	570	0.99	1.38	58.1	230.0	E	F
			TR	T	915	1158	0.88	1.41	38.1	222.1	D	F
				R	260	260	-	0.47	-	6.1	-	A
		SB	T	T	715	724	0.68	0.73	40.5	43.5	D	D
			R	R	90	91	0.32	0.35	36.3	38.6	D	D
		EB	L	L	135	172	0.78	1.11	73.5	145.1	E	F
			T	T	605	611	0.64	0.83	41.5	48.4	D	D
			R	R	225	227	0.96	0.85	89.8	63.8	F	E
		WB	L	L	235	235	0.70	0.78	58.3	66.0	E	E
			T	T	375	376	0.89	0.93	60.0	62.9	E	E
			R	R	365	463	1.05	1.06	113.6	111.9	F	F
		Intersection			0	0	-	-	52.3	116.9	D	F
2	Adam Street and Tillary Street	NB	L	L	0	0	-	-	-	-	-	-
			T	T	751	617	1.04	0.83	83.4	48.7	F	D
			R	R	59	59	0.72	0.72	52.6	51.8	D	D
				R2	150	157	-	-	-	-	-	-
		SB	L	L	600	609	0.92	0.88	61.0	54.3	E	D
			T	T	820	833	0.62	0.61	24.7	23.3	C	C
			R	R	15	15	0.04	0.03	9.7	8.5	A	A
		EB	L	L	0	0	-	-	-	-	-	-
			TR	T	195	205	0.47	0.36	45.1	37.1	D	D
				R	90	90	-	-	-	-	-	-
		WB	L	L	140	141	0.74	0.83	56.8	75.0	E	E
			T	T	230	232	0.61	0.36	43.9	37.3	D	D
			R	R	525	0	1.02	-	82.3	-	F	-
				R2	35	39	-	0.10	-	32.8	-	C
		Intersection			0	0	-	-	57.9	42.0	E	D
3	Old Fulton Street and Vine Street	NB	L	L	1120	1127	0.98	0.99	50.2	51.5	D	D
			T	T	175	176	0.34	0.34	20.0	20.0	C	C
		SB	T	T	690	663	0.59	0.56	62.8	62.5	E	E
			R	R	0	0	-	-	-	-	-	-
		EB	L	L	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection			0	0	-	-	51.9	52.4	D	D

Downtown Brooklyn Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	585	585	0.97	1.20	52.5	155.2	D	F
			TR	T	755	820	0.75	1.21dl	31.9	69.7	C	E
				R	345	345	-	0.51	-	5.8	-	A
		SB	T	T	660	636	0.58	0.59	37.8	39.5	D	D
			R	R	80	77	0.31	0.31	35.6	37.4	D	D
		EB	L	L	115	123	0.57	0.68	57.4	66.4	E	E
			T	T	695	683	0.65	0.82	41.6	47.2	D	D
			R	R	260	255	0.90	0.77	73.4	53.8	E	D
		WB	L	L	235	233	0.66	0.73	55.9	61.6	E	E
			T	T	370	366	0.92	0.85	63.1	51.5	E	D
			R	R	355	382	1.04	0.96	109.2	83.4	F	F
		Intersection			0	0	-	-	49.3	59.6	D	E
2	Adam Street and Tillary Street	NB	L	L	0	0	-	-	-	-	-	-
			T	T	556	474	0.80	0.66	47.8	41.2	D	D
			R	R	44	44	0.79	0.81	57.3	57.9	E	E
				R2	185	188	-	-	-	-	-	-
		SB	L	L	660	634	0.98	0.88	71.4	54.8	E	D
			T	T	765	735	0.58	0.54	23.6	21.6	C	C
			R	R	20	19	0.05	0.04	9.9	8.6	A	A
		EB	L	L	0	0	-	-	-	-	-	-
			TR	T	275	279	0.54	0.41	46.1	37.6	D	D
				R	85	85	-	-	-	-	-	-
		WB	L	L	170	169	0.97	1.10	96.2	138.4	F	F
			T	T	215	214	0.54	0.31	41.4	36.6	D	D
			R	R	534	0	0.92	-	61.4	-	E	-
				R2	36	33	-	0.08	-	32.4	-	C
		Intersection			0	0	-	-	51.4	45.3	D	D
3	Old Fulton Street and Vine Street	NB	L	L	1120	1094	1.05	1.03	70.2	63.0	E	E
			T	T	125	122	0.25	0.25	20.8	20.7	C	C
		SB	T	T	535	509	0.43	0.41	38.4	23.5	D	C
			R	R	0	0	-	-	-	-	-	-
		EB	L	L	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection			0	0	-	-	56.2	47.2	E	D

Downtown Brooklyn Study Area - Existing vs No-Action - PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	520	520	1.05	1.45	83.1	263.4	F	F
			TR	T	800	971	0.76	1.47dl	31.9	111.1	C	F
				R	310	311	-	0.48	-	5.4	-	A
		SB	T	T	955	955	0.85	0.90	47.0	52.5	D	D
			R	R	80	80	0.28	0.30	34.7	36.6	C	D
		EB	L	L	105	128	0.48	0.66	54.1	65.3	D	E
			T	T	730	733	0.70	0.89	42.7	53.0	D	D
			R	R	230	230	0.85	0.75	65.1	51.3	E	D
		WB	L	L	225	223	0.56	0.62	52.1	55.9	D	E
			T	T	650	643	1.04	0.93	87.0	58.4	F	E
			R	R	240	289	0.89	0.88	73.9	65.7	E	E
		Intersection			0	0	-	-	54.6	75.7	D	E
2	Adam Street and Tillary Street	NB	L	L	0	0	-	-	-	-	-	-
			T	T	769	621	0.97	0.76	66.9	44.9	E	D
			R	R	61	61	0.91	0.92	71.9	72.2	E	E
				R2	230	236	-	-	-	-	-	-
		SB	L	L	535	536	0.78	0.74	49.0	45.3	D	D
			T	T	1025	1027	0.76	0.74	29.1	26.9	C	C
			R	R	20	20	0.04	0.04	9.7	8.5	A	A
		EB	L	L	0	0	-	-	-	-	-	-
			TR	T	320	329	0.56	0.43	46.5	37.9	D	D
				R	85	85	-	-	-	-	-	-
		WB	L	L	225	225	1.05	1.34	107.9	219.1	F	F
			T	T	365	365	0.86	0.49	59.0	39.6	E	D
			R	R	562	0	1.04	-	85.0	-	F	-
				R2	38	38	-	0.11	-	32.9	-	C
		Intersection			0	0	-	-	57.8	51.7	E	D
3	Old Fulton Street and Vine Street	NB	L	L	1150	1151	0.73	0.73	22.0	22.0	C	C
			T	T	245	245	0.33	0.33	14.6	14.6	B	B
		SB	T	T	305	280	0.37	0.34	24.4	14.0	C	B
			R	R	0	0	-	-	-	-	-	-
		EB	L	L	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection			0	0	-	-	21.3	19.4	C	B

Downtown Brooklyn Study Area - Existing vs No-Action - Late Night Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	465	465	1.01	1.29	70.2	200.0	E	F
			TR	T	835	847	0.76	1.29	31.6	47.9	C	D
				R	415	415	-	1.29	-	7.1	-	A
		SB	T	T	895	866	0.78	1.29	43.1	45.3	D	D
			R	R	55	53	0.18	1.29	32.8	34.3	C	C
		EB	L	L	105	106	0.51	1.29	55.9	61.5	E	E
			T	T	530	528	0.52	1.29	38.7	40.4	D	D
			R	R	150	149	0.52	1.29	43.0	37.9	D	D
		WB	L	L	250	250	0.62	1.29	54.0	59.1	D	E
			T	T	410	410	0.79	1.29	49.1	42.3	D	D
			R	R	290	294	0.84	1.29	65.5	52.1	E	D
		Intersection			0	0	-	1.29	44.9	50.7	D	D
2	Adam Street and Tillary Street	NB	L	L	0	0	-	1.29	-	-	-	-
			T	T	556	511	0.71	1.29	43.6	40.4	D	D
			R	R	44	44	0.46	1.29	39.4	38.6	D	D
				R2	105	106	-	1.29	-	-	-	-
		SB	L	L	375	371	0.58	1.29	41.8	39.3	D	D
			T	T	625	619	0.49	1.29	21.9	20.4	C	C
			R	R	0	0	-	1.29	-	-	-	-
		EB	L	L	0	0	-	1.29	-	-	-	-
			TR	T	140	141	0.25	1.29	41.4	34.4	D	C
				R	45	45	-	1.29	-	-	-	-
		WB	L	L	115	115	0.51	1.29	40.5	47.0	D	D
			T	T	120	120	0.32	1.29	35.6	34.7	D	C
			R	R	576	0	0.95	1.29	64.1	-	E	-
				R2	39	37	-	1.29	-	34.2	-	C
		Intersection			0	0	-	1.29	41.5	33.5	D	C
3	Old Fulton Street and Vine Street	NB	L	L	1195	1190	0.79	1.29	24.4	24.3	C	C
			T	T	130	129	0.17	1.29	12.6	12.6	B	B
		SB	T	T	325	307	0.38	1.29	30.7	20.2	C	C
			R	R	0	0	-	1.29	-	-	-	-
		EB	L	L	0	0	-	1.29	-	-	-	-
			R	R	0	0	-	1.29	-	-	-	-
		Intersection			0	0	-	1.29	24.7	22.5	C	C

Long Island City Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	70	71	-	-	-	-	-	-
				T	715	715	1.05	1.18	83.2	128.5	F	F
			R	R	385	390	0.65	0.66	43.6	43.9	D	D
		SB	TR	T	445	445	0.68	0.68	8.6	8.6	A	A
				R	60	60	-	-	-	-	-	-
		EB	LT	L	35	35	-	-	-	-	-	-
				T	55	71	0.23	0.26	37.3	37.8	D	D
		WB	L	L	490	480	0.70	0.69	45.1	44.6	D	D
			T	T	210	206	0.29	0.29	14.6	14.6	B	B
		Intersection							45.7	61.3	D	E
1b	11th Street & 48TH Avenue	NB	L	L	65	65	0.39	0.39	5.6	3.2	A	A
			T	T	685	685	0.65	0.65	12.4	23.2	B	C
		SB	TR	T	495	495	0.66	0.66	39.1	39.1	D	D
				R	15	15	-	-	-	-	-	-
		WB	LTR	L	10	10	-	-	-	-	-	-
				T	25	25	0.08	0.08	17.8	17.8	B	B
				R	10	10	-	-	-	-	-	-
		Intersection							22.4	28.0	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	205	218	0.35	0.37	13.9	14.2	B	B
			R	R	10	11	0.03	0.03	10.6	10.6	B	B
		SB	LT	L	35	35	-	-	-	-	-	-
				T	165	165	0.47	0.47	16.9	16.9	B	B
		EB	LTR	L	35	35	-	-	-	-	-	-
				T	50	50	0.29	0.29	13.7	13.7	B	B
				R	30	30	-	-	-	-	-	-
		Intersection							14.9	15.0	B	B
3	Green Street & McGuiness Blvd	NB	TR	T	1160	1176	0.84	0.85	26.5	27.2	C	C
				R	30	30	-	-	-	-	-	-
		SB	L	L	75	74	0.78	0.80	63.9	68.0	E	E
			T	T	970	962	0.61	0.61	18.0	17.9	B	B
		EB	LTR	L	185	185	-	-	-	-	-	-
				T	20	20	0.63	0.63	40.7	40.7	D	D
				R	40	40	-	-	-	-	-	-
		Intersection							25.9	26.3	C	C
4	McGuinness Blvd & Freeman Street	NB	T	T	1345	1361	-	-	-	-	-	-
		SB	TR	T	1045	1036	-	-	-	-	-	-
				R	115	115	-	-	-	-	-	-
		WB	R	R	220	211	-	-	-	-	-	-
		Intersection	Unsignalized									
5	21th Street & 49th Avenue	NB	LTR	L	35	35	-	-	-	-	-	-
				T	90	90	0.57	0.57	33.0	33.0	C	C
				R	40	40	-	-	-	-	-	-
		SB	LTR	L	100	99	-	-	-	-	-	-
				T	130	129	1.05	1.04	100.2	97.1	F	F
				R	10	10	-	-	-	-	-	-
		EB	LTR	L	35	38	-	-	-	-	-	-
				T	130	141	0.45	0.49	23.6	24.5	C	C
				R	10	11	-	-	-	-	-	-
		WB	LT	L	5	5	-	-	-	-	-	-
				T	40	40	0.11	0.11	17.8	17.8	B	B
			R	R	310	310	0.91	0.91	57.4	57.4	E	E
		Intersection							56.1	54.9	E	D
7	11th Street & Borden Avenue	NB	LTR	L	15	17	-	-	-	-	-	-
				T	60	67	-	-	-	-	-	-
				R	20	23	-	-	-	-	-	-
		SB	LTR	L	25	35	-	-	-	-	-	-
				T	0	0	-	-	-	-	-	-
				R	90	125	-	-	-	-	-	-
		EB	LTR	L	560	561	-	-	-	-	-	-
				T	50	50	-	-	-	-	-	-
				R	25	26	-	-	-	-	-	-
		WB	LTR	L	40	40	-	-	-	-	-	-
				T	420	422	-	-	-	-	-	-
				R	75	77	-	-	-	-	-	-
		Intersection	Unsignalized									
8a	Van Dam Street & QMT Expy	NB	LT	L	25	26	-	-	-	-	-	-
				T	295	303	0.44	0.45	8.3	8.3	A	A
		SB	TR	T	900	842	0.74	0.70	81.4	80.0	F	E
				R	20	19	-	-	-	-	-	-
		WB	TR	T	895	891	0.70	0.70	26.6	26.6	C	C
				R	260	263	-	-	-	-	-	-
		Intersection							43.9	42.3	D	D
8b	Van Dam Street & Borden Avenue	NB	TR	T	290	299	0.56	0.57	43.2	43.7	D	D
				R	5	5	-	-	-	-	-	-
		SB	L	L	680	636	1.04	0.97	94.4	95.6	F	F
			T	T	220	206	0.31	0.29	3.9	3.4	A	A
		EB	LTR	L	30	30	-	-	-	-	-	-
				T	185	185	0.31	0.31	29.0	29.0	C	C
				R	15	15	-	-	-	-	-	-
		Intersection							58.0	57.9	E	E
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	TR	L	0	0	-	-	-	-	-	-
				T	190	260	0.48	0.65	46.8	51.3	D	D
				R	15	16	-	-	-	-	-	-
		SB	LT	L	15	15	-	-	-	-	-	-
				T	130	132	0.39	0.40	38.5	38.9	D	D
		EB	T	T	1045	963	0.51	0.47	23.5	22.8	C	C
			R	R	355	327	0.71	0.66	33.8	31.1	C	C
		WB	LTR	L	50	50	-	-	-	-	-	-
				T	730	733	0.50	0.50	15.5	15.5	B	B
				R	60	60	-	-	-	-	-	-
		Intersection							25.4	26.0	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	LR	L	0	0	-	-	-	-	-	-
				R	0	0	-	-	-	-	-	-
		EB	T	T	400	400	-	-	-	-	-	-
		WB	T	T	385	385	-	-	-	-	-	-
			R	R	895	896	-	-	-	-	-	-
		Intersection	Unsignalized									
11b	Thomson Avenue & Dutch Kills Street	WB	TR	T	1280	1281	-	-	-	-	-	-
				R	830	842	-	-	-	-	-	-
		EB	T	T	400	400	-	-	-	-	-	-
		Intersection	Unsignalized									
12	21th Street & Queens Plaza N	NB	LT	L	40	0	-	-	-	-	-	-
				T	315	365	0.37	0.47	15.5	17.6	B	B
		SB	TR	T	945	947	0.82	1.05	25.9	70.5	C	E
				R	405	401	-	0.51	-	18.3	-	B
		WB	LTR	L	125	123	-	-	-	-	-	-
				T	80	78	0.72	0.71	47.8	47.3	D	D
				R	85	84	-	-	-	-	-	-
		Intersection							27.4	46.5	C	D

Long Island City Study Area - Existing vs No-Action - Midday Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	70	70	-	-	-	-	-	-
				T	515	515	1.03	1.03	84.6	84.6	F	F
			R	R	280	283	0.40	0.41	33.9	34.0	C	C
		SB	TR	T	340	340	0.65	0.65	8.9	8.9	A	A
				R	75	75	-	-	-	-	-	-
		EB	LT	L	55	55	-	-	-	-	-	-
				T	75	89	0.30	0.33	38.6	38.9	D	D
		WB	L	L	410	395	0.59	0.57	38.1	37.5	D	D
			T	T	215	208	0.28	0.28	12.1	12.0	B	B
		Intersection							41.6	41.6	D	D
1b	11th Street & 48TH Avenue	NB	L	L	55	55	0.32	0.32	6.0	5.9	A	A
			T	T	515	515	0.57	0.57	11.3	11.3	B	B
		SB	TR	T	410	410	0.67	0.67	43.1	43.1	D	D
				R	35	35	-	-	-	-	-	-
		WB	LTR	L	5	5	-	-	-	-	-	-
				T	25	25	0.08	0.08	15.1	15.1	B	B
				R	15	15	-	-	-	-	-	-
		Intersection							24.3	24.3	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	220	230	0.42	0.44	15.1	15.4	B	B
			R	R	25	27	0.06	0.06	10.9	11.0	B	B
		SB	LT	L	35	35	-	-	-	-	-	-
				T	215	214	0.53	0.53	17.6	17.6	B	B
		EB	LTR	L	30	30	-	-	-	-	-	-
				T	30	30	0.21	0.21	12.7	12.7	B	B
				R	20	20	-	-	-	-	-	-
		Intersection							15.6	15.7	B	B
3	Green Street & McGuiness Blvd	NB	TR	T	745	752	0.55	0.55	17.0	17.1	B	B
				R	40	40	-	-	-	-	-	-
		SB	L	L	80	78	0.39	0.38	19.2	19.1	B	B
			T	T	640	624	0.39	0.38	14.2	14.1	B	B
		EB	LTR	L	240	243	-	-	-	-	-	-
				T	40	40	0.83	0.84	52.7	53.3	D	D
				R	60	60	-	-	-	-	-	-
		Intersection							23.3	23.5	C	C
4	McGuinness Blvd & Freeman Street	NB	T	T	985	995	-	-	-	-	-	-
		SB	TR	T	720	702	-	-	-	-	-	-
				R	215	215	-	-	-	-	-	-
		WB	R	R	205	185	-	-	-	-	-	-
		Intersection	Unsignalized									
5	21th Street & 49th Avenue	NB	LTR	L	20	20	-	-	-	-	-	-
				T	85	85	0.47	0.47	28.7	28.7	C	C
				R	50	50	-	-	-	-	-	-
		SB	LTR	L	105	105	-	-	-	-	-	-
				T	100	100	0.87	0.87	58.7	58.7	E	E
				R	10	10	-	-	-	-	-	-
		EB	LTR	L	30	33	-	-	-	-	-	-
				T	100	111	0.35	0.39	21.5	22.3	C	C
				R	10	11	-	-	-	-	-	-
		WB	LT	L	5	5	-	-	-	-	-	-
				T	35	35	0.09	0.09	17.5	17.5	B	B
			R	R	310	310	0.79	0.79	39.3	39.3	D	D
		Intersection							38.1	38.0	D	D
7	11th Street & Borden Avenue	NB	LTR	L	10	10	-	-	-	-	-	-
				T	80	80	-	-	-	-	-	-
				R	40	41	-	-	-	-	-	-
		SB	LTR	L	35	45	-	-	-	-	-	-
				T	5	6	-	-	-	-	-	-
				R	100	130	-	-	-	-	-	-
		EB	LTR	L	580	581	-	-	-	-	-	-
				T	75	75	-	-	-	-	-	-
				R	40	41	-	-	-	-	-	-
		WB	LTR	L	70	70	-	-	-	-	-	-
				T	270	271	-	-	-	-	-	-
				R	340	346	-	-	-	-	-	-
		Intersection	Unsignalized									
8a	Van Dam Street & QMT Expy	NB	LT	L	20	20	-	-	-	-	-	-
				T	235	238	0.27	0.27	3.7	3.6	A	A
		SB	TR	T	850	768	0.71	0.64	75.2	73.7	E	E
				R	15	14	-	-	-	-	-	-
		WB	TR	T	645	651	0.69	0.70	17.9	18.1	B	B
				R	495	501	-	-	-	-	-	-
		Intersection							37.2	35.2	D	D
8b	Van Dam Street & Borden Avenue	NB	TR	T	235	238	0.37	0.38	28.0	28.0	C	C
				R	10	10	-	-	-	-	-	-
		SB	L	L	635	574	1.05	0.95	92.8	93.1	F	F
			T	T	215	194	0.30	0.27	2.6	2.2	A	A
		EB	LTR	L	20	20	-	-	-	-	-	-
				T	205	205	0.32	0.32	23.6	23.6	C	C
				R	35	35	-	-	-	-	-	-
		Intersection							52.4	51.4	D	D
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	TR	L	15	15	-	-	-	-	-	-
				T	260	272	0.76	0.80	57.0	59.2	E	E
				R	40	42	-	-	-	-	-	-
		SB	LT	L	55	55	-	-	-	-	-	-
				T	145	145	0.64	0.66	52.7	53.9	D	D
		EB	T	T	945	762	0.50	0.40	22.7	21.1	C	C
			R	R	260	210	0.51	0.41	25.5	23.2	C	C
		WB	LTR	L	45	45	-	-	-	-	-	-
				T	860	861	0.56	0.54	16.7	16.4	B	B
				R	90	90	-	-	-	-	-	-
		Intersection							27.4	27.6	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	LR	L	1040	1047	0.59	0.59	17.3	17.4	B	B
				R	25	25	-	-	-	-	-	-
		EB	T	T	230	223	0.20	0.19	29.1	29.0	C	C
		WB	T	T	235	235	0.28	0.28	30.4	30.4	C	C
			R	R	0	0	-	-	-	-	-	-
		Intersection	Unsignalized						21.0	21.0	C	C
11b	Thomson Avenue & Dutch Kills Street	WB	TR	T	235	235	-	-	-	-	-	-
				R	885	885	-	-	-	-	-	-
		EB	T	T	1270	1270	-	-	-	-	-	-
		Intersection	Unsignalized									
12	21th Street & Queens Plaza N	NB	LT	L	60	0	-	-	-	-	-	-
				T	750	818	0.64	0.99	20.3	54.6	C	D
		SB	TR	T	495	496	0.50	0.72	17.1	26.7	B	C
				R	240	249	-	0.34	-	16.5	-	B
		WB	LTR	L	70	65	-	-	-	-	-	-
				T	45	44	0.42	0.41	37.8	38.2	D	D
				R	55	51	-	-	-	-	-	-
		Intersection							20.6	39.7	C	D

Long Island City Study Area - Existing vs No-Action- PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	70	70	1.01	1.01	145.9	145.9	F	F
				T	610	610	0.81	0.81	48.5	48.5	D	D
			R	R	380	379	0.50	0.50	35.7	35.7	D	D
		SB	TR	T	555	556	0.89	0.89	20.0	20.1	B	C
				R	55	55	-	-	-	-	-	-
		EB	LT	L	50	50	-	-	-	-	-	-
				T	85	145	0.31	0.41	38.4	40.2	D	D
		WB	L	L	685	666	0.89	0.86	52.2	49.9	D	D
			T	T	165	159	0.18	0.18	11.0	10.9	B	B
		Intersection							40.9	40.4	D	D
1b	11th Street & 48TH Avenue	NB	L	L	70	70	0.63	0.64	22.5	22.7	C	C
			T	T	590	590	0.56	0.56	4.7	4.6	A	A
		SB	TR	T	600	601	0.91	0.92	59.9	60.1	E	E
				R	35	35	-	-	-	-	-	-
		WB	LTR	L	10	10	-	-	-	-	-	-
				T	40	40	0.10	0.10	15.3	15.3	B	B
				R	15	15	-	-	-	-	-	-
		Intersection							32.8	32.8	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	240	277	0.43	0.50	15.0	16.1	B	B
			R	R	40	45	0.10	0.12	11.5	11.6	B	B
		SB	LT	L	50	48	-	-	-	-	-	-
				T	180	179	0.52	0.51	17.4	17.3	B	B
		EB	LTR	L	50	50	-	-	-	-	-	-
				T	35	34	0.29	0.29	13.9	13.9	B	B
				R	15	15	-	-	-	-	-	-
		Intersection							15.5	15.8	B	B
3	Green Street & McGuiness Blvd	NB	TR	T	885	892	0.60	0.61	18.0	18.1	B	B
				R	20	20	-	-	-	-	-	-
		SB	L	L	60	59	0.35	0.35	19.1	19.2	B	B
			T	T	985	970	0.56	0.55	16.8	16.7	B	B
		EB	LTR	L	170	170	-	-	-	-	-	-
				T	35	35	0.63	0.63	40.4	40.4	D	D
				R	55	55	-	-	-	-	-	-
		Intersection							20.4	20.4	C	C
4	McGuinness Blvd & Freeman Street	NB	T	T	1055	1062	-	-	-	-	-	-
		SB	TR	T	1045	1029	-	-	-	-	-	-
				R	340	340	-	-	-	-	-	-
		WB	R	R	155	139	-	-	-	-	-	-
		Intersection	Unsignalized									
5	21th Street & 49th Avenue	NB	LTR	L	40	40	-	-	-	-	-	-
				T	105	105	0.62	0.63	33.4	33.5	C	C
				R	65	65	-	-	-	-	-	-
		SB	LTR	L	165	163	-	-	-	-	-	-
				T	80	79	1.05	1.17	97.5	137.6	F	F
				R	30	30	-	-	-	-	-	-
		EB	LTR	L	40	48	-	-	-	-	-	-
				T	80	97	0.41	0.50	23.0	25.1	C	C
				R	30	36	-	-	-	-	-	-
		WB	LT	L	5	5	-	-	-	-	-	-
				T	85	85	0.20	0.20	18.8	18.8	B	B
			R	R	355	355	0.87	0.87	47.0	47.0	D	D
		Intersection							50.2	60.9	D	E
7	11th Street & Borden Avenue	NB	LTR	L	10	11	-	-	-	-	-	-
				T	40	42	-	-	-	-	-	-
				R	15	16	-	-	-	-	-	-
		SB	LTR	L	30	53	-	-	-	-	-	-
				T	5	9	-	-	-	-	-	-
				R	150	263	-	-	-	-	-	-
		EB	LTR	L	570	567	-	-	-	-	-	-
				T	70	70	-	-	-	-	-	-
				R	10	10	-	-	-	-	-	-
		WB	LTR	L	0	0	-	-	-	-	-	-
				T	330	334	-	-	-	-	-	-
				R	150	154	-	-	-	-	-	-
		Intersection	Unsignalized									
8a	Van Dam Street & QMT Expy	NB	LT	L	30	30	-	-	-	-	-	-
				T	265	265	0.29	0.29	4.8	4.7	A	A
		SB	TR	T	575	508	0.51	0.45	27.6	25.2	C	C
				R	10	9	-	-	-	-	-	-
		WB	TR	T	860	867	0.73	0.74	26.7	26.8	C	C
				R	395	393	-	-	-	-	-	-
		Intersection				0		-	24.0	23.3	C	C
8b	Van Dam Street & Borden Avenue	NB	TR	T	265	265	0.44	0.44	39.5	39.5	D	D
				R	10	10	-	-	-	-	-	-
		SB	L	L	335	296	0.63	0.56	97.9	96.8	F	F
			T	T	240	212	0.64	0.57	85.5	85.6	F	F
		EB	LTR	L	30	30	-	-	-	-	-	-
				T	545	545	0.59	0.59	34.0	34.0	C	C
				R	15	15	-	-	-	-	-	-
		Intersection							56.7	55.1	E	E
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	TR	L	35	35	-	-	-	-	-	-
				T	375	410	0.84	0.91	61.7	69.6	E	E
				R	15	17	-	-	-	-	-	-
		SB	LT	L	20	20	-	-	-	-	-	-
				T	140	143	0.34	0.35	36.5	36.7	D	D
		EB	T	T	1255	926	0.60	0.44	24.5	21.7	C	C
			R	R	270	199	0.55	0.40	26.6	23.0	C	C
		WB	LTR	L	20	20	-	-	-	-	-	-
				T	750	752	0.38	0.38	14.2	14.1	B	B
				R	60	60	-	-	-	-	-	-
		Intersection							27.9	29.0	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	LR	L	1385	1385	0.70	0.70	19.3	19.3	B	B
				R	15	15	-	-	-	-	-	-
		EB	T	T	340	342	0.36	0.36	43.6	43.6	D	D
		WB	T	T	400	401	0.58	0.58	49.0	49.1	D	D
			R	R	0	0	-	-	-	-	-	-
		Intersection	Unsignalized						29.3	29.3	C	C
11b	Thomson Avenue & Dutch Kills Street	WB	TR	T	400	401	-	-	-	-	-	-
				R	670	670	-	-	-	-	-	-
		EB	T	T	1725	1727	-	-	-	-	-	-
		Intersection	Unsignalized									
12	21th Street & Queens Plaza N	NB	LT	L	25	0	-	-	-	-	-	-
				T	1030	1063	0.64	1.12	19.7	95.6	B	F
		SB	TR	T	625	629	0.54	0.70	17.6	23.5	B	C
				R	265	272	-	0.34	-	15.2	-	B
		WB	LTR	L	80	77	-	-	-	-	-	-
				T	115	113	0.84	0.82	56.4	54.4	E	D
				R	150	144	-	-	-	-	-	-
		Intersection							24.8	59.1	C	E

Lower Manhattan Study Area - Existing vs No-Action Comparison - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Trinity Place & Edgar Street	NEB	L	L2	0	0	-	-	-	-	-	-
				L	0	0	-	-	-	-	-	-
		NB	LT	L	15	3	-	-	-	-	-	-
			T	T	200	79	0.18	0.09	13.9	10.1	B	B
		EB	L	L	35	35	0.30	0.09	43.4	20.7	D	C
		Intersection							18.4	13.5	B	B
2	Trinity Place & Rector Street	NB	TR	T	220	104	0.33	0.16	18.1	10.7	B	B
				R	15	10	-		-		-	
		EB	LT	L	100	102	-	-	-	-	-	-
				T	35	35	0.51	0.52	31.5	31.9	C	C
		Intersection							22.9	22.1	C	C
3a	HCT Entrance/Exit & West Street	NB	T	T	1070	1056	0.74	0.73	45.6	45.2	D	D
			R2	R2	400	424	0.25	0.27	0.5	0.5	A	A
		SB	T	T	1040	1044	0.65	0.65	1.4	1.4	A	A
		WB	L	L	1560	1692	0.90	0.97	42.7	53.0	D	D
		Intersection							28.4	32.7	C	C
3b	HCT Exit & West Street & West Thams Street	NB	T	T	1070	1056	0.61	0.61	1.3	1.2	A	A
		SB	TR	T	1040	1044	0.75	0.76	46.0	46.1	D	D
				R	0	0	-	-	-	-	-	-
		EB	R	R	0	0	-	-	-	-	-	-
		WB	R	R	1090	1239	0.73	0.82	33.8	38.4	C	D
		Intersection				0			27.3	29.5	C	C
4	Chambers Street & Centre Street	NB	L	L	560	430	0.72	0.48	19.1	26.5	B	C
			T	T	645	496	0.66	0.57	13.4	13.8	B	B
		SB	TR	T	225	237	0.44	0.79	30.5	50.5	C	D
				R	30	31	-	0.29	-	35.9	-	D
		EB	R	R	385	394	0.60	0.89	31.5	51.3	C	D
		Intersection				0			20.8	32.7	C	C
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	105	105	-	-	-	-	-	-
				T	670	670	0.86	0.87	41.0	41.0	D	D
			R	R	190	190	0.56	0.56	34.9	34.9	C	C
			R2	R2	45	46	0.24	0.24	27.8	27.9	C	C
		EB	L	L2	50	50	-	-	-	-	-	-
				L	435	438	0.79	0.80	42.6	42.9	D	D
			T	T	575	589	0.69	0.71	19.2	19.8	B	B
		WB	TR	T	460	409	0.91	0.81	56.5	28.9	E	C
				R	100	89	-	-	-	-	-	-
		Intersection							39.4	33.6	D	C
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	620	635	0.41	0.42	5.0	5.1	A	A
		WB	T	T	560	498	1.17	1.08	122.4	97.8	F	F
			R	R	880	880	1.14	1.14	100.9	100.9	F	F
		Intersection							80.6	70.3	F	E
7a	Canal Street S & West Street	NB	T	T	2680	2680	1.00	1.00	50.1	50.2	D	D
			R	R	290	291	0.61	0.61	28.2	28.2	C	C
		SB	L	L	730	734	0.75	0.75	115.1	115.1	F	F
			T	T	2105	2144	0.74	0.76	7.9	8.2	A	A
		Intersection							41.9	41.9	D	D
7b	Canal Street N & West Street	NB	T	T	2680	2680	0.60	0.60	0.9	0.9	A	A
		SB	T	T	2835	2878	0.56	0.57	8.2	8.3	A	A
		WB	LR	L	0	0	-	-	-	-	-	-
				R	0	0	-	-	-	-	-	-
		Intersection							4.6	4.7	A	A
9	West Street & Albany Street	NB	TR	T	2205	2267	0.77	0.79	24.9	25.8	C	C
				R	90	93	-	-	-	-	-	-
		SB	TR	L	5	5	-	-	-	-	-	-
				T	1580	1644	0.56	0.58	19.3	19.8	B	B
				R	140	140	-	-	-	-	-	-
		EB	LTR	L	135	135	-	-	-	-	-	-
				T	90	90	0.75	0.76	57.5	57.9	E	E
				R	60	62	-	-	-	-	-	-
		Intersection				0			25.1	25.6	C	C
10	West Street & Vesey Street	NB		L	5	5	-	-	-	-	-	-
			T	T	2250	2296	0.69	0.71	19.9	20.3	B	C
		SB	T	T	1805	1855	0.67	0.69	19.6	20.0	B	C
			R	R	330	330	0.85	0.86	43.4	44.0	D	D
		EB	L	L	105	105	0.58	0.58	58.0	58.1	E	E
			R	R	75	77	0.37	0.38	48.0	48.5	D	D
		WB	LT	L	0	0	-	-	-	-	-	-
				T	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection							23.1	23.5	C	C
11	West Street & Chambers Street	NB	TR	T	2345	2328	0.88	0.88	38.8	38.4	D	D
				T	65	65	-	-	-	-	-	-
		SB	L	L	230	230	0.77	0.77	80.2	80.2	F	F
			T	T	1750	1793	0.62	0.63	16.8	17.1	B	B
			R	R	50	50	0.27	0.27	57.3	57.3	E	E
		EB	LTR	L	105	105	-	-	-	-	-	-
				T	30	30	0.57	0.58	55.2	55.5	E	E
				R	15	15	-	-	-	-	-	-
		WB	LT	L	65	67	-	-	-	-	-	-
				T	60	60	0.55	0.56	55.3	56.0	E	E
			R	R	310	310	0.75	0.75	46.7	46.7	D	D
		Intersection							35.2	35.0	D	D
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	825	839	0.85	0.87	32.9	34.0	C	C
			R	R	85	104	0.24	0.29	19.8	20.7	B	C
		WB	T	T	965	1149	0.88	1.05	36.0	69.5	D	E
		NB	T	T	295	294	0.51	0.56	32.4	35.0	C	D
			R	L	340	337	0.38	0.36	1.0	0.9	A	A
		SB	L	L	325	331	0.55	0.57	13.2	16.0	B	B
			TR	T	155	156	0.65	0.68	11.1	12.7	B	B
				R	85	85	-	-	-	-	-	-
		Intersection							25.7	37.7	C	D
15	Manhattan Bridge & Bowery	NB	T	T	295	294	0.27	0.51	1.3	6.7	A	A
		SB	T	T	565	572	0.37	0.37	18.6	18.6	B	B
		WB	R	R	350	555	0.47	0.94	10.7	54.0	B	D
		Intersection							12.0	30.0	B	C
18	6th Avenue & Watts Street	WB	TR	T	775	776	0.37	0.37	17.1	17.1	B	B
				R	25	25	-	-	-	-	-	-
		NB	LT	L	95	86	-	-	-	-	-	-
				T	1105	997	0.52	0.47	10.2	12.5	B	B
		Intersection							13.0	14.4	B	B
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	620	629	1.03	1.05	78.6	82.6	E	F
		NB	LTR	L	210	168	-	-	-	-	-	-
				T	865	694	0.65	0.52	26.4	24.2	C	C
				R	5	4	-	-	-	-	-	-
		EB	T	T	640	657	0.81	0.83	39.4	40.8	D	D
		WB	TR	T	1150	1217	1.03	1.09	57.8	78.6	E	E
				R	250	265	-	-	-	-	-	-
		Intersection							49.1	59.5	D	E

Lower Manhattan Study Area - Existing vs No-Action Comparison - Midday Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Trinity Place & Edgar Street	NEB	L	L2	5	0	-	-	-	-	-	-
				L	100	0	0.34	-	30.3	-	C	-
		NB	LT	L	20	11	-	-	-	-	-	-
			T	T	180	99	0.13	0.09	13.3	10.0	B	B
		EB	L	L	35	254	0.29	0.61	43.0	30.4	D	C
		Intersection							22.0	24.7	C	C
2	Trinity Place & Rector Street	NB	TR	T	265	297	0.38	0.42	16.4	36.9	B	D
				R	50	56	-	-	-	-	-	-
		EB	LT	L	115	110	-	-	-	-	-	-
				T	45	45	0.43	0.42	24.7	24.3	C	C
		Intersection							19.2	33.1	B	C
3a	HCT Entrance/Exit & West Street	NB	T	T	1045	1033	0.59	0.58	25.1	25.0	C	C
			R2	R2	735	781	0.39	0.41	0.7	0.8	A	A
		SB	T	T	1415	1409	0.65	0.65	1.1	1.1	A	A
		WB	L	L	735	832	0.55	0.63	33.9	35.5	C	D
		Intersection							13.6	14.2	B	B
3b	HCT Exit & West Street & West Thams Street	NB	T	T	1045	1033	0.49	0.49	0.7	0.7	A	A
		SB	TR	T	1415	1409	0.76	0.76	29.5	29.4	C	C
				R	0	0	-	-	-	-	-	-
		EB	R	R	0	0	-	-	-	-	-	-
		WB	R	R	725	823	0.65	0.73	36.5	39.2	D	D
		Intersection							21.3	22.4	C	C
4	Chambers Street & Centre Street	NB	L	L	425	344	0.57	0.43	13.9	25.7	B	C
			T	T	535	433	0.52	0.47	11.3	12.1	B	B
		SB	TR	T	235	226	0.43	0.77	30.2	48.6	C	D
				R	15	15	-	0.21	-	35.3	-	D
		EB	R	R	410	391	0.64	0.89	32.5	50.4	C	D
		Intersection							20.4	32.9	C	C
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	75	75	-	-	-	-	-	-
				T	515	515	0.96	0.96	58.4	58.7	E	E
			R	R	330	325	0.58	0.57	31.4	31.2	C	C
			R2	R2	60	58	0.32	0.31	30.1	29.8	C	C
		EB	L	L2	30	31	-	-	-	-	-	-
				L	325	328	0.64	0.65	36.3	36.5	D	D
			T	T	350	357	0.43	0.44	13.1	13.3	B	B
		WB	TR	T	305	257	0.89	0.75	27.6	19.1	C	B
				R	50	42	0.23	0.19	12.9	11.1	B	B
		Intersection							36.4	35.6	D	D
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	410	415	0.27	0.28	6.2	5.6	A	A
		WB	T	T	355	299	1.03	0.87	94.3	55.9	F	E
			R	R	605	605	0.58	0.58	15.2	15.2	B	B
		Intersection							33.7	21.8	C	C
7a	Canal Street S & West Street	NB	T	T	2105	2136	0.93	0.94	36.9	38.4	D	D
			R	R	165	163	0.41	0.40	23.5	23.4	C	C
		SB	L	L	440	428	0.45	0.44	57.1	53.1	E	D
			T	T	1860	1911	0.69	0.71	6.1	6.5	A	A
		Intersection							26.2	26.3	C	C
7b	Canal Street N & West Street	NB	T	T	2105	2136	0.52	0.53	0.4	0.4	A	A
		SB	T	T	2300	2339	0.48	0.49	8.5	8.6	A	A
		WB	LR	L	0	0	-	-	-	-	-	-
				R	0	0	-	-	-	-	-	-
		Intersection							4.6	4.7	A	A
9	West Street & Albany Street	NB	TR	T	1445	1533	0.59	0.62	20.1	20.8	C	C
				R	80	85	-	-	-	-	-	-
		SB	TR	L	5	5	-	-	-	-	-	-
				T	2110	2174	0.74	0.76	23.4	24.1	C	C
				R	90	90	-	-	-	-	-	-
		EB	LTR	L	105	105	-	-	-	-	-	-
				T	95	95	0.59	0.60	36.3	36.6	D	D
				R	60	62	-	-	-	-	-	-
		Intersection							23.1	23.7	C	C
10	West Street & Vesey Street	NB		L	10	10	-	-	-	-	-	-
			T	T	1850	1924	0.71	0.74	22.9	23.8	C	C
		SB	T	T	2115	2165	0.86	0.88	28.4	29.6	C	C
			R	R	170	170	0.42	0.42	20.4	20.5	C	C
		EB	L	L	145	144	0.56	0.56	39.9	39.9	D	D
			R	R	145	149	0.44	0.45	34.2	34.6	C	C
		WB	LT	L	0	0	-	-	-	-	-	-
				T	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection							26.4	27.3	C	C
11	West Street & Chambers Street	NB	TR	T	1960	1996	0.86	0.88	36.0	36.9	D	D
				R	45	46	-	-	-	-	-	-
		SB	L	L	180	179	0.48	0.47	53.0	52.9	D	D
			T	T	2025	2063	0.73	0.74	18.4	18.7	B	B
			R	R	85	85	0.36	0.36	45.4	45.4	D	D
		EB	LTR	L	45	45	-	-	-	-	-	-
				T	0	0	0.18	0.18	33.5	33.5	C	C
				R	10	10	-	-	-	-	-	-
		WB	LT	L	70	72	-	-	-	-	-	-
				T	65	65	0.51	0.52	42.0	42.5	D	D
			R	R	285	284	0.61	0.60	28.3	28.2	C	C
		Intersection							29.2	29.7	C	C
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	650	631	0.67	0.65	26.0	25.5	C	C
			R	R	120	125	0.35	0.35	22.0	21.6	C	C
		WB	T	T	645	697	0.65	0.71	25.5	27.0	C	C
		NB	T	T	275	269	0.47	0.46	31.7	31.5	C	C
			R	L	455	431	0.48	0.44	1.6	1.3	A	A
		SB	L	L	410	396	0.74	0.69	26.8	22.5	C	C
			TR	T	150	150	0.77	0.76	17.7	17.0	B	B
				R	75	75	-	-	-	-	-	-
		Intersection							21.0	20.9	C	C
15	Manhattan Bridge & Bowery	NB	T	T	275	269	0.25	0.25	0.7	0.7	A	A
		SB	T	T	635	621	0.41	0.40	19.1	19.0	B	B
		WB	R	R	225	272	0.30	0.21	8.6	7.4	A	A
		Intersection							12.4	11.9	B	B
18	6th Avenue & Watts Street	WB	TR	T	785	785	0.37	0.37	17.2	17.2	B	B
				R	25	25	-	-	-	-	-	-
		NB	LT	L	100	92	-	-	-	-	-	-
				T	960	882	0.43	0.39	6.9	8.0	A	A
		Intersection							11.5	12.3	B	B
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	395	389	0.71	0.70	40.6	40.2	D	D
		NB	LTR	L	190	165	-	-	-	-	-	-
				T	845	733	0.59	0.51	25.1	24.0	C	C
				R	5	4	-	-	-	-	-	-
		EB	T	T	400	417	0.56	0.58	31.0	31.5	C	C
		WB	TR	T	685	703	0.67	0.69	22.2	22.7	C	C
				R	140	144	-	-	-	-	-	-
		Intersection							27.4	27.3	C	C

Lower Manhattan Study Area - Existing vs No-Action Comparison - PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Trinity Place & Edgar Street	NEB	L	L2	0	0	0	-	0	-	0	-
				L	80	0	0.29	-	30.0	-	C	-
		NB	LT	L	15	1	-	-	-	-	-	-
			T	T	125	9	0.12	0.01	13.3	9.5	B	A
		EB	L	L	55	134	0.40	0.28	46.1	23.2	D	C
		Intersection			0		-		24.2	22.2	C	C
2	Trinity Place & Rector Street	NB	TR	T	225	125	0.38	0.21	18.0	34.1	B	C
				R	35	18	-	-	-	-	-	-
		EB	LT	L	80	81	-	-	-	-	-	-
				T	40	40	0.35	0.35	23.1	23.2	C	C
		Intersection			0		-		19.6	29.1	B	C
3a	HCT Entrance/Exit & West Street	NB	T	T	575	566	0.33	0.32	23.5	23.4	C	C
			R2	R2	1230	1297	0.62	0.65	1.3	1.5	A	A
		SB	T	T	1295	1297	0.61	0.61	1.0	1.0	A	A
		WB	L	L	350	351	0.29	0.29	35.8	35.8	D	D
		Intersection			0		-		8.5	8.4	A	A
3b	HCT Exit & West Street & West Thams Street	NB	T	T	575	566	0.28	0.28	0.5	0.5	A	A
		SB	TR	T	1295	1297	0.69	0.69	31.2	31.2	C	C
				R	0	0	-	-	-	-	-	-
		EB	R	R	0	0	-	-	-	-	-	-
		WB	R	R	510	510	0.48	0.48	39.5	39.5	D	D
		Intersection							25.3	25.4	C	C
4	Chambers Street & Centre Street	NB	L	L	560	445	0.76	0.51	23.9	27.1	C	C
			T	T	670	533	0.73	0.66	14.9	16.0	B	B
		SB	TR	T	365	370	0.62	1.24	34.0	160.8	C	F
				R	15	15	-	0.17	-	33.1	-	C
		EB	R	R	510	510	0.81	1.18	39.9	131.1	D	F
		Intersection							26.0	80.0	C	E
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	45	45	-	-	-	-	-	-
				T	585	585	0.88	0.88	44.6	44.6	D	D
			R	R	180	189	0.29	0.31	26.3	26.5	C	C
			R2	R2	10	10	0.05	0.05	24.0	24.0	C	C
		EB	L	L2	5	5	-	-	-	-	-	-
				L	215	225	0.39	0.41	31.1	31.3	C	C
			T	T	460	462	0.54	0.54	15.0	15.0	B	B
		WB	TR	T	75	10	0.23	0.03	5.6	3.8	A	A
				R	15	2	0.07	0.01	4.1	4.0	A	A
		Intersection							29.6	31.1	C	C
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	470	472	0.30	0.30	3.2	3.2	A	A
		WB	T	T	90	12	0.27	0.04	27.6	24.2	C	C
			R	R	1405	1405	1.23	1.23	131.8	131.8	F	F
		Intersection							96.7	99.7	F	F
7a	Canal Street S & West Street	NB	T	T	2790	2698	1.02	0.98	54.0	45.7	D	D
			R	R	5	5	0.01	0.01	14.8	14.8	B	B
		SB	L	L	555	559	0.61	0.62	114.2	114.2	F	F
			T	T	1850	1884	0.64	0.65	5.3	5.4	A	A
		Intersection							43.6	39.0	D	D
7b	Canal Street N & West Street	NB	T	T	2790	2698	0.64	0.62	1.0	0.9	A	A
		SB	T	T	2405	2443	0.48	0.48	9.0	9.1	A	A
		WB	LR	L	0	0	-	-	-	-	-	-
				R	0	0	-	-	-	-	-	-
		Intersection							4.7	4.8	A	A
9	West Street & Albany Street	NB	TR	T	1310	1284	0.49	0.48	20.6	20.5	C	C
				R	50	49	-	-	-	-	-	-
		SB	TR	L	0	0	-	-	-	-	-	-
				T	2265	2324	0.68	0.70	24.7	25.1	C	C
				R	80	80	-	-	-	-	-	-
		EB	LTR	L	140	140	-	-	-	-	-	-
				T	90	90	0.71	0.71	50.3	50.7	D	D
				R	80	82	-	-	-	-	-	-
		Intersection							25.4	25.7	C	C
10	West Street & Vesey Street	NB		L	0	0	-	-	-	-	-	-
			T	T	1560	1536	0.45	0.45	15.1	15.0	B	B
		SB	T	T	2420	2465	0.82	0.83	24.4	25.1	C	C
			R	R	140	140	0.32	0.33	15.4	15.5	B	B
		EB	L	L	100	100	0.57	0.58	58.1	58.3	E	E
			R	R	120	122	0.59	0.60	58.1	58.7	E	E
		WB	LT	L	10	10	0	-	-	-	-	-
				T	0	0	0.05	0.05	39.7	39.7	D	D
			R	R	0	0	0	-	-	-	-	-
		Intersection							22.6	23.1	C	C
11	West Street & Chambers Street	NB	TR	T	1975	1879	0.78	0.75	36.8	35.4	D	D
				T	40	38	-	-	-	-	-	-
		SB	L	L	195	195	0.82	0.82	89.8	89.8	F	F
			T	T	1910	1945	0.71	0.72	23.2	23.6	C	C
			R	R	95	95	0.47	0.47	67.4	67.4	E	E
		EB	LTR	L	50	50	-	-	-	-	-	-
				T	20	20	0.27	0.27	39.8	39.9	D	D
				R	5	5	-	-	-	-	-	-
		WB	LT	L	125	127	-	-	-	-	-	-
				T	90	90	0.72	0.74	57.9	58.8	E	E
			R	R	395	396	0.72	0.72	40.7	40.9	D	D
		Intersection							35.9	35.5	D	D
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	1040	1051	0.98	0.99	50.0	52.4	D	D
			R	R	75	85	0.28	0.30	21.2	21.3	C	C
		WB	T	T	440	542	0.42	0.52	20.7	22.2	C	C
		NB	T	T	185	177	0.32	0.30	29.4	29.2	C	C
			R	L	625	619	0.58	0.56	2.2	1.9	A	A
		SB	L	L	670	677	1.04	1.02	62.8	55.1	E	E
			TR	T	105	105	0.26	0.26	4.3	4.3	A	A
				R	20	20	0.06	0.06	2.8	2.8	A	A
		Intersection							35.3	34.4	D	C
15	Manhattan Bridge & Bowery	NB	T	T	185	177	0.17	0.16	1.5	1.6	A	A
		SB	T	T	795	802	0.40	0.40	18.8	18.8	B	B
		WB	R	R	315	416	0.42	0.32	10.1	8.3	B	A
		Intersection					-		14.1	13.4	B	B
18	6th Avenue & Watts Street	WB	TR	T	215	219	0.10	0.11	14.7	14.7	B	B
				R	0	0	-	-	-	-	-	-
		NB	LT	L	200	173	-	-	-	-	-	-
				T	710	605	0.40	0.34	39.2	35.7	D	D
		Intersection							34.3	30.8	C	C
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	445	447	0.79	0.79	44.0	44.3	D	D
		NB	LTR	L	55	44	0	-	-	-	-	-
				T	870	698	0.53	0.43	24.3	22.9	C	C
				R	5	4	0	-	-	-	-	-
		EB	T	T	395	396	0.53	0.53	30.2	30.2	C	C
		WB	TR	T	1300	1333	0.94	0.96	35.3	38.9	D	D
				R	10	10	0	-	-	-	-	-
		Intersection							32.7	34.6	C	C

New Jersey Study Area - Existing vs No-Action - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					Existing	No-Action	Increment	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	14th Street / Holland Tunnel (E-W) & Marin Boulevard (N-S)	WB	TR	T	1970	1988	18	1.03	1.03	58.5	61.3	E	E
				R	205	207	2	-	-	-	-	-	-
		WB2	TR	T	195	197	2	0.83	0.84	80.2	80.9	F	F
				R	5	5	0	-	-	-	-	-	-
		NB	L	L	270	273	3	0.95	0.97	69.9	76.7	E	E
			T	T	170	172	2	0.29	0.29	25.7	25.8	C	C
		SB	TR	T	185	187	2	0.98	0.99	87.2	89.9	F	F
				R	150	152	2	-	-	-	-	-	-
		Intersection								62.4	65.2	E	E
4	14th Street (E-W) & Jersey Avenue (N-S)	WB	L	L	60	61	1	0.10	0.11	16.9	16.9	B	B
			TR	T	2795	2821	26	0.78	0.78	27.4	27.6	C	C
				R	40	40	0	-	-	-	-	-	-
		NB	L	L	85	86	1	0.25	0.25	26.6	26.7	C	C
			T	T	720	727	7	0.56	0.57	32.6	32.7	C	C
		SB	TR	T	135	136	1	0.32	0.33	37.9	37.9	D	D
				R	810	818	8	1.03	1.04	83.6	86.2	F	F
		Intersection								38.4	39.0	D	D
5	12th Street (E-W) & Jersey Avenue (N-S)	SE	L	L	430	434	4	0.27	0.28	4.9	5.0	A	A
			TR	T	655	662	7	1.04	1.05	103.8	107.3	F	F
				R	365	369	4	-	-	-	-	-	-
		EB	LTR	L	375	379	4	-	-	-	-	-	-
				T	1045	1064	19	1.04	1.06	77.6	83.2	E	F
				R	660	667	7	-	-	-	-	-	-
		SB	L	L	125	126	1	0.72	0.73	109.0	109.1	F	F
			T	T	70	71	1	0.72	0.72	107.9	107.4	F	F
		Intersection								78.3	82.4	E	F
8	12th Street/Holland Tunnel (E-W) & Marin Boulevard (N-S)	EB	L	L	70	71	1	0.11	0.12	17.1	17.1	B	B
			TR	T	1920	1948	28	1.03	1.04	57.6	62.3	E	E
				R	55	56	1	-	-	-	-	-	-
		NB	T	T	370	374	4	0.57	0.58	26.7	26.9	C	C
			R	R	445	449	4	1.03	1.04	78.4	81.3	E	F
		SB	T	T	185	187	2	0.29	0.29	21.3	21.4	C	C
		Intersection								53.0	56.5	D	E

New Jersey Study Area - Existing vs No-Action - Midday Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					Existing	No-Action	Increment	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	14th Street / Holland Tunnel (E-W) & Marin Boulevard (N-S)	WB	TR	T	1780	1779	-1	0.95	0.95	38.8	39.5	D	D
				R	175	177	2	-	-	-	-	-	-
		WB2	TR	T	235	237	2	0.94	0.95	95.8	97.1	F	F
				R	5	5	0	-	-	-	-	-	-
		NB	L	L	300	303	3	0.91	0.92	62.1	64.1	E	E
			T	T	280	283	3	0.46	0.46	31.9	31.9	C	C
		SB	TR	T	150	152	2	0.81	0.82	67.9	68.2	E	E
				R	115	116	1	-	-	-	-	-	-
		Intersection								47.9	48.7	D	D
4	14th Street (E-W) & Jersey Avenue (N-S)	WB	L	L	60	61	1	0.10	0.10	16.9	16.9	B	B
			TR	T	2340	2344	4	0.77	0.77	27.6	27.7	C	C
				R	70	71	1	-	-	-	-	-	-
		NB	L	L	110	111	1	0.38	0.39	29.2	29.4	C	C
			T	T	495	500	5	0.38	0.39	28.4	28.4	C	C
		SB	TR	T	115	116	1	0.56	0.57	43.2	43.3	D	D
				R	530	535	5	0.79	0.80	59.8	60.5	E	E
		Intersection								31.5	31.6	C	C
5	12th Street (E-W) & Jersey Avenue (N-S)	SE	L	L	295	298	3	0.23	0.23	5.5	5.5	A	A
			TR	T	680	687	7	0.95	0.96	66.0	68.8	E	E
				R	200	202	2	-	-	-	-	-	-
		EB	LTR	L	310	313	3	-	-	-	-	-	-
				T	895	894	-1	0.83	0.83	49.2	49.1	D	D
				R	115	116	1	-	-	-	-	-	-
		SB	L	L	85	86	1	0.57	0.57	81.2	81.4	F	F
			T	T	90	91	1	0.67	0.67	85.9	86.5	F	F
		Intersection								52.7	53.7	D	D
8	12th Street/Holland Tunnel (E-W) & Marin Boulevard (N-S)	EB	L	L	155	157	2	0.21	0.21	15.4	15.5	B	B
			TR	T	1565	1571	6	0.81	0.81	24.9	25.2	C	C
				R	90	91	1	-	-	-	-	-	-
		NB	T	T	425	429	4	0.81	0.82	41.9	42.0	D	D
			R	R	175	177	2	0.38	0.38	22.3	22.3	C	C
		SB	T	T	150	152	2	0.27	0.27	24.7	24.6	C	C
		Intersection								27.0	27.2	C	C

New Jersey Study Area - Existing vs No-Action - PM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					Existing	No-Action	Increment	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	14th Street / Holland Tunnel (E-W) & Marin Boulevard (N-S)	WB	TR	T	1360	1407	47	1.02	1.06	61.9	73.5	E	E
				R	95	96	1	-	-	-	-	-	-
		WB2	TR	T	280	283	3	1.01	1.02	109.1	110.9	F	F
				R	10	10	0	-	-	-	-	-	-
		NB	L	L	425	429	4	1.04	1.05	83.7	86.1	F	F
			T	T	395	399	4	0.53	0.53	32.1	32.2	C	C
		SB	TR	T	110	111	1	0.96	0.97	84.9	85.6	F	F
				R	225	227	2	-	-	-	-	-	-
		Intersection								68.8	75.2	E	E
4	14th Street (E-W) & Jersey Avenue (N-S)	WB	L	L	35	35	0	0.05	0.05	16.3	16.3	B	B
			TR	T	3560	3629	69	1.04	1.06	58.3	65.2	E	E
				R	30	30	0	-	-	-	-	-	-
		NB	L	L	165	167	2	0.41	0.42	30.5	30.6	C	C
			T	T	810	818	8	0.59	0.60	33.4	33.6	C	C
		SB	TR	T	70	71	1	0.16	0.16	34.9	34.9	C	C
				R	905	914	9	1.04	1.05	85.4	88.1	F	F
		Intersection								57.5	62.4	E	E
5	12th Street (E-W) & Jersey Avenue (N-S)	SE	L	L	355	359	4	0.23	0.23	4.0	4.0	A	A
			TR	T	670	677	7	1.04	1.06	104.4	107.6	F	F
				R	175	177	2	-	-	-	-	-	-
		EB	LTR	L	620	626	6	-	-	-	-	-	-
				T	1605	1617	12	1.04	1.05	74.6	78.0	E	E
				R	185	187	2	-	-	-	-	-	-
		SB	L	L	40	40	0	0.38	0.38	92.5	91.9	F	F
			T	T	65	66	1	0.65	0.65	106.9	106.6	F	F
		Intersection								76.4	79.4	E	E
8	12th Street/Holland Tunnel (E-W) & Marin Boulevard (N-S)	EB	L	L	245	247	2	0.34	0.34	19.3	19.4	B	B
			TR	T	2165	2183	18	0.56	0.57	20.4	20.6	C	C
				R	110	111	1	-	-	-	-	-	-
		NB	T	T	575	581	6	0.90	0.91	46.2	46.8	D	D
			R	R	340	343	3	0.62	0.62	27.3	27.3	C	C
		SB	T	T	110	111	1	0.19	0.19	20.7	20.6	C	C
		Intersection								25.3	25.5	C	C

Queens Midtown Tunnel (Manhattan) Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	E 37th Street & 3rd Avenue	NB	LT	L	20	20	0.09	0.09	4.1	4.1	A	A
			T	T	835	826	0.61	0.60	6.1	6.8	A	A
		WB	T	T	725	728	0.50	0.58	16.8	18.6	B	B
			R	R	260	263	1.05	0.75	117.7	47.9	F	D
		Intersection							21.6	17.4	C	B
2	E 36th Street & 2nd Avenue	SB	L	L	415	438	0.45	0.65	19.3	33.2	B	C
			T	T	1020	1006	0.55	0.52	20.7	12.1	C	B
		EB	TR	T	390	431	0.99	0.48	76.9	27.5	E	C
				R	45	47	-	-	-	-	-	-
		WB	L	L	515	515	1.05	1.67	87.6	340.7	F	F
		Intersection							46.2	93.6	D	F
3	E 34th Street & 3rd Avenue	NB	LT	L	95	94	-	-	-	-	-	-
				T	1000	1005	0.54	0.54	19.4	19.4	B	B
			R	R	105	104	1.04	1.02	121.2	116.9	F	F
		EB	T	T	415	416	1.01	1.01	72.9	73.5	E	E
		WB	T	T	400	402	1.03	1.04	82.7	84.1	F	F
			R	R	50	50	0.18	0.18	21.3	21.3	C	C
		Intersection							47.5	47.5	D	D
4	E 35th Street & 3rd Avenue	NB	LT	L	110	109	-	-	-	-	-	-
				T	940	946	0.57	0.48	3.7	2.5	A	A
		WB	T	T	575	574	0.61	0.61	26.4	26.4	C	C
			R	R	55	55	0.16	0.16	20.7	20.7	C	C
		Intersection							11.8	11.0	B	B
5	E 34th Street & 2nd Ave	SB	L	L	370	370	0.48	0.66	12.3	34.1	B	C
			TR	T	1465	1453	0.78	0.83	21.4	24.7	C	C
				R	120	120	-	1.18	-	162.2	-	F
		EB	TR	T	560	572	0.69	0.76	31.3	34.8	C	C
				R	115	116	-	0.63	-	42.3	-	D
		WB	T	T	205	195	0.56	0.51	32.1	30.5	C	C
		Intersection							23.2	35.3	C	D
6	E 35th Street & 2nd Ave	SB	TR	T	1405	1393	0.82	0.56	25.5	16.1	C	B
				R	175	175	-	0.55	-	19.5	-	B
		EB	R	R	470	473	0.64	0.64	26.7	26.8	C	C
		WB	T	T	90	87	0.22	0.14	19.9	18.3	B	B
			L	L	80	77	0.10	0.14	17.9	18.9	B	B
		Intersection							25.2	19.0	C	B

Queens Midtown Tunnel (Manhattan) Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	E 37th Street & 3rd Avenue	NB	LT	L	45	44	0.17	0.16	8.8	6.5	A	A
			T	T	650	635	0.50	0.49	8.1	5.9	A	A
		WB	T	T	575	577	0.83	0.95	30.6	49.3	C	D
			R	R	260	265	1.01	0.73	103.5	44.8	F	D
		Intersection							29.5	29.2	C	C
2	E 36th Street & 2nd Avenue	SB	L	L	235	242	0.23	0.43	12.3	28.6	B	C
			T	T	1045	1035	0.57	0.50	16.7	11.7	B	B
		EB	TR	T	1230	1278	0.83	1.34	31.1	189.4	C	F
				R	85	85	-	-	-	-	-	-
		Intersection							23.7	106.1	C	F
3	E 34th Street & 3rd Avenue	NB	LT	L	25	24	-	-	-	-	-	-
				T	1070	1075	0.48	0.48	19.0	18.5	B	B
			R	R	175	173	0.79	0.78	48.2	47.2	D	D
		EB	T	T	450	445	0.98	0.96	64.6	62.0	E	E
		WB	T	T	450	450	0.98	0.98	65.0	65.0	E	E
			R	R	80	80	0.30	0.30	23.4	23.4	C	C
		Intersection							39.8	38.9	D	D
4	E 35th Street & 3rd Avenue	NB	LT	L	85	83	-	-	-	-	-	-
				T	1065	1072	1.02	0.82	66.8	14.3	E	B
		WB	T	T	520	519	0.57	0.57	25.4	25.4	C	C
			R	R	60	60	0.19	0.19	21.4	21.4	C	C
		Intersection							52.2	18.0	D	B
5	E 34th Street & 2nd Ave	SB	L	L	230	229	0.35	0.37	12.2	29.5	B	C
			TR	T	1335	1325	0.62	0.73	16.9	21.9	B	C
				R	45	45	-	0.34	-	18.9	-	B
		EB	TR	T	585	591	0.70	0.75	31.2	34.3	C	C
				R	130	130	-	0.59	-	37.9	-	D
		WB	T	T	260	253	0.67	0.63	35.8	33.8	D	C
		Intersection							22.4	27.4	C	C
6	E 35th Street & 2nd Ave	SB	TR	T	1050	1040	0.98	0.58	38.1	12.1	D	B
				R	80	80	-	-	-	-	-	-
		EB	R	R	475	476	0.62	0.62	26.1	26.1	C	C
		WB	T	T	90	88	0.21	0.15	19.8	18.4	B	B
			L	L	85	83	0.11	0.15	18.0	19.0	B	B
		Intersection							32.8	16.6	C	B

Queens Midtown Tunnel (Manhattan) Study Area - Existing vs No-Action - PM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	E 37th Street & 3rd Avenue	NB	LT	L	25	25	-	-	-	-	-	-
			T	T	890	873	0.53	0.52	3.4	2.9	A	A
		WB	T	T	625	618	0.42	0.51	15.7	17.2	B	B
			R	R	270	274	1.05	0.69	111.8	42.1	F	D
		Intersection							20.6	14.0	C	B
2	E 36th Street & 2nd Avenue	SB	L	L	325	364	0.32	0.55	13.3	30.2	B	C
			T	T	1590	1567	0.61	0.67	16.4	14.4	B	B
		EB	TR	T	910	1044	0.57	0.79	24.4	33.4	C	C
				R	60	61	-	-	-	-	-	-
		Intersection							18.7	23.4	B	C
3	E 34th Street & 3rd Avenue	NB	LT	L	70	69	-	-	-	-	-	-
				T	1410	1418	0.65	0.65	21.9	21.2	C	C
			R	R	125	124	0.69	0.68	38.9	38.6	D	D
		EB	T	T	385	386	0.81	0.81	40.2	40.3	D	D
		WB	T	T	435	431	1.05	1.04	83.6	80.6	F	F
			R	R	80	79	0.30	0.30	23.5	23.4	C	C
		Intersection							37.0	35.9	D	D
4	E 35th Street & 3rd Avenue	NB	LT	L	175	173	-	-	-	-	-	-
				T	1315	1324	0.95	0.81	20.7	9.0	C	A
		WB	T	T	435	429	0.49	0.48	24.0	23.9	C	C
			R	R	35	35	0.13	0.13	20.4	20.4	C	C
		Intersection							21.5	12.6	C	B
5	E 34th Street & 2nd Ave	SB	L	L	260	259	0.27	0.42	7.3	24.3	A	C
			TR	T	1680	1657	0.73	0.84	14.8	28.5	B	C
				R	55	55	-	1.28	-	231.7	-	F
		EB	TR	T	415	428	0.57	0.58	28.5	29.4	C	C
				R	110	111	-	0.60	-	39.0	-	D
		WB	T	T	215	202	0.55	0.50	31.6	30.0	C	C
		Intersection							18.2	33.5	B	C
6	E 35th Street & 2nd Ave	SB	TR	T	1555	1533	0.82	0.61	13.7	10.8	B	B
				R	95	95	-	0.29	-	10.2	-	B
		EB	R	R	435	437	0.56	0.56	24.7	24.8	C	C
		WB	T	T	5	1	0.01	-	17.0	17.0	B	B
			L	L	5	1	0.01	-	17.0	17.0	B	B
		Intersection							16.0	13.8	B	B

Queens Midtown Tunnel (Manhattan) Study Area - Existing vs No-Action - Late Night Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	E 37th Street & 3rd Avenue	NB	LT	L	25	25	0.08	0.08	3.6	3.7	A	A
			T	T	1075	1063	0.56	0.55	4.4	4.9	A	A
		WB	T	T	370	372	0.34	0.29	14.8	14.4	B	B
			R	R	335	339	1.00	0.98	101.9	78.4	F	E
		Intersection							17.4	21.8	B	C
2	E 36th Street & 2nd Avenue	SB	L	L	410	421	0.32	0.53	13.1	29.6	B	C
			T	T	1540	1530	0.60	0.67	16.3	14.3	B	B
		EB	TR	T	560	580	0.35	0.56	21.4	28.7	C	C
				R	50	50	-	-	-	-	-	-
		Intersection							17.0	20.3	B	C
3	E 34th Street & 3rd Avenue	NB	LT	L	40	39	-	-	-	-	-	-
				T	1260	1257	0.52	0.52	19.0	18.9	B	B
			R	R	195	193	0.58	0.57	26.1	25.8	C	C
		EB	T	T	500	500	0.52	0.52	24.5	24.5	C	C
		WB	T	T	320	321	0.36	0.36	22.1	22.1	C	C
			R	R	100	100	0.32	0.33	23.5	23.6	C	C
		Intersection							21.3	21.3	C	C
4	E 35th Street & 3rd Avenue	NB	LT	L	55	54	-	-	-	-	-	-
				T	1305	1303	0.62	0.52	5.9	4.3	A	A
		WB	T	T	460	461	0.51	0.51	24.3	24.3	C	C
			R	R	60	60	0.17	0.17	20.7	20.7	C	C
		Intersection							11.2	10.1	B	B
5	E 34th Street & 2nd Ave	SB	L	L	350	350	0.31	0.57	7.7	26.7	A	C
			TR	T	1420	1406	0.55	0.72	8.8	14.3	A	B
				R	105	105	-	0.28	-	8.0	-	A
		EB	TR	T	620	623	0.65	0.66	29.8	29.9	C	C
				R	75	75	-	-	-	-	-	-
		WB	T	T	225	210	0.31	0.28	24.9	24.5	C	C
		Intersection							15.4	20.6	B	C
6	E 35th Street & 2nd Ave	SB	TR	T	1495	1485	0.81	0.68	12.5	11.5	B	B
				R	95	95	-	-	-	-	-	-
		EB	R	R	295	295	0.37	0.37	21.1	21.2	C	C
		WB	T	T	90	86	0.18	0.13	19.3	18.2	B	B
			L	L	85	81	0.10	0.13	17.8	18.6	B	B
		Intersection							14.3	13.5	B	B

Lincoln Tunnel Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	9th Ave and 33rd Street	SB	TR	T	1065	1059	0.46	0.46	15.3	15.3	B	B
				R	60	60	-	-	-	-	-	-
		WB	L	L	50	50	0.19	0.19	25.1	25.1	C	C
			T	T	100	100	0.25	0.25	24.9	24.9	C	C
		Intersection							16.5	16.5	B	B
2	Dyer Ave and 34th Street	SB	L	L	245	245	0.81	0.81	54.1	54.1	D	D
			R	R	155	155	0.87	0.87	81.2	81.2	F	F
		EB	LT	L	0	0	-	-	-	-	-	-
				T	410	411	0.62	0.62	19.2	19.2	B	B
		WB	T	T	350	350	0.52	0.52	16.8	16.8	B	B
			R	R	75	75	0.11	0.11	8.6	8.6	A	A
		Intersection							32.0	32.1	C	C
3	12th Ave and 34th Street	NB	T	T	1825	1833	0.73	0.73	29.4	29.5	C	C
			R	R	220	222	0.55	0.56	29.3	29.4	C	C
		SB	L	L	170	169	0.41	0.41	53.2	53.0	D	D
			T	T	2010	2023	0.68	0.69	2.9	2.9	A	A
		WB	L	L	140	141	0.60	0.60	61.5	61.6	E	E
			R	R	200	200	0.34	0.34	34.7	34.7	C	C
		Intersection							20.7	20.7	C	C
4	11th Ave and 42nd Street	SB	LT	L	60	60	-	-	-	-	-	-
				T	1065	1068	0.48	0.48	21.4	21.4	C	C
			R	R	90	90	0.28	0.28	21.3	21.4	C	C
		EB	T	T	200	199	0.48	0.48	24.6	24.6	C	C
			R	R	230	230	0.56	0.56	32.1	32.2	C	C
		WB	L	L	125	126	0.57	0.57	23.1	23.3	C	C
			T	T	395	396	0.40	0.40	14.3	14.3	B	B
		Intersection							21.2	21.2	C	C
5	12th Ave and 34th Street	NB	TR	T	70	70	0.31	0.31	32.2	32.2	C	C
				R	20	20	-	-	-	-	-	-
		SB	L	L	435	434	0.69	0.69	37.5	37.4	D	D
			T	T	635	633	0.77	0.77	33.5	33.5	C	C
			R	R	210	209	0.65	0.65	36.1	36.0	D	D
		EB	LTR	L	0	0	-	-	-	-	-	-
				T	140	140	0.27	0.27	25.2	25.2	C	C
				R	25	25	-	-	-	-	-	-
		WB	R	R	0	0	-	-	-	-	-	-
		Intersection							33.5	33.4	C	C
6	10th Ave and 33rd Street	NB	LT	L	0	0	-	-	-	-	-	-
				T	1240	1241	0.51	0.51	16.2	16.2	B	B
		WB	TR	T	0	0	0.34	0.34	22.4	22.5	C	C
				R	160	160	-	-	-	-	-	-
		Intersection							16.9	16.9	B	B
7	11th Ave and 34th Street	SB	LTR	L	115	115	-	-	-	-	-	-
				T	905	907	0.76	0.76	24.8	24.9	C	C
				R	110	110	-	-	-	-	-	-
		EB	L	L	110	110	0.76	0.76	47.0	47.0	D	D
			T	T	200	201	0.29	0.29	26.1	26.1	C	C
			R	R	80	80	0.60	0.61	45.6	46.0	D	D
		WB	L	L	175	176	0.77	0.78	39.8	40.6	D	D
			TR	T	230	231	0.83	0.83	50.7	51.3	D	D
				R	25	25	-	-	-	-	-	-
		Intersection							32.2	32.5	C	C
8	10th Ave and 41st Street	NB	LT	L	170	172	-	-	-	-	-	-
				T	1225	1224	0.71	0.71	25.3	25.4	C	C
		WB	T	T	525	531	0.38	0.38	14.7	14.8	B	B
			R	R	485	484	0.99	0.99	72.2	71.8	E	E
		Intersection							32.4	32.3	C	C
9	12th Ave and 42nd Street	NB	T	T	2250	2254	0.98	0.98	72.7	73.0	E	E
			R	R	155	155	0.40	0.40	46.2	46.1	D	D
		SB	L	L	275	274	0.50	0.50	56.0	55.9	E	E
			T	T	2215	2220	0.88	0.88	30.4	30.5	C	C
		EB	LTR	L	5	5	-	-	-	-	-	-
				T	0	0	0.03	0.03	47.0	47.0	D	D
				R	0	0	-	-	-	-	-	-
		WB	L	L	125	126	0.37	0.37	53.1	53.2	D	D
			R	R	360	360	0.50	0.50	29.1	29.1	C	C
		Intersection							50.1	50.2	D	D

Lincoln Tunnel Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	9th Ave and 33rd Street	SB	TR	T	980	977	0.43	0.42	14.9	14.9	B	B
				R	65	64	-	-	-	-	-	-
		WB	L	L	70	70	0.28	0.28	26.5	26.5	C	C
			T	T	110	108	0.27	0.27	25.2	25.1	C	C
		Intersection							16.6	16.5	B	B
2	Dyer Ave and 34th Street	SB	L	L	160	159	0.44	0.44	37.2	37.2	D	D
			R	R	95	95	0.54	0.54	47.3	47.3	D	D
		EB	LT	L	5	5	-	-	-	-	-	-
				T	370	370	0.52	0.52	16.5	16.5	B	B
		WB	T	T	405	405	0.59	0.59	18.2	18.2	B	B
			R	R	170	170	0.25	0.25	9.9	9.9	A	A
		Intersection							21.1	21.1	C	C
3	12th Ave and 34th Street	NB	T	T	1385	1396	0.61	0.61	23.5	23.6	C	C
			R	R	215	217	0.58	0.58	28.4	28.6	C	C
		SB	L	L	180	180	0.62	0.62	63.4	63.3	E	E
			T	T	1665	1675	0.60	0.60	16.2	16.3	B	B
		WB	L	L	130	131	0.49	0.49	42.4	42.5	D	D
			R	R	220	220	0.30	0.30	26.2	26.2	C	C
		Intersection							24.1	24.2	C	C
4	11th Ave and 42nd Street	SB	LT	L	50	50	-	-	-	-	-	-
				T	1115	1102	0.63	0.48	36.6	21.5	D	C
			R	R	100	100	0.44	0.32	38.6	22.1	D	C
		EB	T	T	185	185	0.66	0.50	43.1	24.9	D	C
			R	R	280	277	0.78	0.59	64.1	33.0	E	C
		WB	L	L	135	135	0.34	0.50	12.7	19.2	B	B
			T	T	580	581	0.43	0.51	12.7	16.1	B	B
		Intersection							32.2	21.2	C	C
5	12th Ave and 34th Street	NB	TR	T	265	263	0.88	0.87	59.5	58.7	E	E
				R	10	10	-	-	-	-	-	-
		SB	L	L	190	189	0.28	0.28	25.6	25.6	C	C
			T	T	250	249	0.33	0.33	24.8	24.8	C	C
			R	R	80	80	0.25	0.25	25.2	25.2	C	C
		EB		L	0	0	-	-	-	-	-	-
			LTR	T	200	198	0.30	0.30	25.5	25.5	C	C
				R	30	30	-	-	-	-	-	-
		WB	R	R	0	0	-	-	-	-	-	-
		Intersection							34.9	34.6	C	C
6	10th Ave and 33rd Street	NB	LT	L	0	0	-	-	-	-	-	-
				T	1310	1310	0.49	0.49	15.9	15.9	B	B
		WB	TR	T	30	27	0.42	0.41	23.5	23.5	C	C
				R	145	145	-	-	-	-	-	-
		Intersection							17.0	17.0	B	B
7	11th Ave and 34th Street	SB		L	75	75	-	-	-	-	-	-
			LTR	T	735	736	0.67	0.67	22.3	22.3	C	C
				R	120	120	-	-	-	-	-	-
		EB	L	L	160	160	0.96	0.96	79.8	81.2	E	F
			T	T	180	182	0.29	0.29	26.1	26.1	C	C
			R	R	55	55	0.38	0.39	33.4	33.5	C	C
		WB	L	L	140	140	0.51	0.51	23.4	23.4	C	C
			TR	T	230	231	0.84	0.84	51.0	51.3	D	D
				R	35	35	-	-	-	-	-	-
		Intersection							32.9	33.1	C	C
8	10th Ave and 41st Street	NB	LT	L	240	233	-	-	-	-	-	-
				T	1450	1450	0.78	0.78	27.1	27.0	C	C
		WB	T	T	710	690	0.42	0.40	15.1	14.9	B	B
			R	R	540	540	0.97	0.97	65.4	65.4	E	E
		Intersection							31.3	31.3	C	C
9	12th Ave and 42nd Street	NB	T	T	1850	1860	1.02	1.03	53.3	54.8	D	D
			R	R	125	125	0.45	0.45	22.9	22.8	C	C
		SB	L	L	340	337	0.65	0.65	49.2	48.9	D	D
			T	T	1775	1783	0.93	0.93	38.6	39.1	D	D
		EB		L	5	5	-	-	-	-	-	-
			LTR	T	0	0	0.19	0.19	35.5	35.5	D	D
				R	40	40	-	-	-	-	-	-
		WB	L	L	140	141	0.41	0.41	39.1	39.3	D	D
			R	R	540	540	0.64	0.64	21.9	21.9	C	C
		Intersection							42.5	43.3	D	D

Lincoln Tunnel Study Area - Existing vs No-Action - PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	9th Ave and 33rd Street	SB	TR	T	1050	1042	0.41	0.41	14.7	14.7	B	B
				R	85	85	-	-	-	-	-	-
		WB	L	L	95	95	0.37	0.37	28.6	28.6	C	C
			T	T	210	211	0.48	0.48	28.9	29.0	C	C
		Intersection							18.0	18.0	B	B
2	Dyer Ave and 34th Street	SB	L	L	165	167	0.47	0.48	37.7	37.8	D	D
			R	R	105	105	0.52	0.52	45.2	45.2	D	D
		EB	LT	L	0	0	-	-	-	-	-	-
				T	400	400	0.55	0.55	17.2	17.2	B	B
		WB	T	T	555	553	0.79	0.78	25.7	25.5	C	C
			R	R	90	90	0.13	0.13	8.8	8.8	A	A
		Intersection							24.9	24.8	C	C
3	12th Ave and 34th Street	NB	T	T	2355	2322	0.75	0.74	23.0	22.7	C	C
			R	R	290	286	0.51	0.50	20.1	19.9	C	B
		SB	L	L	295	293	1.05	1.04	118.2	116.8	F	F
			T	T	2285	2288	0.74	0.74	24.0	24.0	C	C
		WB	L	L	85	86	0.47	0.48	57.6	57.6	E	E
			R	R	220	220	0.39	0.39	44.9	44.9	D	D
		Intersection							30.0	29.9	C	C
4	11th Ave and 42nd Street	SB	LT	L	15	15	-	-	-	-	-	-
				T	700	700	0.43	0.33	33.3	19.8	C	B
			R	R	45	45	0.21	0.15	32.9	19.3	C	B
		EB	T	T	185	183	0.72	0.55	46.2	26.1	D	C
			R	R	290	288	0.90	0.65	83.5	37.0	F	D
		WB	L	L	175	176	0.33	0.50	12.7	19.4	B	B
			T	T	185	185	0.23	0.30	10.5	12.6	B	B
		Intersection							35.9	21.6	D	C
5	12th Ave and 34th Street	NB	TR	T	145	142	0.48	0.47	35.4	35.1	D	D
				R	5	5	-	-	-	-	-	-
		SB	L	L	355	356	0.54	0.54	31.0	31.0	C	C
			T	T	535	536	0.59	0.59	28.4	28.4	C	C
			R	R	105	105	0.31	0.31	26.1	26.1	C	C
		EB	LTR	L	120	120	-	-	-	-	-	-
				T	150	150	0.49	0.49	28.5	28.5	C	C
				R	35	35	-	-	-	-	-	-
		WB	R	R	0	0	-	-	-	-	-	-
		Intersection							29.4	29.3	C	C
6	10th Ave and 33rd Street	NB	LT	L	0	0	-	-	-	-	-	-
				T	1650	1641	0.61	0.61	17.5	17.5	B	B
		WB	TR	T	180	181	0.45	0.45	18.9	18.9	B	B
				R	115	115	-	-	-	-	-	-
		Intersection							17.8	17.7	B	B
7	11th Ave and 34th Street	SB	LTR	L	35	35	-	-	-	-	-	-
				T	245	245	0.26	0.26	16.3	16.3	B	B
				R	60	60	-	-	-	-	-	-
		EB	L	L	220	218	0.97	0.96	74.4	72.4	E	E
			T	T	305	302	0.42	0.42	28.0	27.9	C	C
			R	R	60	59	0.40	0.39	33.4	33.3	C	C
		WB	L	L	110	110	0.42	0.42	20.2	20.2	C	C
			TR	T	245	246	0.90	0.90	58.6	59.0	E	E
				R	45	45	-	-	-	-	-	-
		Intersection							38.5	38.3	D	D
8	10th Ave and 41st Street	NB	LT	L	285	292	-	-	-	-	-	-
				T	1610	1603	0.84	0.88dl	29.0	29.1	C	C
		WB	T	T	210	214	0.14	0.14	12.4	12.4	B	B
			R	R	80	79	0.22	0.22	31.7	31.7	C	C
		Intersection							27.3	27.4	C	C
9	12th Ave and 42nd Street	NB	T	T	2640	2609	0.88	0.87	16.7	16.4	B	B
			R	R	125	123	0.28	0.28	7.6	7.6	A	A
		SB	L	L	350	348	1.05	1.05	124.7	123.4	F	F
			T	T	2510	2509	0.91	0.91	29.2	29.2	C	C
		EB	LTR	L	5	5	-	-	-	-	-	-
				T	0	0	0.04	0.04	47.0	47.0	D	D
				R	0	0	-	-	-	-	-	-
		WB	L	L	95	95	0.37	0.37	53.8	53.8	D	D
			R	R	135	135	0.28	0.28	35.3	35.3	D	D
		Intersection							29.5	29.3	C	C

Red Hook Study Area - Existing vs No-Action - AM Peak Hour											
Intersection #	Intersection Name	Approach	Lane Group	Volume		V/C		Delay		LOS	
				Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Hamilton Avenue, Clinton Street & West 9th Street	EB	TR	110	112	0.42	0.42	44.5	44.6	D	D
				0	0	-	-	-	-	-	-
		NB	LT	260	260	-	-	-	-	-	-
				2445	2425	0.65	0.65	7.5	7.8	A	A
		SB (at West 9th)	TR	1085	1118	0.39	0.40	8.2	8.3	A	A
				80	82	-	-	-	-	-	-
		SB (at Clinton St)	L	240	249	0.28	0.29	4.8	4.7	A	A
			TR	845	866	0.52	0.53	6.6	6.7	A	A
				115	118	-	-	-	-	-	-
		WB	L	115	115	0.14	0.14	54.2	54.5	D	D
			T	145	145	0.24	0.24	58.3	58.4	E	E
		Intersection						9.8	10.0	A	A
2	Hamilton Avenue NB & West 9th Street	NB	T	2110	2081	0.61	0.60	14.6	14.5	B	B
		WB	R	245	243	0.42	0.42	36.6	36.5	D	D
		Intersection						17.3	17.1	B	B

Red Hook Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Volume		V/C		Delay		LOS	
				Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Hamilton Avenue, Clinton Street & West 9th Street	EB	TR	110	114	0.37	0.39	41.5	41.8	D	D
				0	0	-	-	-	-	-	-
		NB	LT	245	245	-	-	-	-	-	-
				2185	2226	0.61	0.62	8.0	8.4	A	A
		SB (at West 9th)	TR	1125	1167	0.42	0.43	9.3	9.5	A	A
				90	93	-	-	-	-	-	-
		SB (at Clinton St)	L	245	258	0.27	0.28	4.8	4.7	A	A
			TR	880	905	0.56	0.57	7.2	7.3	A	A
				130	134	-	-	-	-	-	-
		WB	L	130	130	0.14	0.14	55.7	55.6	E	E
			T	115	115	0.16	0.16	56.2	56.1	E	E
		Intersection						10.2	10.4	B	B
2	Hamilton Avenue NB & West 9th Street	NB	T	1945	1967	0.53	0.54	10.8	10.9	B	B
		WB	R	130	132	0.28	0.29	38.7	38.8	D	D
		Intersection						12.8	13.0	B	B

Red Hook Study Area - Existing vs No-Action - PM Peak Hour											
Intersection #	Intersection Name	Approach	Lane Group	Volume		V/C		Delay		LOS	
				Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Hamilton Avenue, Clinton Street & West 9th Street	EB	TR	120	120	0.35	0.35	40.8	40.8	D	D
				0	0	-	-	-	-	-	-
		NB	LT	200	200	-	-	-	-	-	-
				2145	2066	0.58	0.56	9.4	9.6	A	A
		SB (at West 9th)	TR	1280	1312	0.45	0.46	9.6	9.7	A	A
				55	57	-	-	-	-	-	-
		SB (at Clinton St)	L	285	287	0.29	0.29	4.1	4.1	A	A
			TR	995	1022	0.61	0.63	7.0	7.1	A	A
				105	108	-	-	-	-	-	-
		WB	L	105	105	0.15	0.15	57.9	58.6	E	E
			T	95	95	0.16	0.16	58.2	58.9	E	E
		Intersection						10.6	10.7	B	B
2	Hamilton Avenue NB & West 9th Street	NB	T	1805	1729	0.50	0.48	12.3	11.3	B	B
		WB	R	135	130	0.29	0.27	38.7	38.5	D	D
		Intersection						14.4	13.5	B	B

Red Hook Study Area - Existing vs No-Action - Late Night Peak Hour											
Intersection #	Intersection Name	Approach	Lane Group	Volume		V/C		Delay		LOS	
				Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Hamilton Avenue, Clinton Street & West 9th Street	EB	TR	55	55	0.17	0.17	37.4	37.4	D	D
				0	0	-	-	-	-	-	-
		NB	LT	75	75	-	-	-	-	-	-
				1345	1282	0.37	0.36	7.7	8.0	A	A
		SB (at West 9th)	TR	735	739	0.25	0.25	7.8	7.8	A	A
				45	45	-	-	-	-	-	-
		SB (at Clinton St)	L	190	192	0.20	0.20	2.6	2.6	A	A
			TR	545	547	0.29	0.29	2.5	2.5	A	A
				25	25	-	-	-	-	-	-
		WB	L	25	25	0.03	0.03	60.1	59.8	E	E
			T	50	50	0.07	0.07	60.4	61.0	E	E
		Intersection						7.9	8.1	A	A
2	Hamilton Avenue NB & West 9th Street	NB	T	1095	1034	0.29	0.27	8.1	8.0	A	A
		WB	R	80	76	0.16	0.15	36.8	36.7	D	D
		Intersection						10.3	10.2	B	B

RFK Bridge Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	126th Street and 2nd Avenue	NW	L	L2	30	30	-	-	-	-	-	-
				L	190	190	0.97	0.97	85.0	85.0	F	F
			R	R	415	415	0.31	0.31	7.3	7.3	A	A
		SB	TR	T	1240	1240	0.56	0.56	21.9	21.9	C	C
				R	45	45	-	-	-	-	-	-
		WB	LTR	L	40	40	-	-	-	-	-	-
				T	30	30	0.81	0.80	58.1	57.6	E	E
				R	95	94	-	-	-	-	-	-
		Intersection							28.9	28.9	C	C
2	125th Street and 2nd Avenue	SB	L	L	495	501	0.54	0.54	7.3	7.4	A	A
			TR	T	760	754	0.58	0.58	6.9	6.9	A	A
				R	55	55	-	-	-	-	-	-
		SW	LR	L	385	394	1.04	1.06	83.2	90.2	F	F
				R	130	133	-	-	-	-	-	-
		EB	TR	T	600	627	0.83	0.86	41.7	44.2	D	D
				R	40	40	-	-	-	-	-	-
		WB	LT	L	25	22	-	-	-	-	-	-
				T	70	61	0.26	0.22	29.5	28.9	C	C
		Intersection							32.5	34.9	C	C
11	E 134th Street & St. Ann's Avenue	NB	TR	T	140	140	0.46	0.46	18.5	18.5	B	B
				R	80	80	-	-	-	-	-	-
		SB	LT	L	145	145	-	-	-	-	-	-
				T	105	105	0.62	0.62	20.2	20.2	C	C
		EB	LTR	L	140	140	-	-	-	-	-	-
				T	120	120	0.80	0.80	33.1	33.1	C	C
				R	45	45	-	-	-	-	-	-
		Intersection							24.8	24.8	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	25	25	-	-	-	-	-	-
				T	105	105	0.56	0.56	46.0	46.0	D	D
				R	30	30	-	-	-	-	-	-
		SB	LTR	L	55	55	-	-	-	-	-	-
				T	70	70	0.57	0.57	48.6	48.6	D	D
				R	25	25	-	-	-	-	-	-
		EB	LTR	L	50	50	-	-	-	-	-	-
				T	1440	1440	0.90	0.90	25.6	25.6	C	C
				R	30	30	-	-	-	-	-	-
		WB	LTR	L	40	40	-	-	-	-	-	-
				T	480	480	0.50	0.50	11.6	11.6	B	B
				R	65	65	-	-	-	-	-	-
		Intersection							24.9	24.9	C	C
17	31st St & Astoria Blvd	NB	T	T	110	96	0.29	0.26	38.0	37.3	D	D
			R	R	20	17	0.03	0.02	7.3	7.3	A	A
		SB	T	T	545	558	0.61	0.62	25.8	26.5	C	C
			R	R	170	174	0.40	0.41	23.5	23.9	C	C
		EB	LTR	L	10	10	-	-	-	-	-	-
				T	350	362	0.49	0.51	32.3	32.6	C	C
				R	25	26	-	-	-	-	-	-
		Intersection							28.5	28.8	C	C
24	Hoyt N & 31st St	NB	LT	L	20	18	-	-	-	-	-	-
				T	105	94	0.23	0.21	24.1	21.0	C	C
		SB	TR	T	250	262	0.78	0.81	108.0	109.4	F	F
				R	130	131	-	-	-	-	-	-
		WB	L	L	400	401	0.26	0.26	9.3	9.3	A	A
			T	T	2120	2135	0.66	0.66	14.0	14.1	B	B
			R	R	35	35	0.10	0.10	8.5	8.5	A	A
		Intersection							26.8	27.3	C	C
3	Hoyt S & 31st St	NB	TR	T	110	97	0.18	0.16	21.9	21.9	C	C
				R	10	9	-	-	-	-	-	-
		SB	LT	L	20	20	-	-	-	-	-	-
				T	630	643	0.37	0.38	15.2	15.7	B	B
		EB	LT	L	15	15	-	-	-	-	-	-
				T	865	893	0.77	0.79	45.6	46.5	D	D
			R	R	85	89	0.36	0.38	41.1	41.7	D	D
		Intersection							32.7	33.6	C	C

RFK Bridge Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	126th Street and 2nd Avenue	NW	L	L2	0	0	-	-	-	-	-	-
				L	120	120	0.55	0.55	41.3	41.3	D	D
			R	R	1050	1050	0.70	0.70	13.0	13.0	B	B
		SB	TR	T	1045	1042	0.47	0.47	20.8	20.7	C	C
				R	50	49	-	-	-	-	-	-
		WB	LTR	L	45	45	-	-	-	-	-	-
				T	20	20	0.68	0.68	46.0	46.0	D	D
				R	90	90	-	-	-	-	-	-
		Intersection							20.3	20.3	C	C
2	125th Street and 2nd Avenue	SB	L	L	315	318	0.37	0.38	6.2	6.2	A	A
			TR	T	730	724	0.54	0.54	6.8	6.8	A	A
				R	45	45	-	-	-	-	-	-
		SW	LR	L	305	314	0.98	1.02	72.7	80.0	E	F
				R	125	129	-	-	-	-	-	-
		EB	TR	T	545	555	0.71	0.72	36.4	36.8	D	D
				R	50	50	-	-	-	-	-	-
		WB	LT	L	20	18	-	-	-	-	-	-
				T	70	64	0.21	0.19	28.5	28.3	C	C
		Intersection							28.6	30.6	C	C
11	E 134th Street & St. Ann's Avenue	NB	TR	T	170	170	0.51	0.51	14.0	14.1	B	B
				R	80	80	-	-	-	-	-	-
		SB	LT	L	110	110	-	-	-	-	-	-
				T	95	95	0.53	0.53	17.9	18.0	B	B
		EB	LTR	L	155	155	-	-	-	-	-	-
				T	140	140	0.94	0.94	51.5	51.5	D	D
				R	85	85	-	-	-	-	-	-
		Intersection							31.7	31.7	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	20	20	-	-	-	-	-	-
				T	140	140	0.80	0.80	55.7	55.7	E	E
				R	75	75	-	-	-	-	-	-
		SB	LTR	L	85	85	-	-	-	-	-	-
				T	60	60	0.72	0.73	59.0	59.3	E	E
				R	35	35	-	-	-	-	-	-
		EB	LTR	L	55	55	-	-	-	-	-	-
				T	1260	1260	0.98	0.98	41.0	41.0	D	D
				R	35	35	-	-	-	-	-	-
		WB	LTR	L	40	40	-	-	-	-	-	-
				T	760	760	0.70	0.70	19.9	19.9	B	B
				R	55	55	-	-	-	-	-	-
		Intersection							37.1	37.1	D	D
17	31st St & Astoria Blvd	NB	T	T	165	117	0.45	0.32	32.9	30.4	C	C
			R	R	5	3	0.01	-	4.4	4.3	A	A
		SB	T	T	240	242	0.29	0.29	11.6	11.6	B	B
			R	R	115	115	0.38	0.38	14.7	14.8	B	B
		EB	LTR	L	20	20	-	-	-	-	-	-
				T	360	364	0.45	0.46	22.2	22.3	C	C
				R	40	40	-	-	-	-	-	-
		Intersection							20.5	19.5	C	B
24	Hoyt N & 31st St	NB	LT	L	130	102	-	-	-	-	-	-
				T	60	41	0.38	0.29	11.4	9.5	B	A
		SB	TR	T	205	206	0.37	0.37	23.1	23.1	C	C
				R	70	70	-	-	-	-	-	-
		WB	L	L	215	215	0.17	0.17	11.2	11.2	B	B
			T	T	1680	1684	0.67	0.67	16.7	16.7	B	B
			R	R	65	65	0.17	0.17	12.0	12.0	B	B
		Intersection							16.4	16.4	B	B
3	Hoyt S & 31st St	NB	TR	T	180	133	0.22	0.16	9.8	11.4	A	B
				R	5	4	-	-	-	-	-	-
		SB	LT	L	140	140	-	-	-	-	-	-
				T	280	281	0.41	0.41	13.3	13.2	B	B
		EB	LT	L	10	10	-	-	-	-	-	-
				T	850	861	0.55	0.55	25.9	26.0	C	C
			R	R	75	76	0.23	0.23	23.8	23.9	C	C
		Intersection							20.4	20.9	C	C

RFK Bridge Study Area - Existing vs No-Action - PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	126th Street and 2nd Avenue	NW	L	L2	25	25	-	-	-	-	-	-
				L	180	180	0.93	0.93	76.4	76.4	E	E
			R	R	765	765	0.55	0.55	10.0	10.0	B	B
		SB	TR	T	1405	1472	0.56	0.58	21.8	22.2	C	C
				R	35	35	-	-	-	-	-	-
		WB	LTR	L	45	47	-	-	-	-	-	-
				T	25	25	0.56	0.57	39.5	40.0	D	D
				R	50	51	-	-	-	-	-	-
		Intersection							23.9	24.1	C	C
2	125th Street and 2nd Avenue	SB	L	L	580	663	0.61	0.69	8.4	9.9	A	A
			TR	T	835	822	0.55	0.55	6.6	6.4	A	A
				R	60	59	-	-	-	-	-	-
		SW	LR	L	400	369	0.96	0.88	62.5	51.0	E	D
				R	150	138	-	-	-	-	-	-
		EB	TR	T	595	686	0.70	0.81	35.8	39.9	D	D
				R	20	20	-	-	-	-	-	-
		WB	LT	L	25	55	-	-	-	-	-	-
				T	80	176	0.23	0.63	28.7	38.3	C	D
		Intersection							25.3	25.0	C	C
11	E 134th Street & St. Ann's Avenue	NB	TR	T	110	110	0.41	0.41	10.9	10.9	B	B
				R	100	100	-	-	-	-	-	-
		SB	LT	L	110	110	-	-	-	-	-	-
				T	50	50	0.38	0.38	13.8	13.8	B	B
		EB	LTR	L	155	155	-	-	-	-	-	-
				T	140	140	0.78	0.78	30.3	30.3	C	C
				R	30	30	-	-	-	-	-	-
		Intersection							20.5	20.5	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	20	20	-	-	-	-	-	-
				T	95	95	0.50	0.50	43.0	43.0	D	D
				R	30	30	-	-	-	-	-	-
		SB	LTR	L	35	35	-	-	-	-	-	-
				T	20	20	0.29	0.29	39.6	39.6	D	D
				R	25	25	-	-	-	-	-	-
		EB	LTR	L	50	50	-	-	-	-	-	-
				T	1300	1300	0.85	0.85	22.5	22.5	C	C
				R	45	45	-	-	-	-	-	-
		WB	LTR	L	25	25	-	-	-	-	-	-
				T	610	610	0.46	0.46	11.4	11.4	B	B
				R	65	65	-	-	-	-	-	-
		Intersection							21.1	21.1	C	C
17	31st St & Astoria Blvd	NB	T	T	175	42	0.47	0.11	33.5	27.5	C	C
			R	R	20	5	0.03	0.01	4.6	4.4	A	A
		SB	T	T	475	478	0.58	0.58	76.7	76.7	E	E
			R	R	220	222	0.74	0.75	93.8	94.5	F	F
		EB	LTR	L	15	16	-	-	-	-	-	-
				T	360	388	0.47	0.50	22.4	23.0	C	C
				R	45	48	-	-	-	-	-	-
		Intersection							54.9	57.3	D	E
24	Hoyt N & 31st St	NB	LT	L	50	17	-	-	-	-	-	-
				T	135	47	0.36	0.12	97.0	27.8	F	C
		SB	TR	T	125	121	0.36	0.36	38.5	38.4	D	D
				R	70	70	-	-	-	-	-	-
		WB	L	L	510	513	0.33	0.34	9.7	9.7	A	A
			T	T	1515	1523	0.47	0.47	10.7	10.7	B	B
			R	R	35	35	0.07	0.07	7.8	7.8	A	A
		Intersection							19.6	13.3	B	B
3	Hoyt S & 31st St	NB	TR	T	175	53	0.25	0.08	103.7	37.4	F	D
				R	15	5	-	-	-	-	-	-
		SB	LT	L	20	20	-	-	-	-	-	-
				T	615	614	0.39	0.39	13.6	13.2	B	B
		EB	LT	L	10	11	-	-	-	-	-	-
				T	990	1071	0.56	0.61	32.3	33.2	C	C
			R	R	80	86	0.24	0.25	29.0	29.3	C	C
		Intersection							33.5	26.4	C	C

RFK Bridge Study Area - Existing vs No-Action - Late Night Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	126th Street and 2nd Avenue	NW	L	L2	5	5	-	-	-	-	-	-
				L	75	75	0.36	0.36	35.3	35.3	D	D
			R	R	535	535	0.40	0.40	8.1	8.1	A	A
		SB	TR	T	570	560	0.24	0.24	18.2	18.2	B	B
				R	20	20	-	-	-	-	-	-
		WB	LTR	L	20	20	-	-	-	-	-	-
				T	35	35	0.46	0.46	35.7	35.7	D	D
				R	60	60	-	-	-	-	-	-
		Intersection							16.7	16.6	B	B
2	125th Street and 2nd Avenue	SB	L	L	110	109	0.13	0.13	5.7	5.7	A	A
			TR	T	465	456	0.32	0.31	6.3	6.3	A	A
				R	20	20	-	-	-	-	-	-
		SW	LR	L	165	174	0.58	0.61	36.8	37.6	D	D
				R	145	153	-	-	-	-	-	-
		EB	TR	T	530	535	0.67	0.68	34.8	34.9	C	C
				R	50	50	-	-	-	-	-	-
		WB	LT	L	10	9	-	-	-	-	-	-
				T	80	70	0.17	0.15	27.8	27.5	C	C
		Intersection							23.3	23.8	C	C
11	E 134th Street & St. Ann's Avenue	NB	TR	T	100	100	0.21	0.21	17.0	17.0	B	B
				R	20	20	-	-	-	-	-	-
		SB	LT	L	40	40	-	-	-	-	-	-
				T	50	50	0.18	0.18	10.9	10.9	B	B
		EB	LTR	L	190	190	-	-	-	-	-	-
				T	90	90	0.70	0.70	25.0	25.0	C	C
				R	35	35	-	-	-	-	-	-
		Intersection							20.6	20.6	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	10	10	-	-	-	-	-	-
				T	55	55	0.24	0.24	33.0	33.0	C	C
				R	15	15	-	-	-	-	-	-
		SB	LTR	L	30	30	-	-	-	-	-	-
				T	10	10	0.25	0.25	35.0	35.0	C	C
				R	45	45	-	-	-	-	-	-
		EB	LTR	L	40	40	-	-	-	-	-	-
				T	1515	1515	0.88	0.88	26.6	26.6	C	C
				R	10	10	-	-	-	-	-	-
		WB	LTR	L	10	10	-	-	-	-	-	-
				T	500	500	0.33	0.33	12.2	12.2	B	B
				R	25	25	-	-	-	-	-	-
		Intersection							23.7	23.7	C	C
17	31st St & Astoria Blvd	NB	T	T	140	120	0.40	0.34	31.8	30.7	C	C
			R	R	15	13	0.02	0.02	4.5	4.5	A	A
		SB	T	T	345	345	0.47	0.47	9.3	9.2	A	A
			R	R	165	165	0.38	0.39	10.0	10.0	A	A
		EB	LTR	L	10	10	-	-	-	-	-	-
				T	285	286	0.32	0.32	20.2	20.2	C	C
				R	15	15	-	-	-	-	-	-
		Intersection							16.0	15.5	B	B
24	Hoyt N & 31st St	NB	LT	L	90	80	-	-	-	-	-	-
				T	60	51	0.27	0.23	8.7	7.7	A	A
		SB	TR	T	220	220	0.28	0.28	21.7	21.7	C	C
				R	40	40	-	-	-	-	-	-
		WB	L	L	440	440	0.33	0.33	48.5	45.6	D	D
			T	T	1105	1105	0.42	0.42	13.2	13.2	B	B
			R	R	20	20	0.04	0.04	10.4	10.4	B	B
		Intersection							21.8	21.2	C	C
3	Hoyt S & 31st St	NB	TR	T	145	126	0.18	0.16	7.8	8.3	A	A
				R	5	4	-	-	-	-	-	-
		SB	LT	L	205	205	-	-	-	-	-	-
				T	455	455	0.65	0.65	27.2	26.9	C	C
		EB	LT	L	5	5	-	-	-	-	-	-
				T	740	744	0.44	0.44	24.3	24.3	C	C
			R	R	55	55	0.17	0.17	22.7	22.7	C	C
		Intersection							24.0	24.1	C	C

Upper East Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	15	14	-	-	-	-	-	-
				T	310	296	-	-	-	-	-	-
				R	510	487	-	-	-	-	-	-
		EB	LT	L	0	0	-	-	-	-	-	-
				T	10	10	-	-	-	-	-	-
		Intersection	Unsignalized									
2	E 60th Street & 3rd Ave	NB	L	L	95	94	0.24	0.24	19.9	19.8	B	B
			T	T	1050	1000	0.57	0.55	22.5	22.1	C	C
		WB	T	T	350	384	0.65	0.72	16.1	19.1	B	B
			R	R	225	242	1.03	1.11	87.7	110.3	F	F
		Intersection							29.4	33.5	C	C
3	E 60th Street & York Ave	NB	T	T	670	670	0.38	0.38	20.3	20.3	C	C
		SB	T	T	460	447	0.28	0.27	19.0	18.9	B	B
		EB	L	L	250	219	0.34	0.29	29.6	28.7	C	C
			T	T	0	0	0.35	0.31	30.0	29.0	C	C
			R	R	50	50	0.13	0.13	25.7	25.7	C	C
		WB	L	L	0	0	-	-	-	-	-	-
			T	T	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection							21.7	21.4	C	C
4	E 59th Street & 2nd Ave	EB	T	T	765	1023	1.02	1.36	67.5	198.1	E	F
			RR2	R	15	15	0.11	0.11	25.5	25.5	C	C
				R2	15	15	-	-	-	-	-	-
		SB	L2	L2	980	1332	0.65	0.88	11.1	27.1	B	C
			L2L	L	5	5	-	-	-	-	-	-
			T	T	840	856	0.45	0.46	7.3	7.1	A	A
		Intersection							26.6	75.9	C	E
5	E 60th Street & 2nd Ave	NWB	L2	L2	700	769	0.49	0.54	20.2	20.9	C	C
			L	L	525	577	0.59	0.65	22.8	24.1	C	C
		SB	LT	L2	10	10	-	-	-	-	-	-
				T	1120	1420	0.58	0.73	20.1	23.6	C	C
			R	R	40	39	0.13	0.13	16.0	16.0	B	B
		WB	LT	L	5	4	-	-	-	-	-	-
				T	10	10	0.03	0.03	15.5	15.4	B	B
		Intersection							20.6	22.8	C	C
6	E 60th Street & 1st Ave	NB	TR	T	1260	1196	0.54	0.51	16.9	16.5	B	B
				R	50	47	-	-	-	-	-	-
		EB	L	L	270	275	0.76	0.77	42.6	43.8	D	D
			T	T	250	222	0.23	0.20	16.6	16.4	B	B
		Intersection							20.5	20.6	C	C
7	E 60th Street & Lexington Ave	SB	TR	T	960	939	0.68	0.58	22.4	20.4	C	C
				R	80	78	-	0.25	-	17.9	-	B
		WB	L	L	95	101	0.32	0.34	34.6	34.1	C	C
			T	T	350	377	0.42	0.45	35.1	34.8	D	C
		Intersection							26.3	25.0	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	105	104	-	-	-	-	-	-
				T	950	917	0.54	0.53	19.4	21.5	B	C
		WB	TR	T	335	357	0.59	0.59	41.3	30.6	D	C
				R	95	98	-	-	-	-	-	-
		Intersection							26.0	24.5	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	1200	1198	0.70	0.68	21.9	24.0	C	C
				R	95	95	-	-	-	-	-	-
		WB	LT	L	75	80	-	-	-	-	-	-
				T	365	381	0.58	0.58	13.5	15.3	B	B
		Intersection							19.6	21.6	B	C
9	E 60th Street & Madison Ave	NB	L	L	140	134	0.37	0.32	20.9	20.5	C	C
			T	T	815	782	0.66	0.61	18.1	18.3	B	B
		WB	TR	T	335	348	0.55	0.59	24.1	21.7	C	C
				R	125	128	-	-	-	-	-	-
		Intersection							20.4	19.7	C	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	715	681	0.41	0.61	8.5	11.2	A	B
			R	R	750	715	0.99	0.62	45.9	13.9	D	B
		EB	LT	L	10	10	-	-	-	-	-	-
				T	240	232	0.42	0.41	30.8	30.6	C	C
		Intersection							28.3	15.0	C	B
11	E 60th Street & 5th Ave	SB	T	T	870	851	0.63	0.90	13.5	27.1	B	C
			R	R	280	274	0.80	0.78	30.5	29.1	C	C
		WB	L	L	150	153	0.43	0.44	27.5	27.4	C	C
			T	T	325	329	0.77	0.41	39.7	24.2	D	C
		Intersection							23.3	26.8	C	C
12	E 63rd Street & York Ave	NB	TR	T	490	472	0.84	0.81	43.3	40.9	D	D
				R	550	527	0.68	0.65	8.7	7.9	A	A
		SB	L	L	355	353	0.67	0.65	42.1	39.2	D	D
			TR	T	375	372	0.47	0.47	13.8	13.8	B	B
				R	75	75	-	-	-	-	-	-
		WB	L	L	275	270	0.57	0.56	42.7	42.3	D	D
			TR	T	255	251	0.59	0.58	40.2	39.9	D	D
				R	75	74	-	-	-	-	-	-
		Intersection							27.4	26.5	C	C
13	E 53rd Street & FDR Drive	SB	R	R	235	233	-	-	-	-	-	-
		SWB	R	R	260	258	-	-	-	-	-	-
		Intersection	Unsignalized									

Upper East Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
14	E 61st Street & 5th Ave	SB	T	T	880	867	0.58	0.57	22.3	22.4	C	C
		WB	L	L	270	258	0.27	0.26	19.0	18.8	B	B
		Intersection			0	0	-	-	21.5	21.6	C	C
15	E 65th Street & 5th Ave	SB	LT	L	90	89	-	-	-	-	-	-
				T	785	773	0.54	0.54	5.0	4.9	A	A
		EB	T	T	785	781	0.97	0.97	56.7	55.7	E	E
			R	R	340	338	0.97	0.97	70.8	69.7	E	E
		Intersection							36.5	36.0	D	D
16	E 66th Street & 5th Avenue	SB	TR	T	810	798	0.70	0.70	21.2	21.0	C	C
				R	320	318	-	-	-	-	-	-
		WB	LT	L	65	64	-	-	-	-	-	-
				T	420	410	0.55	0.54	28.4	28.1	C	C
		Intersection							23.3	23.1	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	75	74	-	-	-	-	-	-
				T	665	660	0.74	0.73	29.4	29.2	C	C
				R	100	99	-	-	-	-	-	-
		EB	T	T	400	397	0.74	0.74	40.1	39.8	D	D
			R	R	245	243	1.04	1.03	102.1	101.2	F	F
		WB	L	L	100	98	0.88	0.87	93.4	90.7	F	F
			T	T	450	441	0.50	0.49	24.3	24.1	C	C
		Intersection							42.1	41.7	D	D
18	E 71st Street & York Ave	NB	LTR	L	55	53	-	-	-	-	-	-
				T	395	380	0.48	0.46	22.8	22.4	C	C
				R	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	-	-	-	-	-	-
				T	390	384	0.43	0.43	21.8	21.7	C	C
				R	60	59	-	-	-	-	-	-
		WB	L	L	160	160	0.41	0.42	31.5	31.5	C	C
			TR	T	125	125	0.63	0.62	38.0	37.9	D	D
				R	115	114	-	-	-	-	-	-
		Intersection							26.4	26.3	C	C

Upper East Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	15	15	-	-	-	-	-	-
				T	280	277	-	-	-	-	-	-
				R	635	628	-	-	-	-	-	-
		EB	LT	L	5	5	-	-	-	-	-	-
				T	15	15	-	-	-	-	-	-
		Intersection	Unsignalized									
2	E 60th Street & 3rd Ave	NB	L	L	75	74	0.19	0.19	19.0	19.0	B	B
			T	T	985	969	0.59	0.58	22.8	22.7	C	C
		WB	T	T	265	264	0.56	0.55	4.9	4.8	A	A
			R	R	275	275	1.05	1.05	88.6	88.7	F	F
		Intersection							29.4	29.4	C	C
3	E 60th Street & York Ave	NB	T	T	525	525	0.31	0.31	19.3	19.3	B	B
		SB	T	T	690	681	0.39	0.39	20.5	20.4	C	C
		EB	L	L	420	412	0.56	0.55	35.9	35.6	D	D
			T	T	0	0	0.58	0.57	37.0	36.5	D	D
			R	R	35	35	0.10	0.10	25.3	25.3	C	C
		WB	L	L	0	0	-	-	-	-	-	-
			T	T	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection							24.2	24.0	C	C
4	E 59th Street & 2nd Ave	EB	T	T	670	875	0.78	1.02	33.2	65.5	C	E
			RR2	R	90	112	0.42	0.47	25.9	27.2	C	C
				R2	70	70	-	-	-	-	-	-
		SB	L2	L2	800	1044	0.56	0.73	17.8	46.4	B	D
			L2L	L	5	6	-	-	-	-	-	-
			T	T	1585	1579	0.73	0.73	31.4	40.7	C	D
		Intersection							28.0	47.7	C	D
5	E 60th Street & 2nd Ave	NWB	L2	L2	965	963	0.79	0.79	28.9	28.8	C	C
			L	L	515	514	0.64	0.64	25.5	25.4	C	C
		SB	LT	L2	20	20	-	-	-	-	-	-
				T	1415	1656	0.75	0.87	26.6	40.8	C	D
			R	R	20	20	0.06	0.06	14.9	14.9	B	B
		WB	LT	L	10	10	-	-	-	-	-	-
				T	5	5	0.01	0.01	15.2	15.2	B	B
		Intersection							27.0	34.2	C	C
6	E 60th Street & 1st Ave	NB	TR	T	955	940	0.46	0.44	16.0	15.7	B	B
				R	85	84	0.24	-	15.2	-	B	-
		EB	L	L	280	280	0.81	0.81	45.4	45.6	D	D
			T	T	370	363	0.34	0.34	17.9	17.8	B	B
		Intersection							21.4	21.3	C	C
7	E 60th Street & Lexington Ave	SB	TR	T	950	938	0.66	0.88	22.0	33.6	C	C
				R	70	69	-	0.26	-	19.4	-	B
		WB	L	L	65	66	-	0.25	-	18.7	-	B
			T	T	275	272	0.39	0.29	18.0	17.9	B	B
		Intersection							21.0	29.0	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	65	64	-	-	-	-	-	-
				T	910	900	0.51	0.51	18.8	21.6	B	C
		WB	TR	T	270	266	0.42	0.42	16.6	28.3	B	C
				R	75	75	-	-	-	-	-	-
		Intersection							18.2	23.4	B	C
8b	E 60th Street & Park Ave NB	SB	TR	T	920	915	0.56	0.55	19.3	22.1	B	C
				R	100	99	-	-	-	-	-	-
		WB	LT	L	115	116	-	-	-	-	-	-
				T	220	214	0.43	0.43	14.1	13.8	B	B
		Intersection							17.9	20.0	B	B
9	E 60th Street & Madison Ave	NB	L	L	110	109	0.30	0.27	19.7	19.7	B	B
			T	T	660	652	0.56	0.51	15.9	14.5	B	B
		WB	TR	T	250	243	0.37	0.40	20.3	19.6	C	B
				R	70	70	-	-	-	-	-	-
		Intersection							17.5	16.5	B	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	775	810	0.42	0.67	8.6	12.3	A	B
			R	R	745	779	0.96	0.69	40.1	16.0	D	B
		EB	LT	L	0	0	-	-	-	-	-	-
				T	210	206	0.23	0.33	27.9	29.4	C	C
		Intersection							24.8	15.4	C	B
11	E 60th Street & 5th Ave	SB	T	T	640	632	0.49	0.71	15.3	21.5	B	C
			R	R	290	286	1.02	1.01	79.3	76.2	E	E
		WB	L	L	150	151	-	0.42	-	27.0	-	C
			T	T	210	201	0.49	0.25	12.8	22.1	B	C
		Intersection							28.3	33.9	C	C
12	E 63rd Street & York Ave	NB	TR	T	425	424	0.73	0.73	36.9	36.8	D	D
				R	435	432	0.77	0.67	20.3	16.1	C	B
		SB	L	L	430	428	0.79	0.45	35.5	16.4	D	B
			TR	T	465	463	0.30	0.40	6.6	8.0	A	A
				R	70	70	-	-	-	-	-	-
		WB	L	L	320	317	0.93	0.92	86.4	85.0	F	F
			TR	T	260	258	0.94	0.94	74.5	73.6	E	E
				R	65	65	-	-	-	-	-	-
		Intersection							38.8	34.2	D	C
13	E 53rd Street & FDR Drive	SB	R	R	150	149	-	-	-	-	-	-
		SWB	R	R	355	353	-	-	-	-	-	-
		Intersection	Unsignalized									

Upper East Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
14	E 61st Street & 5th Ave	SB	T	T	640	628	0.42	0.41	19.9	19.8	B	B
		WB	L	L	290	290	0.28	0.28	19.1	19.1	B	B
		Intersection							19.6	19.6	B	B
15	E 65th Street & 5th Ave	SB	LT	L	85	85	-	-	-	-	-	-
				T	535	533	0.39	0.39	7.5	7.6	A	A
		EB	T	T	640	638	0.75	0.75	34.3	34.2	C	C
			R	R	300	299	0.88	0.88	54.6	54.5	D	D
		Intersection							27.5	27.5	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	540	538	0.65	0.65	20.2	20.2	C	C
				R	410	410	-	-	-	-	-	-
		WB	LT	L	80	80	-	-	-	-	-	-
				T	475	474	0.66	0.66	30.8	30.8	C	C
		Intersection							24.1	24.1	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	65	65	-	-	-	-	-	-
				T	445	445	0.66	0.66	27.7	27.7	C	C
				R	150	150	-	-	-	-	-	-
		EB	T	T	460	458	0.72	0.72	38.8	38.7	D	D
			R	R	190	189	0.92	0.92	79.8	78.1	E	E
		WB	L	L	70	70	0.82	0.82	92.6	92.6	F	F
			T	T	545	543	0.56	0.56	25.2	25.1	C	C
		Intersection							37.1	36.9	D	D
18	E 71st Street & York Ave	NB	LTR	L	65	64	-	-	-	-	-	-
				T	395	390	0.50	0.49	23.1	23.0	C	C
				R	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	-	-	-	-	-	-
				T	350	348	0.40	0.40	21.2	21.2	C	C
				R	55	55	-	-	-	-	-	-
		WB	L	L	205	205	0.66	0.66	41.1	41.1	D	D
			TR	T	160	160	0.78	0.78	46.8	46.3	D	D
				R	140	139	-	-	-	-	-	-
		Intersection							30.7	30.6	C	C

Upper East Study Area - Existing vs No-Action- PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	5	5	-	-	-	-	-	-
				T	125	130	-	-	-	-	-	-
				R	315	328	-	-	-	-	-	-
		EB	LT	L	0	0	-	-	-	-	-	-
				T	10	10	-	-	-	-	-	-
		Intersection	Unsignalized									
2	E 60th Street & 3rd Ave	NB	L	L	90	92	0.24	0.25	19.8	19.9	B	B
			T	T	875	892	0.49	0.50	21.3	21.4	C	C
		WB	T	T	350	331	0.56	0.53	7.4	7.0	A	A
			R	R	165	162	0.77	0.75	41.6	40.6	D	D
		Intersection							20.4	20.4	C	C
3	E 60th Street & York Ave	NB	T	T	445	445	0.24	0.24	18.6	18.6	B	B
		SB	T	T	1050	1016	0.55	0.53	23.1	22.8	C	C
		EB	L	L	170	170	0.24	0.26	27.7	28.1	C	C
			T	T	0	15	0.25	0.27	27.9	28.3	C	C
			R	R	45	45	0.11	0.11	25.3	25.3	C	C
		WB	L	L	0	0	-	-	-	-	-	-
			T	T	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection							22.5	22.4	C	C
4	E 59th Street & 2nd Ave	EB	T	T	780	1063	0.88	1.20	39.0	127.9	D	F
			RR2	R	40	47	0.39	0.41	25.6	25.9	C	C
				R2	105	104	-	-	-	-	-	-
		SB	L2	L2	1155	1561	0.83	1.12	24.5	78.7	C	E
			L2L	L	0	0	-	-	-	-	-	-
			T	T	1050	1028	0.50	0.49	11.7	8.9	B	A
		Intersection							24.1	72.4	C	E
5	E 60th Street & 2nd Ave	NWB	L2	L2	700	670	0.43	0.41	19.2	19.0	B	B
			L	L	475	454	0.42	0.41	19.5	19.3	B	B
		SB	LT	L2	10	10	-	-	-	-	-	-
				T	1500	1914	0.57	0.86	19.7	33.3	B	C
			R	R	40	39	0.12	0.12	15.8	15.8	B	B
		WB	LT	L	5	5	-	-	-	-	-	-
				T	0	0	-	-	15.2	15.2	B	B
		Intersection							19.5	27.8	B	C
6	E 60th Street & 1st Ave	NB	TR	T	1080	1091	0.45	0.46	15.8	15.8	B	B
				R	40	40	-	-	-	-	-	-
		EB	L	L	150	148	0.51	0.51	30.7	30.7	C	C
			T	T	175	190	0.16	0.18	16.0	16.1	B	B
		Intersection							17.5	17.5	B	B
7	E 60th Street & Lexington Ave	SB	TR	T	745	724	0.57	0.49	20.2	18.9	C	B
				R	60	58	-	0.19	-	16.9	-	B
		WB	L	L	100	98	0.33	0.32	19.3	19.4	B	B
			T	T	340	325	0.36	0.35	18.1	18.1	B	B
		Intersection							19.6	18.7	B	B
8a	E 60th Street & Park Ave NB	NB	LT	L	75	77	-	-	-	-	-	-
				T	990	1014	0.52	0.53	18.8	21.3	B	C
		WB	TR	T	315	298	0.44	0.40	14.9	26.4	B	C
				R	85	85	-	-	-	-	-	-
		Intersection							17.7	22.7	B	C
8b	E 60th Street & Park Ave NB	SB	TR	T	860	851	0.52	0.50	18.6	20.5	B	C
				R	100	99	-	-	-	-	-	-
		WB	LT	L	110	109	-	-	-	-	-	-
				T	280	266	0.47	0.44	12.9	12.4	B	B
		Intersection							16.9	18.1	B	B
9	E 60th Street & Madison Ave	NB	L	L	105	106	0.29	0.26	19.4	19.5	B	B
			T	T	890	901	0.78	0.77	22.2	23.0	C	C
		WB	TR	T	285	271	0.42	0.41	21.3	14.1	C	B
				R	95	94	-	-	-	-	-	-
		Intersection							21.8	20.4	C	C
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	365	387	0.22	0.52	7.0	9.9	A	A
			R	R	770	816	0.94	0.55	36.3	12.1	D	B
		EB	LT	L	0	0	-	-	-	-	-	-
				T	105	105	0.17	0.17	27.6	27.6	C	C
		Intersection							26.2	12.1	C	B
11	E 60th Street & 5th Ave	SB	T	T	585	566	0.48	0.68	9.8	15.2	A	B
			R	R	275	266	0.88	0.85	41.1	37.6	D	D
		WB	L	L	150	150	0.46	0.46	13.5	27.7	B	C
			T	T	240	227	0.49	0.24	13.1	21.9	B	C
		Intersection							17.5	22.8	B	C
12	E 63rd Street & York Ave	NB	TR	T	395	389	0.96	0.94	71.1	68.3	E	E
				R	245	239	0.33	0.32	9.2	9.1	A	A
		SB	L	L	420	416	1.01	1.00	99.2	97.1	F	F
			TR	T	675	671	0.87	0.86	44.7	44.0	D	D
				R	75	75	-	-	-	-	-	-
		WB	L	L	410	398	0.53	0.51	39.8	39.3	D	D
			TR	T	175	171	0.53	0.52	37.1	36.8	D	D
				R	15	15	-	-	-	-	-	-
		Intersection							50.4	49.4	D	D
13	E 53rd Street & FDR Drive	SB	R	R	210	207	-	-	-	-	-	-
		SWB	R	R	325	321	-	-	-	-	-	-
		Intersection	Unsignalized									

Upper East Study Area - Existing vs No-Action- PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
14	E 61st Street & 5th Ave	SB	T	T	690	661	0.49	0.47	20.9	20.6	C	C
		WB	L	L	170	171	0.18	0.18	18.0	18.0	B	B
		Intersection							20.3	20.1	C	C
15	E 65th Street & 5th Ave	SB	LT	L	65	65	-	-	-	-	-	-
				T	660	656	0.42	0.42	7.3	7.3	A	A
		EB	T	T	735	737	0.88	0.88	42.7	42.9	D	D
			R	R	360	361	0.97	0.97	70.6	71.2	E	E
		Intersection							34.2	34.4	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	635	631	0.85dr	0.71	21.7	21.6	C	C
				R	380	378	-	-	-	-	-	-
		WB	LT	L	90	90	-	-	-	-	-	-
				T	515	517	0.65	0.65	30.6	30.6	C	C
		Intersection							24.8	24.8	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	70	69	-	-	-	-	-	-
				T	565	561	0.73	0.72	29.3	29.2	C	C
				R	180	178	-	-	-	-	-	-
		EB	T	T	415	416	0.72	0.73	39.0	39.1	D	D
			R	R	215	216	0.98	0.99	88.8	90.9	F	F
		WB	L	L	50	50	0.53	0.53	58.7	58.7	E	E
			T	T	555	554	0.60	0.60	26.1	26.1	C	C
		Intersection							37.8	38.1	D	D
18	E 71st Street & York Ave	NB	LTR	L	35	35	-	-	-	-	-	-
				T	430	421	0.48	0.47	22.6	22.4	C	C
				R	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	-	-	-	-	-	-
				T	565	556	0.66	0.65	27.0	26.8	C	C
				R	85	84	-	-	-	-	-	-
		WB	L	L	115	115	0.31	0.31	29.0	29.0	C	C
			TR	T	125	125	0.52	0.52	33.8	33.7	C	C
				R	95	94	-	-	-	-	-	-
		Intersection							26.8	26.6	C	C

Upper East Study Area - Existing vs No-Action - Late Night Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	10	10	-	-	-	-	-	-
				T	90	89	-	-	-	-	-	-
				R	310	308	-	-	-	-	-	-
		EB	LT	L	0	0	-	-	-	-	-	-
				T	30	30	-	-	-	-	-	-
		Intersection	Unsignalized									
2	E 60th Street & 3rd Ave	NB	L	L	80	79	0.16	0.16	18.2	18.2	B	B
			T	T	1070	1059	0.52	0.52	21.6	21.5	C	C
		WB	T	T	375	378	0.65	0.66	13.3	13.3	B	B
			R	R	160	160	0.74	0.74	43.4	43.2	D	D
		Intersection			0	0	-	-	21.7	21.6	C	C
3	E 60th Street & York Ave	NB	T	T	475	475	0.27	0.27	18.8	18.8	B	B
		SB	T	T	640	635	0.32	0.32	19.5	19.5	B	B
		EB	L	L	250	247	0.34	0.34	29.7	29.6	C	C
			T	T	0	0	0.36	0.35	30.1	30.0	C	C
			R	R	45	45	0.11	0.11	25.2	25.2	C	C
		WB	L	L	0	0	-	-	-	-	-	-
			T	T	0	0	-	-	-	-	-	-
			R	R	0	0	-	-	-	-	-	-
		Intersection							21.5	21.4	C	C
4	E 59th Street & 2nd Ave	EB	T	T	705	819	0.78	0.90	32.4	41.2	C	D
			RR2	R	155	166	0.83	0.86	46.3	50.2	D	D
				R2	120	120	-	-	-	-	-	-
		SB	L2	L2	995	1151	0.69	0.80	12.0	17.3	B	B
			L2L	L	10	11	-	-	-	-	-	-
			T	T	1215	1209	0.58	0.58	8.6	7.7	A	A
		Intersection							18.5	22.7	B	C
5	E 60th Street & 2nd Ave	NWB	L2	L2	470	474	0.29	0.29	17.6	17.6	B	B
			L	L	440	444	0.40	0.40	19.2	19.2	B	B
		SB	LT	L2	30	30	-	-	-	-	-	-
				T	1745	1892	0.64	0.82	20.7	25.9	C	C
			R	R	90	89	0.24	0.24	17.2	17.2	B	B
		WB	LT	L	5	5	-	-	-	-	-	-
				T	5	5	0.01	0.01	15.2	15.2	B	B
		Intersection							19.8	23.1	B	C
6	E 60th Street & 1st Ave	NB	TR	T	1305	1290	0.52	0.52	16.6	16.5	B	B
				R	100	99	-	-	-	-	-	-
		EB	L	L	145	145	0.41	0.41	27.3	27.3	C	C
			T	T	195	193	0.18	0.18	16.1	16.1	B	B
		Intersection							17.5	17.5	B	B
7	E 60th Street & Lexington Ave	SB	TR	T	1120	1113	0.69	0.94	22.5	40.4	C	D
				R	70	70	-	0.17	-	16.7	-	B
		WB	L	L	160	160	0.35	0.37	19.4	21.4	B	C
			T	T	295	297	0.33	0.35	18.0	19.8	B	B
		Intersection							21.3	33.3	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	55	55	-	-	-	-	-	-
				T	555	552	0.32	0.32	16.2	18.7	B	B
		WB	TR	T	330	332	0.46	0.46	12.6	28.9	B	C
				R	35	35	-	-	-	-	-	-
		Intersection							14.8	22.8	B	C
8b	E 60th Street & Park Ave NB	SB	TR	T	885	877	0.55	0.54	19.1	21.8	B	C
				R	105	104	-	-	-	-	-	-
		WB	LT	L	110	110	-	-	-	-	-	-
				T	275	277	0.47	0.48	7.5	10.0	A	B
		Intersection							15.6	18.3	B	B
9	E 60th Street & Madison Ave	NB	L	L	85	82	0.18	0.16	17.3	17.5	B	B
			T	T	920	911	0.73	0.66	19.9	17.7	B	B
		WB	TR	T	265	266	0.43	0.48	18.1	16.1	B	B
				R	115	115	-	-	-	-	-	-
		Intersection							19.3	17.2	B	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	995	982	0.55	0.70	10.1	13.0	B	B
			R	R	755	746	0.90	0.71	29.9	16.7	C	B
		EB	LT	L	10	10	-	-	-	-	-	-
				T	145	142	0.25	0.25	28.6	28.5	C	C
		Intersection							19.3	15.4	B	B
11	E 60th Street & 5th Ave	SB	T	T	880	876	0.63	0.91	11.8	26.0	B	C
			R	R	285	284	0.71	0.71	20.3	20.1	C	C
		WB	L	L	170	169	0.38	0.37	11.3	24.9	B	C
			T	T	180	179	0.44	0.21	12.3	21.7	B	C
		Intersection							13.4	24.3	B	C
12	E 63rd Street & York Ave	NB	TR	T	195	189	0.47	0.46	35.5	35.1	D	D
				R	390	377	0.48	0.47	8.1	7.9	A	A
		SB	L	L	370	370	0.50	0.50	26.1	25.7	C	C
			TR	T	385	385	0.46	0.46	19.4	19.3	B	B
				R	50	50	-	-	-	-	-	-
		WB	L	L	330	330	0.54	0.54	40.2	40.2	D	D
			TR	T	295	295	0.54	0.54	37.2	37.2	D	D
				R	25	25	-	-	-	-	-	-
		Intersection							25.3	25.3	C	C
13	E 53rd Street & FDR Drive	SB	R	R	160	158	-	-	-	-	-	-
		SWB	R	R	365	365	-	-	-	-	-	-
		Intersection	Unsignalized									

Upper East Study Area - Existing vs No-Action - Late Night Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
14	E 61st Street & 5th Ave	SB	T	T	975	976	0.59	0.59	22.3	22.6	C	C
		WB	L	L	190	184	0.20	0.19	18.2	18.2	B	B
		Intersection							21.6	21.8	C	C
15	E 65th Street & 5th Ave	SB	LT	L	75	75	-	-	-	-	-	-
				T	735	731	0.47	0.47	6.7	6.6	A	A
		EB	T	T	670	669	0.75	0.74	33.7	33.6	C	C
			R	R	205	205	0.58	0.58	32.7	32.7	C	C
		Intersection							20.0	20.0	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	750	747	0.56	0.56	18.2	18.2	B	B
				R	255	255	-	-	-	-	-	-
		WB	LT	L	60	59	-	-	-	-	-	-
				T	475	468	0.61	0.60	29.6	29.4	C	C
		Intersection							22.2	22.1	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	60	60	-	-	-	-	-	-
				T	615	617	0.56	0.56	25.1	25.1	C	C
				R	70	70	-	-	-	-	-	-
		EB	T	T	355	354	0.56	0.56	34.1	34.1	C	C
			R	R	110	110	0.41	0.38	34.0	33.0	C	C
		WB	L	L	55	54	0.60	0.55	63.5	57.9	E	E
			T	T	395	388	0.41	0.40	22.6	22.5	C	C
		Intersection							28.4	28.1	C	C
18	E 71st Street & York Ave	NB	LTR	L	10	10	-	-	-	-	-	-
				T	245	236	0.22	0.21	18.5	18.4	B	B
				R	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	-	-	-	-	-	-
				T	315	317	0.31	0.32	19.8	19.8	B	B
				R	40	40	-	-	-	-	-	-
		WB	L	L	80	80	0.20	0.20	26.7	26.7	C	C
			TR	T	180	180	0.59	0.59	35.3	35.3	D	D
				R	100	100	-	-	-	-	-	-
		Intersection							24.6	24.6	C	C

Upper West Side Study Area - Existing vs No-Action - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	W 72nd Street & West End Ave	NB	L	L	105	104	0.37	0.36	20.5	20.4	C	C
			T	T	190	187	0.36	0.35	16.8	16.7	B	B
			R	R	65	64	0.22	0.22	15.8	15.7	B	B
		SB	TR	T	415	414	0.60	0.60	27.8	27.8	C	C
				R	30	30	-	-	-	-	-	-
		EB	LTR	L	10	10	-	-	-	-	-	-
				T	135	131	0.67	0.64	38.3	37.4	D	D
				R	120	116	-	-	-	-	-	-
		WB	LTR	L	85	84	-	-	-	-	-	-
				T	140	138	0.77	0.75	45.3	43.9	D	D
				R	45	44	-	-	-	-	-	-
		Intersection							30.5	30.0	C	C
2	W 61st Street & West End Ave	NB	LTR	L	20	19	-	-	-	-	-	-
				T	385	370	0.49	0.47	10.2	10.1	B	B
				R	60	57	-	-	-	-	-	-
		SB	L	L	55	55	0.25	0.25	15.0	14.8	B	B
			TR	T	585	574	0.37	0.36	13.4	13.4	B	B
				R	35	35	-	-	-	-	-	-
		EB	LTR	L	20	20	-	-	-	-	-	-
				T	15	15	0.34	0.34	28.9	28.9	C	C
				R	55	55	-	-	-	-	-	-
		Intersection							13.5	13.5	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	60	60	-	-	-	-	-	-
				T	30	30	0.66	0.66	48.3	48.3	D	D
				R	10	10	-	-	-	-	-	-
		SB	LTR	L	15	15	-	-	-	-	-	-
				T	130	130	1.03	1.03	88.6	87.9	F	F
				R	155	154	-	-	-	-	-	-
		EB	TR	L	5	5	-	-	-	-	-	-
				T	510	502	0.60	0.59	12.7	12.6	B	B
				R	335	330	-	-	-	-	-	-
		WB	TR	L	5	5	-	-	-	-	-	-
				T	595	590	0.46	0.46	10.7	10.6	B	B
				R	25	25	-	-	-	-	-	-
		Intersection							26.8	26.7	C	C
4a	W 56th Street & 12th Avenue	NB	TR	L	210	2143	0.35	1.05	22.2	65.6	C	E
				R	100	1170	-	0.91	-	47.9	-	D
		EB	LT	L	465	2958	-	0.52	-	0.7	-	A
				T	705	0	0.86	-	7.0	32.1	A	C
		Intersection							10.6	206.8	B	F
4b	W 56th Street & West Side Highway	NB	T	T	2145	2013	1.05	0.59	65.9	15.6	E	B
		SB	L	L	1170	2958	0.91	0.92	47.9	33.2	D	C
			T	T	2950	0	0.52	-	0.7	-	A	-
		Intersection							32.2	-	C	-
5a	W 55th Street & West Side Highway	NB	L	L	75	30	1.01	0.77	206.8	30.1	F	C
			T	T	2015	130	0.59	0.36	15.6	6.2	B	A
		SB	TR	T	2950	0	0.92	-	33.0	28.2	C	C
				R	0	0	-	-	-	-	-	-
		WB	LT	L	125	282	-	0.36	-	11.8	-	B
				T	30	0	0.76	-	29.2	-	C	-
			R	R	130	0	0.36	-	6.1	-	A	-
		Intersection							28.1	-	C	-
5b	W 55th Street & 12th Avenue	NB	LT	L	0	286	-	0.54	-	57.9	-	E
				T	280	30	0.36	-	11.8	-	B	-
		WB	LTR	L	0	105	-	0.41	-	37.2	-	D
				T	285	0	0.54	-	57.9	37.2	E	D
				R	30	328	-	0.78	-	48.5	-	D
		Intersection							36.2	14.3	D	B
5c	W 55th Street & West Side Highway Arterial	WB	L	L	105	64	0.41	-	36.3	-	D	-
		Intersection							36.3	27.9	D	C

Upper West Side Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
6	W 60th Street & Broadway	NB	L	L	330	972	0.79	0.73	49.0	5.9	D	A
			T	T	510	78	0.42	-	14.4	-	B	-
		SB	TR	T	860	235	0.90	0.92	29.2	46.5	C	D
				R	65	157	-	0.29	-	3.8	-	A
		Intersection							28.7	12.5	C	B
7	W 60th Street & Columbus Ave	SB	TR	T	995	91	0.74	-	6.4	-	A	-
				R	80	912	-	0.47	-	14.5	-	B
		WB	L	L	235	170	0.91	0.48	45.5	44.6	D	D
			T	T	160	65	0.30	0.31	3.8	42.9	A	D
		Intersection							12.6	20.9	B	C
8	W 60th Street & Amsterdam Ave	NB	LT	L	95	19	-	0.09	-	11.1	-	B
				T	955	372	0.50	0.34	14.8	12.3	B	B
		WB	T	T	175	609	0.50	0.33	44.9	3.1	D	A
			R	R	65	20	0.31	-	42.8	-	D	-
		Intersection							21.0	-	C	-
9	W 60th Street & West End Ave	NB	L	L	20	0	0.10	0.12	11.2	21.3	B	C
			T	T	390	30	0.35	-	12.5	-	B	-
		SB	TR	T	620	140	0.33	-	3.0	-	A	-
				R	20	52	-	0.68	-	56.0	-	E
		EB	LTR	L	5	69	-	-	-	-	-	-
				T	0	0	0.12	-	21.3	16.7	C	B
				R	30	972	-	0.44	-	3.2	-	A
		WB	LTR	L	140	5	-	-	-	-	-	-
				T	60	117	0.70	-	56.3	-	E	-
				R	70	10	-	0.46	-	38.9	-	D
		Intersection							16.9	23.6	B	C
10	W 61st Street & Amsterdam Ave	NB	TR	T	1015	0	0.46	-	3.2	8.1	A	A
				R	5	182	-	-	-	-	-	-
		EB	LT	L	120	1050	-	0.77	-	22.2	-	C
				T	10	0	0.47	-	39.1	22.2	D	C
		WB	R	R	10	493	0.04	0.34	23.6	9.6	C	A
		Intersection							8.0	-	A	-
11	W 61st Street & Columbus Ave	SB	LT	L	185	20	-	-	-	-	-	-
				T	1075	801	0.79	0.56	22.8	19.7	C	B
		Intersection							22.8	-	C	-
12	W 61st Street & Broadway	NB	TR	T	495	44	0.35	0.54	9.6	25.7	A	C
				R	15	108	-	-	-	-	-	-
		SB	LT	L	20	0	-	-	-	17.0	-	B
				T	815	598	0.57	0.32	19.9	13.4	B	B
		EB	LTR	L	30	74	-	0.23	-	28.1	-	C
				T	45	0	0.55	-	25.6	15.1	C	B
				R	110	15	-	-	-	-	-	-
		Intersection							17.1	19.1	B	B
13	W 61st Street & Columbus Ave	NB	T	T	610	169	0.33	0.44	13.4	23.2	B	C
		EB	L	L	80	165	0.25	0.57	29.3	28.7	C	C
		Intersection							15.4	43.6	B	D
14	W 81st Street & Central Park West	NB	LTR	L	15	45	-	-	-	-	-	-
				T	225	15	0.54	0.18	23.3	44.0	C	D
				R	170	312	-	0.92	-	61.6	-	E
		SB	LTR	L	165	10	-	0.04	-	23.5	-	C
				T	385	167	0.96	0.84	51.3	52.4	D	D
				R	45	224	-	0.71	-	40.8	-	D
		EB	L	L	15	118	0.18	0.41	44.0	30.1	D	C
			TR	T	315	0	0.93	-	63.4	39.7	E	D
				R	10	65	0.03	-	23.5	-	C	-
		WB	L	L	170	353	0.85	0.43	54.4	3.4	D	A
			T	T	230	656	0.73	0.57	42.0	20.4	D	C
			R	R	120	45	0.41	-	30.2	-	C	-
		Intersection							44.8	31.3	D	C
15	W 66th Street & Central Park West	NB	LT	L	65	314	-	0.80	-	44.6	-	D
				T	355	231	0.43	0.65	3.5	37.0	A	D
		SB	TR	T	665	0	0.58	-	20.5	23.6	C	C
				R	45	388	-	0.84	-	37.7	-	D
		WB	L	L	180	255	0.52	-	31.5	-	C	-
			T	T	320	370	0.81	0.98	46.0	59.2	D	E
			R	R	235	463	0.66	0.56	37.5	9.8	D	A
		Intersection							24.1	22.9	C	C
16	W 65th Street & Central Park West	NB	TR	T	390	499	0.84	0.77	37.9	36.1	D	D
				R	255	25	-	-	-	-	-	-
		SB	LT	L	375	0	1.00	-	62.9	35.2	E	D
				T	470	0	0.57	-	10.1	-	B	-
		EB	L	L	30	0	0.09	-	22.9	-	C	-
			TR	T	505	0	0.77	-	36.5	-	D	-
				R	25	0	-	-	-	-	-	-
		Intersection							36.1	-	D	-

Upper West Side Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	W 72nd Street & West End Ave	NB	L	L	115	115	0.34	0.34	19.0	19.0	B	B
			T	T	285	284	0.49	0.49	19.8	19.8	B	B
			R	R	70	70	0.23	0.23	16.5	16.5	B	B
		SB	TR	T	330	329	0.57	0.57	29.4	29.4	C	C
				R	55	55	-	-	-	-	-	-
		EB	LTR	L	25	25	-	-	-	-	-	-
				T	110	108	0.64	0.63	38.8	38.5	D	D
				R	90	89	-	-	-	-	-	-
		WB	LTR	L	80	80	-	-	-	-	-	-
				T	155	155	0.89	0.89	60.0	59.6	E	E
				R	50	50	-	-	-	-	-	-
		Intersection							34.3	34.2	C	C
2	W 61st Street & West End Ave	NB	LTR	L	5	5	-	-	-	-	-	-
				T	370	366	0.42	0.42	9.4	9.5	A	A
				R	60	60	-	-	-	-	-	-
		SB	L	L	15	14	0.07	0.07	12.7	12.6	B	B
			TR	T	575	568	0.33	0.32	14.0	14.0	B	B
				R	15	15	-	-	-	-	-	-
		EB	LTR	L	5	5	-	-	-	-	-	-
				T	20	20	0.17	0.17	24.0	24.0	C	C
				R	35	35	-	-	-	-	-	-
		Intersection							12.8	12.8	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	70	70	-	-	-	-	-	-
				T	45	45	0.46	0.46	31.6	31.6	C	C
				R	5	5	-	-	-	-	-	-
		SB	LTR	L	5	5	-	-	-	-	-	-
				T	65	65	0.68	0.68	38.8	38.8	D	D
				R	130	130	-	-	-	-	-	-
		EB	TR	L	20	20	-	-	-	-	-	-
				T	315	313	0.53	0.53	12.7	12.7	B	B
				R	360	357	-	-	-	-	-	-
		WB	TR	L	0	0	-	-	-	-	-	-
				T	535	533	0.38	0.38	10.6	10.6	B	B
				R	50	50	-	-	-	-	-	-
		Intersection							16.8	16.8	B	B
4a	W 56th Street & 12th Avenue	NB	TR	L	255	2417	0.25	0.78	4.0	10.5	A	B
				R	85	560	-	0.91	-	63.0	-	E
		EB	LT	L	270	2307	-	0.81	-	49.6	-	D
				T	290	0	0.84	-	16.8	33.6	B	C
		Intersection							11.6	165.1	B	F
4b	W 56th Street & West Side Highway	NB	T	T	2415	2232	0.78	0.71	10.5	19.0	B	B
		SB	L	L	560	2307	0.91	0.91	63.0	79.9	E	E
			T	T	2305	0	0.81	-	49.6	-	D	-
		Intersection							33.6	-	C	-
5a	W 55th Street & West Side Highway	NB	L	L	155	65	1.05	0.80	165.1	26.5	F	C
			T	T	2230	185	0.71	0.42	19.0	5.9	B	A
		SB	TR	T	2305	0	0.91	-	79.9	50.5	E	D
				R	0	0	-	-	-	-	-	-
		WB	LT	L	160	298	-	0.43	-	15.5	-	B
				T	65	0	0.80	-	25.7	-	C	-
			R	R	185	0	0.42	-	5.9	-	A	-
		Intersection							50.4	-	D	-
5b	W 55th Street & 12th Avenue	NB	LT	L	0	412	-	0.56	-	42.7	-	D
				T	295	45	0.43	-	15.4	-	B	-
		WB	LTR	L	0	220	-	0.57	-	66.0	-	E
				T	410	0	0.56	-	42.6	66.0	D	E
				R	45	338	-	0.83	-	52.2	-	D
		Intersection							31.9	13.6	C	B
5c	W 55th Street & West Side Highway Arterial	WB	L	L	220	79	0.57	-	64.5	-	E	-
		Intersection							64.5	32.6	E	C

Upper West Side Study Area - Existing vs No-Action - Midday Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
6	W 60th Street & Broadway	NB	L	L	340	967	0.84	0.74	52.7	6.6	D	A
			T	T	455	123	0.37	-	13.7	-	B	-
		SB	TR	T	760	214	0.87	0.75	35.3	25.2	D	C
				R	80	203	-	0.32	-	3.5	-	A
		Intersection							33.1	8.8	C	A
7	W 60th Street & Columbus Ave	SB	TR	T	980	64	0.75	-	6.8	-	A	-
				R	125	1031	-	0.48	-	14.6	-	B
		WB	L	L	215	241	0.75	0.60	25.0	45.3	C	D
			T	T	205	85	0.32	0.36	3.5	41.1	A	D
		Intersection							9.0	22.0	A	C
8	W 60th Street & Amsterdam Ave	NB	LT	L	65	10	-	0.05	-	10.3	-	B
				T	1045	356	0.49	0.29	14.7	11.8	B	B
		WB	T	T	245	588	0.61	0.30	45.5	5.2	D	A
			R	R	85	15	0.36	-	41.1	-	D	-
		Intersection							22.1	-	C	-
9	W 60th Street & West End Ave	NB	L	L	10	0	0.05	0.07	10.4	20.6	B	C
			T	T	360	20	0.30	-	11.9	-	B	-
		SB	TR	T	595	170	0.31	-	5.1	-	A	-
				R	15	60	-	0.72	-	47.9	-	D
		EB	LTR	L	0	75	-	-	-	-	-	-
				T	0	0	0.07	-	20.6	17.9	C	B
				R	20	1106	-	0.47	-	3.6	-	A
		WB	LTR	L	170	10	-	-	-	-	-	-
				T	65	84	0.73	-	48.1	-	D	-
				R	75	10	-	0.28	-	34.0	-	C
		Intersection							18.0	23.9	B	C
10	W 61st Street & Amsterdam Ave	NB	TR	T	1120	0	0.48	-	3.6	6.8	A	A
				R	10	224	-	-	-	-	-	-
		EB	LT	L	85	1090	-	0.82	-	23.8	-	C
				T	10	0	0.29	-	34.0	23.8	C	C
		WB	R	R	20	442	0.06	0.28	23.9	5.1	C	A
		Intersection							6.7	-	A	-
11	W 61st Street & Columbus Ave	SB	LT	L	225	30	-	-	-	-	-	-
				T	1105	688	0.83	0.53	24.2	19.2	C	B
		Intersection							24.2	-	C	-
12	W 61st Street & Broadway	NB	TR	T	445	35	0.29	0.66	5.1	37.9	A	D
				R	10	144	-	-	-	-	-	-
		SB	LT	L	30	0	-	-	-	18.0	-	B
				T	695	617	0.54	0.34	19.3	13.6	B	B
		EB	LTR	L	45	73	-	0.25	-	24.0	-	C
				T	35	0	0.66	-	37.8	14.7	D	B
				R	145	40	-	-	-	-	-	-
		Intersection							18.0	21.7	B	C
13	W 61st Street & Columbus Ave	NB	T	T	630	255	0.35	0.91	13.6	60.8	B	E
		EB	L	L	75	85	0.26	0.48	24.9	29.3	C	C
		Intersection							14.9	35.8	B	D
14	W 81st Street & Central Park West	NB	LTR	L	40	40	-	-	-	-	-	-
				T	395	15	0.94	0.20	46.5	44.7	D	D
				R	255	299	-	0.74	-	40.7	-	D
		SB	LTR	L	85	30	0.75	0.19	58.2	27.2	E	C
				T	305	178	0.77	0.91	35.8	64.5	D	E
				R	40	261	-	0.64	-	36.0	-	D
		EB	L	L	15	158	0.20	0.57	44.7	35.2	D	D
			TR	T	300	0	0.74	-	40.9	38.7	D	D
				R	30	45	0.19	-	27.2	-	C	-
		WB	L	L	180	474	0.92	0.44	67.1	1.6	E	A
			T	T	265	585	0.65	0.55	36.3	20.6	D	C
			R	R	160	55	0.57	-	35.4	-	D	-
		Intersection							44.0	36.1	D	D
15	W 66th Street & Central Park West	NB	LT	L	45	387	-	0.98	-	71.1	-	E
				T	475	273	0.44	0.81	1.6	49.0	A	D
		SB	TR	T	590	0	0.56	-	20.6	30.9	C	C
				R	55	464	-	0.81	-	34.6	-	C
		WB	L	L	220	200	0.66	-	36.3	-	D	-
			T	T	390	332	0.99	0.78	72.8	34.0	E	C
			R	R	275	471	0.82	0.54	49.6	11.0	D	B
		Intersection							31.4	25.5	C	C
16	W 65th Street & Central Park West	NB	TR	T	465	363	0.81	0.61	34.6	32.0	C	C
				R	200	30	-	-	-	-	-	-
		SB	LT	L	335	0	0.78	-	34.6	28.1	C	C
				T	475	0	0.54	-	11.0	-	B	-
		EB	L	L	55	0	0.18	-	25.5	-	C	-
			TR	T	365	0	0.62	-	32.1	-	C	-
				R	30	0	-	-	-	-	-	-
		Intersection							28.3	-	C	-

Upper West Side Study Area - Existing vs No-Action - PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	W 72nd Street & West End Ave	NB	L	L	150	150	0.37	0.37	18.3	18.3	B	B
			T	T	625	626	0.87	0.87	33.9	34.0	C	C
			R	R	135	135	0.34	0.34	15.8	15.8	B	B
		SB	TR	T	365	363	0.65	0.64	35.8	35.7	D	D
				R	30	30	-	-	-	-	-	-
		EB	LTR	L	20	20	-	-	-	-	-	-
				T	95	96	0.65	0.65	41.5	41.7	D	D
				R	90	90	-	-	-	-	-	-
		WB	LTR	L	80	79	-	-	-	-	-	-
				T	120	120	0.83	0.83	55.3	55.3	E	E
				R	45	45	-	-	-	-	-	-
		Intersection							35.5	35.6	D	D
2	W 61st Street & West End Ave	NB	LTR	L	15	15	-	-	-	-	-	-
				T	750	746	0.68	0.68	10.9	10.9	B	B
				R	45	48	-	-	-	-	-	-
		SB	L	L	35	35	0.23	0.23	15.6	15.6	B	B
			TR	T	740	723	0.40	0.39	13.7	13.6	B	B
				R	20	20	-	-	-	-	-	-
		EB	LTR	L	25	25	-	-	-	-	-	-
				T	20	20	0.27	0.27	27.2	27.2	C	C
				R	35	35	-	-	-	-	-	-
		Intersection							13.1	13.0	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	40	40	-	-	-	-	-	-
				T	185	185	0.78	0.78	46.6	46.6	D	D
				R	15	15	-	-	-	-	-	-
		SB	LTR	L	5	5	-	-	-	-	-	-
				T	60	60	0.63	0.62	39.1	39.0	D	D
				R	100	99	-	-	-	-	-	-
		EB	TR	L	60	60	-	-	-	-	-	-
				T	610	605	0.78	0.78	17.3	17.1	B	B
				R	355	352	-	-	-	-	-	-
		WB	TR	L	0	0	-	-	-	-	-	-
				T	420	419	0.41	0.41	9.5	9.5	A	A
				R	155	156	-	-	-	-	-	-
		Intersection							20.7	20.6	C	C
4a	W 56th Street & 12th Avenue	NB	TR	L	295	2667	0.29	0.79	4.2	8.7	A	A
				R	130	570	-	0.92	-	77.6	-	E
		EB	LT	L	160	2014	-	0.36	-	0.2	-	A
				T	410	0	0.76	-	17.2	13.9	B	B
		Intersection							11.4	73.1	B	E
4b	W 56th Street & West Side Highway	NB	T	T	2690	2478	0.80	0.68	8.8	15.9	A	B
		SB	L	L	570	2014	0.92	0.66	77.6	23.7	E	C
			T	T	2010	0	0.36	-	0.2	-	A	-
		Intersection							13.9	25.3	B	C
5a	W 55th Street & West Side Highway	NB	L	L	15	10	0.21	0.88	73.1	39.1	E	D
			T	T	2500	189	0.68	0.77	16.1	22.9	B	C
		SB	TR	T	2010	0	0.66	-	23.7	20.8	C	C
				R	0	0	-	-	-	-	-	-
		WB	LT	L	315	399	0.80	0.46	25.3	13.4	C	B
				T	10	0	0.88	-	39.1	-	D	-
			R	R	190	0	0.78	-	23.6	-	C	-
		Intersection							20.9	-	C	-
5b	W 55th Street & 12th Avenue	NB	LT	L	0	514	-	0.76	-	64.7	-	E
				T	405	20	0.47	-	13.5	-	B	-
		WB	LTR	L	0	25	-	0.08	-	7.1	-	A
				T	515	0	0.76	-	64.7	7.1	E	A
				R	20	303	-	0.71	-	44.1	-	D
		Intersection							42.6	15.3	D	B
5c	W 55th Street & West Side Highway Arterial	WB	L	L	25	88	0.08	-	7.1	-	A	-
		Intersection							7.1	34.1	A	C

Upper West Side Study Area - Existing vs No-Action - PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
6	W 60th Street & Broadway	NB	L	L	305	1133	0.71	0.82	44.3	8.1	D	A
			T	T	645	126	0.49	-	15.3	-	B	-
		SB	TR	T	865	190	0.95	0.69	47.0	25.9	D	C
				R	90	201	-	0.35	-	5.0	-	A
		Intersection							35.8	9.7	D	A
7	W 60th Street & Columbus Ave	SB	TR	T	1170	97	0.84	-	9.0	-	A	-
				R	130	1371	-	0.65	-	17.1	-	B
		WB	L	L	190	222	0.69	0.60	25.7	45.7	C	D
			T	T	205	105	0.36	0.49	5.1	46.1	A	D
		Intersection							10.4	22.6	B	C
8	W 60th Street & Amsterdam Ave	NB	LT	L	95	10	-	0.05	-	10.5	-	B
				T	1345	679	0.64	0.54	16.8	15.1	B	B
		WB	T	T	230	748	0.62	0.39	46.1	5.8	D	A
			R	R	105	10	0.49	-	45.8	-	D	-
		Intersection							22.6	-	C	-
9	W 60th Street & West End Ave	NB	L	L	10	0	0.06	0.10	10.5	21.0	B	C
			T	T	680	25	0.54	-	15.2	-	B	-
		SB	TR	T	765	130	0.40	-	5.9	-	A	-
				R	10	69	-	0.74	-	44.2	-	D
		EB	LTR	L	10	120	-	-	-	-	-	-
				T	0	0	0.10	-	21.0	16.9	C	B
				R	25	1456	-	0.61	-	3.4	-	A
		WB	LTR	L	130	20	-	-	-	-	-	-
				T	75	98	0.74	-	45.0	-	D	-
				R	120	5	-	0.32	-	32.5	-	C
		Intersection							17.0	23.9	B	C
10	W 61st Street & Amsterdam Ave	NB	TR	T	1430	0	0.60	-	3.3	5.7	A	A
				R	20	194	-	-	-	-	-	-
		EB	LT	L	95	1259	-	0.83	-	24.4	-	C
				T	5	0	0.31	-	32.1	24.4	C	C
		WB	R	R	20	630	0.07	0.38	23.9	5.3	C	A
		Intersection							5.6	-	A	-
11	W 61st Street & Columbus Ave	SB	LT	L	195	40	-	-	-	-	-	-
				T	1300	814	0.85	0.60	25.7	20.6	C	C
		Intersection							25.7	-	C	-
12	W 61st Street & Broadway	NB	TR	T	635	38	0.38	0.51	5.3	32.7	A	C
				R	10	121	-	-	-	-	-	-
		SB	LT	L	40	0	-	-	-	16.2	-	B
				T	835	806	0.62	0.42	20.9	14.5	C	B
		EB	LTR	L	35	88	-	0.29	-	26.1	-	C
				T	40	0	0.51	-	32.4	15.7	C	B
				R	120	25	-	-	-	-	-	-
		Intersection							16.3	22.8	B	C
13	W 61st Street & Columbus Ave	NB	T	T	825	255	0.44	0.80	14.6	41.6	B	D
		EB	L	L	90	59	0.30	0.44	25.8	30.8	C	C
		Intersection							15.8	29.1	B	C
14	W 81st Street & Central Park West	NB	LTR	L	25	34	-	-	-	-	-	-
				T	620	25	0.98	0.28	49.5	47.1	D	D
				R	255	306	-	0.89	-	55.4	-	E
		SB	LTR	L	60	25	0.91	0.13	113.0	25.5	F	C
				T	275	204	0.66	0.99	29.5	79.0	C	E
				R	35	283	-	0.74	-	40.9	-	D
		EB	L	L	25	209	0.28	0.75	47.1	45.6	D	D
			TR	T	305	0	0.88	-	55.0	40.2	E	D
				R	25	35	0.13	-	25.5	-	C	-
		WB	L	L	205	645	0.99	0.55	78.9	13.0	E	B
			T	T	285	586	0.74	0.54	41.2	20.3	D	C
			R	R	210	40	0.75	-	45.6	-	D	-
		Intersection							50.6	29.7	D	C
15	W 66th Street & Central Park West	NB	LT	L	35	391	-	1.03	-	85.6	-	F
				T	645	292	0.55	0.85	13.0	51.7	B	D
		SB	TR	T	585	0	0.54	-	20.3	34.6	C	C
				R	40	630	-	0.94	-	51.0	-	D
		WB	L	L	175	250	0.46	-	29.9	-	C	-
			T	T	395	326	1.04	0.91	88.2	95.3	F	F
			R	R	295	433	0.86	0.50	53.0	9.8	D	A
		Intersection							35.3	25.4	D	C
16	W 65th Street & Central Park West	NB	TR	T	630	462	0.94	0.78	50.8	38.3	D	D
				R	250	40	-	-	-	-	-	-
		SB	LT	L	330	0	0.92	-	96.2	46.0	F	D
				T	430	0	0.50	-	9.7	-	A	-
		EB	L	L	50	0	0.17	-	25.4	-	C	-
			TR	T	460	0	0.78	-	38.1	-	D	-
				R	40	0	-	-	-	-	-	-
		Intersection							46.2	-	D	-

Upper West Side Study Area - Existing vs No-Action - Late Night Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	W 72nd Street & West End Ave	NB	L	L	95	93	0.24	0.23	16.1	16.0	B	B
			T	T	135	133	0.20	0.20	15.1	15.1	B	B
			R	R	60	59	0.16	0.15	15.0	15.0	B	B
		SB	TR	T	295	295	0.41	0.41	26.2	26.2	C	C
				R	25	25	-	-	-	-	-	-
		EB	LTR	L	10	10	-	-	-	-	-	-
				T	105	104	0.47	0.46	33.1	33.1	C	C
				R	80	79	-	-	-	-	-	-
		WB	LTR	L	65	65	-	-	-	-	-	-
				T	125	126	0.58	0.58	36.4	36.5	D	D
				R	30	30	-	-	-	-	-	-
		Intersection							27.0	27.0	C	C
2	W 61st Street & West End Ave	NB	LTR	L	10	10	-	-	-	-	-	-
				T	275	269	0.27	0.26	8.4	8.2	A	A
				R	25	24	-	-	-	-	-	-
		SB	L	L	30	30	0.10	0.10	12.8	12.7	B	B
			TR	T	555	555	0.28	0.28	13.5	13.5	B	B
				R	15	15	-	-	-	-	-	-
		EB	LTR	L	10	10	-	-	-	-	-	-
				T	20	20	0.16	0.16	23.8	23.8	C	C
				R	25	25	-	-	-	-	-	-
		Intersection							12.5	12.5	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	40	40	-	-	-	-	-	-
				T	35	35	0.25	0.25	26.1	26.1	C	C
				R	5	5	-	-	-	-	-	-
		SB	LTR	L	5	5	-	-	-	-	-	-
				T	50	50	0.46	0.46	30.4	30.4	C	C
				R	85	85	-	-	-	-	-	-
		EB	TR	L	5	5	-	-	-	-	-	-
				T	400	396	0.42	0.42	11.1	11.1	B	B
				R	175	173	-	-	-	-	-	-
		WB	TR	L	0	0	-	-	-	-	-	-
				T	485	484	0.36	0.36	10.4	10.4	B	B
				R	30	30	-	-	-	-	-	-
		Intersection							13.8	13.8	B	B
4a	W 56th Street & 12th Avenue	NB	TR	L	155	2966	0.13	0.85	0.2	21.3	A	C
				R	45	420	-	0.84	-	60.8	-	E
		EB	LT	L	140	1338	-	0.25	-	0.1	-	A
				T	280	0	0.76	-	14.6	19.0	B	B
		Intersection							9.6	55.0	A	D
4b	W 56th Street & West Side Highway	NB	T	T	2980	2696	0.85	0.83	22.5	24.6	C	C
		SB	L	L	420	1338	0.84	0.55	60.8	23.7	E	C
			T	T	1340	0	0.25	-	0.1	-	A	-
		Intersection							19.7	-	B	-
5a	W 55th Street & West Side Highway	NB	L	L	5	5	0.06	0.39	55.0	6.9	D	A
			T	T	2710	270	0.83	0.54	25.0	7.4	C	A
		SB	TR	T	1340	0	0.55	-	23.7	22.7	C	C
				R	0	0	-	-	-	-	-	-
		WB	LT	L	105	195	-	0.26	-	12.7	-	B
				T	5	0	0.39	-	7.0	-	A	-
			R	R	270	0	0.54	-	7.6	-	A	-
		Intersection							22.9	-	C	-
5b	W 55th Street & 12th Avenue	NB	LT	L	0	380	-	0.45	-	40.4	-	D
				T	200	10	0.26	-	12.8	-	B	-
		WB	LTR	L	0	10	-	0.03	-	2.5	-	A
				T	380	0	0.44	-	40.1	2.5	D	A
				R	0	312	-	0.68	-	42.1	-	D
		Intersection							30.6	13.3	C	B
5c	W 55th Street & West Side Highway Arterial	WB	L	L	10	85	0.03	-	2.5	-	A	-
		Intersection							2.5	25.3	A	C

Upper West Side Study Area - Existing vs No-Action - Late Night Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
6	W 60th Street & Broadway	NB	L	L	315	1024	0.68	0.70	42.3	5.8	D	A
			T	T	480	70	0.34	-	13.3	-	B	-
		SB	TR	T	625	235	0.76	0.75	25.7	28.6	C	C
				R	85	162	-	0.27	-	4.9	-	A
		Intersection							25.4	9.4	C	A
7	W 60th Street & Columbus Ave	SB	TR	T	1030	40	0.71	-	5.9	-	A	-
				R	70	949	-	0.40	-	13.5	-	B
		WB	L	L	235	147	0.74	0.38	28.2	44.0	C	D
			T	T	165	85	0.27	0.30	4.9	43.6	A	D
		Intersection							9.4	20.0	A	B
8	W 60th Street & Amsterdam Ave	NB	LT	L	40	15	-	0.06	-	10.4	-	B
				T	960	258	0.40	0.18	13.5	10.8	B	B
		WB	T	T	150	570	0.39	0.29	28.5	5.2	C	A
			R	R	85	10	0.30	-	27.9	-	C	-
		Intersection							16.7	-	B	-
9	W 60th Street & West End Ave	NB	L	L	15	0	0.06	0.04	10.4	20.0	B	B
			T	T	265	15	0.19	-	10.8	-	B	-
		SB	TR	T	570	100	0.29	-	5.2	-	A	-
				R	10	42	-	0.47	-	41.8	-	D
		EB	LTR	L	0	45	-	-	-	-	-	-
				T	0	0	0.04	-	20.0	13.8	B	B
				R	15	1019	-	0.43	-	5.0	-	A
		WB	LTR	L	100	15	-	-	-	-	-	-
				T	45	70	0.47	-	41.7	-	D	-
				R	45	4	-	0.20	-	30.3	-	C
		Intersection							13.9	22.6	B	C
10	W 61st Street & Amsterdam Ave	NB	TR	T	1030	0	0.44	-	5.0	7.2	A	A
				R	15	184	-	-	-	-	-	-
		EB	LT	L	70	1094	-	0.70	-	19.8	-	B
				T	5	0	0.20	-	30.4	19.8	C	B
		WB	R	R	25	476	0.07	0.26	22.6	5.0	C	A
		Intersection							7.2	-	A	-
11	W 61st Street & Columbus Ave	SB	LT	L	185	20	-	-	-	-	-	-
				T	1100	590	0.71	0.39	19.9	17.1	B	B
		Intersection							19.9	-	B	-
12	W 61st Street & Broadway	NB	TR	T	480	29	0.27	0.49	5.0	34.8	A	C
				R	0	115	-	-	-	-	-	-
		SB	LT	L	20	0	-	-	-	15.4	-	B
				T	595	683	0.39	0.34	17.2	13.6	B	B
		EB	LTR	L	40	49	-	0.16	-	19.0	-	B
				T	30	0	0.49	-	34.8	14.0	C	B
				R	115	30	-	-	-	-	-	-
		Intersection							15.4	20.5	B	C
13	W 61st Street & Columbus Ave	NB	T	T	695	170	0.34	0.36	13.6	21.4	B	C
		EB	L	L	50	55	0.16	0.19	18.9	19.5	B	B
		Intersection							14.0	24.4	B	C
14	W 81st Street & Central Park West	NB	LTR	L	30	25	-	-	-	-	-	-
				T	320	15	0.59	0.18	24.3	44.0	C	D
				R	170	244	-	0.66	-	36.4	-	D
		SB	LTR	L	55	30	-	0.09	-	24.2	-	C
				T	200	93	0.38	0.37	20.8	21.2	C	C
				R	25	210	-	0.56	-	32.7	-	C
		EB	L	L	15	137	0.18	0.43	44.0	30.2	D	C
			TR	T	245	0	0.66	-	36.5	26.8	D	C
				R	30	30	0.09	-	24.2	-	C	-
		WB	L	L	95	444	0.38	0.34	21.3	1.2	C	A
			T	T	215	403	0.57	0.36	33.1	17.5	C	B
			R	R	140	30	0.44	-	30.4	-	C	-
		Intersection							27.5	26.3	C	C
15	W 66th Street & Central Park West	NB	LT	L	30	360	-	0.86	-	49.0	-	D
				T	445	242	0.34	0.73	1.2	41.4	A	D
		SB	TR	T	410	0	0.37	-	17.6	24.5	B	C
				R	30	439	-	0.84	-	35.8	-	D
		WB	L	L	105	305	0.29	-	26.4	-	C	-
			T	T	365	212	0.87	0.57	50.5	22.3	D	C
			R	R	245	295	0.74	0.32	41.9	6.8	D	A
		Intersection							25.0	24.5	C	C
16	W 65th Street & Central Park West	NB	TR	T	440	419	0.84	0.61	35.9	31.6	D	C
				R	305	30	-	-	-	-	-	-
		SB	LT	L	215	0	-	-	-	28.0	-	C
				T	300	0	0.48	-	10.4	-	B	-
		EB	L	L	35	0	0.10	-	24.5	-	C	-
			TR	T	420	0	0.61	-	31.5	-	C	-
				R	30	0	-	-	-	-	-	-
		Intersection							26.9	-	C	-

LDR Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	W 179th St & Broadway	NB	NBL	L	55	55	0.15	0.15	11.1	11.1	B	B
			NBT	T	210	210	0.18	0.18	10.3	10.3	B	B
		SB	SBT	T	220	220	0.44	0.44	23.0	23.0	C	C
			SBR	R	80	80	-	-	-	-	-	-
		WB	WBL	L	45	45	-	-	-	-	-	-
			WBT	T	145	153	0.70	0.72	38.4	39.8	D	D
			WBR	R	50	50	-	-	-	-	-	-
		Intersection							23.5	24.0	C	C

LDR Study Area - Existing vs No-Action - MD Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	W 179th St & Broadway	NB	NBL	L	140	140	0.36	0.36	15.6	15.6	B	B
			NBT	T	330	330	0.25	0.25	11.4	11.4	B	B
		SB	SBT	T	220	220	0.44	0.44	24.1	24.1	C	C
			SBR	R	105	105	-	-	-	-	-	-
		WB	WBL	L	40	40	-	-	-	-	-	-
			WBT	T	200	196	0.74	0.73	38.4	37.7	D	D
			WBR	R	50	50	-	-	-	-	-	-
		Intersection							23.2	22.9	C	C

LDR Study Area - Existing vs No-Action - PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	W 179th St & Broadway	NB	NBL	L	135	135	0.30	0.30	14.1	14.1	B	B
			NBT	T	340	340	0.27	0.27	11.6	11.6	B	B
		SB	SBT	T	230	230	0.41	0.41	23.7	23.7	C	C
			SBR	R	100	100	-	-	-	-	-	-
		WB	WBL	L	35	35	-	-	-	-	-	-
			WBT	T	220	217	0.77	0.76	40.2	39.6	D	D
			WBR	R	60	60	-	-	-	-	-	-
		Intersection							23.5	23.3	C	C

LES Study Area - Existing vs No-Action - AM Peak Hour												
Intersection #	**Intersection Name**	**Approach**	**Lane Group**	**Movement**	**Volume**		**V/C**		**Delay**		**LOS**	
					Existing	**No-Action**	**Existing**	**No-Action**	**Existing**	**No-Action**	**Existing**	**No-Action**
1	Park Row/Chatham Square & Worth/Oliver St & Mott St	NB	NBL	L	10	10						
			NBT	T	355	355	0.76	0.76	39.1	39.1	D	D
			NBR2	R2	155	165	0.42	0.45	28.8	29.5	C	C
		SB	SBL	T	75	85	0.69	0.78	66.7	86.2	E	F
			SBT	T	50	50	0.15	0.15	23.6	23.6	C	C
			SBR	R	10	10						
		EB	EBT	T	20	20	0.09	0.09	22	22	C	C
			EBR	R	10	10	0	0	0	0	0	0
		WB	WBL	L	135	133	0.46	0.46	29.6	29.6	C	C
			WBT	T	15	15	0.3	0.3	21.3	21.5	C	C
			WBR	R	170	168						
		SWB	SWL2	L2	55	55						
			SWL	L	0	0	0.24	0.24	33	33	C	C
			SWR	R	0	0						
		Intersection							33.5	35.5	C	D
2	Chatham Square & E Broadway	NB	NBL	L	95	95	0.2	0.2	16.4	16.4	B	B
			NBR	R	30	30	0.07	0.07	14.9	14.9	B	B
		EB	EBT	T	170	190	0.16	0.18	18.4	19.2	B	B
			EBR	R	135	135	0.29	0.29	57	59.7	E	E
		WB	WBL	L	120	120	0.35	0.35	10.2	10.4	B	B
			WBT	T	225	221	0.22	0.21	6.4	6.4	A	A
		Intersection							20.1	20.9	C	C
3	Chatham Square/Bowery & Divison St	NB	NBL	L	140	140	0.58	0.58	41.5	41.5	D	D
			NBR	T	250	250	0.55	0.55	19.8	19.8	B	B
		EB	EBT	T	195	215	0.24	0.27	6.2	5.8	A	A
			EBR2	R2	5	5						
		WB	WBL	L	5	5						
			WBT	T	205	201	0.25	0.25	20.2	20.1	C	C
		Intersection							20.6	20.1	C	C

						Volume	VC Ratio	Delay	LOS	Q Length 50th	Q Length 95th				
	LES Study Area - Existing vs No-Action - Midday Peak Hour														
	Intersection #	**Intersection Name**	**Approach**	**Lane Group**	**Movement**	**Volume**		**V/C**		**Delay**		**LOS**		**Calibration Edits**	**Notes**
Node						**Existing**	**No-Action**	**Existing**	**No-Action**	**Existing**	**No-Action**	**Existing**	**No-Action**		
1	1	Park Row/Chatham Square & Worth/Oliver St & Mott St	NB	NBL	L	10	10								Based on video observation.
1				NBT	T	215	215	0.49	0.49	29.3	29.3	C	C		
1				NBR2	R2	170	172	0.46	0.47	30	30.2	C	C		
1			SB	SBL	T	160	163	0.82	0.84	88	95.2	F	F		
1				SBT	T	75	75	0.22	0.22	24.6	24.6	C	C		
1				SBR	R	10	10								
1			EB	EBT	T	20	20	0.11	0.11	22.2	22.2	C	C		
1				EBR	R	20	20								
1			WB	WBL	L	155	140	0.48	0.44	25.6	25.6	C	C		
1				WBT	T	20	20	0.3	0.27	17.4	18.2	B	B		
1				WBR	R	180	165								Based on video observation
			SWB	SWL2	L2	40	40								
2				SWL	L	0	0	0.17	0.17	31.8	31.8	C	C		
2				SWR	R	0	0								
2			Intersection							35.4	37.3	D	D		
	2	Chatham Square & E Broadway	NB	NBL	L	85	85	0.15	0.15	15.8	15.8	B	B		
2				NBR	R	35	35	0.08	0.08	14.9	14.9	B	B		
2			EB	EBT	T	205	210	0.2	0.2	19.4	20	B	B		
2				EBR	R	185	185	0.37	0.37	84.9	84.7	F	F		
2			WB	WBL	L	130	130	0.35	0.35	7.1	7.7	A	A		
2				WBT	T	270	240	0.23	0.21	4.7	4.7	A	A		
2			Intersection							26.5	27.3	C	C		
2	3	Chatham Square/Bowery & Divison St	NB	NBL	L	110	110	0.43	0.43	36.6	36.6	D	D		
2				NBR	T	225	225	0.41	0.41	16.3	16.3	B	B		
2			EB	EBT	T	230	235	0.28	0.29	5.5	5.7	A	A		
				EBR2	R2	10	10	0	0	0	0	0	0		
			WB	WBL	L	5	5	0	0	0	0	0	0		
3				WBT	T	290	260	0.33	0.3	21.1	20.7	C	C		
3			**Intersection**							17.7	17.4	B	B		

A	3	3
B	5	5
C	7	7
D	1	1
E	-	-
F	2	2

LES Study Area - Existing vs No-Action - PM Peak Hour												
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume		V/C		Delay		LOS	
					Existing	No-Action	Existing	No-Action	Existing	No-Action	Existing	No-Action
1	Park Row/Chatham Square & Worth/Oliver St & Mott St	NB	NBL	L	5	5						
			NBT	T	175	175	0.37	0.37	26.8	26.8	C	C
			NBR2	R2	225	230	0.61	0.62	37.5	39	D	D
		SB	SBL	T	190	195	0.71	0.73	61.6	68.8	E	E
			SBT	T	95	95	0.24	0.24	24.7	24.7	C	C
			SBR	R	5	5						
		EB	EBT	T	25	25	0.09	0.09	22.1	22.1	C	C
			EBR	R	10	10	0	0	0	0	0	0
		WB	WBL	L	150	143	0.48	0.46	28.6	28.7	C	C
			WBT	T	20	20	0.32	0.31	20.5	21	C	C
			WBR	R	195	188						
		SWB	SWL2	L2	55	55						
			SWL	L	0	0	0.24	0.24	33	33	C	C
			SWR	R	0	0						
		Intersection							33.3	35.1	C	D
2	Chatham Square & E Broadway	NB	NBL	L	105	105	0.2	0.2	16.3	16.3	B	B
			NBR	R	45	45	0.09	0.09	15	15	B	B
		EB	EBT	T	270	280	0.25	0.26	38.2	45.5	D	D
			EBR	R	225	225	0.39	0.39	84.5	84.4	F	F
		WB	WBL	L	125	125	0.34	0.35	9.4	9.9	A	A
			WBT	T	260	246	0.24	0.22	6.2	6.4	A	A
		Intersection							32.8	35.4	C	D
3	Chatham Square/Bowery & Divison St	NB	NBL	L	155	155	0.62	0.62	43	43	D	D
			NBR	T	395	395	0.74	0.74	26.5	26.5	C	C
		EB	EBT	T	305	315	0.37	0.38	6.3	6.2	A	A
			EBR2	R2	10	10	0	0	0	0	0	0
		WB	WBL	L	5	5	0	0	0	0	0	0
			WBT	T	230	216	0.26	0.25	20.3	20.1	C	C
		Intersection							21.7	21.5	C	C

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.4, Transportation:
Traffic LOS: CBD Tolling Alternative

August 2022

9A Study Area - No-Action vs Action (No Mitigation) - AM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	24th Street & 12th Ave	NB	T	T	1874	1854	-20	0.71	0.71	19.2	19.0	B	B
			TR	R	20	20	-	-	-	-	-	-	
		SB	L	L	109	103	-6	0.96	0.91	133.8	121.2	F	F
			T	T	1765	1663	-102	0.60	0.57	16.4	15.7	B	B
		WB	LR	LR	200	200	-	0.71	0.71	71.3	71.3	E	E
			R	R	165	165	-	0.92	0.92	116.4	116.4	F	F
		Intersection								27.9	27.3	C	C

9A Study Area - No-Action vs Action (No Mitigation)- MD Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	24th Street & 12th Ave	NB	T	T	1523	1524	1	0.69	0.69	21.4	21.4	C	C
			TR	R	20	20	-	-	-	-	-	-	
		SB	L	L	80	73	-7	0.78	0.71	91.3	82.7	F	F
			T	T	1536	1408	-128	0.64	0.59	20.2	19.1	C	B
		WB	LR	LR	130	130	-	0.45	0.45	43.7	43.7	D	D
			R	R	195	195	-	0.54	0.54	51.7	51.7	D	D
		Intersection								25.1	24.5	C	C

9A Study Area - No-Action vs Action (No Mitigation)- PM Peak Hour														
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS		
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action	
1	24th Street & 12th Ave	NB	T	T	2323	2254	-69	0.80	0.78	23.6	22.7	C	C	
			TR	R	10	10	-	-	-	-	-	-		
		SB	L	L	85	77	-8	0.80	0.72	105.1	95.9	F	F	
			T	T	2048	1860	-188	0.69	0.63	20.0	18.4	B	B	
		WB	LR	LR	235	235	-	0.80	0.80	72.4	72.4	E	E	
			R	R	275	275	-	0.88	0.88	96.6	96.6	F	F	
		Intersection								30.1	29.2	C	C	

9A Study Area - No-Action vs Action (No Mitigation) - LN Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	24th Street & 12th Ave	NB	T	T	1605	1500	-105	0.66	0.62	20.6	19.7	C	B
			TR	R	15	14	-1	-	-	-	-	-	
		SB	L	L	45	39	-6	0.39	0.33	60.4	58.6	E	E
			T	T	1240	1083	-157	0.49	0.43	17.4	16.5	B	B
		WB	LR	LR	135	135	-	0.43	0.43	43.2	43.2	D	D
			R	R	195	195	-	0.48	0.48	48.5	48.5	D	D
		Intersection								22.7	22.1	C	C

Downtown Brooklyn Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	570	570	0	1.38	1.21	230.0	161.6	F	F
			TR	T	1158	934	-224	1.41	1.21	222.1	136.5	F	F
				R	260	260	0	0.47	0.46	6.1	4.7	A	A
		SB	T	T	724	667	-57	0.73	0.67	43.5	41.7	D	D
			R	R	91	84	-7	0.35	0.32	38.6	37.9	D	D
		EB	L	L	172	139	-33	1.11	0.90	145.1	94.7	F	F
			T	T	611	608	-3	0.83	0.83	48.4	48.1	D	D
			R	R	227	226	-1	0.85	0.84	63.8	63.4	E	E
		WB	L	L	235	231	-4	0.78	0.77	66.0	65.1	E	E
			T	T	376	369	-7	0.93	0.79	62.9	47.8	E	D
			R	R	463	367	-96	1.06	0.91	111.9	77.1	F	E
		Intersection								116.9	80.1	F	F
2	Adam Street and Tillary Street	NB	L	L	0	0	0	-	-	-	-	-	-
			T	T	617	593	-24	0.83	0.80	48.7	46.8	D	D
			R	R	59	59	0	0.72	0.70	51.8	50.3	D	D
				R2	157	150	-7	-	-	-	-	-	-
		SB	L	L	609	604	-5	0.88	0.87	54.3	53.6	D	D
			T	T	833	826	-7	0.61	0.61	23.3	23.1	C	C
			R	R	15	15	0	0.03	0.03	8.5	8.5	A	A
		EB	L	L	0	0	0	-	-	-	-	-	-
			TR	T	205	196	-9	0.36	0.35	37.1	36.9	D	D
				R	90	90	0	-	-	-	-	-	-
		WB	L	L	141	139	-2	0.83	0.81	75.0	71.5	E	E
			T	T	232	229	-3	0.36	0.35	37.3	37.3	D	D
			R	R	0	0	0	-	-	-	-	-	-
				R2	39	32	-7	0.10	0.09	32.8	32.5	C	C
		Intersection								42.0	41.1	D	D
3	Old Fulton Street and Vine Street	NB	L	L	1127	1123	-4	0.99	0.99	51.5	50.7	D	D
			T	T	176	175	-1	0.34	0.34	20.0	20.0	C	C
		SB	T	T	663	658	-5	0.56	0.56	62.5	62.4	E	E
		Intersection								52.4	51.9	D	D

Downtown Brooklyn Study Area - No-Action vs With-Action (No Mitigation) - Midday Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	585	585	0	1.20	0.92	155.2	68.3	F	E
			TR	T	820	475	-345	1.21dl	0.90dl	69.7	32.6	E	C
				R	345	342	-3	0.51	0.51	5.8	5.4	A	A
		SB	T	T	636	361	-275	0.59	0.33	39.5	35.0	D	D
			R	R	77	44	-33	0.31	0.18	37.4	34.5	D	C
		EB	L	L	123	58	-65	0.68	0.32	66.4	51.2	E	D
			T	T	683	603	-80	0.82	0.73	47.2	42.4	D	D
			R	R	255	227	-28	0.77	0.68	53.8	47.9	D	D
		WB	L	L	233	222	-11	0.73	0.69	61.6	59.7	E	E
			T	T	366	349	-17	0.85	0.58	51.5	38.4	D	D
			R	R	382	203	-179	0.96	0.68	83.4	48.6	F	D
		Intersection								59.6	39.6	E	D
2	Adam Street and Tillary Street	NB	L	L	0	0	0	-	-	-	-	-	-
			T	T	474	395	-79	0.66	0.55	41.2	38.2	D	D
			R	R	44	44	0	0.81	0.75	57.9	53.2	E	D
				R2	188	173	-15	-	-	-	-	-	-
		SB	L	L	634	488	-146	0.88	0.68	54.8	43.1	D	D
			T	T	735	565	-170	0.54	0.41	21.6	19.4	C	B
			R	R	19	15	-4	0.04	0.04	8.6	8.5	A	A
		EB	L	L	0	0	0	-	-	-	-	-	-
			TR	T	279	256	-23	0.41	0.38	37.6	37.2	D	D
				R	85	85	0	-	-	-	-	-	-
		WB	L	L	169	156	-13	1.10	0.97	138.4	103.2	F	F
			T	T	214	197	-17	0.31	0.29	36.6	36.2	D	D
			R	R	0	0	0	-	-	-	-	-	-
				R2	33	12	-21	0.08	0.03	32.4	31.6	C	C
		Intersection								45.3	40.0	D	D
3	Old Fulton Street and Vine Street	NB	L	L	1094	949	-145	1.03	0.89	63.0	37.9	E	D
			T	T	122	106	-16	0.25	0.21	20.7	20.3	C	C
		SB	T	T	509	455	-54	0.41	0.37	23.5	9.2	C	A
		Intersection								47.2	27.2	D	C

Downtown Brooklyn Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	520	520	0	1.45	1.12	263.4	129.6	F	F
			TR	T	971	610	-361	1.47dl	1.14dl	111.1	38.6	F	D
				R	311	301	-10	0.48	0.46	5.4	4.6	A	A
		SB	T	T	955	687	-268	0.90	0.65	52.5	40.7	D	D
			R	R	80	58	-22	0.30	0.21	36.6	35.0	D	C
		EB	L	L	128	72	-56	0.66	0.37	65.3	52.7	E	D
			T	T	733	650	-83	0.89	0.79	53.0	45.4	D	D
			R	R	230	211	-19	0.75	0.69	51.3	47.4	D	D
		WB	L	L	223	218	-5	0.62	0.60	55.9	55.5	E	E
			T	T	643	628	-15	0.93	0.89	58.4	53.3	E	D
			R	R	289	175	-114	0.88	0.53	65.7	41.0	E	D
		Intersection								75.7	46.9	E	D
2	Adam Street and Tillary Street	NB	L	L	0	0	0	-	-	-	-	-	-
			T	T	621	558	-63	0.76	0.68	44.9	41.8	D	D
			R	R	61	61	0	0.92	0.87	72.2	63.8	E	E
				R2	236	218	-18	-	-	-	-	-	-
		SB	L	L	536	461	-75	0.74	0.64	45.3	41.7	D	D
			T	T	1027	883	-144	0.74	0.64	26.9	23.8	C	C
			R	R	20	17	-3	0.04	0.03	8.5	8.4	A	A
		EB	L	L	0	0	0	-	-	-	-	-	-
			TR	T	329	304	-25	0.43	0.40	37.9	37.5	D	D
				R	85	85	0	-	-	-	-	-	-
		WB	L	L	225	215	-10	1.34	1.23	219.1	176.9	F	F
			T	T	365	349	-16	0.49	0.47	39.6	39.2	D	D
			R	R	0	0	0	-	-	-	-	-	-
				R2	38	14	-24	0.11	0.04	32.9	31.7	C	C
		Intersection								51.7	47.1	D	D
3	Old Fulton Street and Vine Street	NB	L	L	1151	1100	-51	0.73	0.70	22.0	21.0	C	C
			T	T	245	234	-11	0.33	0.31	14.6	14.4	B	B
		SB	T	T	280	259	-21	0.34	0.31	14.0	10.3	B	B
		Intersection								19.4	18.0	B	B

Downtown Brooklyn Study Area - No-Action vs With-Action (No Mitigation) - Late Night Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	465	465	0	1.29	0.98	200.0	90.8	F	F
			TR	T	847	209	-638	1.25dl	0.93dl	47.9	25.2	D	C
				R	415	384	-31	0.53	0.49	7.1	4.9	A	A
		SB	T	T	866	588	-278	0.79	0.54	45.3	38.3	D	D
			R	R	53	36	-17	0.18	0.12	34.3	33.2	C	C
		EB	L	L	106	16	-90	0.58	0.09	61.5	46.2	E	D
			T	T	528	440	-88	0.67	0.56	40.4	37.4	D	D
			R	R	149	135	-14	0.46	0.41	37.9	36.8	D	D
		WB	L	L	250	246	-4	0.69	0.68	59.1	58.5	E	E
			T	T	410	404	-6	0.71	0.57	42.3	38.0	D	D
			R	R	294	68	-226	0.75	0.22	52.1	32.9	D	C
		Intersection								50.7	37.6	D	D
2	Adam Street and Tillary Street	NB	L	L	0	0	0	-	-	-	-	-	-
			T	T	511	325	-186	0.64	0.40	40.4	35.2	D	D
			R	R	44	44	0	0.46	0.31	38.6	35.1	D	D
				R2	106	58	-48	-	-	-	-	-	-
		SB	L	L	371	298	-73	0.54	0.44	39.3	37.2	D	D
			T	T	619	497	-122	0.47	0.38	20.4	18.9	C	B
			R	R	0	0	0	-	-	-	-	-	-
		EB	L	L	0	0	0	-	-	-	-	-	-
			TR	T	141	77	-64	0.18	0.12	34.4	33.7	C	C
				R	45	45	0	-	-	-	-	-	-
		WB	L	L	115	107	-8	0.54	0.47	47.0	43.7	D	D
			T	T	120	112	-8	0.18	0.17	34.7	34.5	C	C
			R	R	0	0	0	-	-	-	-	-	-
				R2	37	18	-19	0.10	0.05	34.2	33.3	C	C
		Intersection								33.5	30.8	C	C
3	Old Fulton Street and Vine Street	NB	L	L	1190	1093	-97	0.79	0.73	24.3	21.8	C	C
			T	T	129	118	-11	0.17	0.15	12.6	12.4	B	B
		SB	T	T	307	216	-91	0.36	0.25	20.2	5.7	C	A
		Intersection								22.5	18.5	C	B

Long Island City Study Area - No-Action vs With-Action (No Mitigation)- AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph) No-Action	Volume (vph) With-Action	Volume (vph) Increment	V/C No-Action	V/C With-Action	Delay (seconds) No-Action	Delay (seconds) With-Action	LOS No-Action	LOS With-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	71	71	0	-	-	-	-	-	-
			T	T	715	705	-10	1.18	1.17	128.5	124.4	F	F
			R	R	390	396	6	0.66	0.67	43.9	44.2	D	D
		SB	T	T	445	445	0	0.68	0.68	8.6	8.7	A	A
			TR	R	60	62	2	-	-	-	-	-	-
		EB	LT	L	35	31	-4	-	-	-	-	-	-
			T	T	71	65	-6	0.26	0.23	37.8	37.3	D	D
		WB	L	L	480	464	-16	0.69	0.66	44.6	43.8	D	D
			T	T	206	208	2	0.29	0.29	14.6	14.6	B	B
		Intersection								61.3	59.7	E	E
1b	11th Street & 48TH Avenue	NB	L	L	65	65	0	0.39	0.39	3.2	3.0	A	A
			T	T	685	671	-14	0.65	0.64	23.2	19.1	C	B
		SB	T	T	495	497	2	0.66	0.66	39.1	39.2	D	D
			TR	R	15	15	0	-	-	-	-	-	-
		WB	LTR	L	10	10	0	-	-	-	-	-	-
				T	25	25	0	0.08	0.08	17.8	17.8	B	B
				R	10	10	0	-	-	-	-	-	-
		Intersection								28.0	25.9	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	218	214	-4	0.37	0.36	14.2	14.1	B	B
			R	R	11	12	1	0.03	0.03	10.6	10.8	B	B
		SB	LT	L	35	40	5	-	-	-	-	-	-
				T	165	164	-1	0.47	0.49	16.9	17.3	B	B
		EB	LTR	L	35	35	0	-	-	-	-	-	-
				T	50	58	8	0.29	0.31	13.7	13.8	B	B
				R	30	30	0	-	-	-	-	-	-
		Intersection								15.0	15.2	B	B
3	Green Street & McGuiness Blvd	NB	T	T	1176	1153	-23	0.85	0.83	27.2	26.2	C	C
			TR	R	30	30	0	-	-	-	-	-	-
		SB	L	L	74	73	-1	0.80	0.75	68.0	58.7	E	E
			T	T	962	944	-18	0.61	0.60	17.9	17.7	B	B
		EB	LTR	L	185	182	-3	-	-	-	-	-	-
				T	20	20	0	0.63	0.62	40.7	40.4	D	D
				R	40	40	0	-	-	-	-	-	-
		Intersection						-	-	26.3	25.4	C	C
4	McGuinness Blvd & Freeman Street	NB	T	T	1361	1335	-26	-	-	-	-	-	-
		SB	T	T	1036	1017	-19	-	-	-	-	-	-
			TR	R	115	115	0	-	-	-	-	-	-
		WB	R	R	211	180	-31	-	-	-	-	-	-
		Intersection											
5	21st Street & 49th Avenue	NB	LTR	L	35	35	0	-	-	-	-	-	-
				T	90	90	0	0.57	0.57	33.0	32.9	C	C
				R	40	40	0	-	-	-	-	-	-
		SB	LTR	L	99	98	-1	-	-	-	-	-	-
				T	129	127	-2	1.04	1.04	97.1	95.3	F	F
				R	10	10	0	-	-	-	-	-	-
		EB	LTR	L	38	37	-1	-	-	-	-	-	-
				T	141	138	-3	0.49	0.48	24.5	24.3	C	C
				R	11	11	0	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
				T	40	40	0	0.11	0.11	17.8	17.8	B	B
			R	R	310	310	0	0.91	0.91	57.4	57.4	E	E
		Intersection						-	-	54.9	54.4	D	D
7	11th Street & Borden Avenue	NB	LTR	L	17	17	0	-	-	-	-	-	-
				T	67	67	0	-	-	-	-	-	-
				R	23	17	-6	-	-	-	-	-	-
		SB	LTR	L	35	32	-3	-	-	-	-	-	-
				T	0	0	0	-	-	-	-	-	-
				R	125	114	-11	-	-	-	-	-	-
		EB	LTR	L	561	570	9	-	-	-	-	-	-
				T	50	50	0	-	-	-	-	-	-
				R	26	19	-7	-	-	-	-	-	-
		WB	LTR	L	40	40	0	-	-	-	-	-	-
				T	422	424	2	-	-	-	-	-	-
				R	77	59	-18	-	-	-	-	-	-
		Intersection											
8a	Van Dam Street & QMT Expy	NB	LT	L	26	23	-3	-	-	-	-	-	-
			T	T	303	297	-6	0.45	0.41	8.3	7.1	A	A
		SB	T	T	842	765	-77	0.70	0.63	80.0	61.2	E	E
			TR	R	19	17	-2	-	-	-	-	-	-
		WB	T	T	891	840	-51	0.70	0.67	26.6	25.5	C	C
			TR	R	263	258	-5	-	-	-	-	-	-
		Intersection								42.3	34.6	D	C
8b	Van Dam Street & Borden Avenue	NB	T	T	299	291	-8	0.57	0.56	43.7	42.7	D	D
			TR	R	5	5	0	-	-	-	-	-	-
		SB	L	L	636	585	-51	0.97	0.89	95.6	92.4	F	F
			T	T	206	180	-26	0.29	0.26	3.4	3.0	A	A
		EB	LTR	L	30	29	-1	-	-	-	-	-	-
				T	185	185	0	0.31	0.31	29.0	28.9	C	C
				R	15	15	0	-	-	-	-	-	-
		Intersection								57.9	56.0	E	E
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	260	301	41	0.65	0.74	51.3	55.4	D	E
			TR	R	16	16	0	-	-	-	-	-	-
		SB	LT	L	15	15	0	-	-	-	-	-	-
			T	T	132	135	3	0.40	0.41	38.9	39.3	D	D
		EB	T	T	963	833	-130	0.47	0.41	22.8	21.8	C	C
			R	R	327	283	-44	0.66	0.57	31.1	27.9	C	C
		WB	LT	L	50	50	0	-	-	-	-	-	-
			T	T	733	723	-10	0.50	0.48	15.5	15.3	B	B
			TR	R	60	60	0	-	-	-	-	-	-
		Intersection								26.0	26.4	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	L	L	0	0	0	-	-	-	-	-	-
			LR	R	0	0	0	-	-	-	-	-	-
		EB	T	T	400	388	-12	-	-	-	-	-	-
		WB	T	T	385	385	0	-	-	-	-	-	-
			R	R	896	896	0	-	-	-	-	-	-
		Intersection											
11b	Thomson Avenue & Dutch Kills Street	WB	T	T	1281	1281	0	-	-	-	-	-	-
			R	R	842	689	-153	-	-	-	-	-	-
		EB	T	T	400	388	-12	-	-	-	-	-	-
		Intersection											
12	21st Street & Queens Plaza N	NB		L	0	0	0	-	-	-	-	-	-
			T	T	365	365	0	0.47	0.47	17.6	17.6	B	B
		SB	T	T	947	951	4	1.05	1.06	70.5	72.2	E	E
			R	R	401	334	-67	0.51	0.43	18.3	16.6	B	B
		WB	LTR	L	123	120	-3	-	-	-	-	-	-
				T	78	63	-15	0.71	0.66	47.3	45.1	D	D
				R	84	82	-2	-	-	-	-	-	-
		Intersection								46.5	47.8	D	D

Long Island City Study Area - No-Action vs With-Action (No Mitigation) - Midday Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	70	68	-2	-	-	-	-	-	-
			T	T	515	499	-16	1.03	1.00	84.6	77.8	F	E
			R	R	283	312	29	0.41	0.45	34.0	34.8	C	C
		SB	T	T	340	337	-3	0.65	0.66	8.9	9.0	A	A
			TR	R	75	84	9	-	-	-	-	-	-
		EB	LT	L	55	73	18	-	-	-	-	-	-
			T	T	89	114	25	0.33	0.42	38.9	40.9	D	D
		WB	L	L	395	342	-53	0.57	0.49	37.5	35.7	D	D
			T	T	208	209	1	0.28	0.28	12.0	12.1	B	B
		Intersection								41.6	39.3	D	D
1b	11th Street & 48TH Avenue	NB	L	L	55	55	0	0.32	0.33	5.9	6.9	A	A
			T	T	515	517	2	0.57	0.57	11.3	12.7	B	B
		SB	T	T	410	416	6	0.67	0.68	43.1	43.4	D	D
			TR	R	35	35	0	-	-	-	-	-	-
		WB	LTR	L	5	5	0	-	-	-	-	-	-
				T	25	25	0	0.08	0.08	15.1	15.1	B	B
				R	15	15	0	-	-	-	-	-	-
		Intersection								24.3	25.3	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	230	249	19	0.44	0.48	15.4	16.0	B	B
			R	R	27	39	12	0.06	0.09	11.0	11.2	B	B
		SB	LT	L	35	48	13	-	-	-	-	-	-
				T	214	207	-7	0.53	0.56	17.6	18.7	B	B
		EB	LTR	L	30	30	0	-	-	-	-	-	-
				T	30	42	12	0.21	0.23	12.7	12.9	B	B
				R	20	20	0	-	-	-	-	-	-
		Intersection								15.7	16.3	B	B
3	Green Street & McGuiness Blvd	NB	T	T	752	754	2	0.55	0.55	17.1	17.1	B	B
			TR	R	40	39	-1	-	-	-	-	-	-
		SB	L	L	78	71	-7	0.38	0.35	19.1	18.1	B	B
			T	T	624	561	-63	0.38	0.34	14.1	13.6	B	B
		EB	LTR	L	243	250	7	-	-	-	-	-	-
				T	40	40	0	0.84	0.85	53.3	54.8	D	D
				R	60	59	-1	-	-	-	-	-	-
		Intersection								23.5	24.1	C	C
4	McGuinness Blvd & Freeman Street	NB	T	T	995	1004	9	-	-	-	-	-	-
		SB	T	T	702	632	-70	-	-	-	-	-	-
			TR	R	215	215	0	-	-	-	-	-	-
		WB	R	R	185	114	-71	-	-	-	-	-	-
		Intersection											
5	21st Street & 49th Avenue	NB	LTR	L	20	20	0	-	-	-	-	-	-
				T	85	85	0	0.47	0.47	28.7	28.7	C	C
				R	50	50	0	-	-	-	-	-	-
		SB	LTR	L	105	96	-9	-	-	-	-	-	-
				T	100	91	-9	0.87	0.78	58.7	47.2	E	D
				R	10	9	-1	-	-	-	-	-	-
		EB	LTR	L	33	38	5	-	-	-	-	-	-
				T	111	128	17	0.39	0.45	22.3	23.6	C	C
				R	11	13	2	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
				T	35	35	0	0.09	0.09	17.5	17.5	B	B
			R	R	310	310	0	0.79	0.79	39.3	39.3	D	D
		Intersection								38.0	34.8	D	C
7	11th Street & Borden Avenue	NB	LTR	L	10	8	-2	-	-	-	-	-	-
				T	80	70	-10	-	-	-	-	-	-
				R	41	32	-9	-	-	-	-	-	-
		SB	LTR	L	45	64	19	-	-	-	-	-	-
				T	6	9	3	-	-	-	-	-	-
				R	130	186	56	-	-	-	-	-	-
		EB	LTR	L	581	610	29	-	-	-	-	-	-
				T	75	73	-2	-	-	-	-	-	-
				R	41	40	-1	-	-	-	-	-	-
		WB	LTR	L	70	70	0	-	-	-	-	-	-
				T	271	265	-6	-	-	-	-	-	-
				R	346	357	11	-	-	-	-	-	-
		Intersection											
8a	Van Dam Street & QMT Expy	NB	LT	L	20	19	-1	-	-	-	-	-	-
			T	T	238	228	-10	0.27	0.26	3.6	3.6	A	A
		SB	T	T	768	580	-188	0.64	0.48	73.7	22.9	E	C
			TR	R	14	11	-3	-	-	-	-	-	-
		WB	T	T	651	643	-8	0.70	0.71	18.1	18.1	B	B
			TR	R	501	528	27	-	-	-	-	-	-
		Intersection								35.2	17.6	D	B
8b	Van Dam Street & Borden Avenue	NB	T	T	238	227	-11	0.38	0.36	28.0	27.8	C	C
			TR	R	10	10	0	-	-	-	-	-	-
		SB	L	L	574	403	-171	0.95	0.66	93.1	83.9	F	F
			T	T	194	177	-17	0.27	0.24	2.2	1.5	A	A
		EB	LTR	L	20	20	0	-	-	-	-	-	-
				T	205	205	0	0.32	0.32	23.6	23.6	C	C
				R	35	35	0	-	-	-	-	-	-
		Intersection								51.4	42.7	D	D
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	LT	L	15	15	0	-	-	-	-	-	-
				T	272	304	32	0.80	0.88	59.2	67.3	E	E
			TR	R	42	46	4	-	-	-	-	-	-
		SB	LT	L	55	56	1	-	-	-	-	-	-
			T	T	145	147	2	0.66	0.70	53.9	57.7	D	E
		EB	T	T	762	326	-436	0.40	0.17	21.1	18.3	C	B
			R	R	210	90	-120	0.41	0.18	23.2	19.1	C	B
		WB	LT	L	45	44	-1	-	-	-	-	-	-
			T	T	861	849	-12	0.54	0.50	16.4	15.9	B	B
			TR	R	90	89	-1	-	-	-	-	-	-
		Intersection								27.6	31.0	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	L	L	1047	1022	-25	0.59	0.58	17.4	17.1	B	B
			LR	R	25	24	-1	-	-	-	-	-	-
		EB	T	T	223	207	-16	0.19	0.18	29.0	28.8	C	C
		WB	T	T	235	230	-5	0.28	0.27	30.4	30.3	C	C
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								21	20.7	C	C
11b	Thomson Avenue & Dutch Kills Street	WB	T	T	235	230	-5	-	-	-	-	-	-
			R	R	885	885	0	-	-	-	-	-	-
		EB	T	T	1270	1229	-41	-	-	-	-	-	-
		Intersection											
12	21th Street & Queens Plaza N	NB		L	0	0	0	-	-	-	-	-	-
			T	T	818	804	-14	0.99	0.97	54.6	50.7	D	D
		SB	T	T	496	499	3	0.72	0.73	26.7	26.9	C	C
			R	R	249	268	19	0.34	0.37	16.5	16.9	B	B
		WB	LTR	L	65	55	-10	-	-	-	-	-	-
				T	44	41	-3	0.41	0.35	38.2	37.0	D	D
				R	51	43	-8	-	-	-	-	-	-
		Intersection								39.7	37.5	D	D

Long Island City Study Area - No-Action vs With-Action (No Mitigation)- PM Peak Hour													
					Volume (vph)			V/C		Delay (seconds)		LOS	
Intersection #	Intersection Name	Approach	Lane Group	Movement	No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	70	70	0	1.01	0.98	145.9	135.1	F	F
			T	T	610	565	-45	0.81	0.75	48.5	45.5	D	D
			R	R	379	378	-1	0.50	0.50	35.7	35.7	D	D
		SB	T	T	556	546	-10	0.89	0.88	20.1	19.2	C	B
			TR	R	55	58	3	-	-	-	-	-	-
		EB	LT	L	50	104	54	-	-	-	-	-	-
			T	T	145	237	92	0.41	0.74	40.2	50.4	D	D
		WB	L	L	666	621	-45	0.86	0.80	49.9	45.8	D	D
			T	T	159	160	1	0.18	0.18	10.9	10.9	B	B
		Intersection								40.4	39.5	D	D
1b	11th Street & 48TH Avenue	NB	L	L	70	70	0	0.64	0.63	22.7	25.1	C	C
			T	T	590	599	9	0.56	0.57	4.6	6.5	A	A
		SB	T	T	601	594	-7	0.92	0.91	60.1	58.7	E	E
			TR	R	35	35	0	-	-	-	-	-	-
		WB	LTR	L	10	10	0	-	-	-	-	-	-
				T	40	40	0	0.10	0.10	15.3	15.3	B	B
				R	15	15	0	-	-	-	-	-	-
		Intersection								32.8	32.8	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	277	338	61	0.50	0.60	16.1	18.4	B	B
			R	R	45	63	18	0.12	0.16	11.6	12.2	B	B
		SB	LT	L	48	56	8	-	-	-	-	-	-
				T	179	176	-3	0.51	0.55	17.3	18.6	B	B
		EB	LTR	L	50	50	0	-	-	-	-	-	-
				T	34	41	7	0.29	0.30	13.9	14.0	B	B
				R	15	15	0	-	-	-	-	-	-
		Intersection								15.8	17.2	B	B
3	Green Street & McGuiness Blvd	NB	T	T	892	829	-63	0.61	0.56	18.1	17.2	B	B
			TR	R	20	20	0	-	-	-	-	-	-
		SB	L	L	59	57	-2	0.35	0.31	19.2	17.2	B	B
			T	T	970	914	-56	0.55	0.52	16.7	16.1	B	B
		EB	LTR	L	170	160	-10	-	-	-	-	-	-
				T	35	35	0	0.63	0.60	40.4	39.3	D	D
				R	55	53	-2	-	-	-	-	-	-
		Intersection								20.4	19.6	C	B
4	McGuinness Blvd & Freeman Street	NB	T	T	1062	989	-73	-	-	-	-	-	-
		SB	T	T	1029	971	-58	-	-	-	-	-	-
			TR	R	340	340	0	-	-	-	-	-	-
		WB	R	R	139	101	-38	-	-	-	-	-	-
		Intersection											
5	21st Street & 49th Avenue	NB	LTR	L	40	40	0	-	-	-	-	-	-
				T	105	105	0	0.63	0.63	33.5	33.4	C	C
				R	65	65	0	-	-	-	-	-	-
		SB	LTR	L	163	159	-4	-	-	-	-	-	-
				T	79	77	-2	1.17	1.13	137.6	124.8	F	F
				R	30	29	-1	-	-	-	-	-	-
		EB	LTR	L	48	61	13	-	-	-	-	-	-
				T	97	123	26	0.50	0.64	25.1	29.9	C	C
				R	36	46	10	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
				T	85	85	0	0.20	0.20	18.8	18.8	B	B
			R	R	355	355	0	0.87	0.87	47.0	47.0	D	D
		Intersection								60.9	56.8	E	E
7	11th Street & Borden Avenue	NB	LTR	L	11	9	-2	-	-	-	-	-	-
				T	42	39	-3	-	-	-	-	-	-
				R	16	6	-10	-	-	-	-	-	-
		SB	LTR	L	53	90	37	-	-	-	-	-	-
				T	9	15	6	-	-	-	-	-	-
				R	263	450	187	-	-	-	-	-	-
		EB	LTR	L	567	590	23	-	-	-	-	-	-
				T	70	65	-5	-	-	-	-	-	-
				R	10	5	-5	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	334	313	-21	-	-	-	-	-	-
				R	154	88	-66	-	-	-	-	-	-
		Intersection											
8a	Van Dam Street & QMT Expy	NB	LT	L	30	26	-4	-	-	-	-	-	-
			T	T	265	243	-22	0.29	0.26	4.7	4.7	A	A
		SB	T	T	508	412	-96	0.45	0.37	25.2	22.8	C	C
			TR	R	9	7	-2	-	-	-	-	-	-
		WB	T	T	867	808	-59	0.74	0.68	26.8	25.2	C	C
			TR	R	393	356	-37	-	-	-	-	-	-
		Intersection								23.3	21.7	C	C
8b	Van Dam Street & Borden Avenue	NB	T	T	265	241	-24	0.44	0.40	39.5	38.8	D	D
			TR	R	10	10	0	-	-	-	-	-	-
		SB	L	L	296	240	-56	0.56	0.46	96.8	83.0	F	F
			T	T	212	172	-40	0.57	0.45	85.6	85.7	F	F
		EB	LTR	L	30	28	-2	-	-	-	-	-	-
				T	545	545	0	0.59	0.59	34.0	34.0	C	C
				R	15	15	0	-	-	-	-	-	-
		Intersection								55.1	51.3	E	D
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	LT	L	35	35	0	-	-	-	-	-	-
				T	410	305	-105	0.91	0.73	69.6	54.6	E	D
			TR	R	17	21	4	-	-	-	-	-	-
		SB	LT	L	20	20	0	-	-	-	-	-	-
			T	T	143	144	1	0.35	0.35	36.7	36.5	D	D
		EB	T	T	926	465	-461	0.44	0.22	21.7	18.8	C	B
			R	R	199	100	-99	0.40	0.20	23.0	19.4	C	B
		WB	LT	L	20	20	0	-	-	-	-	-	-
			T	T	752	738	-14	0.38	0.36	14.1	14.0	B	B
			TR	R	60	60	0	-	-	-	-	-	-
		Intersection								29.0	25.2	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	L	L	1385	1374	-11	0.70	0.69	19.3	19.1	B	B
			LR	R	15	15	0	-	-	-	-	-	-
		EB	T	T	342	355	13	0.36	0.37	43.6	43.9	D	D
		WB	T	T	401	400	-1	0.58	0.58	49.1	49.0	D	D
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								29.3	29.4	C	C
11b	Thomson Avenue & Dutch Kills Street	WB	T	T	401	400	-1	-	-	-	-	-	-
			R	R	670	670	0	-	-	-	-	-	-
		EB	T	T	1727	1729	2	-	-	-	-	-	-
		Intersection											
12	21th Street & Queens Plaza N	NB		L	0	0	0	-	-	-	-	-	-
			T	T	1063	1045	-18	1.12	1.11	95.6	88.4	F	F
		SB	T	T	629	631	2	0.70	0.71	23.5	23.6	C	C
			R	R	272	226	-46	0.34	0.28	15.2	14.4	B	B
		WB	LTR	L	77	73	-4	-	-	-	-	-	-
				T	113	87	-26	0.82	0.73	54.4	48.4	D	D
				R	144	136	-8	-	-	-	-	-	-
		Intersection								59.1	55.6	E	E

Lower Manhattan Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph) No-Action	Volume (vph) With-Action	Volume (vph) Increment	V/C No-Action	V/C With-Action	Delay (seconds) No-Action	Delay (seconds) With-Action	LOS No-Action	LOS With-Action
1	Trinity Place & Edgar Street	NB	LT	L	3	0	-3	-	-	-	-	-	-
			T	T	79	62	-17	0.09	0.06	10.1	10.0	B	A
		EB	L	L	35	35	0	0.09	0.09	20.7	20.7	C	C
		Intersection								13.5	14.1	B	B
2	Trinity Place & Rector Street	NB	TR	T	104	88	-16	0.16	0.14	10.7	10.5	B	B
				R	10	9		-	-	-	-	-	-
		EB	LT	L	102	97	-5	-	-	-	-	-	-
				T	35	34	-1	0.52	0.49	31.9	31.0	C	C
		Intersection								22.1	22.2	C	C
3a	HCT Entrance/Exit & West Street	NB	T	T	1056	1022	-34	0.73	0.71	45.2	44.4	D	D
			R2	R2	424	448	24	0.27	0.28	0.5	0.5	A	A
		SB	T	T	1044	1008	-36	0.65	0.63	1.4	1.3	A	A
		WB	L	L	1692	1722	30	0.97	0.99	53.0	56.8	D	E
		Intersection								32.7	34.2	C	C
3b	HCT Exit & West Street & West Thames Street	NB	T	T	1056	1022	-34	0.61	0.59	1.2	1.2	A	A
		SB	TR	T	1044	1008	-36	0.76	0.73	46.1	45.1	D	D
				R	0	0	0	-	-	-	-	-	-
		EB	R	R	0	0	0	-	-	-	-	-	-
		WB	R	R	1239	1280	41	0.82	0.85	38.4	40.1	D	D
		Intersection								29.5	30.1	C	C
4	Chambers Street & Centre Street	NB	L	L	430	406	-24	0.48	0.45	26.5	26.0	C	C
			T	T	496	469	-27	0.57	0.54	13.8	13.2	B	B
		SB	TR	T	237	206	-31	0.79	0.69	50.5	43.2	D	D
				R	31	27	-4	0.29	0.25	35.9	34.7	D	C
		EB	R	R	394	381	-13	0.89	0.86	51.3	47.5	D	D
		Intersection								32.7	30.2	C	C
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	105	105	0	-	-	-	-	-	-
				T	670	670	0	0.87	0.86	41.0	40.8	D	D
			R	R	190	147	-43	0.56	0.43	34.9	31.0	C	C
			R2	R2	46	45	-1	0.24	0.24	27.9	27.8	C	C
		EB	L	L2	50	49	-1	-	-	-	-	-	-
				L	438	328	-110	0.80	0.62	42.9	35.6	D	D
			T	T	589	564	-25	0.71	0.68	19.8	18.8	B	B
		WB	TR	T	409	342	-67	0.81	0.68	28.9	18.5	C	B
				R	89	74	-15	-	-	-	-	-	-
		Intersection								33.6	29.8	C	C
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	635	609	-26	0.42	0.40	5.1	5.0	A	A
		WB	T	T	498	416	-82	1.08	0.97	97.8	60.0	F	E
			R	R	880	880	0	1.14	1.14	100.9	100.9	F	F
		Intersection								70.3	57.7	E	E
7a	Canal Street S & West Street	NB	T	T	2680	2678	-2	1.00	1.00	50.2	49.9	D	D
			R	R	291	278	-13	0.61	0.58	28.2	27.1	C	C
		SB	L	L	734	673	-61	0.75	0.69	115.1	113.0	F	F
			T	T	2144	2111	-33	0.76	0.74	8.2	8.0	A	A
		Intersection								41.9	40.8	D	D
9	West Street & Albany Street	NB	TR	T	2267	2230	-37	0.79	0.78	25.8	25.3	C	C
				R	93	92	-1	-	-	-	-	-	-
		SB	TR	L	5	5		-	-	-	-	-	-
				T	1644	1670	26	0.58	0.59	19.8	19.9	B	B
				R	140	136	-4	-	-	-	-	-	-
		EB	LTR	L	135	134		-	-	-	-	-	-
				T	90	90		0.76	0.76	57.9	58.3	E	E
				R	62	65	3	-	-	-	-	-	-
		Intersection								25.6	25.4	C	C
10	West Street & Vesey Street	NB		L	5	5	0	-	-	-	-	-	-
			T	T	2296	2243	-53	0.71	0.69	20.3	19.8	C	B
		SB	T	T	1855	1874	19	0.69	0.70	20.0	20.3	C	C
			R	R	330	323	-7	0.86	0.84	44.0	41.6	D	D
		EB	L	L	105	104	-1	0.58	0.57	58.1	57.5	E	E
			R	R	77	79	2	0.38	0.39	48.5	48.8	D	D
		WB	LT	L	0	0	0	-	-	-	-	-	-
				T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								23.5	23.1	C	C
11	West Street & Chambers Street	NB	TR	T	2328	2256	-72	0.88	0.85	38.4	36.9	D	D
				T	65	63	-2	-	-	-	-	-	-
		SB	L	L	230	223	-7	0.77	0.75	80.2	78.7	F	E
			T	T	1793	1789	-4	0.63	0.63	17.1	17.1	B	B
			R	R	50	49	-1	0.27	0.26	57.3	57.1	E	E
		EB	LTR	L	105	103	-2	-	-	-	-	-	-
				T	30	29	-1	0.58	0.57	55.5	55.0	E	E
				R	15	15	0	-	-	-	-	-	-
		WB	LT	L	67	69	2	-	-	-	-	-	-
				T	60	60	0	0.56	0.57	56.0	56.6	E	E
			R	R	310	305	-5	0.75	0.74	46.7	45.9	D	D
		Intersection								35.0	34.0	D	C
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	839	756	-83	0.87	0.78	34.0	29.0	C	C
			R	R	104	103	-1	0.29	0.29	20.7	20.7	C	C
		WB	T	T	1149	980	-169	1.05	0.90	69.5	37.4	E	D
		NB	T	T	294	292	-2	0.56	0.55	35.0	35.0	D	C
			R	R	337	304	-33	0.36	0.33	0.9	0.8	A	A
		SB	L	L	331	272	-59	0.57	0.49	16.0	13.6	B	B
			TR	T	156	142	-14	0.68	0.58	12.7	10.3	B	B
				R	85	77	-8	-	-	-	-	-	-
		Intersection								37.7	25.8	D	C
15	Manhattan Bridge & Bowery	NB	T	T	294	292	-2	0.51	0.51	6.7	6.6	A	A
		SB	T	T	572	491	-81	0.37	0.32	18.6	18.0	B	B
		WB	R	R	555	366	-189	0.94	0.62	54.0	32.2	D	C
		Intersection								30.0	19.6	C	B
18	6th Avenue & Watts Street	WB	TR	T	776	715	-61	0.37	0.34	17.1	16.9	B	B
				R	25	25	0	-	-	-	-	-	-
		NB	LT	L	86	74	-12	-	-	-	-	-	-
				T	997	925	-72	0.47	0.43	12.5	11.8	B	B
		Intersection								14.4	13.9	B	B
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	629	602	-27	1.05	1.00	82.6	71.1	F	E
		NB	LTR	L	168	160	-8	-	-	-	-	-	-
				T	694	663	-31	0.52	0.50	24.2	23.9	C	C
				R	4	4	0	-	-	-	-	-	-
		EB	T	T	657	628	-29	0.83	0.79	40.8	38.5	D	D
		WB	TR	T	1217	1145	-72	1.09	1.03	78.6	56.8	E	E
				R	265	249	-16	-	-	-	-	-	-
		Intersection								59.5	48.1	E	D

Lower Manhattan Study Area - No-Action vs With-Action (No Mitigation) - Midday Peak Hour													
					Volume (vph)			V/C		Delay (seconds)		LOS	
Intersection #	Intersection Name	Approach	Lane Group	Movement	No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Trinity Place & Edgar Street	NB	LT	L	11	1	-10	-	-	-	-	-	-
			T	T	99	10	-89	0.09	0.01	10.0	9.5	B	A
		EB	L	L	254	451	197	0.61	1.08	30.4	92.0	C	F
		Intersection								24.7	90.2	C	F
2	Trinity Place & Rector Street	NB	TR	T	297	389	92	0.42	0.55	36.9	44.9	D	D
				R	56	72	16	-	-	-	-	-	-
		EB	LT	L	110	79	-31	-	-	-	-	-	-
				T	45	44	-1	0.42	0.32	24.3	22.2	C	C
		Intersection								33.1	40.1	C	D
3a	HCT Entrance/Exit & West Street	NB	T	T	1033	970	-63	0.58	0.55	25.0	24.2	C	C
			R2	R2	781	977	196	0.41	0.51	0.8	1.2	A	A
		SB	T	T	1409	1294	-115	0.65	0.60	1.1	0.9	A	A
		WB	L	L	832	964	132	0.63	0.73	35.5	38.2	D	D
		Intersection								14.2	15.0	B	B
3b	HCT Exit & West Street & West Thames Street	NB	T	T	1033	970	-63	0.49	0.46	0.7	0.6	A	A
		SB	TR	T	1409	1294	-115	0.76	0.69	29.4	27.5	C	C
				R	0	0	0	-	-	-	-	-	-
		EB	R	R	0	0	0	-	-	-	-	-	-
		WB	R	R	823	973	150	0.73	0.87	39.2	46.1	D	D
		Intersection								22.4	24.6	C	C
4	Chambers Street & Centre Street	NB	L	L	344	266	-78	0.43	0.33	25.7	24.3	C	C
			T	T	433	334	-99	0.47	0.36	12.1	10.6	B	B
		SB	TR	T	226	107	-119	0.77	0.36	48.6	33.0	D	C
				R	15	12	-3	0.21	0.16	35.3	33.6	D	C
		EB	R	R	391	269	-122	0.89	0.61	50.4	31.8	D	C
		Intersection								32.9	23.3	C	C
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	75	75	0	-	-	-	-	-	-
				T	515	515	0	0.96	0.96	58.7	58.7	E	E
			R	R	325	207	-118	0.57	0.36	31.2	27.3	C	C
			R2	R2	58	43	-15	0.31	0.23	29.8	27.8	C	C
		EB	L	L2	31	31	0	-	-	-	-	-	-
				L	328	211	-117	0.65	0.44	36.5	31.9	D	C
			T	T	357	322	-35	0.44	0.40	13.3	12.6	B	B
		WB	TR	T	257	104	-153	0.75	0.30	19.1	6.3	B	A
				R	42	17	-25	0.19	0.08	11.1	4.4	B	A
		Intersection								35.6	36.0	D	D
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	415	365	-50	0.28	0.24	5.6	5.2	A	A
		WB	T	T	299	121	-178	0.87	0.35	55.9	29.2	E	C
			R	R	605	605	0	0.58	0.58	15.2	15.2	B	B
		Intersection								21.8	13.5	C	B
7a	Canal Street S & West Street	NB	T	T	2136	2186	50	0.94	0.96	38.4	41.1	D	D
			R	R	163	125	-38	0.40	0.31	23.4	21.3	C	C
		SB	L	L	428	285	-143	0.44	0.29	53.1	38.4	D	D
			T	T	1911	2014	103	0.71	0.75	6.5	7.5	A	A
		Intersection								26.3	25.7	C	C
9	West Street & Albany Street	NB	TR	T	1533	1578	45	0.62	0.64	20.8	21.2	C	C
				R	85	90	5	-	-	-	-	-	-
		SB	TR	L	5	5	0	-	-	-	-	-	-
				T	2174	2349	175	0.76	0.82	24.1	26.0	C	C
				R	90	86	-4	-	-	-	-	-	-
		EB	LTR	L	105	101	-4	-	-	-	-	-	-
				T	95	95	0	0.60	0.60	36.6	36.9	D	D
				R	62	69	7	-	-	-	-	-	-
		Intersection								23.7	24.9	C	C
10	West Street & Vesey Street	NB		L	10	11	1	-	-	-	-	-	-
			T	T	1924	1923	-1	0.74	0.76	23.8	24.5	C	C
		SB	T	T	2165	2304	139	0.88	0.93	29.6	34.2	C	C
			R	R	170	164	-6	0.42	0.40	20.5	20.1	C	C
		EB	L	L	144	136	-8	0.56	0.53	39.9	38.6	D	D
			R	R	149	163	14	0.45	0.49	34.6	35.9	C	D
		WB	LT	L	0	0	0	-	-	-	-	-	-
				T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								27.3	29.9	C	C
11	West Street & Chambers Street	NB	TR	T	1996	1960	-36	0.88	0.86	36.9	35.9	D	D
				T	46	44	-2	-	-	-	-	-	-
		SB	L	L	179	165	-14	0.47	0.44	52.9	52.2	D	D
			T	T	2063	2127	64	0.74	0.76	18.7	19.4	B	B
			R	R	85	82	-3	0.36	0.34	45.4	45.1	D	D
		EB	LTR	L	45	43	-2	-	-	-	-	-	-
				T	0	0	0	0.18	0.18	33.5	33.4	C	C
				R	10	11	1	-	-	-	-	-	-
		WB	LT	L	72	80	8	-	-	-	-	-	-
				T	65	65	0	0.52	0.56	42.5	44.0	D	D
			R	R	284	271	-13	0.60	0.57	28.2	27.3	C	C
		Intersection								29.7	29.3	C	C
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	631	372	-259	0.65	0.38	25.5	20.5	C	C
			R	R	125	124	-1	0.35	0.34	21.6	21.6	C	C
		WB	T	T	697	419	-278	0.71	0.42	27.0	21.0	C	C
		NB	T	T	269	255	-14	0.46	0.44	31.5	31.1	C	C
			R	R	431	245	-186	0.44	0.25	1.3	0.5	A	A
		SB	L	L	396	189	-207	0.69	0.39	22.5	11.2	C	B
			TR	T	150	99	-51	0.76	0.41	17.0	6.9	B	A
				R	75	66	-9	-	-	-	-	-	-
		Intersection								20.9	17.0	C	B
15	Manhattan Bridge & Bowery	NB	T	T	269	255	-14	0.25	0.23	0.7	0.7	A	A
		SB	T	T	621	354	-267	0.40	0.23	19.0	17.0	B	B
		WB	R	R	272	21	-251	0.21	0.02	7.4	6.2	A	A
		Intersection								11.9	9.9	B	A
18	6th Avenue & Watts Street	WB	TR	T	785	685	-100	0.37	0.33	17.2	16.7	B	B
				R	25	24	-1	-	-	-	-	-	-
		NB	LT	L	92	69	-23	-	-	-	-	-	-
				T	882	747	-135	0.39	0.33	8.0	7.6	A	A
		Intersection								12.3	11.9	B	B
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	389	318	-71	0.70	0.57	40.2	36.6	D	D
		NB	LTR	L	165	141	-24	-	-	-	-	-	-
				T	733	625	-108	0.51	0.43	24.0	23.0	C	C
				R	4	3	-1	-	-	-	-	-	-
		EB	T	T	417	383	-34	0.58	0.54	31.5	30.5	C	C
		WB	TR	T	703	594	-109	0.69	0.58	22.7	20.3	C	C
				R	144	122	-22	-	-	-	-	-	-
		Intersection								27.3	25.4	C	C

Lower Manhattan Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour													
					Volume (vph)			V/C		Delay (seconds)		LOS	
Intersection #	Intersection Name	Approach	Lane Group	Movement	No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Trinity Place & Edgar Street	NB	LT	L	1	0	-1	-	-	-	-	-	-
			T	T	9	0	-9	0.01	-	9.5	-	A	-
		EB	L	L	134	138	4	0.28	0.29	23.2	23.3	C	C
		Intersection								22.2	23.3	C	C
2	Trinity Place & Rector Street	NB	TR	T	125	120	-5	0.21	0.20	34.1	35.8	C	D
				R	18	18	0	-	-	-	-	-	-
		EB	LT	L	81	59	-22	-	-	-	-	-	-
				T	40	39	-1	0.35	0.27	23.2	21.5	C	C
		Intersection								29.1	29.8	C	C
3a	HCT Entrance/Exit & West Street	NB	T	T	566	539	-27	0.32	0.31	23.4	23.2	C	C
			R2	R2	1297	1520	223	0.65	0.77	1.5	2.6	A	A
		SB	T	T	1297	1191	-106	0.61	0.56	1.0	0.8	A	A
		WB	L	L	351	347	-4	0.29	0.29	35.8	35.7	D	D
		Intersection								8.4	8.4	A	A
3b	HCT Exit & West Street & West Thames Street	NB	T	T	566	539	-27	0.28	0.26	0.5	0.5	A	A
		SB	TR	T	1297	1191	-106	0.69	0.63	31.2	29.6	C	C
				R	0	0	0	-	-	-	-	-	-
		EB	R	R	0	0	0	-	-	-	-	-	-
		WB	R	R	510	510	0	0.48	0.48	39.5	39.5	D	D
		Intersection								25.4	24.6	C	C
4	Chambers Street & Centre Street	NB	L	L	445	396	-49	0.51	0.45	27.1	26.1	C	C
			T	T	533	474	-59	0.66	0.58	16.0	14.2	B	B
		SB	TR	T	370	230	-140	1.24	0.77	160.8	49.0	F	D
				R	15	11	-4	0.17	0.13	33.1	31.5	C	C
		EB	R	R	510	434	-76	1.18	1.01	131.1	74.1	F	E
		Intersection								80.0	39.8	E	D
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	45	45	0	-	-	-	-	-	-
				T	585	585	0	0.88	0.88	44.6	44.6	D	D
			R	R	189	184	-5	0.31	0.30	26.5	26.4	C	C
		EB	R2	R2	10	5	-5	0.05	0.02	24.0	23.4	C	C
			L	L2	5	5	0	-	-	-	-	-	-
				L	225	209	-16	0.41	0.38	31.3	30.9	C	C
			T	T	462	419	-43	0.54	0.49	15.0	14.1	B	B
		WB	TR	T	10	0	-10	0.03	-	3.8	-	A	-
				R	2	0	-2	0.01	-	4.0	-	A	-
		Intersection								31.1	31.5	C	C
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	472	424	-48	0.30	0.27	3.2	2.9	A	A
		WB	T	T	12	0	-12	0.04	-	24.2	-	C	-
			R	R	1405	1405	0	1.23	1.23	131.8	131.8	F	F
		Intersection								99.7	102.7	F	F
7a	Canal Street S & West Street	NB	T	T	2698	2647	-51	0.98	0.97	45.7	42.2	D	D
			R	R	5	5	0	0.01	0.01	14.8	14.8	B	B
		SB	L	L	559	476	-83	0.62	0.53	114.2	111.6	F	F
			T	T	1884	1854	-30	0.65	0.64	5.4	5.4	A	A
		Intersection								39.0	35.7	D	D
9	West Street & Albany Street	NB	TR	T	1284	1227	-57	0.48	0.46	20.5	20.1	C	C
				R	49	47	-2	-	-	-	-	-	-
		SB	TR	L	0	0	0	-	-	-	-	-	-
				T	2324	2402	78	0.70	0.72	25.1	25.7	C	C
				R	80	76	-4	-	-	-	-	-	-
		EB	LTR	L	140	140	0	-	-	-	-	-	-
				T	90	90	0	0.71	0.73	50.7	51.7	D	D
				R	82	88	6	-	-	-	-	-	-
		Intersection								25.7	26.1	C	C
10	West Street & Vesey Street	NB		L	0	0	0	-	-	-	-	-	-
			T	T	1536	1469	-67	0.45	0.43	15.0	14.7	B	B
		SB	T	T	2465	2518	53	0.83	0.85	25.1	26.0	C	C
			R	R	140	135	-5	0.33	0.31	15.5	15.3	B	B
		EB	L	L	100	99	-1	0.58	0.57	58.3	57.9	E	E
			R	R	122	129	7	0.60	0.64	58.7	60.9	E	E
		WB	LT	L	10	10	0	-	-	-	-	-	-
				T	0	0	0	0.05	0.05	39.7	39.7	D	D
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								23.1	23.8	C	C
11	West Street & Chambers Street	NB	TR	T	1879	1781	-98	0.75	0.71	35.4	34.2	D	C
				T	38	36	-2	-	-	-	-	-	-
		SB	L	L	195	182	-13	0.82	0.77	89.8	84.7	F	F
			T	T	1945	1938	-7	0.72	0.72	23.6	23.5	C	C
			R	R	95	90	-5	0.47	0.44	67.4	66.6	E	E
		EB	LTR	L	50	50	0	-	-	-	-	-	-
				T	20	20	0	0.27	0.27	39.9	40.1	D	D
				R	5	5	0	-	-	-	-	-	-
		WB	LT	L	127	135	8	-	-	-	-	-	-
				T	90	90	0	0.74	0.77	58.8	61.7	E	E
			R	R	396	394	-2	0.72	0.72	40.9	40.6	D	D
		Intersection								35.5	34.7	D	C
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	1051	763	-288	0.99	0.72	52.4	26.5	D	C
			R	R	85	83	-2	0.30	0.29	21.3	21.1	C	C
		WB	T	T	542	328	-214	0.52	0.31	22.2	19.4	C	B
		NB	T	T	177	171	-6	0.30	0.29	29.2	29.1	C	C
			R	R	619	454	-165	0.56	0.41	1.9	1.1	A	A
		SB	L	L	677	370	-307	1.02	0.56	55.1	13.8	E	B
			TR	T	105	32	-73	0.26	0.08	4.3	3.4	A	A
				R	20	16	-4	0.06	0.05	2.8	2.8	A	A
		Intersection								34.4	17.9	C	B
15	Manhattan Bridge & Bowery	NB	T	T	177	171	-6	0.16	0.15	1.6	1.5	A	A
		SB	T	T	802	418	-384	0.40	0.21	18.8	16.8	B	B
		WB	R	R	416	203	-213	0.32	0.16	8.3	7.0	A	A
		Intersection								13.4	10.8	B	B
18	6th Avenue & Watts Street	WB	TR	T	219	188	-31	0.11	0.09	14.7	14.6	B	B
				R	0	0	0	-	-	-	-	-	-
		NB	LT	L	173	147	-26	-	-	-	-	-	-
				T	605	516	-89	0.34	0.29	35.7	35.1	D	D
		Intersection								30.8	30.3	C	C
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	447	381	-66	0.79	0.67	44.3	39.1	D	D
		NB	LTR	L	44	39	-5	-	-	-	-	-	-
				T	698	625	-73	0.43	0.38	22.9	22.3	C	C
				R	4	3	-1	-	-	-	-	-	-
		EB	T	T	396	345	-51	0.53	0.46	30.2	29.1	C	C
		WB	TR	T	1333	1229	-104	0.96	0.88	38.9	30.1	D	C
				R	10	9	-1	-	-	-	-	-	-
		Intersection								34.6	29.4	C	C

New Jersey Study Area - No-Action vs Action (No Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	14th Street / Holland Tunnel (E-W) & Marin Boulevard (N-S)	WB	TR	T	1988	1695	-293	1.03	0.90	61.3	36.7	E	D
				R	207	207	0	-	-	-	-	-	-
		WB2	TR	T	197	197	0	0.84	0.84	80.9	80.9	F	F
				R	5	5	0	-	-	-	-	-	-
		NB	L	L	273	273	0	0.97	0.97	76.7	76.7	E	E
			T	T	172	172	0	0.29	0.29	25.8	25.8	C	C
		SB	TR	T	187	187	0	0.99	0.99	89.9	89.9	F	F
				R	152	152	0	-	-	-	-	-	-
		Intersection								65.2	50.0	E	D
4	14th Street (E-W) & Jersey Avenue (N-S)	WB	L	L	61	61	0	0.11	0.11	16.9	16.9	B	B
			TR	T	2821	2528	-293	0.78	0.70	27.6	25.4	C	C
				R	40	40	0	-	-	-	-	-	-
		NB	L	L	86	86	0	0.25	0.25	26.7	26.7	C	C
			T	T	727	727	0	0.57	0.57	32.7	32.7	C	C
		SB	TR	T	136	136	0	0.33	0.33	37.9	37.9	D	D
			R	R	818	818	0	1.04	1.04	86.2	86.2	F	F
		Intersection								39.0	38.5	D	D
5	12th Street (E-W) & Jersey Avenue (N-S)	SE	L	L	434	434	0	0.28	0.28	5.0	5.0	A	A
			TR	T	662	662	0	1.05	1.05	107.3	107.3	F	F
				R	369	369	0	-	-	-	-	-	-
		EB	LTR	L	379	379	0	-	-	-	-	-	-
				T	1064	986	-78	1.06	1.02	83.2	71.8	F	E
				R	667	667	0	-	-	-	-	-	-
		SB	L	L	126	126	0	0.73	0.73	109.1	109.1	F	F
			T	T	71	71	0	0.72	0.72	107.4	107.4	F	F
		Intersection								82.4	75.9	F	E
8	12th Street/Holland Tunnel (E-W) & Marin Boulevard (N-S)	EB	L	L	71	71	0	0.12	0.12	17.1	17.1	B	B
			TR	T	1948	1870	-78	1.04	1.00	62.3	50.9	E	D
				R	56	56	0	-	-	-	-	-	-
		NB	T	T	374	374	0	0.58	0.58	26.9	26.9	C	C
			R	R	449	449	0	1.04	1.04	81.3	81.3	F	F
		SB	T	T	187	187	0	0.29	0.29	21.4	21.4	C	C
		Intersection								56.5	49.3	E	D

Lincoln Tunnel Study Area - No-Action vs With-Action (No Mitigation)- Midday Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	9th Ave and 33rd Street	SB	TR	T	977	920	-57	0.42	0.39	14.9	14.5	B	B
				R	64	51	-13	-	-	-	-	-	-
		WB	L	L	70	70	0	0.28	0.28	26.5	26.5	C	C
			T	T	108	92	-16	0.27	0.23	25.1	24.6	C	C
		Intersection								16.5	16.2	B	B
2	Dyer Ave and 34th Street	SB	L	L	159	143	-16	0.44	0.41	37.2	36.7	D	D
			R	R	95	90	-5	0.54	0.49	47.3	45.3	D	D
		EB	LT	L	5	5	0	-	-	-	-	-	-
				T	370	337	-33	0.52	0.47	16.5	15.6	B	B
		WB	T	T	405	409	4	0.59	0.60	18.2	18.4	B	B
			R	R	170	172	2	0.25	0.25	9.9	9.9	A	A
		Intersection								21.1	20.5	C	C
3	12th Ave and 34th Street	NB	T	T	1396	1375	-21	0.61	0.61	23.6	23.4	C	C
			R	R	217	214	-3	0.58	0.57	28.6	28.3	C	C
		SB	L	L	180	165	-15	0.62	0.56	63.3	63.4	E	E
			T	T	1675	1567	-108	0.60	0.57	16.3	15.8	B	B
		WB	L	L	131	134	3	0.49	0.49	42.5	42.5	D	D
			R	R	220	221	1	0.30	0.31	26.2	26.3	C	C
		Intersection								24.2	24.0	C	C
4	11th Ave and 42nd Street	SB	LT	L	50	45	-5	-	-	-	-	-	-
				T	1102	859	-243	0.48	0.38	21.5	20.3	C	C
			R	R	100	90	-10	0.32	0.29	22.1	21.5	C	C
		EB	T	T	185	166	-19	0.50	0.44	24.9	23.8	C	C
			R	R	277	238	-39	0.59	0.51	33.0	29.7	C	C
		WB	L	L	135	135	0	0.50	0.48	19.2	18.5	B	B
			T	T	581	581	0	0.51	0.51	16.1	16.1	B	B
		Intersection								21.2	20.1	C	C
5	Dyer Ave & West 36th Street	NB	TR	T	263	228	-35	0.87	0.76	58.7	47.6	E	D
				R	10	10	0	-	-	-	-	-	-
		SB	L	L	189	169	-20	0.28	0.25	25.6	25.1	C	C
			T	T	249	222	-27	0.33	0.29	24.8	24.4	C	C
			R	R	80	71	-9	0.25	0.22	25.2	24.8	C	C
		EB	LTR	L	0	0	0	-	-	-	-	-	-
				T	198	178	-20	0.30	0.28	25.5	25.2	C	C
				R	30	30	0	-	-	-	-	-	-
		WB	R	R	0	0	0	-	-	-	-	-	-
		Intersection								34.6	31.1	C	C
6	10th Ave and 33rd Street	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	1310	1260	-50	0.49	0.47	15.9	15.7	B	B
		WB	TR	T	27	12	-15	0.41	0.34	23.5	21.5	C	C
				R	145	131	-14	-	-	-	-	-	-
		Intersection								17.0	16.4	B	B
7	11th Ave and 34th Street	SB	LTR	L	75	71	-4	-	-	-	-	-	-
				T	736	697	-39	0.67	0.64	22.3	21.7	C	C
				R	120	121	1	-	-	-	-	-	-
		EB	L	L	160	152	-8	0.96	0.92	81.2	70.3	F	E
			T	T	182	173	-9	0.29	0.28	26.1	26.0	C	C
			R	R	55	54	-1	0.39	0.38	33.5	33.3	C	C
		WB	L	L	140	142	2	0.51	0.52	23.4	23.6	C	C
			TR	T	231	234	3	0.84	0.84	51.3	51.3	D	D
				R	35	34	-1	-	-	-	-	-	-
		Intersection								33.1	31.9	C	C
8	10th Ave and 41st Street	NB	LT	L	233	157	-76	-	-	-	-	-	-
				T	1450	1419	-31	0.78	0.72	27.0	25.4	C	C
		WB	T	T	690	472	-218	0.40	0.28	14.9	13.6	B	B
			R	R	540	533	-7	0.97	0.96	65.4	63.0	E	E
		Intersection								31.3	31.0	C	C
9	12th Ave and 42nd Street	NB	T	T	1860	1861	1	1.03	1.03	54.8	55.3	D	E
			R	R	125	117	-8	0.45	0.42	22.8	22.3	C	C
		SB	L	L	337	287	-50	0.65	0.55	48.9	46.3	D	D
			T	T	1783	1669	-114	0.93	0.87	39.1	34.0	D	C
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	0	0	0	0.19	0.19	35.5	35.5	D	D
				R	40	40	0	-	-	-	-	-	-
		WB	L	L	141	138	-3	0.41	0.40	39.3	39.0	D	D
			R	R	540	533	-7	0.64	0.64	21.9	21.7	C	C
		Intersection								43.3	41.6	D	D

Lincoln Tunnel Study Area - No-Action vs Action (No Mitigation)- PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	9th Ave and 33rd Street	SB	TR	T	1042	962	-80	0.41	0.38	14.7	14.3	B	B
				R	85	72	-13	-	-	-	-	-	-
		WB	L	L	95	95	0	0.37	0.37	28.6	28.6	C	C
			T	T	211	195	-16	0.48	0.45	29.0	28.2	C	C
		Intersection								18.0	17.7	B	B
2	Dyer Ave and 34th Street	SB	L	L	167	158	-9	0.48	0.46	37.8	37.5	D	D
			R	R	105	103	-2	0.52	0.50	45.2	44.3	D	D
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	400	368	-32	0.55	0.51	17.2	16.2	B	B
		WB	T	T	553	546	-7	0.78	0.77	25.5	24.9	C	C
			R	R	90	89	-1	0.13	0.13	8.8	8.8	A	A
		Intersection								24.8	24.3	C	C
3	12th Ave and 34th Street	NB	T	T	2322	2250	-72	0.74	0.71	22.7	22.0	C	C
			R	R	286	277	-9	0.50	0.49	19.9	19.5	B	B
		SB	L	L	293	276	-17	1.04	0.99	116.8	107.1	F	F
			T	T	2288	2105	-183	0.74	0.68	24.0	21.9	C	C
		WB	L	L	86	81	-5	0.48	0.46	57.6	57.2	E	E
			R	R	220	215	-5	0.39	0.38	44.9	44.6	D	D
		Intersection								29.9	28.2	C	C
4	11th Ave and 42nd Street	SB	LT	L	15	12	-3	-	-	-	-	-	-
				T	700	527	-173	0.33	0.25	19.8	18.9	B	B
			R	R	45	37	-8	0.15	0.12	19.3	18.9	B	B
		EB	T	T	183	177	-6	0.55	0.50	26.1	25.0	C	C
			R	R	288	256	-32	0.65	0.59	37.0	33.5	D	C
		WB	L	L	176	177	1	0.50	0.49	19.4	19.0	B	B
			T	T	185	185	0	0.30	0.30	12.6	12.6	B	B
		Intersection								21.6	20.6	C	C
5	Dyer Ave & West 36th Street	NB	TR	T	142	111	-31	0.47	0.37	35.1	33.0	D	C
				R	5	4	-1	-	-	-	-	-	-
		SB	L	L	356	344	-12	0.54	0.52	31.0	30.5	C	C
			T	T	536	518	-18	0.59	0.57	28.4	28.0	C	C
			R	R	105	102	-3	0.31	0.30	26.1	26.0	C	C
		EB	LTR	L	120	119	-1	-	-	-	-	-	-
				T	150	136	-14	0.49	0.46	28.5	28.1	C	C
				R	35	35	0	-	-	-	-	-	-
		WB	R	R	0	0	0	-	-	-	-	-	-
		Intersection								29.3	28.7	C	C
6	10th Ave and 33rd Street	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	1641	1581	-60	0.61	0.58	17.5	17.2	B	B
		WB	TR	T	181	153	-28	0.45	0.42	18.9	17.7	B	B
				R	115	114	-1	-	-	-	-	-	-
		Intersection								17.7	17.2	B	B
7	11th Ave and 34th Street	SB	LTR	L	35	30	-5	-	-	-	-	-	-
				T	245	208	-37	0.26	0.23	16.3	15.9	B	B
				R	60	51	-9	-	-	-	-	-	-
		EB	L	L	218	208	-10	0.96	0.91	72.4	62.3	E	E
			T	T	302	288	-14	0.42	0.40	27.9	27.6	C	C
			R	R	59	57	-2	0.39	0.38	33.3	32.8	C	C
		WB	L	L	110	110	0	0.42	0.41	20.2	20.1	C	C
			TR	T	246	245	-1	0.90	0.89	59.0	57.4	E	E
				R	45	44	-1	-	-	-	-	-	-
		Intersection								38.3	36.9	D	D
8	10th Ave and 41st Street	NB	LT	L	292	111	-181	-	-	-	-	-	-
				T	1603	1570	-33	0.88dl	0.70	29.1	25.0	C	C
		WB	T	T	214	65	-149	0.14	0.04	12.4	11.6	B	B
			R	R	79	71	-8	0.22	0.20	31.7	31.4	C	C
		Intersection								27.4	24.7	C	C
9	12th Ave and 42nd Street	NB	T	T	2609	2559	-50	0.87	0.85	16.4	16.2	B	B
			R	R	123	116	-7	0.28	0.26	7.6	7.7	A	A
		SB	L	L	348	317	-31	1.05	0.95	123.4	103.6	F	F
			T	T	2509	2308	-201	0.91	0.84	29.2	24.1	C	C
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	0	0	0	0.04	0.04	47.0	47.0	D	D
				R	0	0	0	-	-	-	-	-	-
		WB	L	L	95	91	-4	0.37	0.36	53.8	53.4	D	D
			R	R	135	131	-4	0.28	0.27	35.3	35.2	D	D
		Intersection								29.3	25.6	C	C

Lincoln Tunnel Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour													
					Volume (vph)			V/C		Delay (seconds)		LOS	
Intersection #	Intersection Name	Approach	Lane Group	Movement	No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	9th Ave and 33rd Street	SB	TR	T	1059	1018	-41	0.46	0.44	15.3	15.1	B	B
				R	60	56	-4	-	-	-	-	-	-
		WB	L	L	50	50	0	0.19	0.19	25.1	25.1	C	C
			T	T	100	97	-3	0.25	0.24	24.9	24.8	C	C
		Intersection								16.5	16.3	B	B
2	Dyer Ave and 34th Street	SB	L	L	245	240	-5	0.81	0.80	54.1	52.8	D	D
			R	R	155	153	-2	0.87	0.86	81.2	80.1	F	F
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	411	395	-16	0.62	0.60	19.2	18.5	B	B
		WB	T	T	350	345	-5	0.52	0.51	16.8	16.6	B	B
			R	R	75	74	-1	0.11	0.11	8.6	8.6	A	A
		Intersection								32.1	31.5	C	C
3	12th Ave and 34th Street	NB	T	T	1833	1812	-21	0.73	0.73	29.5	29.2	C	C
			R	R	222	219	-3	0.56	0.55	29.4	29.2	C	C
		SB	L	L	169	160	-9	0.41	0.39	53.0	54.5	D	D
			T	T	2023	1912	-111	0.69	0.65	2.9	3.0	A	A
		WB	L	L	141	136	-5	0.60	0.59	61.6	61.1	E	E
			R	R	200	200	0	0.34	0.34	34.7	34.7	C	C
		Intersection								20.7	21.0	C	C
4	11th Ave and 42nd Street	SB	LT	L	60	56	-4	-	-	-	-	-	-
				T	1068	965	-103	0.48	0.43	21.4	20.9	C	C
			R	R	90	84	-6	0.28	0.26	21.4	21.0	C	C
		EB	T	T	199	187	-12	0.48	0.45	24.6	24.2	C	C
			R	R	230	220	-10	0.56	0.53	32.2	30.9	C	C
		WB	L	L	126	126	0	0.57	0.56	23.3	22.8	C	C
			T	T	396	396	0	0.40	0.40	14.3	14.3	B	B
		Intersection								21.2	20.7	C	C
5	Dyer Ave & West 36th Street	NB	TR	T	70	62	-8	0.31	0.29	32.2	31.8	C	C
				R	20	19	-1	-	-	-	-	-	-
		SB	L	L	434	427	-7	0.69	0.68	37.4	36.8	D	D
			T	T	633	623	-10	0.77	0.76	33.5	33.0	C	C
			R	R	209	206	-3	0.65	0.64	36.0	35.5	D	D
		EB	LTR	L	0	0	0	-	-	-	-	-	-
				T	140	131	-9	0.27	0.26	25.2	25.0	C	C
				R	25	24	-1	-	-	-	-	-	-
		WB	R	R	0	0	0	-	-	-	-	-	-
		Intersection								33.4	33.0	C	C
6	10th Ave and 33rd Street	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	1241	1219	-22	0.51	0.50	16.2	16.1	B	B
		WB	TR	T	0	0	0	0.34	0.32	22.5	21.8	C	C
				R	160	153	-7	-	-	-	-	-	-
		Intersection								16.9	16.7	B	B
7	11th Ave and 34th Street	SB	LTR	L	115	111	-4	-	-	-	-	-	-
				T	907	878	-29	0.76	0.74	24.9	24.1	C	C
				R	110	106	-4	-	-	-	-	-	-
		EB	L	L	110	107	-3	0.76	0.74	47.0	44.4	D	D
			T	T	201	193	-8	0.29	0.28	26.1	26.0	C	C
			R	R	80	79	-1	0.61	0.60	46.0	45.5	D	D
		WB	L	L	176	175	-1	0.78	0.77	40.6	39.8	D	D
			TR	T	231	230	-1	0.83	0.82	51.3	50.1	D	D
				R	25	24	-1	-	-	-	-	-	-
		Intersection								32.5	31.7	C	C
8	10th Ave and 41st Street	NB	LT	L	172	150	-22	-	-	-	-	-	-
				T	1224	1211	-13	0.71	0.69	25.4	24.8	C	C
		WB	T	T	531	459	-72	0.38	0.33	14.8	14.2	B	B
			R	R	484	476	-8	0.99	0.97	71.8	68.0	E	E
		Intersection								32.3	31.6	C	C
9	12th Ave and 42nd Street	NB	T	T	2254	2241	-13	0.98	0.98	73.0	72.0	E	E
			R	R	155	152	-3	0.40	0.39	46.1	46.0	D	D
		SB	L	L	274	255	-19	0.50	0.46	55.9	55.1	E	E
			T	T	2220	2099	-121	0.88	0.83	30.5	27.6	C	C
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	0	0	0	0.03	0.03	47.0	47.0	D	D
				R	0	0	0	-	-	-	-	-	-
		WB	L	L	126	126	0	0.37	0.37	53.2	53.2	D	D
			R	R	360	354	-6	0.50	0.49	29.1	29.0	C	C
		Intersection								50.2	49.0	D	D

Lincoln Tunnel Study Area - No-Action vs With-Action (No Mitigation)- Midday Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	9th Ave and 33rd Street	SB	TR	T	977	920	-57	0.42	0.39	14.9	14.5	B	B
				R	64	51	-13	-	-	-	-	-	-
		WB	L	L	70	70	0	0.28	0.28	26.5	26.5	C	C
			T	T	108	92	-16	0.27	0.23	25.1	24.6	C	C
		Intersection								16.5	16.2	B	B
2	Dyer Ave and 34th Street	SB	L	L	159	143	-16	0.44	0.41	37.2	36.7	D	D
			R	R	95	90	-5	0.54	0.49	47.3	45.3	D	D
		EB	LT	L	5	5	0	-	-	-	-	-	-
				T	370	337	-33	0.52	0.47	16.5	15.6	B	B
		WB	T	T	405	409	4	0.59	0.60	18.2	18.4	B	B
			R	R	170	172	2	0.25	0.25	9.9	9.9	A	A
		Intersection								21.1	20.5	C	C
3	12th Ave and 34th Street	NB	T	T	1396	1375	-21	0.61	0.61	23.6	23.4	C	C
			R	R	217	214	-3	0.58	0.57	28.6	28.3	C	C
		SB	L	L	180	165	-15	0.62	0.56	63.3	63.4	E	E
			T	T	1675	1567	-108	0.60	0.57	16.3	15.8	B	B
		WB	L	L	131	134	3	0.49	0.49	42.5	42.5	D	D
			R	R	220	221	1	0.30	0.31	26.2	26.3	C	C
		Intersection								24.2	24.0	C	C
4	11th Ave and 42nd Street	SB	LT	L	50	45	-5	-	-	-	-	-	-
				T	1102	859	-243	0.48	0.38	21.5	20.3	C	C
			R	R	100	90	-10	0.32	0.29	22.1	21.5	C	C
		EB	T	T	185	166	-19	0.50	0.44	24.9	23.8	C	C
			R	R	277	238	-39	0.59	0.51	33.0	29.7	C	C
		WB	L	L	135	135	0	0.50	0.48	19.2	18.5	B	B
			T	T	581	581	0	0.51	0.51	16.1	16.1	B	B
		Intersection								21.2	20.1	C	C
5	Dyer Ave & West 36th Street	NB	TR	T	263	228	-35	0.87	0.76	58.7	47.6	E	D
				R	10	10	0	-	-	-	-	-	-
		SB	L	L	189	169	-20	0.28	0.25	25.6	25.1	C	C
			T	T	249	222	-27	0.33	0.29	24.8	24.4	C	C
			R	R	80	71	-9	0.25	0.22	25.2	24.8	C	C
		EB	LTR	L	0	0	0	-	-	-	-	-	-
				T	198	178	-20	0.30	0.28	25.5	25.2	C	C
				R	30	30	0	-	-	-	-	-	-
		WB	R	R	0	0	0	-	-	-	-	-	-
		Intersection								34.6	31.1	C	C
6	10th Ave and 33rd Street	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	1310	1260	-50	0.49	0.47	15.9	15.7	B	B
		WB	TR	T	27	12	-15	0.41	0.34	23.5	21.5	C	C
				R	145	131	-14	-	-	-	-	-	-
		Intersection								17.0	16.4	B	B
7	11th Ave and 34th Street	SB	LTR	L	75	71	-4	-	-	-	-	-	-
				T	736	697	-39	0.67	0.64	22.3	21.7	C	C
				R	120	121	1	-	-	-	-	-	-
		EB	L	L	160	152	-8	0.96	0.92	81.2	70.3	F	E
			T	T	182	173	-9	0.29	0.28	26.1	26.0	C	C
			R	R	55	54	-1	0.39	0.38	33.5	33.3	C	C
		WB	L	L	140	142	2	0.51	0.52	23.4	23.6	C	C
			TR	T	231	234	3	0.84	0.84	51.3	51.3	D	D
				R	35	34	-1	-	-	-	-	-	-
		Intersection								33.1	31.9	C	C
8	10th Ave and 41st Street	NB	LT	L	233	157	-76	-	-	-	-	-	-
				T	1450	1419	-31	0.78	0.72	27.0	25.4	C	C
		WB	T	T	690	472	-218	0.40	0.28	14.9	13.6	B	B
			R	R	540	533	-7	0.97	0.96	65.4	63.0	E	E
		Intersection								31.3	31.0	C	C
9	12th Ave and 42nd Street	NB	T	T	1860	1861	1	1.03	1.03	54.8	55.3	D	E
			R	R	125	117	-8	0.45	0.42	22.8	22.3	C	C
		SB	L	L	337	287	-50	0.65	0.55	48.9	46.3	D	D
			T	T	1783	1669	-114	0.93	0.87	39.1	34.0	D	C
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	0	0	0	0.19	0.19	35.5	35.5	D	D
				R	40	40	0	-	-	-	-	-	-
		WB	L	L	141	138	-3	0.41	0.40	39.3	39.0	D	D
			R	R	540	533	-7	0.64	0.64	21.9	21.7	C	C
		Intersection								43.3	41.6	D	D

Lincoln Tunnel Study Area - No-Action vs Action (No Mitigation)- PM Peak Hour													
					Volume (vph)			V/C		Delay (seconds)		LOS	
Intersection #	Intersection Name	Approach	Lane Group	Movement	No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	9th Ave and 33rd Street	SB	TR	T	1042	962	-80	0.41	0.38	14.7	14.3	B	B
				R	85	72	-13	-	-	-	-	-	-
		WB	L	L	95	95	0	0.37	0.37	28.6	28.6	C	C
			T	T	211	195	-16	0.48	0.45	29.0	28.2	C	C
		Intersection								18.0	17.7	B	B
2	Dyer Ave and 34th Street	SB	L	L	167	158	-9	0.48	0.46	37.8	37.5	D	D
			R	R	105	103	-2	0.52	0.50	45.2	44.3	D	D
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	400	368	-32	0.55	0.51	17.2	16.2	B	B
		WB	T	T	553	546	-7	0.78	0.77	25.5	24.9	C	C
			R	R	90	89	-1	0.13	0.13	8.8	8.8	A	A
		Intersection								24.8	24.3	C	C
3	12th Ave and 34th Street	NB	T	T	2322	2250	-72	0.74	0.71	22.7	22.0	C	C
			R	R	286	277	-9	0.50	0.49	19.9	19.5	B	B
		SB	L	L	293	276	-17	1.04	0.99	116.8	107.1	F	F
			T	T	2288	2105	-183	0.74	0.68	24.0	21.9	C	C
		WB	L	L	86	81	-5	0.48	0.46	57.6	57.2	E	E
			R	R	220	215	-5	0.39	0.38	44.9	44.6	D	D
		Intersection								29.9	28.2	C	C
4	11th Ave and 42nd Street	SB	LT	L	15	12	-3	-	-	-	-	-	-
				T	700	527	-173	0.33	0.25	19.8	18.9	B	B
			R	R	45	37	-8	0.15	0.12	19.3	18.9	B	B
		EB	T	T	183	177	-6	0.55	0.50	26.1	25.0	C	C
			R	R	288	256	-32	0.65	0.59	37.0	33.5	D	C
		WB	L	L	176	177	1	0.50	0.49	19.4	19.0	B	B
			T	T	185	185	0	0.30	0.30	12.6	12.6	B	B
		Intersection								21.6	20.6	C	C
5	Dyer Ave & West 36th Street	NB	TR	T	142	111	-31	0.47	0.37	35.1	33.0	D	C
				R	5	4	-1	-	-	-	-	-	-
		SB	L	L	356	344	-12	0.54	0.52	31.0	30.5	C	C
			T	T	536	518	-18	0.59	0.57	28.4	28.0	C	C
			R	R	105	102	-3	0.31	0.30	26.1	26.0	C	C
		EB	LTR	L	120	119	-1	-	-	-	-	-	-
				T	150	136	-14	0.49	0.46	28.5	28.1	C	C
				R	35	35	0	-	-	-	-	-	-
		WB	R	R	0	0	0	-	-	-	-	-	-
		Intersection								29.3	28.7	C	C
6	10th Ave and 33rd Street	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	1641	1581	-60	0.61	0.58	17.5	17.2	B	B
		WB	TR	T	181	153	-28	0.45	0.42	18.9	17.7	B	B
				R	115	114	-1	-	-	-	-	-	-
		Intersection								17.7	17.2	B	B
7	11th Ave and 34th Street	SB	LTR	L	35	30	-5	-	-	-	-	-	-
				T	245	208	-37	0.26	0.23	16.3	15.9	B	B
				R	60	51	-9	-	-	-	-	-	-
		EB	L	L	218	208	-10	0.96	0.91	72.4	62.3	E	E
			T	T	302	288	-14	0.42	0.40	27.9	27.6	C	C
			R	R	59	57	-2	0.39	0.38	33.3	32.8	C	C
		WB	L	L	110	110	0	0.42	0.41	20.2	20.1	C	C
			TR	T	246	245	-1	0.90	0.89	59.0	57.4	E	E
				R	45	44	-1	-	-	-	-	-	-
		Intersection								38.3	36.9	D	D
8	10th Ave and 41st Street	NB	LT	L	292	111	-181	-	-	-	-	-	-
				T	1603	1570	-33	0.88dl	0.70	29.1	25.0	C	C
		WB	T	T	214	65	-149	0.14	0.04	12.4	11.6	B	B
			R	R	79	71	-8	0.22	0.20	31.7	31.4	C	C
		Intersection								27.4	24.7	C	C
9	12th Ave and 42nd Street	NB	T	T	2609	2559	-50	0.87	0.85	16.4	16.2	B	B
			R	R	123	116	-7	0.28	0.26	7.6	7.7	A	A
		SB	L	L	348	317	-31	1.05	0.95	123.4	103.6	F	F
			T	T	2509	2308	-201	0.91	0.84	29.2	24.1	C	C
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	0	0	0	0.04	0.04	47.0	47.0	D	D
				R	0	0	0	-	-	-	-	-	-
		WB	L	L	95	91	-4	0.37	0.36	53.8	53.4	D	D
			R	R	135	131	-4	0.28	0.27	35.3	35.2	D	D
		Intersection								29.3	25.6	C	C

Queens Midtown Tunnel (Manhattan) Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 37th Street & 3rd Avenue	NB	L	L	20	19	-1	0.09	0.09	4.1	4.1	A	A
			T	T	826	773	-53	0.60	0.56	6.8	6.4	A	A
		WB	T	T	728	745	17	0.58	0.59	18.6	18.9	B	B
			R	R	263	271	8	0.75	0.78	47.9	49.6	D	D
		Intersection								17.4	18.1	B	B
2	E 36th Street & 2nd Avenue	SB	L	L	438	415	-23	0.65	0.62	33.2	32.2	C	C
			T	T	1006	970	-36	0.52	0.50	12.1	11.8	B	B
		EB	T	T	431	408	-23	0.48	0.45	27.5	27.2	C	C
			TR	R	47	45	-2	-	-	-	-	-	-
		WB	L	L	515	515	0	1.67	1.61	340.7	311.9	F	F
		Intersection								93.6	88.9	F	F
3	E 34th Street & 3rd Avenue	NB	LT	L	94	88	-6	-	-	-	-	-	-
			T	T	1005	949	-56	0.54	0.51	19.4	18.9	B	B
			R	R	104	99	-5	1.02	0.98	116.9	104.1	F	F
		EB	T	T	416	379	-37	1.01	0.92	73.5	53.9	E	D
		WB	T	T	402	380	-22	1.04	0.98	84.1	69.6	F	E
			R	R	50	48	-2	0.18	0.18	21.3	21.2	C	C
		Intersection								47.5	39.9	D	D
4	E 35th Street & 3rd Avenue	NB	LT	L	109	103	-6	-	-	-	-	-	-
			T	T	946	894	-52	0.48	0.46	2.5	2.4	A	A
		WB	TR	T	574	535	-39	0.61	0.57	26.4	25.5	C	C
			R	R	55	52	-3	0.16	0.15	20.7	20.5	C	C
		Intersection								11.0	10.6	B	B
5	E 34th Street & 2nd Ave	SB	L	L	370	363	-7	0.66	0.65	34.1	34.1	C	C
			T	T	1453	1422	-31	0.83	0.81	24.7	23.7	C	C
				R	120	117	-3	1.18	1.15	162.2	150.8	F	F
		EB	T	T	572	561	-11	0.76	0.74	34.8	34.2	C	C
			R	R	116	114	-2	0.63	0.62	42.3	41.7	D	D
		WB	T	T	195	191	-4	0.51	0.50	30.5	30.3	C	C
		Intersection								35.3	34.1	D	C
6	E 35th Street & 2nd Ave	SB	T	T	1393	1358	-35	0.56	0.55	16.1	16.2	B	B
			R	R	175	172	-3	0.55	0.54	19.5	19.7	B	B
		EB	R	R	473	468	-5	0.64	0.64	26.8	26.6	C	C
		WB	T	T	87	86	-1	0.14	0.14	18.3	18.3	B	B
			L	L	77	76	-1	0.14	0.14	18.9	18.9	B	B
		Intersection								19.0	19.0	B	B

Queens Midtown Tunnel (Manhattan) Study Area - No-Action vs With-Action (No Mitigation) - Midday Peak Hour													
Intersection #	Intersection NMDe	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 37th Street & 3rd Avenue	NB	L	L	44	37	-7	0.16	0.14	6.5	4.8	A	A
			T	T	635	553	-82	0.49	0.43	5.9	4.7	A	A
		WB	T	T	577	638	61	0.95	1.05	49.3	74.7	D	E
			R	R	265	303	38	0.73	0.84	44.8	52.8	D	D
		Intersection								29.2	43.3	C	D
2	E 36th Street & 2nd Avenue	SB	L	L	242	248	6	0.43	0.44	28.6	28.8	C	C
			T	T	1035	990	-45	0.50	0.48	11.7	11.5	B	B
		EB	T	T	1278	1335	57	1.34	1.40	189.4	211.6	F	F
			TR	R	85	83	-2	-	-	-	-	-	-
		Intersection								106.1	121.1	F	F
3	E 34th Street & 3rd Avenue	NB	LT	L	24	21	-3	-	-	-	-	-	-
			T	T	1075	949	-126	0.48	0.42	18.5	17.8	B	B
			R	R	173	162	-11	0.78	0.73	47.2	41.9	D	D
		EB	T	T	445	367	-78	0.96	0.80	62.0	39.1	E	D
		WB	T	T	450	446	-4	0.98	0.97	65.0	63.1	E	E
			R	R	80	83	3	0.30	0.31	23.4	23.6	C	C
		Intersection								38.9	33.8	D	C
4	E 35th Street & 3rd Avenue	NB	LT	L	83	76	-7	-	-	-	-	-	-
			T	T	1072	956	-116	0.82	0.73	14.3	11.6	B	B
		WB	TR	T	519	490	-29	0.57	0.54	25.4	24.8	C	C
			R	R	60	58	-2	0.19	0.19	21.4	21.3	C	C
		Intersection								18.0	16.3	B	B
5	E 34th Street & 2nd Ave	SB	L	L	229	226	-3	0.37	0.37	29.5	30.0	C	C
			TR	T	1325	1271	-54	0.73	0.70	21.9	21.2	C	C
				R	45	43	-2	0.34	0.33	18.9	18.5	B	B
		EB	T	T	591	577	-14	0.75	0.73	34.3	33.6	C	C
			R	R	130	126	-4	0.59	0.57	37.9	36.9	D	D
		WB	T	T	253	234	-19	0.63	0.58	33.8	32.2	C	C
		Intersection								27.4	26.7	C	C
6	E 35th Street & 2nd Ave	SB	T	T	1040	992	-48	0.58	0.55	12.1	11.9	B	B
			TR	R	80	81	1	-	-	-	-	-	-
		EB	R	R	476	467	-9	0.62	0.61	26.1	25.9	C	C
		WB	T	T	88	86	-2	0.15	0.14	18.4	18.3	B	B
			L	L	83	81	-2	0.15	0.15	19.0	19.0	B	B
		Intersection								16.6	16.4	B	B

Queens Midtown Tunnel (Manhattan) Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour													
Intersection #	Intersection NPMe	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 37th Street & 3rd Avenue	NB	L	L	25	22	-3	-	-	-	-	-	-
			T	T	873	780	-93	0.52	0.46	2.9	2.6	A	A
		WB	T	T	618	628	10	0.51	0.51	17.2	17.3	B	B
			R	R	274	293	19	0.69	0.73	42.1	44.7	D	D
		Intersection								14.0	15.3	B	B
2	E 36th Street & 2nd Avenue	SB	L	L	364	421	57	0.55	0.64	30.2	32.3	C	C
			T	T	1567	1488	-79	0.67	0.64	14.4	13.7	B	B
		EB	T	T	1044	1209	165	0.79	0.90	33.4	39.6	C	D
			TR	R	61	59	-2	-	-	-	-	-	-
		Intersection								23.4	26.8	C	C
3	E 34th Street & 3rd Avenue	NB	LT	L	69	64	-5	-	-	-	-	-	-
			T	T	1418	1297	-121	0.65	0.59	21.2	20.2	C	C
			R	R	124	118	-6	0.68	0.65	38.6	36.2	D	D
		EB	T	T	386	320	-66	0.81	0.67	40.3	31.9	D	C
		WB	T	T	431	403	-28	1.04	0.97	80.6	63.5	F	E
			R	R	79	75	-4	0.30	0.28	23.4	23.1	C	C
		Intersection								35.9	30.9	D	C
4	E 35th Street & 3rd Avenue	NB	LT	L	173	163	-10	-	-	-	-	-	-
			T	T	1324	1209	-115	0.81	0.75	9.0	7.9	A	A
		WB	TR	T	429	375	-54	0.48	0.42	23.9	22.9	C	C
			R	R	35	31	-4	0.13	0.11	20.4	20.1	C	C
		Intersection								12.6	11.5	B	B
5	E 34th Street & 2nd Ave	SB	L	L	259	251	-8	0.42	0.41	24.3	24.8	C	C
			T	T	1657	1581	-76	0.84	0.80	28.5	21.7	C	C
			R	R	55	52	-3	1.28	1.21	231.7	207.1	F	F
		EB	T	T	428	431	3	0.58	0.58	29.4	29.4	C	C
			R	R	111	108	-3	0.60	0.58	39.0	38.0	D	D
		WB	T	T	202	182	-20	0.50	0.45	30.0	28.8	C	C
		Intersection								33.5	28.9	C	C
6	E 35th Street & 2nd Ave	SB	T	T	1533	1454	-79	0.61	0.58	10.8	10.5	B	B
			R	R	95	93	-2	0.29	0.29	10.2	10.2	B	B
		EB	R	R	437	430	-7	0.56	0.55	24.8	24.5	C	C
		WB	T	T	1	0	-1	-	-	17.0	-	B	-
			L	L	1	0	-1	-	-	17.0	-	B	-
		Intersection								13.8	13.6	B	B

Queens Midtown Tunnel (Manhattan) Study Area - No-Action vs With-Action (No Mitigation) - Late Night Peak Hour													
Intersection #	Intersection NLNe	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 37th Street & 3rd Avenue	NB	L	L	25	20	-5	0.08	0.07	3.7	3.6	A	A
			T	T	1063	893	-170	0.55	0.46	4.9	4.4	A	A
		WB	T	T	372	477	105	0.29	0.37	14.4	15.3	B	B
			R	R	339	471	132	0.98	1.36	78.4	210.0	E	F
		Intersection								21.8	62.9	C	E
2	E 36th Street & 2nd Avenue	SB	L	L	421	628	207	0.53	0.78	29.6	37.4	C	D
			T	T	1530	1493	-37	0.67	0.66	14.3	14.0	B	B
		EB	T	T	580	816	236	0.56	0.76	28.7	33.3	C	C
			TR	R	50	43	-7	-	-	-	-	-	-
		Intersection								20.3	24.4	C	C
3	E 34th Street & 3rd Avenue	NB	LT	L	39	32	-7	-	-	-	-	-	-
			T	T	1257	1069	-188	0.52	0.44	18.9	17.9	B	B
			R	R	193	175	-18	0.57	0.52	25.8	24.1	C	C
		EB	T	T	500	417	-83	0.52	0.43	24.5	23.1	C	C
		WB	T	T	321	350	29	0.36	0.39	22.1	22.5	C	C
			R	R	100	113	13	0.33	0.37	23.6	24.5	C	C
		Intersection								21.3	20.6	C	C
4	E 35th Street & 3rd Avenue	NB	LT	L	54	47	-7	-	-	-	-	-	-
			T	T	1303	1135	-168	0.52	0.45	4.3	5.1	A	A
		WB	TR	T	461	427	-34	0.51	0.47	24.3	23.7	C	C
			R	R	60	57	-3	0.17	0.16	20.7	20.5	C	C
		Intersection								10.1	10.7	B	B
5	E 34th Street & 2nd Ave	SB	L	L	350	330	-20	0.57	0.53	26.7	25.5	C	C
			TR	T	1406	1357	-49	0.72	0.70	14.3	12.9	B	B
				R	105	82	-23	0.28	0.22	8.0	7.0	A	A
		EB	T	T	623	631	8	0.66	0.66	29.9	29.9	C	C
			R	R	75	72	-3	-	-	-	-	-	-
		WB	T	T	210	119	-91	0.28	0.16	24.5	23.1	C	C
		Intersection								20.6	19.7	C	B
6	E 35th Street & 2nd Ave	SB	T	T	1485	1438	-47	0.68	0.66	11.5	11.2	B	B
			TR	R	95	98	3	-	-	-	-	-	-
		EB	R	R	295	276	-19	0.37	0.34	21.2	20.8	C	C
		WB	T	T	86	59	-27	0.13	0.09	18.2	17.8	B	B
			L	L	81	55	-26	0.13	0.09	18.6	18.1	B	B
		Intersection								13.5	13.0	B	B

Red Hook Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Hamilton Avenue , Clinton Street & West 9 Street	EB	TR	T	112	112	0	0.42	0.42	44.6	44.6	D	D
				R	0	0	0	-	-	-	-	-	-
		NB	LT	L	260	260	0	-	-	-	-	-	-
				T	2425	2395	-30	0.65	0.64	7.8	7.9	A	A
		SB (at West 9th)	RT	T	1118	1140	22	0.40	0.41	8.3	8.4	A	A
				R	82	84	2	-	-	-	-	-	-
		SB (at Clinton St)	L	L	249	254	5	0.29	0.29	4.7	4.7	A	A
			TR	T	866	881	15	0.53	0.54	6.7	6.7	A	A
				L	118	120	2	-	-	-	-	-	-
		WB	T	T	115	115	0	0.14	0.14	54.5	54.6	D	D
			L	L	145	145	0	0.24	0.24	58.4	58.8	E	E
		Intersection								10.0	10.1	A	B
2	Hamilton Avenue NB & West 9 Street	NB	T	T	2081	2050	-31	0.60	0.59	14.5	14.3	B	B
		WB	R	R	243	239	-4	0.42	0.41	36.5	36.4	D	D
		Intersection								17.1	17.0	B	B

Red Hook Study Area - No-Action vs With-Action (No Mitigation) - Midday Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Hamilton Avenue , Clinton Street & West 9 Street	EB	TR	T	114	114	0	0.39	0.39	41.8	41.8	D	D
				R	0	0	0	-	-	-	-	-	-
		NB	LT	L	245	245	0	-	-	-	-	-	-
				T	2226	2289	63	0.62	0.63	8.4	9.2	A	A
		SB (at West 9th)	RT	T	1167	1283	116	0.43	0.48	9.5	10.0	A	A
				R	93	100	7	-	-	-	-	-	-
		SB (at Clinton St)	L	L	258	291	33	0.28	0.31	4.7	4.6	A	A
			TR	T	905	977	72	0.57	0.62	7.3	7.4	A	A
				L	134	145	11	-	-	-	-	-	-
		WB	T	T	130	130	0	0.14	0.14	55.6	55.3	E	E
			L	L	115	115	0	0.16	0.16	56.1	55.6	E	E
		Intersection								10.4	10.7	B	B
2	Hamilton Avenue NB & West 9 Street	NB	T	T	1967	2001	34	0.54	0.54	10.9	11.1	B	B
		WB	R	R	132	128	-4	0.29	0.28	38.8	38.6	D	D
		Intersection								13.0	13.0	B	B

Red Hook Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Hamilton Avenue , Clinton Street & West 9 Street	EB	TR	T	120	120	0	0.35	0.35	40.8	40.8	D	D
				R	0	0	0	-	-	-	-	-	-
		NB	LT	L	200	200	0	-	-	-	-	-	-
				T	2066	1998	-68	0.56	0.55	9.6	10.3	A	B
		SB (at West 9th)	RT	T	1312	1394	82	0.46	0.49	9.7	10.1	A	B
				R	57	60	3	-	-	-	-	-	-
		SB (at Clinton St)	L	L	287	305	18	0.29	0.31	4.1	4.0	A	A
			TR	T	1022	1080	58	0.63	0.66	7.1	7.5	A	A
				L	108	114	6	-	-	-	-	-	-
		WB	T	T	105	105	0	0.15	0.15	58.6	59.2	E	E
			L	L	95	95	0	0.16	0.16	58.9	59.5	E	E
		Intersection								10.7	11.1	B	B
2	Hamilton Avenue NB & West 9 Street	NB	T	T	1729	1650	-79	0.48	0.45	11.3	10.7	B	B
		WB	R	R	130	123	-7	0.27	0.26	38.5	38.3	D	D
		Intersection								13.5	12.9	B	B

Red Hook Study Area - No-Action vs With-Action (No Mitigation) - Late Night Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Hamilton Avenue , Clinton Street & West 9 Street	EB	TR	T	55	62	7	0.17	0.19	37.4	37.8	D	D
				R	0	0	0	-	-	-	-	-	-
		NB	LT	L	75	75	0	-	-	-	-	-	-
				T	1282	1184	-98	0.36	0.33	8.0	10.9	A	B
		SB (at West 9th)	RT	T	739	908	169	0.25	0.30	7.8	8.3	A	A
				R	45	53	8	-	-	-	-	-	-
		SB (at Clinton St)	L	L	192	252	60	0.20	0.26	2.6	2.6	A	A
			TR	T	547	651	104	0.29	0.35	2.5	2.5	A	A
				L	25	30	5	-	-	-	-	-	-
		WB	T	T	25	25	0	0.03	0.03	59.8	61.0	E	E
			L	L	50	50	0	0.07	0.07	61.0	62.0	E	E
		Intersection								8.1	9.0	A	A
2	Hamilton Avenue NB & West 9 Street	NB	T	T	1034	877	-157	0.27	0.23	8.0	7.7	A	A
		WB	R	R	76	68	-8	0.15	0.14	36.7	36.5	D	D
		Intersection								10.2	10.0	B	B

RFK Bridge Study Area - No-Action vs Action (No Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume			V/C		Delay		LOS	
					No-Action	Action	Δ Increment	No-Action	Action	No-Action	Action	No-Action	Action
1	126th Street and 2nd Avenue	NW	L	L2	30	30	0	-	-	-	-	-	-
				L	190	190	0	0.97	0.97	85.0	85.0	F	F
			R	R	415	415	0	0.31	0.31	7.3	7.3	A	A
		SB	TR	T	1240	1161	-79	0.56	0.52	21.9	21.4	C	C
				R	45	41	-4	-	-	-	-	-	-
		WB	L	L	40	39	-1	-	-	-	-	-	-
				T	30	29	-1	0.80	0.77	57.6	54.7	E	D
				R	94	90	-4	-	-	-	-	-	-
		Intersection								28.9	28.5	C	C
2	125th Street and 2nd Avenue	SB	L	L	501	497	-4	0.54	0.54	7.4	7.5	A	A
			TR	T	754	683	-71	0.58	0.53	6.9	6.7	A	A
				R	55	50	-5	-	-	-	-	-	-
		SW	L	L	394	460	66	1.06	1.24	90.2	154.0	F	F
				R	133	155	22	-	-	-	-	-	-
		EB	TR	T	627	678	51	0.86	0.93	44.2	51.5	D	D
				R	40	40	0	-	-	-	-	-	-
		WB	LT	L	22	11	-11	-	-	-	-	-	-
				T	61	30	-31	0.22	0.10	28.9	27.2	C	C
		Intersection								34.9	55.3	C	E
11	E 134th Street & St. Ann's Avenue	NB	TR	T	140	140	0	0.46	0.46	18.5	18.5	B	B
				R	80	80	0	-	-	-	-	-	-
		SB	LT	L	145	145	0	-	-	-	-	-	-
				T	105	105	0	0.62	0.62	20.2	20.2	C	C
		EB	LTR	L	140	140	0	-	-	-	-	-	-
				T	120	120	0	0.80	0.80	33.1	33.1	C	C
				R	45	45	0	-	-	-	-	-	-
		Intersection								24.8	24.8	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	25	25	0	-	-	-	-	-	-
				T	105	105	0	0.56	0.56	46.0	46.0	D	D
				R	30	30	0	-	-	-	-	-	-
		SB	LTR	L	55	55	0	-	-	-	-	-	-
				T	70	70	0	0.57	0.57	48.6	48.6	D	D
				R	25	25	0	-	-	-	-	-	-
		EB	LTR	L	50	50	0	-	-	-	-	-	-
				T	1440	1440	0	0.90	0.90	25.6	25.6	C	C
				R	30	30	0	-	-	-	-	-	-
		WB	LTR	L	40	40	0	-	-	-	-	-	-
				T	480	480	0	0.50	0.50	11.6	11.6	B	B
				R	65	65	0	-	-	-	-	-	-
		Intersection								24.9	24.9	C	C
17	31st St & Astoria Blvd	NB	T	T	96	70	-26	0.26	0.19	37.3	36.1	D	D
			R	R	17	12	-5	0.02	0.02	7.3	7.2	A	A
		SB	T	T	558	567	9	0.62	0.63	26.5	27.2	C	C
			R	R	174	175	1	0.41	0.41	23.9	24.3	C	C
		EB	L	L	10	11	1	-	-	-	-	-	-
				T	362	384	22	0.51	0.54	32.6	33.3	C	C
				R	26	28	2	-	-	-	-	-	-
		Intersection								28.8	29.3	C	C
24	Hoyt N & 31st St	NB	L	L	18	15	-3	-	-	-	-	-	-
				T	94	75	-19	0.21	0.16	21.0	19.2	C	B
		SB	T	T	262	265	3	0.81	0.81	109.4	109.5	F	F
				R	131	130	-1	-	-	-	-	-	-
		WB	L	L	401	402	1	0.26	0.26	9.3	9.3	A	A
			T	T	2135	2127	-8	0.66	0.66	14.1	14.0	B	B
			R	R	35	35	0	0.10	0.10	8.5	8.5	A	A
		Intersection								27.3	27.3	C	C
3	Hoyt S & 31st St	NB	T	T	97	74	-23	0.16	0.12	21.9	22.6	C	C
				R	9	7	-2	-	-	-	-	-	-
		SB	L	L	20	20	0	-	-	-	-	-	-
				T	643	647	4	0.38	0.38	15.7	15.9	B	B
		EB	L	L	15	16	1	-	-	-	-	-	-
				T	893	946	53	0.79	0.84	46.5	48.7	D	D
			R	R	89	95	6	0.38	0.40	41.7	42.9	D	D
		Intersection								33.6	35.5	C	D

RFK Bridge Study Area - No-Action vs Action (No Mitigation) - MD Peak Hour													
					Volume			V/C		Delay		LOS	
Intersection #	Intersection Name	Approach	Lane Group	Movement	No-Action	Action	Δ Increment	No-Action	Action	No-Action	Action	No-Action	Action
1	126th Street and 2nd Avenue	NW	L	L2	0	0	0	-	-	-	-	-	-
				L	120	120	0	0.55	0.55	41.3	41.3	D	D
			R	R	1050	1050	0	0.70	0.70	13.0	13.0	B	B
		SB	TR	T	1042	929	-113	0.47	0.42	20.7	20.1	C	C
				R	49	42	-7	-	-	-	-	-	-
		WB	L	L	45	42	-3	-	-	-	-	-	-
				T	20	18	-2	0.68	0.62	46.0	42.6	D	D
				R	90	82	-8	-	-	-	-	-	-
		Intersection								20.3	19.6	C	B
2	125th Street and 2nd Avenue	SB	L	L	318	305	-13	0.38	0.36	6.2	6.3	A	A
			TR	T	724	627	-97	0.54	0.46	6.8	6.3	A	A
				R	45	39	-6	-	-	-	-	-	-
		SW	L	L	314	322	8	1.02	1.04	80.0	86.9	F	F
				R	129	132	3	-	-	-	-	-	-
		EB	TR	T	555	604	49	0.72	0.78	36.8	39.1	D	D
				R	50	50	0	-	-	-	-	-	-
		WB	LT	L	18	6	-12	-	-	-	-	-	-
				T	64	22	-42	0.19	0.06	28.3	26.6	C	C
		Intersection								30.6	34.5	C	C
11	E 134th Street & St. Ann's Avenue	NB	TR	T	170	170	0	0.51	0.51	14.1	14.1	B	B
				R	80	80	0	-	-	-	-	-	-
		SB	LT	L	110	110	0	-	-	-	-	-	-
				T	95	95	0	0.53	0.53	18.0	18.0	B	B
		EB	LTR	L	155	155	0	-	-	-	-	-	-
				T	140	140	0	0.94	0.94	51.5	51.5	D	D
				R	85	85	0	-	-	-	-	-	-
		Intersection								31.7	31.7	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	20	20	0	-	-	-	-	-	-
				T	140	140	0	0.80	0.80	55.7	55.7	E	E
				R	75	75	0	-	-	-	-	-	-
		SB	LTR	L	85	85	0	-	-	-	-	-	-
				T	60	60	0	0.73	0.73	59.3	59.3	E	E
				R	35	35	0	-	-	-	-	-	-
		EB	LTR	L	55	55	0	-	-	-	-	-	-
				T	1260	1260	0	0.98	0.98	41.0	41.0	D	D
				R	35	35	0	-	-	-	-	-	-
		WB	LTR	L	40	40	0	-	-	-	-	-	-
				T	760	760	0	0.70	0.70	19.9	19.9	B	B
				R	55	55	0	-	-	-	-	-	-
		Intersection								37.1	37.1	D	D
17	31st St & Astoria Blvd	NB	T	T	117	30	-87	0.32	0.08	30.4	27.0	C	C
			R	R	3	3	0	-	-	4.3	4.3	A	A
		SB	T	T	242	240	-2	0.29	0.29	11.6	11.6	B	B
			R	R	115	114	-1	0.38	0.38	14.8	14.9	B	B
		EB	L	L	20	21	1	-	-	-	-	-	-
				T	364	382	18	0.46	0.48	22.3	22.6	C	C
				R	40	42	2	-	-	-	-	-	-
		Intersection								19.5	18.5	B	B
24	Hoyt N & 31st St	NB	L	L	102	48	-54	-	-	-	-	-	-
				T	41	9	-32	0.29	0.11	9.5	11.5	A	B
		SB	T	T	206	203	-3	0.37	0.37	23.1	23.0	C	C
				R	70	70	0	-	-	-	-	-	-
		WB	L	L	215	215	0	0.17	0.17	11.2	11.2	B	B
			T	T	1684	1685	1	0.67	0.67	16.7	16.8	B	B
			R	R	65	65	0	0.17	0.17	12.0	12.0	B	B
		Intersection								16.4	16.8	B	B
3	Hoyt S & 31st St	NB	T	T	133	46	-87	0.16	0.06	11.4	22.4	B	C
				R	4	5	1	-	-	-	-	-	-
		SB	L	L	140	139	-1	-	-	-	-	-	-
				T	281	279	-2	0.41	0.39	13.2	13.1	B	B
		EB	L	L	10	11	1	-	-	-	-	-	-
				T	861	918	57	0.55	0.59	26.0	26.6	C	C
			R	R	76	75	-1	0.23	0.23	23.9	23.8	C	C
		Intersection								20.9	22.4	C	C

RFK Bridge Study Area - No-Action vs Action (No Mitigation) - PM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume			V/C		Delay		LOS	
					No-Action	Action	Δ Increment	No-Action	Action	No-Action	Action	No-Action	Action
1	126th Street and 2nd Avenue	NW	L	L2	25	25	0	-	-	-	-	-	-
				L	180	180	0	0.93	0.93	76.4	76.4	E	E
			R	R	765	765	0	0.55	0.55	10.0	10.0	B	B
		SB	TR	T	1472	1250	-222	0.58	0.49	22.2	20.9	C	C
				R	35	29	-6	-	-	-	-	-	-
		WB	L	L	47	40	-7	-	-	-	-	-	-
				T	25	21	-4	0.57	0.47	40.0	36.6	D	D
				R	51	42	-9	-	-	-	-	-	-
		Intersection								24.1	23.3	C	C
2	125th Street and 2nd Avenue	SB	L	L	663	595	-68	0.69	0.62	9.9	9.3	A	A
			TR	T	822	672	-150	0.55	0.45	6.4	6.1	A	A
				R	59	48	-11	-	-	-	-	-	-
		SW	L	L	369	594	225	0.88	1.42	51.0	228.3	D	F
				R	138	222	84	-	-	-	-	-	-
		EB	TR	T	686	724	38	0.81	0.85	39.9	42.5	D	D
				R	20	20	0	-	-	-	-	-	-
		WB	LT	L	55	21	-34	-	-	-	-	-	-
				T	176	66	-110	0.63	0.19	38.3	28.2	D	C
		Intersection								25.0	77.2	C	E
11	E 134th Street & St. Ann's Avenue	NB	TR	T	110	110	0	0.41	0.41	10.9	10.9	B	B
				R	100	100	0	-	-	-	-	-	-
		SB	LT	L	110	110	0	-	-	-	-	-	-
				T	50	50	0	0.38	0.38	13.8	13.8	B	B
		EB	LTR	L	155	155	0	-	-	-	-	-	-
				T	140	140	0	0.78	0.78	30.3	30.3	C	C
				R	30	30	0	-	-	-	-	-	-
		Intersection								20.5	20.5	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	20	20	0	-	-	-	-	-	-
				T	95	95	0	0.50	0.50	43.0	43.0	D	D
				R	30	30	0	-	-	-	-	-	-
		SB	LTR	L	35	35	0	-	-	-	-	-	-
				T	20	20	0	0.29	0.29	39.6	39.6	D	D
				R	25	25	0	-	-	-	-	-	-
		EB	LTR	L	50	50	0	-	-	-	-	-	-
				T	1300	1300	0	0.85	0.85	22.5	22.5	C	C
				R	45	45	0	-	-	-	-	-	-
		WB	LTR	L	25	25	0	-	-	-	-	-	-
				T	610	610	0	0.46	0.46	11.4	11.4	B	B
				R	65	65	0	-	-	-	-	-	-
		Intersection								21.1	21.1	C	C
17	31st St & Astoria Blvd	NB	T	T	42	11	-31	0.11	0.03	27.5	26.3	C	C
			R	R	5	3	-2	0.01	-	4.4	4.3	A	A
		SB	T	T	478	446	-32	0.58	0.54	76.7	76.5	E	E
			R	R	222	204	-18	0.75	0.69	94.5	92.0	F	F
		EB	L	L	16	16	0	-	-	-	-	-	-
				T	388	399	11	0.50	0.52	23.0	23.2	C	C
				R	48	49	1	-	-	-	-	-	-
		Intersection								57.3	56.2	E	E
24	Hoyt N & 31st St	NB	L	L	17	4	-13	-	-	-	-	-	-
				T	47	31	-16	0.12	0.06	27.8	23.0	C	C
		SB	T	T	121	73	-48	0.36	0.29	38.4	37.4	D	D
				R	70	67	-3	-	-	-	-	-	-
		WB	L	L	513	514	1	0.34	0.34	9.7	9.7	A	A
			T	T	1523	1463	-60	0.47	0.45	10.7	10.5	B	B
			R	R	35	35	0	0.07	0.07	7.8	7.8	A	A
		Intersection								13.3	12.2	B	B
3	Hoyt S & 31st St	NB	T	T	53	24	-29	0.08	0.04	37.4	34.9	D	C
				R	5	3	-2	-	-	-	-	-	-
		SB	L	L	20	20	0	-	-	-	-	-	-
				T	614	567	-47	0.39	0.36	13.2	10.1	B	B
		EB	L	L	11	11	0	-	-	-	-	-	-
				T	1071	1104	33	0.61	0.62	33.2	33.6	C	C
			R	R	86	83	-3	0.25	0.25	29.3	29.1	C	C
		Intersection								26.4	25.9	C	C

RFK Bridge Study Area - No-Action vs Action (No Mitigation) - LN Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume			V/C		Delay		LOS	
					No-Action	Action	Δ Increment	No-Action	Action	No-Action	Action	No-Action	Action
1	126th Street and 2nd Avenue	NW	L	L2	5	5	0	-	-	-	-	-	-
				L	75	75	0	0.36	0.36	35.3	35.3	D	D
			R	R	535	535	0	0.40	0.40	8.1	8.1	A	A
		SB	TR	T	560	342	-218	0.24	0.14	18.2	17.4	B	B
				R	20	11	-9	-	-	-	-	-	-
		WB	L	L	20	20	0	-	-	-	-	-	-
				T	35	33	-2	0.46	0.44	35.7	35.1	D	D
				R	60	56	-4	-	-	-	-	-	-
		Intersection								16.6	15.9	B	B
2	125th Street and 2nd Avenue	SB	L	L	109	91	-18	0.13	0.11	5.7	6.3	A	A
			TR	T	456	266	-190	0.31	0.18	6.3	6.4	A	A
				R	20	10	-10	-	-	-	-	-	-
		SW	L	L	174	198	24	0.61	0.70	37.6	40.4	D	D
				R	153	174	21	-	-	-	-	-	-
		EB	TR	T	535	704	169	0.68	0.87	34.9	43.9	C	D
				R	50	50	0	-	-	-	-	-	-
		WB	LT	L	9	4	-5	-	-	-	-	-	-
				T	70	10	-60	0.15	0.03	27.5	26.2	C	C
		Intersection								23.8	33.1	C	C
11	E 134th Street & St. Ann's Avenue	NB	TR	T	100	100	0	0.21	0.21	17.0	17.0	B	B
				R	20	20	0	-	-	-	-	-	-
		SB	LT	L	40	40	0	-	-	-	-	-	-
				T	50	50	0	0.18	0.18	10.9	10.9	B	B
		EB	LTR	L	190	190	0	-	-	-	-	-	-
				T	90	90	0	0.70	0.70	25.0	25.0	C	C
				R	35	35	0	-	-	-	-	-	-
		Intersection								20.6	20.6	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	10	10	0	-	-	-	-	-	-
				T	55	55	0	0.24	0.24	33.0	33.0	C	C
				R	15	15	0	-	-	-	-	-	-
		SB	LTR	L	30	30	0	-	-	-	-	-	-
				T	10	10	0	0.25	0.25	35.0	35.0	C	C
				R	45	45	0	-	-	-	-	-	-
		EB	LTR	L	40	40	0	-	-	-	-	-	-
				T	1515	1515	0	0.88	0.88	26.6	26.6	C	C
				R	10	10	0	-	-	-	-	-	-
		WB	LTR	L	10	10	0	-	-	-	-	-	-
				T	500	500	0	0.33	0.33	12.2	12.2	B	B
				R	25	25	0	-	-	-	-	-	-
		Intersection								23.7	23.7	C	C
17	31st St & Astoria Blvd	NB	T	T	120	26	-94	0.34	0.07	30.7	26.8	C	C
			R	R	13	6	-7	0.02	0.01	4.5	4.5	A	A
		SB	T	T	345	308	-37	0.47	0.41	9.2	7.4	A	A
			R	R	165	147	-18	0.39	0.34	10.0	8.4	A	A
		EB	L	L	10	10	0	-	-	-	-	-	-
				T	286	328	42	0.32	0.36	20.2	20.8	C	C
				R	15	17	2	-	-	-	-	-	-
		Intersection								15.5	13.6	B	B
24	Hoyt N & 31st St	NB	L	L	80	12	-68	-	-	-	-	-	-
				T	51	25	-26	0.23	0.05	7.7	10.1	A	B
		SB	T	T	220	167	-53	0.28	0.23	21.7	21.1	C	C
				R	40	38	-2	-	-	-	-	-	-
		WB	L	L	440	444	4	0.33	0.33	45.6	40.3	D	D
			T	T	1105	1063	-42	0.42	0.41	13.2	13.1	B	B
			R	R	20	20	0	0.04	0.04	10.4	10.4	B	B
		Intersection								21.2	20.8	C	C
3	Hoyt S & 31st St	NB	T	T	126	31	-95	0.16	0.04	8.3	16.8	A	B
				R	4	5	1	-	-	-	-	-	-
		SB	L	L	205	203	-2	-	-	-	-	-	-
				T	455	408	-47	0.65	0.58	26.9	31.6	C	C
		EB	L	L	5	6	1	-	-	-	-	-	-
				T	744	882	138	0.44	0.52	24.3	25.4	C	C
			R	R	55	47	-8	0.17	0.15	22.7	22.3	C	C
		Intersection								24.1	27.6	C	C

Upper East Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	14	11	-3	-	-	-	-	-	-
				T	296	226	-70	-	-	-	-	-	-
				R	487	371	-116	-	-	-	-	-	-
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	10	10	0	-	-	-	-	-	-
		Intersection	Unsignalized										
2	E 60th Street & 3rd Ave	NB	L	L	94	68	-26	0.24	0.17	19.8	18.8	B	B
			T	T	1000	713	-287	0.55	0.39	22.1	19.9	C	B
		WB	T	T	384	408	24	0.72	0.76	19.1	21.9	B	C
			R	R	242	250	8	1.11	1.15	110.3	121.9	F	F
		Intersection								33.5	37.9	C	D
3	E 60th Street & York Ave	NB	T	T	670	670	0	0.38	0.38	20.3	20.3	C	C
		SB	T	T	447	318	-129	0.27	0.19	18.9	18.0	B	B
		EB	L	L	219	90	-129	0.29	0.12	28.7	25.6	C	C
			T	T	0	0	0	0.31	0.13	29.0	25.8	C	C
			R	R	50	50	0	0.13	0.13	25.7	25.7	C	C
		WB	L	L	0	0	0	-	-	-	-	-	-
			T	T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								21.4	20.3	C	C
4	E 59th Street & 2nd Ave	EB	T	T	1023	727	-296	1.36	0.97	198.1	55.5	F	E
			RR2	R	15	14	-1	0.11	0.11	25.5	25.4	C	C
				R2	15	14	-1	-	-	-	-	-	-
		SB	L2	L2	1332	885	-447	0.88	0.58	27.1	13.9	C	B
			L2L	L	5	4	-1	-	-	-	-	-	-
			T	T	856	811	-45	0.46	0.43	7.1	10.9	A	B
		Intersection								75.9	25.4	E	C
5	E 60th Street & 2nd Ave	NWB	L2	L2	769	828	59	0.54	0.58	20.9	21.6	C	C
			L	L	577	621	44	0.65	0.69	24.1	25.5	C	C
		SB	LT	L2	10	10	0	-	-	-	-	-	-
				T	1420	871	-549	0.73	0.45	23.6	18.3	C	B
			R	R	39	27	-12	0.13	0.09	16.0	15.4	B	B
		WB	LT	L	4	1	-3	-	-	-	-	-	-
				T	10	10	0	0.03	0.02	15.4	15.4	B	B
		Intersection								22.8	21.3	C	C
6	E 60th Street & 1st Ave	NB	TR	T	1196	859	-337	0.51	0.37	16.5	14.8	B	B
				R	47	34	-13	-	-	-	-	-	-
		EB	L	L	275	275	0	0.77	0.77	43.8	43.8	D	D
			T	T	222	106	-116	0.20	0.10	16.4	15.4	B	B
		Intersection								20.6	20.9	C	C
7	E 60th Street & Lexington Ave	SB	TR	T	939	729	-210	0.58	0.45	20.4	18.4	C	B
				R	78	61	-17	0.25	0.19	17.9	17.0	B	B
		WB	L	L	101	101	0	0.34	0.34	34.1	33.8	C	C
			T	T	377	375	-2	0.45	0.45	34.8	34.7	C	C
		Intersection								25.0	24.6	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	104	86	-18	-	-	-	-	-	-
				T	917	751	-166	0.53	0.43	21.5	19.8	C	B
		WB	TR	T	357	357	0	0.59	0.56	30.6	29.7	C	C
				R	98	79	-19	-	-	-	-	-	-
		Intersection								24.5	23.4	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	1198	1166	-32	0.68	0.66	24.0	23.6	C	C
				R	95	92	-3	-	-	-	-	-	-
		WB	LT	L	80	80	0	-	-	-	-	-	-
				T	381	363	-18	0.58	0.56	15.3	13.7	B	B
		Intersection								21.6	20.9	C	C
9	E 60th Street & Madison Ave	NB	L	L	134	105	-29	0.32	0.25	20.5	19.3	C	B
			T	T	782	612	-170	0.61	0.48	18.3	15.8	B	B
		WB	TR	T	348	346	-2	0.59	0.55	21.7	21.1	C	C
				R	128	109	-19	-	-	-	-	-	-
		Intersection								19.7	18.2	B	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	681	491	-190	0.61	0.44	11.2	8.9	B	A
			R	R	715	517	-198	0.62	0.45	13.9	10.3	B	B
		EB	LT	L	10	8	-2	-	-	-	-	-	-
				T	232	184	-48	0.41	0.32	30.6	29.4	C	C
		Intersection								15.0	12.8	B	B
11	E 60th Street & 5th Ave	SB	T	T	851	652	-199	0.90	0.69	27.1	17.3	C	B
			R	R	274	210	-64	0.78	0.60	29.1	20.2	C	C
		WB	L	L	153	150	-3	0.44	0.43	27.4	27.2	C	C
			T	T	329	301	-28	0.41	0.37	24.2	23.7	C	C
		Intersection								26.8	20.5	C	C
12	E 63rd Street & York Ave	NB	TR	T	472	414	-58	0.81	0.71	40.9	35.2	D	D
				R	527	431	-96	0.65	0.52	7.9	4.9	A	A
		SB	L	L	353	332	-21	0.65	0.55	39.2	29.6	D	C
			TR	T	372	342	-30	0.47	0.44	13.8	13.3	B	B
				R	75	74	-1	-	-	-	-	-	-
		WB	L	L	270	216	-54	0.56	0.46	42.3	39.3	D	D
			TR	T	251	212	-39	0.58	0.49	39.9	37.7	D	D
				R	74	65	-9	-	-	-	-	-	-
		Intersection								26.5	23.1	C	C
13	E 53rd Street & FDR Drive	SB	R	R	233	221	-12	-	-	-	-	-	-
		SWB	R	R	258	233	-25	-	-	-	-	-	-
		Intersection	Unsignalized										
14	E 61st Street & 5th Ave	SB	T	T	867	657	-210	0.57	0.43	22.4	20.1	C	C
		WB	L	L	258	205	-53	0.26	0.20	18.8	18.3	B	B
		Intersection								21.6	19.7	C	B
15	E 65th Street & 5th Ave	SB	LT	L	89	78	-11	-	-	-	-	-	-
				T	773	681	-92	0.54	0.47	4.9	4.7	A	A
		EB	T	T	781	755	-26	0.97	0.94	55.7	49.9	E	D
			R	R	338	327	-11	0.97	0.93	69.7	63.1	E	E
		Intersection								36.0	33.6	D	C
16	E 66th Street & 5th Avenue	SB	TR	T	798	702	-96	0.70	0.63	21.0	19.5	C	B
				R	318	298	-20	-	-	-	-	-	-
		WB	LT	L	64	57	-7	-	-	-	-	-	-
				T	410	363	-47	0.54	0.48	28.1	27.1	C	C
		Intersection								23.1	21.7	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	74	67	-7	-	-	-	-	-	-
				T	660	601	-59	0.73	0.66	29.2	27.4	C	C
				R	99	87	-12	-	-	-	-	-	-
		EB	T	T	397	375	-22	0.74	0.70	39.8	38.1	D	D
			R	R	243	229	-14	1.03	0.97	101.2	86.7	F	F
		WB	L	L	98	90	-8	0.87	0.80	90.7	78.7	F	E
			T	T	441	390	-51	0.49	0.43	24.1	23.2	C	C
		Intersection								41.7	38.5	D	D
18	E 71st Street & York Ave	NB	LTR	L	53	48	-5	-	-	-	-	-	-
				T	380	307	-73	0.46	0.38	22.4	20.8	C	C
				R	0	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	0	-	-	-	-	-	-
				T	384	328	-56	0.43	0.37	21.7	20.7	C	C
				R	59	52	-7	-	-	-	-	-	-
		WB	L	L	160	157	-3	0.42	0.41	31.5	31.3	C	C
			TR	T	125	124	-1	0.62	0.59	37.9	36.6	D	D
				R	114	104	-10	-	-	-	-	-	-
		Intersection								26.3	25.6	C	C

Upper East Study Area - No-Action vs With-Action (No Mitigation) - Midday Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	15	11	-4	-	-	-	-	-	-
				T	277	210	-67	-	-	-	-	-	-
				R	628	477	-151	-	-	-	-	-	-
		EB	LT	L	5	5	0	-	-	-	-	-	-
				T	15	8	-7	-	-	-	-	-	-
		Intersection	Unsignalized										
2	E 60th Street & 3rd Ave	NB	L	L	74	50	-24	0.19	0.13	19.0	18.1	B	B
			T	T	969	650	-319	0.58	0.39	22.7	20.0	C	B
		WB	T	T	264	265	1	0.55	0.56	4.8	4.5	A	A
			R	R	275	273	-2	1.05	1.04	88.7	85.5	F	F
		Intersection								29.4	29.0	C	C
3	E 60th Street & York Ave	NB	T	T	525	525	0	0.31	0.31	19.3	19.3	B	B
		SB	T	T	681	437	-244	0.39	0.25	20.4	18.6	C	B
		EB	L	L	412	227	-185	0.55	0.30	35.6	28.9	D	C
			T	T	0	0	0	0.57	0.32	36.5	29.3	D	C
			R	R	35	35	0	0.10	0.10	25.3	25.3	C	C
		WB	L	L	0	0	0	-	-	-	-	-	-
			T	T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								24.0	21.0	C	C
4	E 59th Street & 2nd Ave	EB	T	T	875	112	-763	1.02	0.13	65.5	20.7	E	C
			RR2	R	112	65	-47	0.47	0.34	27.2	24.4	C	C
				R2	70	64	-6	-	-	-	-	-	-
		SB	L2	L2	1044	120	-924	0.73	0.08	46.4	17.1	D	B
			L2L	L	6	3	-3	-	-	-	-	-	-
			T	T	1579	1367	-212	0.73	0.63	40.7	33.4	D	C
		Intersection								47.7	30.6	D	C
5	E 60th Street & 2nd Ave	NWB	L2	L2	963	975	12	0.79	0.80	28.8	29.5	C	C
			L	L	514	520	6	0.64	0.64	25.4	25.6	C	C
		SB	LT	L2	20	13	-7	-	-	-	-	-	-
				T	1656	509	-1147	0.87	0.27	40.8	17.5	D	B
			R	R	20	13	-7	0.06	0.04	14.9	14.6	B	B
		WB	LT	L	10	6	-4	-	-	-	-	-	-
				T	5	5	0	0.01	0.01	15.2	15.2	B	B
		Intersection								34.2	25.3	C	C
6	E 60th Street & 1st Ave	NB	TR	T	940	618	-322	0.44	0.29	15.7	14.1	B	B
				R	84	55	-29	-	-	-	-	-	-
		EB	L	L	280	278	-2	0.81	0.80	45.6	45.1	D	D
			T	T	363	207	-156	0.34	0.19	17.8	16.3	B	B
		Intersection								21.3	22.2	C	C
7	E 60th Street & Lexington Ave	SB	TR	T	938	644	-294	0.88	0.60	33.6	22.2	C	C
				R	69	47	-22	0.26	0.18	19.4	17.8	B	B
		WB	L	L	66	62	-4	0.25	0.24	18.7	18.6	B	B
			T	T	272	253	-19	0.29	0.27	17.9	17.9	B	B
		Intersection								29.0	20.7	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	64	49	-15	-	-	-	-	-	-
				T	900	688	-212	0.51	0.39	21.6	19.6	C	B
		WB	TR	T	266	225	-41	0.42	0.37	28.3	27.6	C	C
				R	75	75	0	-	-	-	-	-	-
		Intersection								23.4	21.9	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	915	858	-57	0.55	0.52	22.1	21.5	C	C
				R	99	93	-6	-	-	-	-	-	-
		WB	LT	L	116	116	0	-	-	-	-	-	-
				T	214	158	-56	0.43	0.37	13.8	13.0	B	B
		Intersection								20.0	19.5	B	B
9	E 60th Street & Madison Ave	NB	L	L	109	83	-26	0.27	0.21	19.7	18.6	B	B
			T	T	652	494	-158	0.51	0.38	14.5	12.8	B	B
		WB	TR	T	243	243	0	0.40	0.28	19.6	20.7	B	C
				R	70	8	-62	-	-	-	-	-	-
		Intersection								16.5	15.7	B	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	810	763	-47	0.67	0.63	12.3	11.5	B	B
			R	R	779	735	-44	0.69	0.65	16.0	14.6	B	B
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	206	147	-59	0.33	0.23	29.4	28.3	C	C
		Intersection								15.4	14.0	B	B
11	E 60th Street & 5th Ave	SB	T	T	632	433	-199	0.71	0.49	21.5	16.1	C	B
			R	R	286	196	-90	1.01	0.69	76.2	29.5	E	C
		WB	L	L	151	150	-1	0.42	0.42	27.0	26.9	C	C
			T	T	201	176	-25	0.25	0.22	22.1	21.7	C	C
		Intersection								33.9	21.4	C	C
12	E 63rd Street & York Ave	NB	TR	T	424	363	-61	0.73	0.62	36.8	32.3	D	C
				R	432	320	-112	0.67	0.50	16.1	11.8	B	B
		SB	L	L	428	376	-52	0.45	0.37	16.4	11.5	B	B
			TR	T	463	412	-51	0.40	0.35	8.0	7.4	A	A
				R	70	69	-1	-	-	-	-	-	-
		WB	L	L	317	210	-107	0.92	0.64	85.0	56.2	F	E
			TR	T	258	188	-70	0.94	0.66	73.6	50.8	E	D
				R	65	50	-15	-	-	-	-	-	-
		Intersection								34.2	23.8	C	C
13	E 53rd Street & FDR Drive	SB	R	R	149	134	-15	-	-	-	-	-	-
		SWB	R	R	353	300	-53	-	-	-	-	-	-
		Intersection	Unsignalized										
14	E 61st Street & 5th Ave	SB	T	T	628	449	-179	0.41	0.29	19.8	18.4	B	B
		WB	L	L	290	180	-110	0.28	0.17	19.1	17.9	B	B
		Intersection								19.6	18.2	B	B
15	E 65th Street & 5th Ave	SB	LT	L	85	76	-9	-	-	-	-	-	-
				T	533	474	-59	0.39	0.35	7.6	7.5	A	A
		EB	T	T	638	607	-31	0.75	0.71	34.2	32.8	C	C
			R	R	299	284	-15	0.88	0.83	54.5	48.9	D	D
		Intersection								27.5	26.3	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	538	478	-60	0.65	0.60	20.2	19.1	C	B
				R	410	388	-22	-	-	-	-	-	-
		WB	LT	L	80	72	-8	-	-	-	-	-	-
				T	474	427	-47	0.66	0.59	30.8	29.2	C	C
		Intersection								24.1	22.9	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	65	61	-4	-	-	-	-	-	-
				T	445	417	-28	0.66	0.61	27.7	26.6	C	C
				R	150	137	-13	-	-	-	-	-	-
		EB	T	T	458	425	-33	0.72	0.66	38.7	36.9	D	D
			R	R	189	175	-14	0.92	0.85	78.1	66.5	E	E
		WB	L	L	70	65	-5	0.82	0.76	92.6	83.4	F	F
			T	T	543	491	-52	0.56	0.50	25.1	24.2	C	C
		Intersection								36.9	34.4	D	C
18	E 71st Street & York Ave	NB	LTR	L	64	57	-7	-	-	-	-	-	-
				T	390	307	-83	0.49	0.39	23.0	21.1	C	C
				R	0	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	0	-	-	-	-	-	-
				T	348	262	-86	0.40	0.30	21.2	19.7	C	B
				R	55	44	-11	-	-	-	-	-	-
		WB	L	L	205	199	-6	0.66	0.64	41.1	40.2	D	D
			TR	T	160	158	-2	0.78	0.72	46.3	42.6	D	D
				R	139	124	-15	-	-	-	-	-	-
		Intersection								30.6	29.5	C	C

Upper East Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	5	2	-3	-	-	-	-	-	-
				T	130	67	-63	-	-	-	-	-	-
				R	328	169	-159	-	-	-	-	-	-
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	10	5	-5	-	-	-	-	-	-
		Intersection	Unsignalized										
2	E 60th Street & 3rd Ave	NB	L	L	92	61	-31	0.25	0.17	19.9	18.7	B	B
			T	T	892	591	-301	0.50	0.33	21.4	19.3	C	B
		WB	T	T	331	199	-132	0.53	0.32	7.0	4.2	A	A
			R	R	162	88	-74	0.75	0.41	40.6	24.9	D	C
		Intersection								20.4	16.7	C	B
3	E 60th Street & York Ave	NB	T	T	445	445	0	0.24	0.24	18.6	18.6	B	B
		SB	T	T	1016	624	-392	0.53	0.33	22.8	19.6	C	B
		EB	L	L	170	22	-148	0.26	0.05	28.1	24.5	C	C
			T	T	15	15	0	0.27	0.04	28.3	24.3	C	C
			R	R	45	45	0	0.11	0.11	25.3	25.3	C	C
		WB	L	L	0	0	0	-	-	-	-	-	-
			T	T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								22.4	19.6	C	B
4	E 59th Street & 2nd Ave	EB	T	T	1063	121	-942	1.20	0.14	127.9	20.8	F	C
			RR2	R	47	17	-30	0.41	0.29	25.9	23.6	C	C
				R2	104	88	-16	-	-	-	-	-	-
		SB	L2	L2	1561	110	-1451	1.12	0.08	78.7	11.1	E	B
			L2L	L	0	0	0	-	-	-	-	-	-
			T	T	1028	705	-323	0.49	0.34	8.9	13.5	A	B
		Intersection								72.4	15.2	E	B
5	E 60th Street & 2nd Ave	NWB	L2	L2	670	397	-273	0.41	0.24	19.0	17.2	B	B
			L	L	454	269	-185	0.41	0.24	19.3	17.3	B	B
		SB	LT	L2	10	7	-3	-	-	-	-	-	-
				T	1914	416	-1498	0.86	0.19	33.3	15.4	C	B
			R	R	39	18	-21	0.12	0.06	15.8	14.9	B	B
		WB	LT	L	5	2	-3	-	-	-	-	-	-
				T	0	0	0	-	-	15.2	15.0	B	B
		Intersection								27.8	16.5	C	B
6	E 60th Street & 1st Ave	NB	TR	T	1091	649	-442	0.46	0.27	15.8	13.9	B	B
				R	40	24	-16	-	-	-	-	-	-
		EB	L	L	148	116	-32	0.51	0.40	30.7	27.8	C	C
			T	T	190	58	-132	0.18	0.05	16.1	15.0	B	B
		Intersection								17.5	16.0	B	B
7	E 60th Street & Lexington Ave	SB	TR	T	724	418	-306	0.49	0.28	18.9	16.4	B	B
				R	58	33	-25	0.19	0.11	16.9	15.7	B	B
		WB	L	L	98	39	-59	0.32	0.13	19.4	17.3	B	B
			T	T	325	221	-104	0.35	0.24	18.1	17.9	B	B
		Intersection								18.7	16.9	B	B
8a	E 60th Street & Park Ave NB	NB	LT	L	77	54	-23	-	-	-	-	-	-
				T	1014	716	-298	0.53	0.37	21.3	18.7	C	B
		WB	TR	T	298	169	-129	0.40	0.28	26.4	24.7	C	C
				R	85	85	0	-	-	-	-	-	-
		Intersection								22.7	20.3	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	851	790	-61	0.50	0.47	20.5	20.0	C	B
				R	99	92	-7	-	-	-	-	-	-
		WB	LT	L	109	62	-47	-	-	-	-	-	-
				T	266	161	-105	0.44	0.26	12.4	13.1	B	B
		Intersection								18.1	18.5	B	B
9	E 60th Street & Madison Ave	NB	L	L	106	79	-27	0.26	0.20	19.5	18.4	B	B
			T	T	901	675	-226	0.77	0.57	23.0	17.5	C	B
		WB	TR	T	271	230	-41	0.41	0.26	14.1	17.3	B	B
				R	94	23	-71	-	-	-	-	-	-
		Intersection								20.4	17.6	C	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	387	197	-190	0.52	0.27	9.9	7.3	A	A
			R	R	816	418	-398	0.55	0.28	12.1	8.1	B	A
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	105	57	-48	0.17	0.09	27.6	26.8	C	C
		Intersection								12.1	9.4	B	A
11	E 60th Street & 5th Ave	SB	T	T	566	352	-214	0.68	0.42	15.2	4.0	B	A
			R	R	266	166	-100	0.85	0.53	37.6	9.9	D	A
		WB	L	L	150	124	-26	0.46	0.38	27.7	25.8	C	C
			T	T	227	185	-42	0.24	0.20	21.9	21.4	C	C
		Intersection								22.8	12.3	C	B
12	E 63rd Street & York Ave	NB	TR	T	389	264	-125	0.94	0.64	68.3	41.4	E	D
				R	239	127	-112	0.32	0.17	9.1	7.7	A	A
		SB	L	L	416	354	-62	1.00	0.89	97.1	73.8	F	E
			TR	T	671	600	-71	0.86	0.69	44.0	30.6	D	C
				R	75	74	-1	-	-	-	-	-	-
		WB	L	L	398	297	-101	0.51	0.40	39.3	36.2	D	D
			TR	T	171	140	-31	0.52	0.40	36.8	34.4	D	C
				R	15	13	-2	-	-	-	-	-	-
		Intersection								49.4	37.5	D	D
13	E 53rd Street & FDR Drive	SB	R	R	207	178	-29	-	-	-	-	-	-
		SWB	R	R	321	266	-55	-	-	-	-	-	-
		Intersection	Unsignalized										
14	E 61st Street & 5th Ave	SB	T	T	661	509	-152	0.47	0.36	20.6	19.1	C	B
		WB	L	L	171	9	-162	0.18	0.01	18.0	16.3	B	B
		Intersection								20.1	19.1	C	B
15	E 65th Street & 5th Ave	SB	LT	L	65	60	-5	-	-	-	-	-	-
				T	656	604	-52	0.42	0.39	7.3	7.1	A	A
		EB	T	T	737	696	-41	0.88	0.83	42.9	38.8	D	D
			R	R	361	341	-20	0.97	0.92	71.2	60.3	E	E
		Intersection								34.4	30.8	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	631	586	-45	0.71	0.67	21.6	20.7	C	C
				R	378	367	-11	-	-	-	-	-	-
		WB	LT	L	90	78	-12	-	-	-	-	-	-
				T	517	448	-69	0.65	0.57	30.6	28.7	C	C
		Intersection								24.8	23.3	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	69	67	-2	-	-	-	-	-	-
				T	561	546	-15	0.72	0.70	29.2	28.5	C	C
				R	178	169	-9	-	-	-	-	-	-
		EB	T	T	416	373	-43	0.73	0.65	39.1	36.5	D	D
			R	R	216	194	-22	0.99	0.89	90.9	69.6	F	E
		WB	L	L	50	45	-5	0.53	0.48	58.7	54.8	E	D
			T	T	554	485	-69	0.60	0.52	26.1	24.6	C	C
		Intersection								38.1	34.3	D	C
18	E 71st Street & York Ave	NB	LTR	L	35	29	-6	-	-	-	-	-	-
				T	421	294	-127	0.47	0.33	22.4	20.1	C	C
				R	0	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	0	-	-	-	-	-	-
				T	556	469	-87	0.65	0.56	26.8	24.3	C	C
				R	84	76	-8	-	-	-	-	-	-
		WB	L	L	115	110	-5	0.31	0.30	29.0	28.7	C	C
			TR	T	125	124	-1	0.52	0.48	33.7	32.6	C	C
				R	94	81	-13	-	-	-	-	-	-
		Intersection								26.6	25.0	C	C

Upper East Study Area - No-Action vs With-Action (No Mitigation) - Late Night Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	10	9	-1	-	-	-	-	-	-
				T	89	78	-11	-	-	-	-	-	-
				R	308	269	-39	-	-	-	-	-	-
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	30	10	-20	-	-	-	-	-	-
		Intersection	Unsignalized										
2	E 60th Street & 3rd Ave	NB	L	L	79	67	-12	0.16	0.13	18.2	17.9	B	B
			T	T	1059	901	-158	0.52	0.44	21.5	20.5	C	C
		WB	T	T	378	194	-184	0.66	0.34	13.3	15.6	B	B
			R	R	160	27	-133	0.74	0.12	43.2	33.6	D	C
		Intersection								21.6	19.8	C	B
3	E 60th Street & York Ave	NB	T	T	475	475	0	0.27	0.27	18.8	18.8	B	B
		SB	T	T	635	275	-360	0.32	0.14	19.5	17.4	B	B
		EB	L	L	247	230	-17	0.34	0.32	29.6	29.1	C	C
			T	T	0	0	0	0.35	0.33	30.0	29.5	C	C
			R	R	45	22	-23	0.11	0.05	25.2	24.4	C	C
		WB	L	L	0	0	0	-	-	-	-	-	-
			T	T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								21.4	21.1	C	C
4	E 59th Street & 2nd Ave	EB	T	T	819	131	-688	0.90	0.14	41.2	20.8	D	C
			RR2	R	166	68	-98	0.86	0.48	50.2	28.0	D	C
				R2	120	91	-29	-	-	-	-	-	-
		SB	L2	L2	1151	127	-1024	0.80	0.09	17.3	2.5	B	A
			L2L	L	11	2	-9	-	-	-	-	-	-
			T	T	1209	616	-593	0.58	0.29	7.7	3.2	A	A
		Intersection								22.7	9.5	C	A
5	E 60th Street & 2nd Ave	NWB	L2	L2	474	142	-332	0.29	0.09	17.6	15.8	B	B
			L	L	444	133	-311	0.40	0.12	19.2	16.2	B	B
		SB	LT	L2	30	10	-20	-	-	-	-	-	-
				T	1892	598	-1294	0.82	0.26	25.9	16.0	C	B
			R	R	89	83	-6	0.24	0.22	17.2	17.0	B	B
		WB	LT	L	5	5	0	-	-	-	-	-	-
				T	5	5	0	0.01	0.01	15.2	15.2	B	B
		Intersection								23.1	16.1	C	B
6	E 60th Street & 1st Ave	NB	TR	T	1290	1073	-217	0.52	0.43	16.5	15.5	B	B
				R	99	82	-17	-	-	-	-	-	-
		EB	L	L	145	109	-36	0.41	0.31	27.3	25.4	C	C
			T	T	193	170	-23	0.18	0.15	16.1	15.9	B	B
		Intersection								17.5	16.4	B	B
7	E 60th Street & Lexington Ave	SB	TR	T	1113	604	-509	0.94	0.51	40.4	20.4	D	C
				R	70	38	-32	0.17	0.09	16.7	15.8	B	B
		WB	L	L	160	46	-114	0.37	0.11	21.4	20.4	C	C
			T	T	297	215	-82	0.35	0.25	19.8	21.9	B	C
		Intersection								33.3	20.6	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	55	52	-3	-	-	-	-	-	-
				T	552	517	-35	0.32	0.30	18.7	18.5	B	B
		WB	TR	T	332	218	-114	0.46	0.32	28.9	26.7	C	C
				R	35	35	0	-	-	-	-	-	-
		Intersection								22.8	21.2	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	877	737	-140	0.54	0.45	21.8	20.5	C	C
				R	104	87	-17	-	-	-	-	-	-
		WB	LT	L	110	96	-14	-	-	-	-	-	-
				T	277	174	-103	0.48	0.34	10.0	11.7	B	B
		Intersection								18.3	18.2	B	B
9	E 60th Street & Madison Ave	NB	L	L	82	71	-11	0.16	0.14	17.5	17.3	B	B
			T	T	911	788	-123	0.66	0.57	17.7	15.7	B	B
		WB	TR	T	266	227	-39	0.48	0.32	16.1	18.0	B	B
				R	115	34	-81	-	-	-	-	-	-
		Intersection								17.2	16.4	B	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	982	1099	117	0.70	0.78	13.0	15.4	B	B
			R	R	746	838	92	0.71	0.79	16.7	21.2	B	C
		EB	LT	L	10	6	-4	-	-	-	-	-	-
				T	142	89	-53	0.25	0.16	28.5	27.4	C	C
		Intersection								15.4	17.7	B	B
11	E 60th Street & 5th Ave	SB	T	T	876	497	-379	0.91	0.52	26.0	8.8	C	A
			R	R	284	161	-123	0.71	0.40	20.1	9.3	C	A
		WB	L	L	169	146	-23	0.37	0.32	24.9	24.0	C	C
			T	T	179	152	-27	0.21	0.18	21.7	21.3	C	C
		Intersection								24.3	13.1	C	B
12	E 63rd Street & York Ave	NB	TR	T	189	151	-38	0.46	0.37	35.1	33.0	D	C
				R	377	240	-137	0.47	0.30	7.9	6.2	A	A
		SB	L	L	370	310	-60	0.50	0.41	25.7	21.8	C	C
			TR	T	385	323	-62	0.46	0.38	19.3	18.0	B	B
				R	50	49	-1	-	-	-	-	-	-
		WB	L	L	330	170	-160	0.54	0.30	40.2	34.1	D	C
			TR	T	295	177	-118	0.54	0.30	37.2	32.9	D	C
				R	25	17	-8	-	-	-	-	-	-
		Intersection								25.3	21.9	C	C
13	E 53rd Street & FDR Drive	SB	R	R	158	119	-39	-	-	-	-	-	-
		SWB	R	R	365	298	-67	-	-	-	-	-	-
		Intersection	Unsignalized										
14	E 61st Street & 5th Ave	SB	T	T	976	607	-369	0.59	0.37	22.6	19.1	C	B
		WB	L	L	184	51	-133	0.19	0.05	18.2	16.8	B	B
		Intersection								21.8	18.9	C	B
15	E 65th Street & 5th Ave	SB	LT	L	75	65	-10	-	-	-	-	-	-
				T	731	638	-93	0.47	0.41	6.6	6.6	A	A
		EB	T	T	669	652	-17	0.74	0.73	33.6	32.9	C	C
			R	R	205	200	-5	0.58	0.57	32.7	32.2	C	C
		Intersection								20.0	20.4	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	747	650	-97	0.56	0.50	18.2	17.2	B	B
				R	255	238	-17	-	-	-	-	-	-
		WB	LT	L	59	53	-6	-	-	-	-	-	-
				T	468	419	-49	0.60	0.54	29.4	28.1	C	C
		Intersection								22.1	21.1	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	60	55	-5	-	-	-	-	-	-
				T	617	564	-53	0.56	0.51	25.1	24.3	C	C
				R	70	62	-8	-	-	-	-	-	-
		EB	T	T	354	331	-23	0.56	0.53	34.1	33.4	C	C
			R	R	110	103	-7	0.38	0.35	33.0	32.5	C	C
		WB	L	L	54	47	-7	0.55	0.48	57.9	53.2	E	D
			T	T	388	329	-59	0.40	0.34	22.5	21.7	C	C
		Intersection								28.1	27.3	C	C
18	E 71st Street & York Ave	NB	LTR	L	10	8	-2	-	-	-	-	-	-
				T	236	104	-132	0.21	0.10	18.4	17.1	B	B
				R	0	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	0	-	-	-	-	-	-
				T	317	181	-136	0.32	0.18	19.8	18.1	B	B
				R	40	26	-14	-	-	-	-	-	-
		WB	L	L	80	75	-5	0.20	0.19	26.7	26.5	C	C
			TR	T	180	178	-2	0.59	0.52	35.3	33.1	D	C
				R	100	70	-30	-	-	-	-	-	-
		Intersection								24.6	24.8	C	C

Upper West Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	W 72nd Street & West End Ave	NB	L	L	104	98	-6	0.36	0.34	20.4	19.7	C	B
			T	T	187	177	-10	0.35	0.33	16.7	16.4	B	B
			R	R	64	60	-4	0.22	0.20	15.7	15.5	B	B
		SB	TR	T	414	406	-8	0.60	0.59	27.8	27.6	C	C
				R	30	30	0	-	-	-	-	-	-
		EB	LTR	L	10	8	-2	-	-	-	-	-	-
				T	131	105	-26	0.64	0.50	37.4	33.2	D	C
				R	116	90	-26	-	-	-	-	-	-
		WB	LTR	L	84	74	-10	-	-	-	-	-	-
				T	138	125	-13	0.75	0.64	43.9	37.7	D	D
				R	44	40	-4	-	-	-	-	-	-
		Intersection			1322	1213	-109			30.0	27.5	C	C
2	W 61st Street & West End Ave	NB	LTR	L	19	15	-4	-	-	-	-	-	-
				T	370	272	-98	0.47	0.35	10.1	9.4	B	A
				R	57	45	-12	-	-	-	-	-	-
		SB	L	L	55	55	0	0.25	0.21	14.8	13.9	B	B
			TR	T	574	450	-124	0.36	0.29	13.4	12.7	B	B
				R	35	35	0	-	-	-	-	-	-
		EB	LTR	L	20	19	-1	-	-	-	-	-	-
				T	15	11	-4	0.34	0.33	28.9	28.8	C	C
				R	55	55	0	-	-	-	-	-	-
		Intersection			1200	957	-243			13.5	13.2	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	60	57	-3	-	-	-	-	-	-
				T	30	30	0	0.66	0.61	48.3	43.5	D	D
				R	10	10	0	-	-	-	-	-	-
		SB	LTR	L	15	15	0	-	-	-	-	-	-
				T	130	130	0	1.03	1.00	87.9	81.7	F	F
				R	154	147	-7	-	-	-	-	-	-
		EB	TR	L	5	4	-1	-	-	-	-	-	-
				T	502	448	-54	0.59	0.53	12.6	11.5	B	B
				R	330	295	-35	-	-	-	-	-	-
		WB	TR	L	5	5	0	-	-	-	-	-	-
				T	590	547	-43	0.46	0.43	10.6	10.3	B	B
				R	25	24	-1	-	-	-	-	-	-
		Intersection			1856	1712	-144			26.7	25.5	C	C
4a	W 56th Street & 12th Avenue	NB	TR	L	212	207	-5	0.35	0.34	22.2	22.1	C	C
				R	100	99	-1	-	-	-	-	-	-
		EB	LT	L	465	464	-1	-	-	-	-	-	-
				T	705	702	-3	0.86	0.86	7.0	6.8	A	A
		Intersection			1482	1472	-10			10.6	10.4	B	B
4b	W 56th Street & West Side Highway	NB	T	T	2143	2128	-15	1.05	1.05	65.6	63.2	E	E
		SB	L	L	1170	1166	-4	0.91	0.90	47.9	47.5	D	D
			T	T	2958	2936	-22	0.52	0.51	0.7	0.6	A	A
		Intersection								32.1	31.2	C	C
5a	W 55th Street & West Side Highway	NB	L	L	75	75	0	1.01	1.01	206.8	206.8	F	F
			T	T	2013	2002	-11	0.59	0.58	15.6	15.4	B	B
		SB	TR	T	2958	2936	-22	0.92	0.92	33.2	32.7	C	C
				R	0	0	0	-	-	-	-	-	-
		WB	LT	L	126	122	-4	-	-	-	-	-	-
				T	30	29	-1	0.77	0.75	30.1	27.9	C	C
			R	R	130	126	-4	0.36	0.35	6.2	6.2	A	A
		Intersection								28.2	27.8	C	C
5b	W 55th Street & 12th Avenue	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	282	277	-5	0.36	0.35	11.8	11.7	B	B
		SB	TR	T	0	0	0	-	-	-	-	-	-
				R	0	0	0	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	286	277	-9	0.54	0.52	57.9	57.5	E	E
				R	30	29	-1	-	-	-	-	-	-
		Intersection								36.2	35.8	D	D
5c	W 55th Street & West Side Highway Arterial	SB	T	T	0	0	0	-	-	-	-	-	-
		WB	L	L	105	104	-1	0.41	0.40	37.2	35.2	D	D
		Intersection								37.2	35.2	D	D
6	W 60th Street & Broadway	NB	L	L	328	317	-11	0.78	0.76	48.5	46.8	D	D
			T	T	503	486	-17	0.42	0.40	14.3	14.2	B	B
		SB	TR	T	845	689	-156	0.89	0.72	27.7	20.9	C	C
				R	64	52	-12	-	-	-	-	-	-
		Intersection								27.9	24.3	C	C
7	W 60th Street & Columbus Ave	SB	TR	T	972	752	-220	0.73	0.56	5.9	4.6	A	A
				R	78	60	-18	-	-	-	-	-	-
		WB	L	L	235	215	-20	0.92	0.84	46.5	36.6	D	D
			T	T	157	154	-3	0.29	0.29	3.8	3.7	A	A
		Intersection								12.5	10.5	B	B
8	W 60th Street & Amsterdam Ave	NB	LT	L	91	69	-22	-	-	-	-	-	-
				T	912	687	-225	0.47	0.36	14.5	13.2	B	B
		WB	T	T	170	150	-20	0.48	0.43	44.6	46.4	D	D
			R	R	65	64	-1	0.31	0.31	42.9	45.9	D	D
		Intersection								20.9	21.4	C	C
9	W 60th Street & West End Ave	NB	L	L	19	14	-5	0.09	0.06	11.1	10.5	B	B
			T	T	372	276	-96	0.34	0.25	12.3	11.4	B	B
		SB	TR	T	609	489	-120	0.33	0.26	3.1	3.5	A	A
				R	20	16	-4	-	-	-	-	-	-
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	0	0	0	0.12	0.12	21.3	21.3	C	C
				R	30	30	0	-	-	-	-	-	-
		WB	LTR	L	140	137	-3	-	-	-	-	-	-
				T	52	31	-21	0.68	0.58	56.0	54.5	E	D
				R	69	51	-18	-	-	-	-	-	-
		Intersection								16.7	16.7	B	B
10	W 61st Street & Amsterdam Ave	NB	TR	T	972	747	-225	0.44	0.34	3.2	3.6	A	A
				R	5	4	-1	-	-	-	-	-	-
		EB	LT	L	117	102	-15	-	-	-	-	-	-
				T	10	9	-1	0.46	0.40	38.9	39.0	D	D
		WB	R	R	10	10	0	0.04	0.04	23.6	23.6	C	C
		Intersection			142	125	-17			8.1	9.0	A	A
11	W 61st Street & Columbus Ave	SB	LT	L	182	156	-26	-	-	-	-	-	-
				T	1050	812	-238	0.77	0.61	22.2	18.1	C	B
		Intersection			1232	968	-264			22.2	18.1	C	B
12	W 61st Street & Broadway	NB	TR	T	493	476	-17	0.34	0.33	9.6	9.6	A	A
				R	10	10	0	-	-	-	-	-	-
		SB	LT	L	20	0	-20	-	-	-	-	-	-
				T	801	650	-151	0.56	0.40	19.7	17.2	B	B
		EB	LTR	L	30	26	-4	-	-	-	-	-	-
				T	44	39	-5	0.54	0.46	25.7	26.5	C	C
				R	108	91	-17	-	-	-	-	-	-
		Intersection			1506	1292	-214			17.0	15.5	B	B
13	W 61st Street & Columbus Ave	NB	T	T	598	575	-23	0.32	0.31	13.4	13.3	B	B
		EB	L	L	74	49	-25	0.23	0.15	28.1	18.9	C	B
		Intersection			672	624	-48			15.1	13.8	B	B
14	W 81st Street & Central Park West	NB	LTR	L	15	14	-1	-	-	-	-	-	-
				T	224	219	-5	0.28	0.27	19.1	19.0	B	B
				R	169	164	-5	0.44	0.42	23.2	22.9	C	C
		SB	LTR	L	165	162	-3	0.57	0.56	28.7	28.2	C	C
				T	385	379	-6	0.88	0.86	43.6	41.1	D	D
				R	45	42	-3	-	-	-	-	-	-
		EB	L	L	15	13	-2	0.18	0.15	44.0	43.2	D	D
			TR	T	312	278	-34	0.92	0.82	61.6	48.2	E	D
				R	10	9	-1	0.04	0.03	23.5	23.4	C	C
		WB	L	L	167	151	-16	0.84	0.68	52.4	34.8	D	C
			T	T	224	188	-36	0.71	0.60	40.8	35.4	D	D
			R	R	118	107	-11	0.41	0.37	30.1	29.2	C	C
		Intersection			1441	1329	-112			39.7	34.4	D	C
15	W 66th Street & Central Park West	NB	LT	L	65	62	-3	-	-	-	-	-	-
				T	353	335	-18	0.43	0.40	3.4	3.2	A	A
		SB	TR	T	656	612	-44	0.57	0.54	20.4	19.6	C	B
				R	45	44	-1	-	-	-	-	-	-
		WB	L	L	177	162	-15	0.51	0.47	31.3	30.2	C	C
			T	T	314	285	-29	0.80	0.73	44.6	39.4	D	D
			R	R	231	211	-20	0.65	0.60	37.0	34.6	D	C
		Intersection			1841	1711	-130			23.6	21.7	C	C
16	W 65th Street & Central Park West	NB	TR	T	388	369	-19	0.84	0.81	37.7	36.2	D	D
				R	255	254	-1	-	-	-	-	-	-
		SB	LT	L	370	345	-25	0.98	0.90	59.2	43.3	E	D
				T	463	429	-34	0.56	0.52	9.8	8.8	A	A
		EB	L	L	30	28	-2	0.09	0.09	22.9	22.9	C	C
			TR	T	499	462	-37	0.77	0.71	36.1	33.6	D	C
				R	25	23	-2	-	-	-	-	-	-
		Intersection			2030	1910	-120			35.2	30.9	D	C

Upper West Study Area - No-Action vs With-Action (No Mitigation) - Midday Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph) No-Action	Volume (vph) With-Action	Volume (vph) Increment	V/C No-Action	V/C With-Action	Delay (seconds) No-Action	Delay (seconds) With-Action	LOS No-Action	LOS With-Action
1	W 72nd Street & West End Ave	NB	L	L	115	107	-8	0.34	0.31	19.0	18.2	B	B
			T	T	284	265	-19	0.49	0.45	19.8	19.1	B	B
			R	R	70	65	-5	0.23	0.22	16.5	16.2	B	B
		SB	TR	T	329	312	-17	0.57	0.55	29.4	28.9	C	C
				R	55	55	0	-	-	-	-	-	-
		EB	LTR	L	25	19	-6	-	-	-	-	-	-
				T	108	81	-27	0.63	0.46	38.5	33.6	D	C
				R	89	62	-27	-	-	-	-	-	-
		WB	LTR	L	80	67	-13	-	-	-	-	-	-
				T	155	137	-18	0.89	0.73	59.6	43.7	E	D
				R	50	44	-6	-	-	-	-	-	-
		Intersection								34.2	29.1	C	C
2	W 61st Street & West End Ave	NB	LTR	L	5	4	-1	-	-	-	-	-	-
				T	366	251	-115	0.42	0.29	9.5	10.3	A	B
				R	60	41	-19	-	-	-	-	-	-
		SB	L	L	14	14	0	0.07	0.06	12.6	12.3	B	B
			TR	T	568	375	-193	0.32	0.22	14.0	13.0	B	B
				R	15	15	0	-	-	-	-	-	-
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	20	20	0	0.17	0.17	24.0	24.0	C	C
				R	35	35	0	-	-	-	-	-	-
		Intersection								12.8	12.9	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	70	66	-4	-	-	-	-	-	-
				T	45	45	0	0.46	0.43	31.6	30.5	C	C
				R	5	5	0	-	-	-	-	-	-
		SB	LTR	L	5	5	0	-	-	-	-	-	-
				T	65	65	0	0.68	0.65	38.8	37.4	D	D
				R	130	122	-8	-	-	-	-	-	-
		EB	TR	L	20	17	-3	-	-	-	-	-	-
				T	313	265	-48	0.53	0.44	12.7	11.5	B	B
				R	357	303	-54	-	-	-	-	-	-
		WB	TR	L	0	0	0	-	-	-	-	-	-
				T	533	483	-50	0.38	0.34	10.6	10.2	B	B
				R	50	48	-2	-	-	-	-	-	-
		Intersection								16.8	16.3	B	B
4a	W 56th Street & 12th Avenue	NB	TR	L	258	252	-6	0.25	0.25	4.0	3.9	A	A
				R	85	84	-1	-	-	-	-	-	-
		EB	LT	L	270	265	-5	-	-	-	-	-	-
				T	290	285	-5	0.84	0.82	16.8	15.5	B	B
		Intersection								11.6	10.8	B	B
4b	W 56th Street & West Side Highway	NB	T	T	2417	2398	-19	0.78	0.78	10.5	10.1	B	B
		SB	L	L	560	550	-10	0.91	0.89	63.0	60.8	E	E
			T	T	2307	2255	-52	0.81	0.79	49.6	49.4	D	D
		Intersection								33.6	33.0	C	C
5a	W 55th Street & West Side Highway	NB	L	L	155	155	0	1.05	1.05	165.1	165.1	F	F
			T	T	2232	2222	-10	0.71	0.70	19.0	18.9	B	B
		SB	TR	T	2307	2255	-52	0.91	0.89	79.9	79.3	E	E
				R	0	0	0	-	-	-	-	-	-
		WB	LT	L	162	155	-7	-	-	-	-	-	-
				T	65	62	-3	0.80	0.77	26.5	23.2	C	C
			R	R	185	176	-9	0.42	0.40	5.9	5.7	A	A
		Intersection								50.5	49.9	D	D
5b	W 55th Street & 12th Avenue	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	298	293	-5	0.43	0.43	15.5	15.4	B	B
		SB	TR	T	0	0	0	-	-	-	-	-	-
				R	0	0	0	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	412	393	-19	0.56	0.53	42.7	42.1	D	D
				R	45	43	-2	-	-	-	-	-	-
		Intersection								31.9	31.3	C	C
5c	W 55th Street & West Side Highway Arterial	SB	T	T	0	0	0	-	-	-	-	-	-
		WB	L	L	220	217	-3	0.57	0.57	66.0	62.0	E	E
		Intersection								66.0	62.0	E	E
6	W 60th Street & Broadway	NB	L	L	338	327	-11	0.83	0.81	52.2	49.9	D	D
			T	T	450	436	-14	0.36	0.35	13.6	13.5	B	B
		SB	TR	T	753	544	-209	0.86	0.62	34.5	21.6	C	C
				R	79	57	-22	-	-	-	-	-	-
		Intersection								32.6	26.3	C	C
7	W 60th Street & Columbus Ave	SB	TR	T	967	636	-331	0.74	0.48	6.6	4.2	A	A
				R	123	81	-42	-	-	-	-	-	-
		WB	L	L	214	181	-33	0.75	0.63	25.2	19.1	C	B
			T	T	203	203	0	0.32	0.32	3.5	3.1	A	A
		Intersection								8.8	6.5	A	A
8	W 60th Street & Amsterdam Ave	NB	LT	L	64	46	-18	-	-	-	-	-	-
				T	1031	735	-296	0.48	0.35	14.6	13.0	B	B
		WB	T	T	241	199	-42	0.60	0.50	45.3	47.4	D	D
			R	R	85	85	0	0.36	0.36	41.1	46.3	D	D
		Intersection								22.0	22.9	C	C
9	W 60th Street & West End Ave	NB	L	L	10	7	-3	0.05	0.03	10.3	9.9	B	A
			T	T	356	221	-135	0.29	0.18	11.8	10.8	B	B
		SB	TR	T	588	400	-188	0.30	0.21	5.2	5.2	A	A
				R	15	10	-5	-	-	-	-	-	-
		EB	LTR	L	0	0	0	-	-	-	-	-	-
				T	0	0	0	0.07	0.07	20.6	20.6	C	C
				R	20	20	0	-	-	-	-	-	-
		WB	LTR	L	170	170	0	-	-	-	-	-	-
				T	60	0	-60	0.72	0.63	47.9	46.9	D	D
				R	75	75	0	-	-	-	-	-	-
		Intersection								17.9	18.7	B	B
10	W 61st Street & Amsterdam Ave	NB	TR	T	1106	812	-294	0.47	0.35	3.6	4.3	A	A
				R	10	8	-2	-	-	-	-	-	-
		EB	LT	L	84	67	-17	-	-	-	-	-	-
				T	10	8	-2	0.28	0.23	34.0	32.4	C	C
		WB	R	R	20	20	0	0.06	0.06	23.9	23.9	C	C
		Intersection								6.8	7.5	A	A
11	W 61st Street & Columbus Ave	SB	LT	L	224	187	-37	-	-	-	-	-	-
				T	1090	717	-373	0.82	0.57	23.8	17.3	C	B
		Intersection								23.8	17.3	C	B
12	W 61st Street & Broadway	NB	TR	T	442	435	-7	0.28	0.27	5.1	5.1	A	A
				R	8	1	-7	-	-	-	-	-	-
		SB	LT	L	30	6	-24	-	-	-	-	-	-
				T	688	483	-205	0.53	0.34	19.2	16.6	B	B
		EB	LTR	L	45	39	-6	-	-	-	-	-	-
				T	35	30	-5	0.66	0.55	37.9	38.6	D	D
				R	144	118	-26	-	-	-	-	-	-
		Intersection								18.0	16.1	B	B
13	W 61st Street & Columbus Ave	NB	T	T	617	578	-39	0.34	0.32	13.6	13.3	B	B
		EB	L	L	73	37	-36	0.25	0.13	24.0	9.4	C	A
		Intersection								14.7	13.1	B	B
14	W 81st Street & Central Park West	NB	LTR	L	40	37	-3	-	-	-	-	-	-
				T	395	386	-9	0.50	0.48	21.7	21.4	C	C
				R	255	247	-8	0.91	0.88	60.8	55.9	E	E
		SB	LTR	L	85	79	-6	0.48	0.44	29.3	27.6	C	C
				T	305	287	-18	0.77	0.72	35.8	32.3	D	C
				R	40	35	-5	-	-	-	-	-	-
		EB	L	L	15	13	-2	0.20	0.16	44.7	43.8	D	D
			TR	T	299	263	-36	0.74	0.65	40.7	36.1	D	D
				R	30	27	-3	0.19	0.17	27.2	26.8	C	C
		WB	L	L	178	159	-19	0.91	0.77	64.5	42.3	E	D
			T	T	261	219	-42	0.64	0.54	36.0	32.4	D	C
			R	R	158	142	-16	0.57	0.51	35.2	33.3	D	C
		Intersection								38.7	34.1	D	C
15	W 66th Street & Central Park West	NB	LT	L	45	43	-2	-	-	-	-	-	-
				T	474	453	-21	0.44	0.41	1.6	1.5	A	A
		SB	TR	T	585	523	-62	0.55	0.50	20.6	19.6	C	B
				R	55	53	-2	-	-	-	-	-	-
		WB	L	L	218	197	-21	0.65	0.59	36.1	33.7	D	C
			T	T	387	347	-40	0.98	0.88	71.1	52.5	E	D
			R	R	273	246	-27	0.81	0.73	49.0	42.3	D	D
		Intersection								30.9	25.5	C	C
16	W 65th Street & Central Park West	NB	TR	T	464	447	-17	0.81	0.79	34.6	33.5	C	C
				R	200	199	-1	-	-	-	-	-	-
		SB	LT	L	332	300	-32	0.78	0.69	34.0	29.0	C	C
				T	471	420	-51	0.54	0.48	11.0	10.3	B	B
		EB	L	L	55	49	-6	0.18	0.15	25.5	25.2	C	C
			TR	T	363	321	-42	0.61	0.54	32.0	30.4	C	C
				R	30	27	-3	-	-	-	-	-	-
		Intersection								28.1	26.6	C	C

Upper West Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	W 72nd Street & West End Ave	NB	L	L	150	136	-14	0.37	0.32	18.3	16.7	B	B
			T	T	626	568	-58	0.87	0.79	34.0	27.4	C	C
			R	R	135	122	-13	0.34	0.31	15.8	15.2	B	B
		SB	TR	T	363	325	-38	0.64	0.58	35.7	34.1	D	C
				R	30	30	0	-	-	-	-	-	-
		EB	LTR	L	20	13	-7	-	-	-	-	-	-
				T	96	62	-34	0.65	0.38	41.7	33.8	D	C
				R	90	48	-42	-	-	-	-	-	-
		WB	LTR	L	79	59	-20	-	-	-	-	-	-
				T	120	102	-18	0.83	0.63	55.3	40.9	E	D
				R	45	38	-7	-	-	-	-	-	-
		Intersection								35.6	29.3	D	C
2	W 61st Street & West End Ave	NB	LTR	L	15	11	-4	-	-	-	-	-	-
				T	746	490	-256	0.68	0.45	10.9	9.8	B	A
				R	48	37	-11	-	-	-	-	-	-
		SB	L	L	35	35	0	0.23	0.14	15.6	12.7	B	B
			TR	T	723	495	-228	0.39	0.28	13.6	12.4	B	B
				R	20	20	0	-	-	-	-	-	-
		EB	LTR	L	25	23	-2	-	-	-	-	-	-
				T	20	0	-20	0.27	0.08	27.2	24.1	C	C
				R	35	0	-35	-	-	-	-	-	-
		Intersection								13.0	11.4	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	40	36	-4	-	-	-	-	-	-
				T	185	185	0	0.78	0.75	46.6	44.3	D	D
				R	15	15	0	-	-	-	-	-	-
		SB	LTR	L	5	5	0	-	-	-	-	-	-
				T	60	59	-1	0.62	0.57	39.0	36.8	D	D
				R	99	87	-12	-	-	-	-	-	-
		EB	TR	L	60	51	-9	-	-	-	-	-	-
				T	605	507	-98	0.78	0.64	17.1	13.1	B	B
				R	352	295	-57	-	-	-	-	-	-
		WB	TR	L	0	0	0	-	-	-	-	-	-
				T	419	345	-74	0.41	0.35	9.5	9.0	A	A
				R	156	146	-10	-	-	-	-	-	-
		Intersection								20.6	18.5	C	B
4a	W 56th Street & 12th Avenue	NB	TR	L	290	277	-13	0.28	0.27	4.2	4.2	A	A
				R	129	124	-5	-	-	-	-	-	-
		EB	LT	L	160	158	-2	-	-	-	-	-	-
				T	410	404	-6	0.76	0.75	17.2	15.8	B	B
		Intersection								11.4	10.7	B	B
4b	W 56th Street & West Side Highway	NB	T	T	2667	2625	-42	0.79	0.78	8.7	8.2	A	A
		SB	L	L	570	562	-8	0.92	0.91	77.6	74.9	E	E
			T	T	2014	1970	-44	0.36	0.35	0.2	0.2	A	A
		Intersection								13.9	13.3	B	B
5a	W 55th Street & West Side Highway	NB	L	L	15	15	0	0.21	0.21	73.1	73.1	E	E
			T	T	2478	2448	-30	0.68	0.67	15.9	15.7	B	B
		SB	TR	T	2014	1970	-44	0.66	0.64	23.7	23.3	C	C
				R	0	0	0	-	-	-	-	-	-
		WB	LT	L	315	301	-14	0.80	0.75	25.3	21.6	C	C
				T	10	10	0	0.88	0.84	39.1	33.5	D	C
			R	R	189	177	-12	0.77	0.74	22.9	21.7	C	C
		Intersection								20.8	20.1	C	C
5b	W 55th Street & 12th Avenue	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	399	382	-17	0.46	0.44	13.4	13.1	B	B
		SB	TR	T	0	0	0	-	-	-	-	-	-
				R	0	0	0	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	514	488	-26	0.76	0.72	64.7	62.8	E	E
				R	20	19	-1	-	-	-	-	-	-
		Intersection								42.6	41.3	D	D
5c	W 55th Street & West Side Highway Arterial	SB	T	T	0	0	0	-	-	-	-	-	-
		WB	L	L	25	25	0	0.08	0.08	7.1	6.7	A	A
		Intersection								7.1	6.7	A	A
6	W 60th Street & Broadway	NB	L	L	303	289	-14	0.71	0.68	44.1	42.6	D	D
			T	T	640	611	-29	0.49	0.47	15.3	14.9	B	B
		SB	TR	T	847	599	-248	0.93	0.66	43.8	22.5	D	C
				R	88	62	-26	-	-	-	-	-	-
		Intersection								34.1	23.3	C	C
7	W 60th Street & Columbus Ave	SB	TR	T	1133	653	-480	0.82	0.47	8.1	4.2	A	A
				R	126	73	-53	-	-	-	-	-	-
		WB	L	L	190	162	-28	0.69	0.59	25.9	20.8	C	C
			T	T	201	189	-12	0.35	0.33	5.0	4.3	A	A
		Intersection								9.7	6.7	A	A
8	W 60th Street & Amsterdam Ave	NB	LT	L	97	66	-31	-	-	-	-	-	-
				T	1371	926	-445	0.65	0.44	17.1	14.0	B	B
		WB	T	T	222	183	-39	0.60	0.50	45.7	49.3	D	D
			R	R	105	79	-26	0.49	0.37	46.1	49.1	D	D
		Intersection								22.6	21.7	C	C
9	W 60th Street & West End Ave	NB	L	L	10	7	-3	0.05	0.03	10.5	9.9	B	A
			T	T	679	432	-247	0.54	0.34	15.1	12.3	B	B
		SB	TR	T	748	488	-260	0.39	0.25	5.8	5.1	A	A
				R	10	7	-3	-	-	-	-	-	-
		EB	LTR	L	10	10	0	-	-	-	-	-	-
				T	0	0	0	0.10	0.10	21.0	21.0	C	C
				R	25	25	0	-	-	-	-	-	-
		WB	LTR	L	130	116	-14	-	-	-	-	-	-
				T	69	37	-32	0.74	0.59	44.2	42.1	D	D
				R	120	96	-24	-	-	-	-	-	-
		Intersection								16.9	16.2	B	B
10	W 61st Street & Amsterdam Ave	NB	TR	T	1456	991	-465	0.61	0.42	3.4	3.1	A	A
				R	20	14	-6	-	-	-	-	-	-
		EB	LT	L	98	60	-38	-	-	-	-	-	-
				T	5	12	7	0.32	0.22	32.5	39.8	C	D
		WB	R	R	20	19	-1	0.07	0.06	23.9	23.9	C	C
		Intersection								5.7	6.1	A	A
11	W 61st Street & Columbus Ave	SB	LT	L	194	141	-53	-	-	-	-	-	-
				T	1259	726	-533	0.83	0.50	24.4	16.2	C	B
		Intersection								24.4	16.2	C	B
12	W 61st Street & Broadway	NB	TR	T	630	601	-29	0.38	0.36	5.3	5.2	A	A
				R	10	10	0	-	-	-	-	-	-
		SB	LT	L	40	4	-36	-	-	-	-	-	-
				T	814	576	-238	0.60	0.37	20.6	16.8	C	B
		EB	LTR	L	35	27	-8	-	-	-	-	-	-
				T	38	29	-9	0.51	0.36	32.7	34.4	C	C
				R	121	85	-36	-	-	-	-	-	-
		Intersection								16.2	13.4	B	B
13	W 61st Street & Columbus Ave	NB	T	T	806	761	-45	0.42	0.40	14.5	14.2	B	B
		EB	L	L	88	43	-45	0.29	0.14	26.1	14.8	C	B
		Intersection								15.7	14.3	B	B
14	W 81st Street & Central Park West	NB	LTR	L	25	23	-2	-	-	-	-	-	-
				T	621	603	-18	0.61	0.59	22.8	22.4	C	C
				R	255	245	-10	0.80	0.77	41.6	38.9	D	D
		SB	LTR	L	59	56	-3	0.44	0.40	30.8	28.5	C	C
				T	272	261	-11	0.65	0.61	29.1	27.9	C	C
				R	34	31	-3	-	-	-	-	-	-
		EB	L	L	25	21	-4	0.28	0.23	47.1	45.5	D	D
			TR	T	306	252	-54	0.89	0.73	55.4	40.6	E	D
				R	25	21	-4	0.13	0.11	25.5	25.1	C	C
		WB	L	L	204	182	-22	0.99	0.78	79.0	40.7	E	D
			T	T	283	237	-46	0.74	0.62	40.9	35.0	D	D
			R	R	209	186	-23	0.75	0.67	45.6	40.0	D	D
		Intersection								40.2	32.4	D	C
15	W 66th Street & Central Park West	NB	LT	L	35	33	-2	-	-	-	-	-	-
				T	645	614	-31	0.55	0.52	13.0	9.5	B	A
		SB	TR	T	586	522	-64	0.54	0.49	20.3	19.4	C	B
				R	40	38	-2	-	-	-	-	-	-
		WB	L	L	173	141	-32	0.46	0.37	29.7	27.9	C	C
			T	T	391	343	-48	1.03	0.90	85.6	57.8	F	E
			R	R	292	258	-34	0.85	0.75	51.7	42.7	D	D
		Intersection								34.6	26.4	C	C
16	W 65th Street & Central Park West	NB	TR	T	630	603	-27	0.94	0.91	51.0	43.9	D	D
				R	250	249	-1	-	-	-	-	-	-
		SB	LT	L	326	287	-39	0.91	0.78	95.3	87.5	F	F
				T	433	376	-57	0.50	0.43	9.8	9.0	A	A
		EB	L	L	50	44	-6	0.17	0.14	25.4	25.1	C	C
			TR	T	462	404	-58	0.78	0.68	38.3	34.0	D	C
				R	40	35	-5	-	-	-	-	-	-
		Intersection								46.0	41.0	D	D

Upper West Study Area - No-Action vs With-Action (No Mitigation) - Late Night Peak Hour													
					Volume (vph)			V/C		Delay (seconds)		LOS	
Intersection #	Intersection Name	Approach	Lane Group	Movement	No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	W 72nd Street & West End Ave	NB	L	L	93	83	-10	0.23	0.20	16.0	15.0	B	B
			T	T	133	119	-14	0.20	0.17	15.1	13.6	B	B
			R	R	59	53	-6	0.15	0.13	15.0	13.6	B	B
		SB	TR	T	295	273	-22	0.41	0.35	26.2	24.1	C	C
				R	25	25	0	-	-	-	-	-	-
		EB	LTR	L	10	8	-2	-	-	-	-	-	-
				T	104	81	-23	0.46	0.32	33.1	29.9	C	C
				R	79	56	-23	-	-	-	-	-	-
		WB	LTR	L	65	48	-17	-	-	-	-	-	-
				T	126	102	-24	0.58	0.41	36.5	31.5	D	C
				R	30	24	-6	-	-	-	-	-	-
		Intersection								27.0	23.8	C	C
2	W 61st Street & West End Ave	NB	LTR	L	10	7	-3	-	-	-	-	-	-
				T	269	146	-123	0.26	0.14	8.2	11.4	A	B
				R	24	14	-10	-	-	-	-	-	-
		SB	L	L	30	30	0	0.10	0.08	12.7	11.9	B	B
			TR	T	555	335	-220	0.28	0.17	13.5	12.0	B	B
				R	15	15	0	-	-	-	-	-	-
		EB	LTR	L	10	9	-1	-	-	-	-	-	-
				T	20	20	0	0.16	0.15	23.8	22.9	C	C
				R	25	25	0	-	-	-	-	-	-
		Intersection								12.5	12.9	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	40	38	-2	-	-	-	-	-	-
				T	35	35	0	0.25	0.23	26.1	25.1	C	C
				R	5	5	0	-	-	-	-	-	-
		SB	LTR	L	5	5	0	-	-	-	-	-	-
				T	50	49	-1	0.46	0.42	30.4	28.6	C	C
				R	85	79	-6	-	-	-	-	-	-
		EB	TR	L	5	4	-1	-	-	-	-	-	-
				T	396	307	-89	0.42	0.32	11.1	9.5	B	A
				R	173	134	-39	-	-	-	-	-	-
		WB	TR	L	0	0	0	-	-	-	-	-	-
				T	484	444	-40	0.36	0.32	10.4	9.6	B	A
				R	30	29	-1	-	-	-	-	-	-
		Intersection								13.8	12.9	B	B
4a	W 56th Street & 12th Avenue	NB	TR	L	161	136	-25	0.13	0.11	1.5	1.5	A	A
				R	44	38	-6	-	-	-	-	-	-
		EB	LT	L	140	135	-5	-	-	-	-	-	-
				T	280	271	-9	0.76	0.63	14.6	6.2	B	A
		Intersection								10.0	4.7	A	A
4b	W 56th Street & West Side Highway	NB	T	T	2966	2884	-82	0.85	0.81	21.3	12.5	C	B
		SB	L	L	420	406	-14	0.84	0.69	60.8	48.5	E	D
			T	T	1338	1274	-64	0.25	0.24	0.1	0.1	A	A
		Intersection								19.0	12.5	B	B
5a	W 55th Street & West Side Highway	NB	L	L	5	5	0	0.06	0.05	55.0	52.6	D	D
			T	T	2696	2648	-48	0.83	0.79	24.6	20.7	C	C
		SB	TR	T	1338	1274	-64	0.55	0.50	23.7	21.6	C	C
				R	0	0	0	-	-	-	-	-	-
		WB	LT	L	105	93	-12	-	-	-	-	-	-
				T	5	4	-1	0.39	0.31	6.9	6.3	A	A
			R	R	270	236	-34	0.54	0.43	7.4	6.1	A	A
		Intersection								22.7	19.7	C	B
5b	W 55th Street & 12th Avenue	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	195	165	-30	0.26	0.21	12.7	11.3	B	B
		SB	TR	T	0	0	0	-	-	-	-	-	-
				R	0	0	0	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	380	333	-47	0.45	0.36	40.4	36.7	D	D
				R	10	9	-1	-	-	-	-	-	-
		Intersection								31.1	28.4	C	C
5c	W 55th Street & West Side Highway Arterial	SB	T	T	0	0	0	-	-	-	-	-	-
		WB	L	L	10	9	-1	0.03	0.02	2.5	2.3	A	A
		Intersection								2.5	2.3	A	A
6	W 60th Street & Broadway	NB	L	L	312	291	-21	0.68	0.46	42.1	31.5	D	C
			T	T	476	444	-32	0.34	0.28	13.3	9.6	B	A
		SB	TR	T	620	363	-257	0.76	0.43	25.6	20.7	C	C
				R	85	50	-35	-	-	-	-	-	-
		Intersection								25.3	19.3	C	B
7	W 60th Street & Columbus Ave	SB	TR	T	1024	476	-548	0.70	0.32	5.8	4.0	A	A
				R	70	33	-37	-	-	-	-	-	-
		WB	L	L	235	180	-55	0.75	0.55	28.6	19.1	C	B
			T	T	162	161	-1	0.27	0.26	4.9	4.3	A	A
		Intersection								9.4	7.4	A	A
8	W 60th Street & Amsterdam Ave	NB	LT	L	40	34	-6	-	-	-	-	-	-
				T	949	777	-172	0.40	0.32	13.5	12.2	B	B
		WB	T	T	147	127	-20	0.38	0.32	44.0	44.9	D	D
			R	R	85	67	-18	0.30	0.23	43.6	44.3	D	D
		Intersection								20.0	19.2	B	B
9	W 60th Street & West End Ave	NB	L	L	15	9	-6	0.06	0.03	10.4	9.3	B	A
			T	T	258	120	-138	0.18	0.08	10.8	9.5	B	A
		SB	TR	T	570	354	-216	0.29	0.17	5.2	5.0	A	A
				R	10	6	-4	-	-	-	-	-	-
		EB	LTR	L	0	0	0	-	-	-	-	-	-
				T	0	0	0	0.04	0.03	20.0	19.3	B	B
				R	15	15	0	-	-	-	-	-	-
		WB	LTR	L	100	94	-6	-	-	-	-	-	-
				T	42	20	-22	0.47	0.39	41.8	39.9	D	D
				R	45	47	2	-	-	-	-	-	-
		Intersection								13.8	15.3	B	B
10	W 61st Street & Amsterdam Ave	NB	TR	T	1019	831	-188	0.43	0.35	5.0	4.4	A	A
				R	15	13	-2	-	-	-	-	-	-
		EB	LT	L	70	60	-10	-	-	-	-	-	-
				T	4	4	0	0.20	0.16	30.3	28.9	C	C
		WB	R	R	25	24	-1	0.07	0.07	22.6	21.8	C	C
		Intersection								7.2	6.7	A	A
11	W 61st Street & Columbus Ave	SB	LT	L	184	156	-28	-	-	-	-	-	-
				T	1094	509	-585	0.70	0.36	19.8	13.9	B	B
		Intersection								19.8	13.9	B	B
12	W 61st Street & Broadway	NB	TR	T	476	444	-32	0.26	0.24	5.0	7.0	A	A
				R	0	0	0	-	-	-	-	-	-
		SB	LT	L	20	0	-20	-	-	-	-	-	-
				T	590	317	-273	0.39	0.18	17.1	14.3	B	B
		EB	LTR	L	40	37	-3	-	-	-	-	-	-
				T	29	23	-6	0.49	0.39	34.8	36.1	C	D
				R	115	96	-19	-	-	-	-	-	-
		Intersection								15.4	14.7	B	B
13	W 61st Street & Columbus Ave	NB	T	T	683	609	-74	0.34	0.30	13.6	12.6	B	B
		EB	L	L	49	23	-26	0.16	0.07	19.0	1.8	B	A
		Intersection								14.0	12.2	B	B
14	W 81st Street & Central Park West	NB	LTR	L	30	29	-1	-	-	-	-	-	-
				T	320	318	-2	0.38	0.37	20.5	19.6	C	B
				R	170	164	-6	0.36	0.33	21.4	20.3	C	C
		SB	LTR	L	55	45	-10	0.19	0.15	19.5	18.3	B	B
				T	201	172	-29	0.50	0.42	24.4	21.8	C	C
				R	25	20	-5	-	-	-	-	-	-
		EB	L	L	15	14	-1	0.18	0.15	44.0	41.7	D	D
			TR	T	244	219	-25	0.66	0.57	36.4	32.3	D	C
				R	30	28	-2	0.09	0.08	24.2	23.4	C	C
		WB	L	L	93	76	-17	0.37	0.27	21.2	18.2	C	B
			T	T	210	163	-47	0.56	0.42	32.7	28.5	C	C
			R	R	137	111	-26	0.43	0.34	30.2	27.4	C	C
		Intersection								26.8	24.1	C	C
15	W 66th Street & Central Park West	NB	LT	L	30	29	-1	-	-	-	-	-	-
				T	444	429	-15	0.34	0.31	1.2	1.1	A	A
		SB	TR	T	403	316	-87	0.36	0.28	17.5	16.0	B	B
				R	30	29	-1	-	-	-	-	-	-
		WB	L	L	104	69	-35	0.29	0.18	26.3	24.0	C	C
			T	T	360	293	-67	0.86	0.67	49.0	35.0	D	C
			R	R	242	200	-42	0.73	0.58	41.4	33.1	D	C
		Intersection								24.5	18.5	C	B
16	W 65th Street & Central Park West	NB	TR	T	439	425	-14	0.84	0.79	35.8	32.5	D	C
				R	305	302	-3	-	-	-	-	-	-
		SB	LT	L	212	165	-47	0.57	0.43	22.3	14.0	C	B
				T	295	220	-75	0.32	0.24	6.8	4.2	A	A
		EB	L	L	35	33	-2	0.10	0.09	24.5	23.6	C	C
			TR	T	419	395	-24	0.61	0.55	31.6	29.6	C	C
				R	30	29	-1	-	-	-	-	-	-
		Intersection								28.0	25.6	C	C

Little Dominican Republic Area - No-Action vs With-Action - AM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	W 179th St & Broadway	NB	L	L	55	55	0	0.15	0.15	11.10	11.10	B	B
			T	T	210	210	0	0.18	0.18	10.3	10.3	B	B
		SB	T	T	220	220	0	0.44	0.44	23.0	23.0	C	C
			TR	R	80	80	0	-	-	-	-	-	-
		WB	TR	L	45	45	0	-	-	-	-	-	-
				T	153	163	10	0.72	0.75	39.8	41.8	D	D
				R	50	50	0	-	-	-	-	-	-
		Intersection								24.0	24.8	C	C

~: the approach is above capacity for the 50th percentile traffic , queue can be longer
#: the volume for the 95th percentile cycle exceeds capacity
m: volume for the 95th percentile queue is metered by an upstream signal

Little Dominican Republic Area - No-Action vs With-Action - MD Peak Hour														
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS		
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	W 179th St & Broadway	NB	L	L	140	140	0	0.36	0.36	15.60	15.60	B	B
			T	T	330	330	0	0.25	0.25	11.4	11.4	B	B
		SB	T	T	220	220	0	0.44	0.44	24.1	24.1	C	C
			TR	R	105	105	0	-	-	-	-	-	-
		WB	TR	L	40	40	0	-	-	-	-	-	-
				T	196	257	61	0.73	0.88	37.7	50.9	D	D
				R	50	50	0	-	-	-	-	-	-
		Intersection						-	-	22.9	27.9	C	C

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#: the volume for the 95th percentile cycle exceeds capacity
m: volume for the 95th percentile queue is metered by an upstream signal

Little Dominican Republic Area - No-Action vs With-Action - PM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	W 179th St & Broadway	NB	L	L	135	135	0	0.30	0.30	14.10	14.10	B	B
			T	T	340	340	0	0.27	0.27	11.6	11.6	B	B
		SB	T	T	230	230	0	0.41	0.41	23.7	23.7	C	C
			TR	R	100	100	0	-	-	-	-	-	-
		WB	TR	L	35	35	0	-	-	-	-	-	-
				T	217	244	27	0.76	0.80	39.6	41.6	D	D
				R	60	60	0	-	-	-	-	-	-
		Intersection								23.3	24.3	C	C

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#: the volume for the 95th percentile cycle exceeds capacity
m: volume for the 95th percentile queue is metered by an upstream signal

Lower East Side Study Area - No-Action vs With-Action - AM Peak Hour													
Intersection #	**Intersection Name**	**Approach**	**Lane Group**	**Movement**	**Volume (vph)**			**V/C**		**Delay**		**LOS**	
					No-Action	**With-Action**	**Increment**	**No-Action**	**With-Action**	**No-Action**	**With-Action**	**No-Action**	**With-Action**
1	Park Row/Chatham Square & Worth/Oliver St & Mott St	NB	LT	L	10	10	0	-	-	-	-	-	-
				T	355	355	0	0.76	0.76	39.1	39.1	D	D
			R	R2	165	157	-8	0.45	0.43	29.5	28.9	C	C
		SB	T	T	85	78	-7	0.78	0.71	86.2	71.0	F	E
			TR	T	50	50	0	0.15	0.15	23.6	23.6	C	C
				R	10	10	0	-	-	-	-	-	-
		EB	TR	T	20	20	0	0.09	0.09	22.0	22.0	C	C
				R	10	10	0	-	-	-	-	-	-
		WB	L	L	133	116	-17	0.46	0.40	29.6	29.7	C	C
			T	T	15	15	0	0.30	0.27	21.5	22.8	C	C
			TR	R	168	150	-18	-	-	-	-	-	-
		SWB	LR	L2	55	55	0	-	-	-	-	-	-
				L	0	0	0	0.24	0.24	33.0	33.0	C	C
				R	0	0	0	-	-	-	-	-	-
		Intersection								35.5	34.5	D	C
2	Chatham Square & E Broadway	NB	L	L	95	95	0	0.20	0.20	16.4	16.4	B	B
			R	R	30	30	0	0.07	0.07	14.9	14.9	B	B
		EB	T	T	190	175	-15	0.18	0.16	19.2	18.6	B	B
			R	R	135	135	0	0.29	0.29	59.7	56.8	E	E
		WB	L	L	120	120	0	0.35	0.35	10.4	11.4	B	B
			T	T	221	186	-35	0.21	0.18	6.4	6.8	A	A
		Intersection			0	0	0	-	-	20.9	21.1	C	C
3	Chatham Square/Bowery & Divison St	NB	L	L	140	140	0	0.58	0.58	41.5	41.5	D	D
			T	T	250	250	0	0.55	0.55	19.8	19.8	B	B
		EB	T	T	215	200	-15	0.27	0.25	5.8	6.1	A	A
			TR	R2	5	5	0	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
			T	T	201	166	-35	0.25	0.20	20.1	19.7	C	B
		Intersection								20.1	20.4	C	C

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Lower East Side Study Area - No-Action vs With-Action - MD Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Park Row/Chatham Square & Worth/Oliver St & Mott St	NB	LT	L	10	10	0	-	-	-	-	-	-
				T	215	215	0	0.49	0.49	29.3	29.3	C	C
			R	R2	172	146	-26	0.47	0.40	30.2	28.3	C	C
		SB	T	T	163	137	-26	0.84	0.70	95.2	57.1	F	E
			TR	T	75	75	0	0.22	0.22	24.6	24.6	C	C
				R	10	10	0	-	-	-	-	-	-
		EB	TR	T	20	20	0	0.11	0.11	22.2	22.2	C	C
				R	20	20	0	-	-	-	-	-	-
		WB	L	L	140	40	-100	0.44	0.12	25.6	35.2	C	D
			T	T	20	20	0	0.27	0.13	18.2	33.9	B	C
			TR	R	165	65	-100	-	-	-	-	-	-
		SWB	LR	L2	40	40	0	-	-	-	-	-	-
				L	0	0	0	0.17	0.17	31.8	31.8	C	C
				R	0	0	0	-	-	-	-	-	-
		Intersection								37.3	34.1	D	C
2	Chatham Square & E Broadway	NB	L	L	85	85	0	0.15	0.15	15.8	15.8	B	B
			R	R	35	35	0	0.08	0.08	14.9	14.9	B	B
		EB	T	T	210	158	-52	0.20	0.15	20.0	16.3	B	B
			R	R	185	185	0	0.37	0.37	84.7	85.6	F	F
		WB	L	L	130	130	0	0.35	0.33	7.7	15.9	A	B
			T	T	240	40	-200	0.21	0.03	4.7	8.0	A	A
		Intersection								27.3	36.0	C	D
3	Chatham Square/Bowery & Divison St	NB	L	L	110	110	0	0.43	0.43	36.6	36.6	D	D
			T	T	225	225	0	0.41	0.41	16.3	16.3	B	B
		EB	T	T	235	183	-52	0.29	0.23	5.7	6.4	A	A
			TR	R2	10	10	0	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
			T	T	260	60	-200	0.30	0.07	20.7	18.3	C	B
		Intersection			0	0	0	-	-	17.4	17.3	B	B

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Lower East Side Study Area - No-Action vs With-Action - PM Peak Hour													
Intersection #	**Intersection Name**	**Approach**	**Lane Group**	**Movement**	**Volume (vph)**			**V/C**		**Delay**		**LOS**	
					No-Action	**With-Action**	**Increment**	**No-Action**	**With-Action**	**No-Action**	**With-Action**	**No-Action**	**With-Action**
1	Park Row/Chatham Square & Worth/Oliver St & Mott St	NB	LT	L	5	5	0	-	-	-	-	-	-
				T	175	175	0	0.37	0.37	26.8	26.8	C	C
			R	R2	230	192	-38	0.62	0.52	39.0	31.9	D	C
		SB	T	T	195	158	-37	0.73	0.59	68.8	40.5	E	D
			TR	T	95	95	0	0.24	0.24	24.7	24.7	C	C
				R	5	5	0	-	-	-	-	-	-
		EB	TR	T	25	25	0	0.09	0.09	22.1	22.1	C	C
				R	10	10	0	-	-	-	-	-	-
		WB	L	L	143	58	-85	0.46	0.19	28.7	34.0	C	C
			T	T	20	20	0	0.31	0.19	21.0	31.5	C	C
			TR	R	188	102	-86	-	-	-	-	-	-
		SWB	LR	L2	55	55	0	-	-	-	-	-	-
				L	0	0	0	0.24	0.24	33.0	33.0	C	C
				R	0	0	0	-	-	-	-	-	-
		Intersection								35.1	31.3	D	C
2	Chatham Square & E Broadway	NB	L	L	105	105	0	0.20	0.20	16.3	16.3	B	B
			R	R	45	45	0	0.09	0.09	15.0	15.0	B	B
		EB	T	T	280	205	-75	0.26	0.19	45.5	19.6	D	B
			R	R	225	225	0	0.39	0.39	84.4	85.0	F	F
		WB	L	L	125	125	0	0.35	0.32	9.9	17.0	A	B
			T	T	246	75	-171	0.22	0.07	6.4	9.0	A	A
		Intersection								35.4	35.2	D	D
3	Chatham Square/Bowery & Divison St	NB	L	L	155	155	0	0.62	0.62	43.0	43.0	D	D
			T	T	395	395	0	0.74	0.74	26.5	26.5	C	C
		EB	T	T	315	240	-75	0.38	0.29	6.2	7.0	A	A
			TR	R2	10	10	0	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
			T	T	216	45	-171	0.25	0.06	20.1	18.1	C	B
		Intersection								21.5	23.3	C	C

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#: the volume for the 95th percentile cycle exceeds capacity
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CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.5, Transportation:

Traffic LOS: CBD Tolling Alternative with Mitigation

August 2022

Downtown Brooklyn Study Area - No-Action vs NEPA 4 With-Action (With Mitigation) - Midday Peak Hour														
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Flatbush Avenue and Tillary Street	NB	L	L	585	585	0	1.20	0.98	155.2	82.9	F	F
			TR	T	820	593	-227	1.21dl	0.97dl	69.7	37.2	E	D
				R	345	343	-2	0.51	0.51	5.8	5.7	A	A
		SB	T	T	636	425	-211	0.59	0.39	39.5	35.9	D	D
			R	R	77	51	-26	0.31	0.21	37.4	35.1	D	D
		EB	L	L	123	91	-32	0.68	0.50	66.4	56.9	E	E
			T	T	683	697	14	0.82	0.84	47.2	48.3	D	D
			R	R	255	262	7	0.77	0.79	53.8	55.8	D	E
		WB	L	L	233	222	-11	0.73	0.69	61.6	59.7	E	E
			T	T	366	349	-17	0.85	0.66	51.5	41.0	D	D
			R	R	382	259	-123	0.96	0.75	83.4	54.4	F	D
		Intersection								59.6	44.1	E	D
2	Adam Street and Tillary Street	NB	L	L	0	0	0	-	-	-	-	-	-
			T	T	474	409	-65	0.66	0.59	41.2	39.8	D	D
			R	R	44	44	0	0.81	0.79	57.9	57.6	E	E
				R2	188	178	-10	-	-	-	-	-	-
		SB	L	L	634	667	33	0.88	0.90	54.8	56.1	D	E
			T	T	735	773	38	0.54	0.57	21.6	22.9	C	C
			R	R	19	20	1	0.04	0.05	8.6	8.7	A	A
		EB	L	L	0	0	0	-	-	-	-	-	-
			TR	T	279	264	-15	0.41	0.39	37.6	37.4	D	D
				R	85	85	0	-	-	-	-	-	-
		WB	L	L	169	158	-11	1.10	1.00	138.4	112.2	F	F
			T	T	214	200	-14	0.31	0.29	36.6	36.3	D	D
			R	R	0	0	0	-	-	-	-	-	-
				R2	33	15	-18	0.08	0.04	32.4	30.9	C	C
		Intersection								45.3	43.9	D	D
3	Old Fulton Street and Vine Street	NB	L	L	1094	1128	34	1.03	1.03	63.0	62.4	E	E
			T	T	122	126	4	0.25	0.25	20.7	20.1	C	C
		SB	T	T	509	463	-46	0.41	0.38	23.5	17.0	C	B
		Intersection								47.2	45.8	D	D

Long Island City Study Area - No-Action vs With-Action (No Mitigation)- AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	71	71	0	-	-	-	-	-	-
			T	T	715	705	-10	1.18	1.17	128.5	124.4	F	F
			R	R	390	396	6	0.66	0.67	43.9	44.2	D	D
		SB	T	T	445	445	0	0.68	0.68	8.6	8.7	A	A
			TR	R	60	62	2	-	-	-	-	-	-
		EB	LT	L	35	31	-4	-	-	-	-	-	-
			T	T	71	65	-6	0.26	0.23	37.8	37.3	D	D
		WB	L	L	480	464	-16	0.69	0.66	44.6	43.8	D	D
			T	T	206	208	2	0.29	0.29	14.6	14.6	B	B
		Intersection								61.3	59.7	E	E
1b	11th Street & 48TH Avenue	NB	L	L	65	65	0	0.39	0.39	3.2	3.0	A	A
			T	T	685	671	-14	0.65	0.64	23.2	19.1	C	B
		SB	T	T	495	497	2	0.66	0.66	39.1	39.2	D	D
			TR	R	15	15	0	-	-	-	-	-	-
		WB	LTR	L	10	10	0	-	-	-	-	-	-
				T	25	25	0	0.08	0.08	17.8	17.8	B	B
				R	10	10	0	-	-	-	-	-	-
		Intersection								28.0	25.9	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	218	214	-4	0.37	0.36	14.2	14.1	B	B
			R	R	11	12	1	0.03	0.03	10.6	10.8	B	B
		SB	LT	L	35	40	5	-	-	-	-	-	-
				T	165	164	-1	0.47	0.49	16.9	17.3	B	B
		EB	LTR	L	35	35	0	-	-	-	-	-	-
				T	50	58	8	0.29	0.31	13.7	13.8	B	B
				R	30	30	0	-	-	-	-	-	-
		Intersection								15.0	15.2	B	B
3	Green Street & McGuiness Blvd	NB	T	T	1176	1153	-23	0.85	0.83	27.2	26.2	C	C
			TR	R	30	30	0	-	-	-	-	-	-
		SB	L	L	74	73	-1	0.80	0.75	68.0	58.7	E	E
			T	T	962	944	-18	0.61	0.60	17.9	17.7	B	B
		EB	LTR	L	185	182	-3	-	-	-	-	-	-
				T	20	20	0	0.63	0.62	40.7	40.4	D	D
				R	40	40	0	-	-	-	-	-	-
		Intersection						-	-	26.3	25.4	C	C
4	McGuinness Blvd & Freeman Street	NB	T	T	1361	1335	-26	-	-	-	-	-	-
		SB	T	T	1036	1017	-19	-	-	-	-	-	-
			TR	R	115	115	0	-	-	-	-	-	-
		WB	R	R	211	180	-31	-	-	-	-	-	-
		Intersection											
5	21st Street & 49th Avenue	NB	LTR	L	35	35	0	-	-	-	-	-	-
				T	90	90	0	0.57	0.57	33.0	32.9	C	C
				R	40	40	0	-	-	-	-	-	-
		SB	LTR	L	99	98	-1	-	-	-	-	-	-
				T	129	127	-2	1.04	1.04	97.1	95.3	F	F
				R	10	10	0	-	-	-	-	-	-
		EB	LTR	L	38	37	-1	-	-	-	-	-	-
				T	141	138	-3	0.49	0.48	24.5	24.3	C	C
				R	11	11	0	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
				T	40	40	0	0.11	0.11	17.8	17.8	B	B
			R	R	310	310	0	0.91	0.91	57.4	57.4	E	E
		Intersection						-	-	54.9	54.4	D	D
7	11th Street & Borden Avenue	NB	LTR	L	17	17	0	-	-	-	-	-	-
				T	67	67	0	-	-	-	-	-	-
				R	23	17	-6	-	-	-	-	-	-
		SB	LTR	L	35	32	-3	-	-	-	-	-	-
				T	0	0	0	-	-	-	-	-	-
				R	125	114	-11	-	-	-	-	-	-
		EB	LTR	L	561	570	9	-	-	-	-	-	-
				T	50	50	0	-	-	-	-	-	-
				R	26	19	-7	-	-	-	-	-	-
		WB	LTR	L	40	40	0	-	-	-	-	-	-
				T	422	424	2	-	-	-	-	-	-
				R	77	59	-18	-	-	-	-	-	-
		Intersection											
8a	Van Dam Street & QMT Expy	NB	LT	L	26	23	-3	-	-	-	-	-	-
			T	T	303	297	-6	0.45	0.41	8.3	7.1	A	A
		SB	T	T	842	765	-77	0.70	0.63	80.0	61.2	E	E
			TR	R	19	17	-2	-	-	-	-	-	-
		WB	T	T	891	840	-51	0.70	0.67	26.6	25.5	C	C
			TR	R	263	258	-5	-	-	-	-	-	-
		Intersection								42.3	34.6	D	C
8b	Van Dam Street & Borden Avenue	NB	T	T	299	291	-8	0.57	0.56	43.7	42.7	D	D
			TR	R	5	5	0	-	-	-	-	-	-
		SB	L	L	636	585	-51	0.97	0.89	95.6	92.4	F	F
			T	T	206	180	-26	0.29	0.26	3.4	3.0	A	A
		EB	LTR	L	30	29	-1	-	-	-	-	-	-
				T	185	185	0	0.31	0.31	29.0	28.9	C	C
				R	15	15	0	-	-	-	-	-	-
		Intersection								57.9	56.0	E	E
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	260	301	41	0.65	0.74	51.3	55.4	D	E
			TR	R	16	16	0	-	-	-	-	-	-
		SB	LT	L	15	15	0	-	-	-	-	-	-
			T	T	132	135	3	0.40	0.41	38.9	39.3	D	D
		EB	T	T	963	833	-130	0.47	0.41	22.8	21.8	C	C
			R	R	327	283	-44	0.66	0.57	31.1	27.9	C	C
		WB	LT	L	50	50	0	-	-	-	-	-	-
			T	T	733	723	-10	0.50	0.48	15.5	15.3	B	B
			TR	R	60	60	0	-	-	-	-	-	-
		Intersection								26.0	26.4	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	L	L	0	0	0	-	-	-	-	-	-
			LR	R	0	0	0	-	-	-	-	-	-
		EB	T	T	400	388	-12	-	-	-	-	-	-
		WB	T	T	385	385	0	-	-	-	-	-	-
			R	R	896	896	0	-	-	-	-	-	-
		Intersection											
11b	Thomson Avenue & Dutch Kills Street	WB	T	T	1281	1281	0	-	-	-	-	-	-
			R	R	842	689	-153	-	-	-	-	-	-
		EB	T	T	400	388	-12	-	-	-	-	-	-
		Intersection											
12	21th Street & Queens Plaza N	NB		L	0	0	0	-	-	-	-	-	-
			T	T	365	365	0	0.47	0.47	17.6	17.6	B	B
		SB	T	T	947	951	4	1.05	1.06	70.5	72.2	E	E
			R	R	401	334	-67	0.51	0.43	18.3	16.6	B	B
		WB	LTR	L	123	120	-3	-	-	-	-	-	-
				T	78	63	-15	0.71	0.66	47.3	45.1	D	D
				R	84	82	-2	-	-	-	-	-	-
		Intersection								46.5	47.8	D	D

Long Island City Study Area - No-Action vs With-Action (With Mitigation) - MD Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	70	68	-2	-	-	-	-	-	-
			T	T	515	499	-16	1.03	1.00	84.6	77.8	F	E
			R	R	283	312	29	0.41	0.45	34.0	34.8	C	C
		SB	T	T	340	337	-3	0.65	0.66	8.9	9.0	A	A
			TR	R	75	84	9	-	-	-	-	-	-
		EB	LT	L	55	73	18	-	-	-	-	-	-
			T	T	89	114	25	0.33	0.42	38.9	40.9	D	D
		WB	L	L	395	342	-53	0.57	0.49	37.5	35.7	D	D
			T	T	208	209	1	0.28	0.28	12.0	12.1	B	B
		Intersection								41.6	39.3	D	D
1b	11th Street & 48TH Avenue	NB	L	L	55	55	0	0.32	0.33	5.9	6.9	A	A
			T	T	515	517	2	0.57	0.57	11.3	12.7	B	B
		SB	T	T	410	416	6	0.67	0.68	43.1	43.4	D	D
			TR	R	35	35	0	-	-	-	-	-	-
		WB	LTR	L	5	5	0	-	-	-	-	-	-
				T	25	25	0	0.08	0.08	15.1	15.1	B	B
				R	15	15	0	-	-	-	-	-	-
		Intersection								24.3	25.3	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	230	249	19	0.44	0.48	15.4	16.0	B	B
			R	R	27	39	12	0.06	0.09	11.0	11.2	B	B
		SB	LT	L	35	48	13	-	-	-	-	-	-
				T	214	207	-7	0.53	0.56	17.6	18.7	B	B
		EB	LTR	L	30	30	0	-	-	-	-	-	-
				T	30	42	12	0.21	0.23	12.7	12.9	B	B
				R	20	20	0	-	-	-	-	-	-
		Intersection								15.7	16.3	B	B
3	Green Street & McGuiness Blvd	NB	T	T	752	754	2	0.55	0.55	17.1	17.1	B	B
			TR	R	40	39	-1	-	-	-	-	-	-
		SB	L	L	78	71	-7	0.38	0.35	19.1	18.1	B	B
			T	T	624	561	-63	0.38	0.34	14.1	13.6	B	B
		EB	LTR	L	243	250	7	-	-	-	-	-	-
				T	40	40	0	0.84	0.85	53.3	54.8	D	D
				R	60	59	-1	-	-	-	-	-	-
		Intersection								23.5	24.1	C	C
4	McGuinness Blvd & Freeman Street	NB	T	T	995	1004	9	-	-	-	-	-	-
		SB	T	T	702	632	-70	-	-	-	-	-	-
			TR	R	215	215	0	-	-	-	-	-	-
		WB	R	R	185	114	-71	-	-	-	-	-	-
		Intersection											
5	21st Street & 49th Avenue	NB	LTR	L	20	20	0	-	-	-	-	-	-
				T	85	85	0	0.47	0.47	28.7	28.7	C	C
				R	50	50	0	-	-	-	-	-	-
		SB	LTR	L	105	96	-9	-	-	-	-	-	-
				T	100	91	-9	0.87	0.78	58.7	47.2	E	D
				R	10	9	-1	-	-	-	-	-	-
		EB	LTR	L	33	38	5	-	-	-	-	-	-
				T	111	128	17	0.39	0.45	22.3	23.6	C	C
				R	11	13	2	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
				T	35	35	0	0.09	0.09	17.5	17.5	B	B
			R	R	310	310	0	0.79	0.79	39.3	39.3	D	D
		Intersection								38.0	34.8	D	C
7	11th Street & Borden Avenue	NB	LTR	L	10	8	-2	-	-	-	-	-	-
				T	80	70	-10	-	-	-	-	-	-
				R	41	32	-9	-	-	-	-	-	-
		SB	LTR	L	45	64	19	-	-	-	-	-	-
				T	6	9	3	-	-	-	-	-	-
				R	130	186	56	-	-	-	-	-	-
		EB	LTR	L	581	610	29	-	-	-	-	-	-
				T	75	73	-2	-	-	-	-	-	-
				R	41	40	-1	-	-	-	-	-	-
		WB	LTR	L	70	70	0	-	-	-	-	-	-
				T	271	265	-6	-	-	-	-	-	-
				R	346	357	11	-	-	-	-	-	-
		Intersection											
8a	Van Dam Street & QMT Expy	NB	LT	L	20	19	-1	-	-	-	-	-	-
			T	T	238	228	-10	0.27	0.26	3.6	3.6	A	A
		SB	T	T	768	580	-188	0.64	0.48	73.7	22.9	E	C
			TR	R	14	11	-3	-	-	-	-	-	-
		WB	T	T	651	643	-8	0.70	0.71	18.1	18.1	B	B
			TR	R	501	528	27	-	-	-	-	-	-
		Intersection								35.2	17.6	D	B
8b	Van Dam Street & Borden Avenue	NB	T	T	238	227	-11	0.38	0.36	28.0	27.8	C	C
			TR	R	10	10	0	-	-	-	-	-	-
		SB	L	L	574	403	-171	0.95	0.66	93.1	83.9	F	F
			T	T	194	177	-17	0.27	0.24	2.2	1.5	A	A
		EB	LTR	L	20	20	0	-	-	-	-	-	-
				T	205	205	0	0.32	0.32	23.6	23.6	C	C
				R	35	35	0	-	-	-	-	-	-
		Intersection								51.4	42.7	D	D
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	LT	L	15	15	0	-	-	-	-	-	-
				T	272	304	32	0.80	0.85	59.2	62.1	E	E
			TR	R	42	46	4	-	-	-	-	-	-
		SB	LT	L	55	56	1	-	-	-	-	-	-
			T	T	145	147	2	0.66	0.69	53.9	56.1	D	E
		EB	T	T	762	326	-436	0.40	0.17	21.1	18.9	C	B
			R	R	210	90	-120	0.41	0.18	23.2	19.7	C	B
		WB	LT	L	45	44	-1	-	-	-	-	-	-
			T	T	861	849	-12	0.54	0.51	16.4	16.6	B	B
			TR	R	90	89	-1	-	-	-	-	-	-
		Intersection								27.6	30.3	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	L	L	1047	1022	-25	0.59	0.58	17.4	17.1	B	B
			LR	R	25	24	-1	-	-	-	-	-	-
		EB	T	T	223	207	-16	0.19	0.18	29.0	28.8	C	C
		WB	T	T	235	230	-5	0.28	0.27	30.4	30.3	C	C
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								21	20.7	C	C
11b	Thomson Avenue & Dutch Kills Street	WB	T	T	235	230	-5	-	-	-	-	-	-
			R	R	885	885	0	-	-	-	-	-	-
		EB	T	T	1270	1229	-41	-	-	-	-	-	-
		Intersection											
12	21th Street & Queens Plaza N	NB		L	0	0	0	-	-	-	-	-	-
			T	T	818	804	-14	0.99	0.97	54.6	50.7	D	D
		SB	T	T	496	499	3	0.72	0.73	26.7	26.9	C	C
			R	R	249	268	19	0.34	0.37	16.5	16.9	B	B
		WB	LTR	L	65	55	-10	-	-	-	-	-	-
				T	44	41	-3	0.41	0.35	38.2	37.0	D	D
				R	51	43	-8	-	-	-	-	-	-
		Intersection								39.7	37.5	D	D

Long Island City Study Area - No-Action vs With-Action (With Mitigation) - PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1a	Pulaski Bridge / 11th Street & Jackson Avenue	NB	LT	L	70	70	0	1.01	0.98	145.9	135.1	F	F
			T	T	610	565	-45	0.81	0.75	48.5	45.5	D	D
			R	R	379	378	-1	0.50	0.54	35.7	38.8	D	D
		SB	T	T	556	546	-10	0.89	0.88	20.1	19.2	C	B
			TR	R	55	58	3	-	-	-	-	-	-
		EB	LT	L	50	104	54	-	-	-	-	-	-
			T	T	145	237	92	0.41	0.67	40.2	45.0	D	D
		WB	L	L	666	621	-45	0.86	0.87	49.9	53.4	D	D
			T	T	159	160	1	0.18	0.18	10.9	10.9	B	B
		Intersection								40.4	40.9	D	D
1b	11th Street & 48TH Avenue	NB	L	L	70	70	0	0.64	0.63	22.7	25.8	C	C
			T	T	590	599	9	0.56	0.57	4.6	7.0	A	A
		SB	T	T	601	594	-7	0.92	0.91	60.1	58.7	E	E
			TR	R	35	35	0	-	-	-	-	-	-
		WB	LTR	L	10	10	0	-	-	-	-	-	-
				T	40	40	0	0.10	0.10	15.3	15.3	B	B
				R	15	15	0	-	-	-	-	-	-
		Intersection								32.8	33.0	C	C
2	50TH Avenue @ Vernon Blvd	NB	T	T	277	338	61	0.50	0.60	16.1	18.4	B	B
			R	R	45	63	18	0.12	0.16	11.6	12.2	B	B
		SB	LT	L	48	56	8	-	-	-	-	-	-
				T	179	176	-3	0.51	0.55	17.3	18.6	B	B
		EB	LTR	L	50	50	0	-	-	-	-	-	-
				T	34	41	7	0.29	0.30	13.9	14.0	B	B
				R	15	15	0	-	-	-	-	-	-
		Intersection								15.8	17.2	B	B
3	Green Street & McGuiness Blvd	NB	T	T	892	829	-63	0.61	0.56	18.1	17.2	B	B
			TR	R	20	20	0	-	-	-	-	-	-
		SB	L	L	59	57	-2	0.35	0.31	19.2	17.2	B	B
			T	T	970	914	-56	0.55	0.52	16.7	16.1	B	B
		EB	LTR	L	170	160	-10	-	-	-	-	-	-
				T	35	35	0	0.63	0.60	40.4	39.3	D	D
				R	55	53	-2	-	-	-	-	-	-
		Intersection								20.4	19.6	C	B
4	McGuinness Blvd & Freeman Street	NB	T	T	1062	989	-73	-	-	-	-	-	-
		SB	T	T	1029	971	-58	-	-	-	-	-	-
			TR	R	340	340	0	-	-	-	-	-	-
		WB	R	R	139	101	-38	-	-	-	-	-	-
		Intersection											
5	21st Street & 49th Avenue	NB	LTR	L	40	40	0	-	-	-	-	-	-
				T	105	105	0	0.63	0.63	33.5	33.4	C	C
				R	65	65	0	-	-	-	-	-	-
		SB	LTR	L	163	159	-4	-	-	-	-	-	-
				T	79	77	-2	1.17	1.13	137.6	124.8	F	F
				R	30	29	-1	-	-	-	-	-	-
		EB	LTR	L	48	61	13	-	-	-	-	-	-
				T	97	123	26	0.50	0.64	25.1	29.9	C	C
				R	36	46	10	-	-	-	-	-	-
		WB	LT	L	5	5	0	-	-	-	-	-	-
				T	85	85	0	0.20	0.20	18.8	18.8	B	B
			R	R	355	355	0	0.87	0.87	47.0	47.0	D	D
		Intersection								60.9	56.8	E	E
7	11th Street & Borden Avenue	NB	LTR	L	11	9	-2	-	-	-	-	-	-
				T	42	39	-3	-	-	-	-	-	-
				R	16	6	-10	-	-	-	-	-	-
		SB	LTR	L	53	90	37	-	-	-	-	-	-
				T	9	15	6	-	-	-	-	-	-
				R	263	450	187	-	-	-	-	-	-
		EB	LTR	L	567	590	23	-	-	-	-	-	-
				T	70	65	-5	-	-	-	-	-	-
				R	10	5	-5	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	334	313	-21	-	-	-	-	-	-
				R	154	88	-66	-	-	-	-	-	-
		Intersection											
8a	Van Dam Street & QMT Expy	NB	LT	L	30	26	-4	-	-	-	-	-	-
			T	T	265	243	-22	0.29	0.26	4.7	4.7	A	A
		SB	T	T	508	412	-96	0.45	0.37	25.2	22.8	C	C
			TR	R	9	7	-2	-	-	-	-	-	-
		WB	T	T	867	808	-59	0.74	0.68	26.8	25.2	C	C
			TR	R	393	356	-37	-	-	-	-	-	-
		Intersection								23.3	21.7	C	C
8b	Van Dam Street & Borden Avenue	NB	T	T	265	241	-24	0.44	0.40	39.5	38.8	D	D
			TR	R	10	10	0	-	-	-	-	-	-
		SB	L	L	296	240	-56	0.56	0.46	96.8	83.0	F	F
			T	T	212	172	-40	0.57	0.45	85.6	85.7	F	F
		EB	LTR	L	30	28	-2	-	-	-	-	-	-
				T	545	545	0	0.59	0.59	34.0	34.0	C	C
				R	15	15	0	-	-	-	-	-	-
		Intersection								55.1	51.3	E	D
9	Jackson Ave / Northern Blvd & Queens Plaza	NB	LT	L	35	35	0	-	-	-	-	-	-
				T	410	305	-105	0.91	0.73	69.6	54.6	E	D
			TR	R	17	21	4	-	-	-	-	-	-
		SB	LT	L	20	20	0	-	-	-	-	-	-
			T	T	143	144	1	0.35	0.35	36.7	36.5	D	D
		EB	T	T	926	465	-461	0.44	0.22	21.7	18.8	C	B
			R	R	199	100	-99	0.40	0.20	23.0	19.4	C	B
		WB	LT	L	20	20	0	-	-	-	-	-	-
			T	T	752	738	-14	0.38	0.36	14.1	14.0	B	B
			TR	R	60	60	0	-	-	-	-	-	-
		Intersection								29.0	25.2	C	C
11a	Thomson Avenue & Dutch Kills Street	SB	L	L	1385	1374	-11	0.70	0.69	19.3	19.1	B	B
			LR	R	15	15	0	-	-	-	-	-	-
		EB	T	T	342	355	13	0.36	0.37	43.6	43.9	D	D
		WB	T	T	401	400	-1	0.58	0.58	49.1	49.0	D	D
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								29.3	29.4	C	C
11b	Thomson Avenue & Dutch Kills Street	WB	T	T	401	400	-1	-	-	-	-	-	-
			R	R	670	670	0	-	-	-	-	-	-
		EB	T	T	1727	1729	2	-	-	-	-	-	-
		Intersection											
12	21th Street & Queens Plaza N	NB		L	0	0	0	-	-	-	-	-	-
			T	T	1063	1045	-18	1.12	1.11	95.6	88.4	F	F
		SB	T	T	629	631	2	0.70	0.71	23.5	23.6	C	C
			R	R	272	226	-46	0.34	0.28	15.2	14.4	B	B
		WB	LTR	L	77	73	-4	-	-	-	-	-	-
				T	113	87	-26	0.82	0.73	54.4	48.4	D	D
				R	144	136	-8	-	-	-	-	-	-
		Intersection								59.1	55.6	E	E

Lower Manhattan Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Trinity Place & Edgar Street	NEB	L	L2	0	0	0	-	-	-	-	-	-
				L	0	0	0	-	-	-	-	-	-
		NB	LT	L	3	0	-3	-	-	-	-	-	-
			T	T	79	62	-17	0.09	0.06	10.1	10.0	B	A
		EB	L	L	35	35	0	0.09	0.09	20.7	20.7	C	C
		Intersection								13.5	14.1	B	B
2	Trinity Place & Rector Street	NB	TR	T	104	88	-16	0.16	0.14	10.7	10.5	B	B
				R	10	9		-	-	-	-	-	-
		EB	LT	L	102	97	-5	-	-	-	-	-	-
				T	35	34	-1	0.52	0.49	31.9	31.0	C	C
		Intersection								22.1	22.2	C	C
3a	HCT Entrance/Exit & West Street	NB	T	T	1056	1022	-34	0.73	0.71	45.2	44.4	D	D
			R2	R2	424	448	24	0.27	0.28	0.5	0.5	A	A
		SB	T	T	1044	1008	-36	0.65	0.63	1.4	1.3	A	A
		WB	L	L	1692	1722	30	0.97	0.99	53.0	56.8	D	E
		Intersection								32.7	34.2	C	C
3b	HCT Exit & West Street & West Thames Street	NB	T	T	1056	1022	-34	0.61	0.59	1.2	1.2	A	A
		SB	TR	T	1044	1008	-36	0.76	0.73	46.1	45.1	D	D
				R	0	0	0	-	-	-	-	-	-
		EB	R	R	0	0	0	-	-	-	-	-	-
		WB	R	R	1239	1280	41	0.82	0.85	38.4	40.1	D	D
		Intersection								29.5	30.1	C	C
4	Chambers Street & Centre Street	NB	L	L	430	406	-24	0.48	0.45	26.5	26.0	C	C
			T	T	496	469	-27	0.57	0.54	13.8	13.2	B	B
		SB	TR	T	237	206	-31	0.79	0.69	50.5	43.2	D	D
				R	31	27	-4	0.29	0.25	35.9	34.7	D	C
		EB	R	R	394	381	-13	0.89	0.86	51.3	47.5	D	D
		Intersection								32.7	30.2	C	C
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	105	105	0	-	-	-	-	-	-
				T	670	670	0	0.87	0.86	41.0	40.8	D	D
			R	R	190	147	-43	0.56	0.43	34.9	31.0	C	C
			R2	R2	46	45	-1	0.24	0.24	27.9	27.8	C	C
		EB	L	L2	50	49	-1	-	-	-	-	-	-
				L	438	328	-110	0.80	0.62	42.9	35.6	D	D
			T	T	589	564	-25	0.71	0.68	19.8	18.8	B	B
		WB	TR	T	409	342	-67	0.81	0.68	28.9	18.5	C	B
				R	89	74	-15	-	-	-	-	-	-
		Intersection								33.6	29.8	C	C
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	635	609	-26	0.42	0.40	5.1	5.0	A	A
		WB	T	T	498	416	-82	1.08	0.97	97.8	60.0	F	E
			R	R	880	880	0	1.14	1.14	100.9	100.9	F	F
		Intersection								70.3	57.7	E	E
7a	Canal Street S & West Street	NB	T	T	2680	2678	-2	1.00	1.00	50.2	49.9	D	D
			R	R	291	278	-13	0.61	0.58	28.2	27.1	C	C
		SB	L	L	734	673	-61	0.75	0.69	115.1	113.0	F	F
			T	T	2144	2111	-33	0.76	0.74	8.2	8.0	A	A
		Intersection								41.9	40.8	D	D
9	West Street & Albany Street	NB	TR	T	2267	2230	-37	0.79	0.78	25.8	25.3	C	C
				R	93	92	-1	-	-	-	-	-	-
		SB		L	5	5		-	-	-	-	-	-
			TR	T	1644	1670	26	0.58	0.59	19.8	19.9	B	B
				R	140	136	-4	-	-	-	-	-	-
		EB		L	135	134		-	-	-	-	-	-
			LTR	T	90	90		0.76	0.76	57.9	58.3	E	E
				R	62	65	3	-	-	-	-	-	-
		Intersection								25.6	25.4	C	C
10	West Street & Vesey Street	NB		L	5	5	0	-	-	-	-	-	-
			T	T	2296	2243	-53	0.71	0.69	20.3	19.8	C	B
		SB	T	T	1855	1874	19	0.69	0.70	20.0	20.3	C	C
			R	R	330	323	-7	0.86	0.84	44.0	41.6	D	D
		EB	L	L	105	104	-1	0.58	0.57	58.1	57.5	E	E
			R	R	77	79	2	0.38	0.39	48.5	48.8	D	D
		WB	LT	L	0	0	0	-	-	-	-	-	-
				T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								23.5	23.1	C	C
11	West Street & Chambers Street	NB	TR	T	2328	2256	-72	0.88	0.85	38.4	36.9	D	D
				T	65	63	-2	-	-	-	-	-	-
		SB	L	L	230	223	-7	0.77	0.75	80.2	78.7	F	E
			T	T	1793	1789	-4	0.63	0.63	17.1	17.1	B	B
			R	R	50	49	-1	0.27	0.26	57.3	57.1	E	E
		EB		L	105	103	-2	-	-	-	-	-	-
			LTR	T	30	29	-1	0.58	0.57	55.5	55.0	E	E
				R	15	15	0	-	-	-	-	-	-
		WB	LT	L	67	69	2	-	-	-	-	-	-
				T	60	60	0	0.56	0.57	56.0	56.6	E	E
			R	R	310	305	-5	0.75	0.74	46.7	45.9	D	D
		Intersection								35.0	34.0	D	C
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	839	756	-83	0.87	0.78	34.0	29.0	C	C
			R	R	104	103	-1	0.29	0.29	20.7	20.7	C	C
		WB	T	T	1149	980	-169	1.05	0.90	69.5	37.4	E	D
		NB	T	T	294	292	-2	0.56	0.55	35.0	35.0	D	C
			R	R	337	304	-33	0.36	0.33	0.9	0.8	A	A
		SB	L	L	331	272	-59	0.57	0.49	16.0	13.6	B	B
			TR	T	156	142	-14	0.68	0.58	12.7	10.3	B	B
				R	85	77	-8	-	-	-	-	-	-
		Intersection								37.7	25.8	D	C
15	Manhattan Bridge & Bowery	NB	T	T	294	292	-2	0.51	0.51	6.7	6.6	A	A
		SB	T	T	572	491	-81	0.37	0.32	18.6	18.0	B	B
		WB	R	R	555	366	-189	0.94	0.62	54.0	32.2	D	C
		Intersection								30.0	19.6	C	B
18	6th Avenue & Watts Street	WB	TR	T	776	715	-61	0.37	0.34	17.1	16.9	B	B
				R	25	25	0	-	-	-	-	-	-
		NB	LT	L	86	74	-12	-	-	-	-	-	-
				T	997	925	-72	0.47	0.43	12.5	11.8	B	B
		Intersection								14.4	13.9	B	B
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	629	602	-27	1.05	1.00	82.6	71.1	F	E
		NB		L	168	160	-8	-	-	-	-	-	-
			LTR	T	694	663	-31	0.52	0.50	24.2	23.9	C	C
				R	4	4	0	-	-	-	-	-	-
		EB	T	T	657	628	-29	0.83	0.79	40.8	38.5	D	D
		WB	TR	T	1217	1145	-72	1.09	1.03	78.6	56.8	E	E
				R	265	249	-16	-	-	-	-	-	-
		Intersection								59.5	48.1	E	D

Lower Manhattan Study Area - No-Action vs With-Action (Mitigation) - MD Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Trinity Place & Edgar Street	NEB	L	L2	0	0	0	-	-	-	-	-	-
				L	0	0	0	-	-	-	-	-	-
		NB	LT	L	11	1	-10	-	-	-	-	-	-
			T	T	99	10	-89	0.09	0.01	10.0	14.6	B	B
		EB	L	L	254	451	197	0.61	0.81	30.4	32.7	C	C
		Intersection								24.7	32.4	C	C
2	Trinity Place & Rector Street	NB	TR	T	297	389	92	0.42	0.55	36.9	30.6	D	C
				R	56	72	16	-	-	-	-	-	-
		EB	LT	L	110	79	-31	-	-	-	-	-	-
				T	45	44	-1	0.42	0.32	24.3	22.2	C	C
		Intersection								33.1	28.8	C	C
3a	HCT Entrance/Exit & West Street	NB	T	T	1033	970	-63	0.58	0.56	25.0	25.0	C	C
			R2	R2	781	977	196	0.41	0.51	0.8	1.2	A	A
		SB	T	T	1409	1294	-115	0.65	0.61	1.1	1.0	A	A
		WB	L	L	832	964	132	0.63	0.71	35.5	37.0	D	D
		Intersection								14.2	14.9	B	B
3b	HCT Exit & West Street & West Thames Street	NB	T	T	1033	970	-63	0.49	0.46	0.7	0.6	A	A
		SB	TR	T	1409	1294	-115	0.76	0.71	29.4	28.5	C	C
				R	0	0	0	-	-	-	-	-	-
		WB	R	R	823	973	150	0.73	0.85	39.2	43.9	D	D
		Intersection								22.4	24.4	C	C
4	Chambers Street & Centre Street	NB	L	L	344	266	-78	0.43	0.33	25.7	24.3	C	C
			T	T	433	334	-99	0.47	0.36	12.1	10.6	B	B
		SB	TR	T	226	107	-119	0.77	0.36	48.6	33.0	D	C
				R	15	12	-3	0.21	0.16	35.3	33.6	D	C
		EB	R	R	391	269	-122	0.89	0.61	50.4	31.8	D	C
		Intersection								32.9	23.3	C	C
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	75	75	0	-	-	-	-	-	-
				T	515	515	0	0.96	0.96	58.7	58.7	E	E
			R	R	325	207	-118	0.57	0.36	31.2	27.3	C	C
			R2	R2	58	43	-15	0.31	0.23	29.8	27.8	C	C
		EB	L	L2	31	31	0	-	-	-	-	-	-
				L	328	211	-117	0.65	0.44	36.5	31.9	D	C
			T	T	357	322	-35	0.44	0.40	13.3	12.6	B	B
		WB	TR	T	257	104	-153	0.75	0.30	19.1	6.3	B	A
				R	42	17	-25	0.19	0.08	11.1	4.4	B	A
		Intersection								35.6	36.0	D	D
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	415	365	-50	0.28	0.24	5.6	5.2	A	A
		WB	T	T	299	121	-178	0.87	0.35	55.9	29.2	E	C
			R	R	605	605	0	0.58	0.58	15.2	15.2	B	B
		Intersection								21.8	13.5	C	B
7a	Canal Street S & West Street	NB	T	T	2136	2186	50	0.94	0.96	38.4	41.1	D	D
			R	R	163	125	-38	0.40	0.31	23.4	21.3	C	C
		SB	L	L	428	285	-143	0.44	0.29	53.1	38.4	D	D
			T	T	1911	2014	103	0.71	0.75	6.5	7.5	A	A
		Intersection								26.3	25.7	C	C
9	West Street & Albany Street	NB	TR	T	1533	1578	45	0.62	0.64	20.8	21.2	C	C
				R	85	90	5	-	-	-	-	-	-
		SB	TR	L	5	5	0	-	-	-	-	-	-
				T	2174	2349	175	0.76	0.82	24.1	26.0	C	C
				R	90	86	-4	-	-	-	-	-	-
		EB	LTR	L	105	101	-4	-	-	-	-	-	-
				T	95	95	0	0.60	0.60	36.6	36.9	D	D
				R	62	69	7	-	-	-	-	-	-
		Intersection								23.7	24.9	C	C
10	West Street & Vesey Street	NB	T	L	10	11	1	-	-	-	-	-	-
				T	1924	1923	-1	0.74	0.76	23.8	24.5	C	C
		SB	T	T	2165	2304	139	0.88	0.93	29.6	34.2	C	C
			R	R	170	164	-6	0.42	0.40	20.5	20.1	C	C
		EB	L	L	144	136	-8	0.56	0.53	39.9	38.6	D	D
			R	R	149	163	14	0.45	0.49	34.6	35.9	C	D
		WB	LT	L	0	0	0	-	-	-	-	-	-
				T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								27.3	29.9	C	C
11	West Street & Chambers Street	NB	TR	T	1996	1960	-36	0.88	0.86	36.9	35.9	D	D
				T	46	44	-2	-	-	-	-	-	-
		SB	L	L	179	165	-14	0.47	0.44	52.9	52.2	D	D
			T	T	2063	2127	64	0.74	0.76	18.7	19.4	B	B
			R	R	85	82	-3	0.36	0.34	45.4	45.1	D	D
		EB	LTR	L	45	43	-2	-	-	-	-	-	-
				T	0	0	0	0.18	0.18	33.5	33.4	C	C
				R	10	11	1	-	-	-	-	-	-
		WB	LT	L	72	80	8	-	-	-	-	-	-
				T	65	65	0	0.52	0.56	42.5	44.0	D	D
			R	R	284	271	-13	0.60	0.57	28.2	27.3	C	C
		Intersection								29.7	29.3	C	C
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	631	372	-259	0.65	0.38	25.5	20.5	C	C
			R	R	125	124	-1	0.35	0.34	21.6	21.6	C	C
		WB	T	T	697	419	-278	0.71	0.42	27.0	21.0	C	C
		NB	T	T	269	255	-14	0.46	0.44	31.5	31.1	C	C
			R	R	431	245	-186	0.44	0.25	1.3	0.5	A	A
		SB	L	L	396	189	-207	0.69	0.39	22.5	11.2	C	B
			TR	T	150	99	-51	0.76	0.41	17.0	6.9	B	A
				R	75	66	-9	-	-	-	-	-	-
		Intersection								20.9	17.0	C	B
15	Manhattan Bridge & Bowery	NB	T	T	269	255	-14	0.25	0.23	0.7	0.7	A	A
		SB	T	T	621	354	-267	0.40	0.23	19.0	17.0	B	B
		WB	R	R	272	21	-251	0.21	0.02	7.4	6.2	A	A
		Intersection								11.9	9.9	B	A
18	6th Avenue & Watts Street	WB	TR	T	785	685	-100	0.37	0.33	17.2	16.7	B	B
				R	25	24	-1	-	-	-	-	-	-
		NB	LT	L	92	69	-23	-	-	-	-	-	-
				T	882	747	-135	0.39	0.33	8.0	7.6	A	A
		Intersection								12.3	11.9	B	B
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	389	318	-71	0.70	0.57	40.2	36.6	D	D
		NB	LTR	L	165	141	-24	-	-	-	-	-	-
				T	733	625	-108	0.51	0.43	24.0	23.0	C	C
				R	4	3	-1	-	-	-	-	-	-
		EB	T	T	417	383	-34	0.58	0.54	31.5	30.5	C	C
		WB	TR	T	703	594	-109	0.69	0.58	22.7	20.3	C	C
				R	144	122	-22	-	-	-	-	-	-
		Intersection								27.3	25.4	C	C

Lower Manhattan Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	Trinity Place & Edgar Street	NEB	L	L2	0	0	0	-	-	-	-	-	-
				L	0	0	0	-	-	-	-	-	-
		NB	LT	L	1	0	-1	-	-	-	-	-	-
			T	T	9	0	-9	0.01	-	9.5	-	A	-
		EB	L	L	134	138	4	0.28	0.29	23.2	23.3	C	C
		Intersection								22.2	23.3	C	C
2	Trinity Place & Rector Street	NB	TR	T	125	120	-5	0.21	0.20	34.1	35.8	C	D
				R	18	18	0	-	-	-	-	-	-
		EB	LT	L	81	59	-22	-	-	-	-	-	-
				T	40	39	-1	0.35	0.27	23.2	21.5	C	C
		Intersection								29.1	29.8	C	C
3a	HCT Entrance/Exit & West Street	NB	T	T	566	539	-27	0.32	0.31	23.4	23.2	C	C
			R2	R2	1297	1520	223	0.65	0.77	1.5	2.6	A	A
		SB	T	T	1297	1191	-106	0.61	0.56	1.0	0.8	A	A
		WB	L	L	351	347	-4	0.29	0.29	35.8	35.7	D	D
		Intersection								8.4	8.4	A	A
3b	HCT Exit & West Street & West Thames Street	NB	T	T	566	539	-27	0.28	0.26	0.5	0.5	A	A
		SB	TR	T	1297	1191	-106	0.69	0.63	31.2	29.6	C	C
				R	0	0	0	-	-	-	-	-	-
		WB	R	R	510	510	0	0.48	0.48	39.5	39.5	D	D
		Intersection								25.4	24.6	C	C
4	Chambers Street & Centre Street	NB	L	L	445	396	-49	0.51	0.45	27.1	26.1	C	C
			T	T	533	474	-59	0.66	0.58	16.0	14.2	B	B
		SB	TR	T	370	230	-140	1.24	0.77	160.8	49.0	F	D
				R	15	11	-4	0.17	0.13	33.1	31.5	C	C
		EB	R	R	510	434	-76	1.18	1.01	131.1	74.1	F	E
		Intersection								80.0	39.8	E	D
5a	Canal Street & Hudson Street/Holland Tunnel On-Ramp	NB	LT	L	45	45	0	-	-	-	-	-	-
				T	585	585	0	0.88	0.88	44.6	44.6	D	D
			R	R	189	184	-5	0.31	0.30	26.5	26.4	C	C
			R2	R2	10	5	-5	0.05	0.02	24.0	23.4	C	C
		EB	L	L2	5	5	0	-	-	-	-	-	-
				L	225	209	-16	0.41	0.38	31.3	30.9	C	C
			T	T	462	419	-43	0.54	0.49	15.0	14.1	B	B
		WB	TR	T	10	0	-10	0.03	-	3.8	-	A	-
				R	2	0	-2	0.01	-	4.0	-	A	-
		Intersection								31.1	31.5	C	C
5b	Canal Street & Holland Tunnel On-Ramp	EB	T	T	472	424	-48	0.30	0.27	3.2	2.9	A	A
		WB	T	T	12	0	-12	0.04	-	24.2	-	C	-
			R	R	1405	1405	0	1.23	1.23	131.8	131.8	F	F
		Intersection								99.7	102.7	F	F
7a	Canal Street S & West Street	NB	T	T	2698	2647	-51	0.98	0.97	45.7	42.2	D	D
			R	R	5	5	0	0.01	0.01	14.8	14.8	B	B
		SB	L	L	559	476	-83	0.62	0.53	114.2	111.6	F	F
			T	T	1884	1854	-30	0.65	0.64	5.4	5.4	A	A
		Intersection								39.0	35.7	D	D
9	West Street & Albany Street	NB	TR	T	1284	1227	-57	0.48	0.46	20.5	20.1	C	C
				R	49	47	-2	-	-	-	-	-	-
		SB		L	0	0	0	-	-	-	-	-	-
			TR	T	2324	2402	78	0.70	0.72	25.1	25.7	C	C
				R	80	76	-4	-	-	-	-	-	-
		EB		L	140	140	0	-	-	-	-	-	-
			LTR	T	90	90	0	0.71	0.73	50.7	51.7	D	D
				R	82	88	6	-	-	-	-	-	-
		Intersection								25.7	26.1	C	C
10	West Street & Vesey Street	NB		L	0	0	0	-	-	-	-	-	-
			T	T	1536	1469	-67	0.45	0.43	15.0	14.7	B	B
		SB	T	T	2465	2518	53	0.83	0.85	25.1	26.0	C	C
			R	R	140	135	-5	0.33	0.31	15.5	15.3	B	B
		EB	L	L	100	99	-1	0.58	0.57	58.3	57.9	E	E
			R	R	122	129	7	0.60	0.64	58.7	60.9	E	E
		WB	LT	L	10	10	0	-	-	-	-	-	-
				T	0	0	0	0.05	0.05	39.7	39.7	D	D
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								23.1	23.8	C	C
11	West Street & Chambers Street	NB	TR	T	1879	1781	-98	0.75	0.71	35.4	34.2	D	C
				T	38	36	-2	-	-	-	-	-	-
		SB	L	L	195	182	-13	0.82	0.77	89.8	84.7	F	F
			T	T	1945	1938	-7	0.72	0.72	23.6	23.5	C	C
			R	R	95	90	-5	0.47	0.44	67.4	66.6	E	E
		EB		L	50	50	0	-	-	-	-	-	-
			LTR	T	20	20	0	0.27	0.27	39.9	40.1	D	D
				R	5	5	0	-	-	-	-	-	-
		WB	LT	L	127	135	8	-	-	-	-	-	-
				T	90	90	0	0.74	0.77	58.8	61.7	E	E
			R	R	396	394	-2	0.72	0.72	40.9	40.6	D	D
		Intersection								35.5	34.7	D	C
14	Canal Street/Manhattan Bridge & Bowery	EB	T	T	1051	763	-288	0.99	0.72	52.4	26.5	D	C
			R	R	85	83	-2	0.30	0.29	21.3	21.1	C	C
		WB	T	T	542	328	-214	0.52	0.31	22.2	19.4	C	B
		NB	T	T	177	171	-6	0.30	0.29	29.2	29.1	C	C
			R	R	619	454	-165	0.56	0.41	1.9	1.1	A	A
		SB	L	L	677	370	-307	1.02	0.56	55.1	13.8	E	B
			TR	T	105	32	-73	0.26	0.08	4.3	3.4	A	A
				R	20	16	-4	0.06	0.05	2.8	2.8	A	A
		Intersection								34.4	17.9	C	B
15	Manhattan Bridge & Bowery	NB	T	T	177	171	-6	0.16	0.15	1.6	1.5	A	A
		SB	T	T	802	418	-384	0.40	0.21	18.8	16.8	B	B
		WB	R	R	416	203	-213	0.32	0.16	8.3	7.0	A	A
		Intersection								13.4	10.8	B	B
18	6th Avenue & Watts Street	WB	TR	T	219	188	-31	0.11	0.09	14.7	14.6	B	B
				R	0	0	0	-	-	-	-	-	-
		NB	LT	L	173	147	-26	-	-	-	-	-	-
				T	605	516	-89	0.34	0.29	35.7	35.1	D	D
		Intersection								30.8	30.3	C	C
19	Canal Street & 6th Avenue/Laight Street	NEB	R	R	447	381	-66	0.79	0.67	44.3	39.1	D	D
		NB		L	44	39	-5	-	-	-	-	-	-
			LTR	T	698	625	-73	0.43	0.38	22.9	22.3	C	C
				R	4	3	-1	-	-	-	-	-	-
		EB	T	T	396	345	-51	0.53	0.46	30.2	29.1	C	C
		WB	TR	T	1333	1229	-104	0.96	0.88	38.9	30.1	D	C
				R	10	9	-1	-	-	-	-	-	-
		Intersection								34.6	29.4	C	C

RFK Bridge Study Area - No-Action vs Action (Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume			V/C		Delay		LOS	
					No-Action	Action	Δ Increment	No-Action	Action	No-Action	Action	No-Action	Action
1	126th Street and 2nd Avenue	NW	L	L2	30	30	0	-	-	-	-	-	-
				L	190	190	0	0.97	0.97	85.0	85.0	F	F
			R	R	415	415	0	0.31	0.31	7.3	7.3	A	A
		SB	TR	T	1240	1161	-79	0.56	0.52	21.9	21.4	C	C
				R	45	41	-4	-	-	-	-	-	-
		WB	L	L	40	39	-1	-	-	-	-	-	-
				T	30	29	-1	0.80	0.77	57.6	54.7	E	D
				R	94	90	-4	-	-	-	-	-	-
		Intersection								28.9	28.5	C	C
2	125th Street and 2nd Avenue	SB	L	L	501	497	-4	0.54	0.64	7.4	12.7	A	B
			TR	T	754	683	-71	0.58	0.62	6.9	11.1	A	B
				R	55	50	-5	-	-	-	-	-	-
		SW	L	L	394	460	66	1.06	1.04	90.2	79.3	F	E
				R	133	155	22	-	-	-	-	-	-
		EB	TR	T	627	678	51	0.86	0.89	44.2	45.4	D	D
				R	40	40	0	-	-	-	-	-	-
		WB	LT	L	22	11	-11	-	-	-	-	-	-
				T	61	30	-31	0.22	0.10	28.9	26.4	C	C
		Intersection								34.9	37.8	C	D
11	E 134th Street & St. Ann's Avenue	NB	TR	T	140	140	0	0.46	0.46	18.5	18.5	B	B
				R	80	80	0	-	-	-	-	-	-
		SB	LT	L	145	145	0	-	-	-	-	-	-
				T	105	105	0	0.62	0.62	20.2	20.2	C	C
		EB	LTR	L	140	140	0	-	-	-	-	-	-
				T	120	120	0	0.80	0.80	33.1	33.1	C	C
				R	45	45	0	-	-	-	-	-	-
		Intersection								24.8	24.8	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	25	25	0	-	-	-	-	-	-
				T	105	105	0	0.56	0.56	46.0	46.0	D	D
				R	30	30	0	-	-	-	-	-	-
		SB	LTR	L	55	55	0	-	-	-	-	-	-
				T	70	70	0	0.57	0.57	48.6	48.6	D	D
				R	25	25	0	-	-	-	-	-	-
		EB	LTR	L	50	50	0	-	-	-	-	-	-
				T	1440	1440	0	0.90	0.90	25.6	25.6	C	C
				R	30	30	0	-	-	-	-	-	-
		WB	LTR	L	40	40	0	-	-	-	-	-	-
				T	480	480	0	0.50	0.50	11.6	11.6	B	B
				R	65	65	0	-	-	-	-	-	-
		Intersection								24.9	24.9	C	C
17	31st St & Astoria Blvd	NB	T	T	96	70	-26	0.26	0.19	37.3	36.1	D	D
			R	R	17	12	-5	0.02	0.02	7.3	7.2	A	A
		SB	T	T	558	567	9	0.62	0.63	26.5	27.2	C	C
			R	R	174	175	1	0.41	0.41	23.9	24.3	C	C
		EB	L	L	10	11	1	-	-	-	-	-	-
				T	362	384	22	0.51	0.54	32.6	33.3	C	C
				R	26	28	2	-	-	-	-	-	-
		Intersection								28.8	29.3	C	C
24	Hoyt N & 31st St	NB	L	L	18	15	-3	-	-	-	-	-	-
				T	94	75	-19	0.21	0.16	21.0	19.2	C	B
		SB	T	T	262	265	3	0.81	0.81	109.4	109.5	F	F
				R	131	130	-1	-	-	-	-	-	-
		WB	L	L	401	402	1	0.26	0.26	9.3	9.3	A	A
			T	T	2135	2127	-8	0.66	0.66	14.1	14.0	B	B
			R	R	35	35	0	0.10	0.10	8.5	8.5	A	A
		Intersection								27.3	27.3	C	C
3	Hoyt S & 31st St	NB	T	T	97	74	-23	0.16	0.12	21.9	22.6	C	C
				R	9	7	-2	-	-	-	-	-	-
		SB	L	L	20	20	0	-	-	-	-	-	-
				T	643	647	4	0.38	0.38	15.7	15.9	B	B
		EB	L	L	15	16	1	-	-	-	-	-	-
				T	893	946	53	0.79	0.84	46.5	48.7	D	D
			R	R	89	95	6	0.38	0.40	41.7	42.9	D	D
		Intersection								33.6	35.5	C	D

RFK Bridge Study Area - No-Action vs Action (Mitigation) - MD Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume			V/C		Delay		LOS	
					No-Action	Action	Δ Increment	No-Action	Action	No-Action	Action	No-Action	Action
1	126th Street and 2nd Avenue	NW	L	L2	0	0	0	-	-	-	-	-	-
				L	120	120	0	0.55	0.55	41.3	41.3	D	D
			R	R	1050	1050	0	0.70	0.70	13.0	13.0	B	B
		SB	TR	T	1042	929	-113	0.47	0.42	20.7	20.1	C	C
				R	49	42	-7	-	-	-	-	-	-
		WB	L	L	45	42	-3	-	-	-	-	-	-
				T	20	18	-2	0.68	0.62	46.0	42.6	D	D
				R	90	82	-8	-	-	-	-	-	-
		Intersection								20.3	19.6	C	B
2	125th Street and 2nd Avenue	SB	L	L	318	305	-13	0.38	0.37	6.2	7.0	A	A
			TR	T	724	627	-97	0.54	0.48	6.8	7.2	A	A
				R	45	39	-6	-	-	-	-	-	-
		SW	L	L	314	322	8	1.02	0.99	80.0	72.3	F	E
				R	129	132	3	-	-	-	-	-	-
		EB	TR	T	555	604	49	0.72	0.78	36.8	39.1	D	D
				R	50	50	0	-	-	-	-	-	-
		WB	LT	L	18	6	-12	-	-	-	-	-	-
				T	64	22	-42	0.19	0.06	28.3	26.6	C	C
		Intersection								30.6	31.5	C	C
11	E 134th Street & St. Ann's Avenue	NB	TR	T	170	170	0	0.51	0.51	14.1	14.1	B	B
				R	80	80	0	-	-	-	-	-	-
		SB	LT	L	110	110	0	-	-	-	-	-	-
				T	95	95	0	0.53	0.53	18.0	18.0	B	B
		EB	LTR	L	155	155	0	-	-	-	-	-	-
				T	140	140	0	0.94	0.94	51.5	51.5	D	D
				R	85	85	0	-	-	-	-	-	-
		Intersection								31.7	31.7	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	20	20	0	-	-	-	-	-	-
				T	140	140	0	0.80	0.80	55.7	55.7	E	E
				R	75	75	0	-	-	-	-	-	-
		SB	LTR	L	85	85	0	-	-	-	-	-	-
				T	60	60	0	0.73	0.73	59.3	59.3	E	E
				R	35	35	0	-	-	-	-	-	-
		EB	LTR	L	55	55	0	-	-	-	-	-	-
				T	1260	1260	0	0.98	0.98	41.0	41.0	D	D
				R	35	35	0	-	-	-	-	-	-
		WB	LTR	L	40	40	0	-	-	-	-	-	-
				T	760	760	0	0.70	0.70	19.9	19.9	B	B
				R	55	55	0	-	-	-	-	-	-
		Intersection								37.1	37.1	D	D
17	31st St & Astoria Blvd	NB	T	T	117	30	-87	0.32	0.08	30.4	27.0	C	C
			R	R	3	3	0	-	-	4.3	4.3	A	A
		SB	T	T	242	240	-2	0.29	0.29	11.6	11.6	B	B
			R	R	115	114	-1	0.38	0.38	14.8	14.9	B	B
		EB	L	L	20	21	1	-	-	-	-	-	-
				T	364	382	18	0.46	0.48	22.3	22.6	C	C
				R	40	42	2	-	-	-	-	-	-
		Intersection								19.5	18.5	B	B
24	Hoyt N & 31st St	NB	L	L	102	48	-54	-	-	-	-	-	-
				T	41	9	-32	0.29	0.11	9.5	11.5	A	B
		SB	T	T	206	203	-3	0.37	0.37	23.1	23.0	C	C
				R	70	70	0	-	-	-	-	-	-
		WB	L	L	215	215	0	0.17	0.17	11.2	11.2	B	B
			T	T	1684	1685	1	0.67	0.67	16.7	16.8	B	B
			R	R	65	65	0	0.17	0.17	12.0	12.0	B	B
		Intersection								16.4	16.8	B	B
3	Hoyt S & 31st St	NB	T	T	133	46	-87	0.16	0.06	11.4	22.4	B	C
				R	4	5	1	-	-	-	-	-	-
		SB	L	L	140	139	-1	-	-	-	-	-	-
				T	281	279	-2	0.41	0.39	13.2	13.1	B	B
		EB	L	L	10	11	1	-	-	-	-	-	-
				T	861	918	57	0.55	0.59	26.0	26.6	C	C
			R	R	76	75	-1	0.23	0.23	23.9	23.8	C	C
		Intersection								20.9	22.4	C	C

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume No-Action	Volume Action	Δ Increment	V/C No-Action	V/C Action	Delay No-Action	Delay Action	LOS No-Action	LOS Action
RFK Bridge Study Area - No-Action vs Action (Mitigation) - PM Peak Hour													
1	126th Street and 2nd Avenue	NW	L	L2	25	25	0	-	-	-	-	-	-
				L	180	180	0	0.93	0.93	76.4	76.4	E	E
			R	R	765	765	0	0.55	0.55	10.0	10.0	B	B
		SB	TR	T	1472	1250	-222	0.58	0.49	22.2	21.0	C	C
				R	35	29	-6	-	-	-	-	-	-
		WB	L	L	47	40	-7	-	-	-	-	-	-
				T	25	21	-4	0.57	0.47	40.0	36.6	D	D
				R	51	42	-9	-	-	-	-	-	-
		Intersection								24.1	23.3	C	C
2	125th Street and 2nd Avenue	SB	L	L	663	595	-68	0.69	0.91	9.9	34.1	A	C
			TR	T	822	672	-150	0.55	0.65	6.4	15.2	A	B
				R	59	48	-11	-	-	-	-	-	-
		SW	L	L	369	594	225	0.88	0.96	51.0	52.1	D	D
				R	138	222	84	-	-	-	-	-	-
		EB	TR	T	686	724	38	0.81	0.85	39.9	42.5	D	D
				R	20	20	0	-	-	-	-	-	-
		WB	LT	L	55	21	-34	-	-	-	-	-	-
				T	176	66	-110	0.63	0.19	38.3	28.2	D	C
		Intersection								25.0	36.2	C	D
11	E 134th Street & St. Ann's Avenue	NB	TR	T	110	110	0	0.41	0.41	10.9	10.9	B	B
				R	100	100	0	-	-	-	-	-	-
		SB	LT	L	110	110	0	-	-	-	-	-	-
				T	50	50	0	0.38	0.38	13.8	13.8	B	B
		EB	LTR	L	155	155	0	-	-	-	-	-	-
				T	140	140	0	0.78	0.78	30.3	30.3	C	C
				R	30	30	0	-	-	-	-	-	-
		Intersection								20.5	20.5	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	20	20	0	-	-	-	-	-	-
				T	95	95	0	0.50	0.50	43.0	43.0	D	D
				R	30	30	0	-	-	-	-	-	-
		SB	LTR	L	35	35	0	-	-	-	-	-	-
				T	20	20	0	0.29	0.29	39.6	39.6	D	D
				R	25	25	0	-	-	-	-	-	-
		EB	LTR	L	50	50	0	-	-	-	-	-	-
				T	1300	1300	0	0.85	0.85	22.5	22.5	C	C
				R	45	45	0	-	-	-	-	-	-
		WB	LTR	L	25	25	0	-	-	-	-	-	-
				T	610	610	0	0.46	0.46	11.4	11.4	B	B
				R	65	65	0	-	-	-	-	-	-
		Intersection								21.1	21.1	C	C
17	31st St & Astoria Blvd	NB	T	T	42	11	-31	0.11	0.03	27.5	26.3	C	C
			R	R	5	3	-2	0.01	-	4.4	4.3	A	A
		SB	T	T	478	446	-32	0.58	0.54	76.7	76.5	E	E
			R	R	222	204	-18	0.75	0.69	94.5	92.0	F	F
		EB	L	L	16	16	0	-	-	-	-	-	-
				T	388	399	11	0.50	0.52	23.0	23.2	C	C
				R	48	49	1	-	-	-	-	-	-
		Intersection								57.3	56.2	E	E
24	Hoyt N & 31st St	NB	L	L	17	4	-13	-	-	-	-	-	-
				T	47	31	-16	0.12	0.06	27.8	23.0	C	C
		SB	T	T	121	73	-48	0.36	0.29	38.4	37.4	D	D
				R	70	67	-3	-	-	-	-	-	-
		WB	L	L	513	514	1	0.34	0.34	9.7	9.7	A	A
			T	T	1523	1463	-60	0.47	0.45	10.7	10.5	B	B
			R	R	35	35	0	0.07	0.07	7.8	7.8	A	A
		Intersection								13.3	12.2	B	B
3	Hoyt S & 31st St	NB	T	T	53	24	-29	0.08	0.04	37.4	34.9	D	C
				R	5	3	-2	-	-	-	-	-	-
		SB	L	L	20	20	0	-	-	-	-	-	-
				T	614	567	-47	0.39	0.36	13.2	10.1	B	B
		EB	L	L	11	11	0	-	-	-	-	-	-
				T	1071	1104	33	0.61	0.62	33.2	33.6	C	C
			R	R	86	83	-3	0.25	0.25	29.3	29.1	C	C
		Intersection								26.4	25.9	C	C

RFK Bridge Study Area - No-Action vs Action (No Mitigation) - LN Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume			V/C		Delay		LOS	
					No-Action	Action	Δ Increment	No-Action	Action	No-Action	Action	No-Action	Action
1	126th Street and 2nd Avenue	NW	L	L2	5	5	0	-	-	-	-	-	-
				L	75	75	0	0.36	0.36	35.3	35.3	D	D
			R	R	535	535	0	0.40	0.40	8.1	8.1	A	A
		SB	TR	T	560	342	-218	0.24	0.14	18.2	17.4	B	B
				R	20	11	-9	-	-	-	-	-	-
		WB	L	L	20	20	0	-	-	-	-	-	-
				T	35	33	-2	0.46	0.44	35.7	35.1	D	D
				R	60	56	-4	-	-	-	-	-	-
		Intersection								16.6	15.9	B	B
2	125th Street and 2nd Avenue	SB	L	L	109	91	-18	0.13	0.11	5.7	6.3	A	A
			TR	T	456	266	-190	0.31	0.18	6.3	6.4	A	A
				R	20	10	-10	-	-	-	-	-	-
		SW	L	L	174	198	24	0.61	0.70	37.6	40.4	D	D
				R	153	174	21	-	-	-	-	-	-
		EB	TR	T	535	704	169	0.68	0.87	34.9	43.9	C	D
				R	50	50	0	-	-	-	-	-	-
		WB	LT	L	9	4	-5	-	-	-	-	-	-
				T	70	10	-60	0.15	0.03	27.5	26.2	C	C
		Intersection								23.8	33.1	C	C
11	E 134th Street & St. Ann's Avenue	NB	TR	T	100	100	0	0.21	0.21	17.0	17.0	B	B
				R	20	20	0	-	-	-	-	-	-
		SB	LT	L	40	40	0	-	-	-	-	-	-
				T	50	50	0	0.18	0.18	10.9	10.9	B	B
		EB	LTR	L	190	190	0	-	-	-	-	-	-
				T	90	90	0	0.70	0.70	25.0	25.0	C	C
				R	35	35	0	-	-	-	-	-	-
		Intersection								20.6	20.6	C	C
22	St Ann's Ave and Bruckner Blvd	NB	LTR	L	10	10	0	-	-	-	-	-	-
				T	55	55	0	0.24	0.24	33.0	33.0	C	C
				R	15	15	0	-	-	-	-	-	-
		SB	LTR	L	30	30	0	-	-	-	-	-	-
				T	10	10	0	0.25	0.25	35.0	35.0	C	C
				R	45	45	0	-	-	-	-	-	-
		EB	LTR	L	40	40	0	-	-	-	-	-	-
				T	1515	1515	0	0.88	0.88	26.6	26.6	C	C
				R	10	10	0	-	-	-	-	-	-
		WB	LTR	L	10	10	0	-	-	-	-	-	-
				T	500	500	0	0.33	0.33	12.2	12.2	B	B
				R	25	25	0	-	-	-	-	-	-
		Intersection								23.7	23.7	C	C
17	31st St & Astoria Blvd	NB	T	T	120	26	-94	0.34	0.07	30.7	26.8	C	C
			R	R	13	6	-7	0.02	0.01	4.5	4.5	A	A
		SB	T	T	345	308	-37	0.47	0.41	9.2	7.4	A	A
			R	R	165	147	-18	0.39	0.34	10.0	8.4	A	A
		EB	L	L	10	10	0	-	-	-	-	-	-
				T	286	328	42	0.32	0.36	20.2	20.8	C	C
				R	15	17	2	-	-	-	-	-	-
		Intersection								15.5	13.6	B	B
24	Hoyt N & 31st St	NB	L	L	80	12	-68	-	-	-	-	-	-
				T	51	25	-26	0.23	0.05	7.7	10.1	A	B
		SB	T	T	220	167	-53	0.28	0.23	21.7	21.1	C	C
				R	40	38	-2	-	-	-	-	-	-
		WB	L	L	440	444	4	0.33	0.33	45.6	40.3	D	D
			T	T	1105	1063	-42	0.42	0.41	13.2	13.1	B	B
			R	R	20	20	0	0.04	0.04	10.4	10.4	B	B
		Intersection								21.2	20.8	C	C
3	Hoyt S & 31st St	NB	T	T	126	31	-95	0.16	0.04	8.3	16.8	A	B
				R	4	5	1	-	-	-	-	-	-
		SB	L	L	205	203	-2	-	-	-	-	-	-
				T	455	408	-47	0.65	0.58	26.9	31.6	C	C
		EB	L	L	5	6	1	-	-	-	-	-	-
				T	744	882	138	0.44	0.52	24.3	25.4	C	C
			R	R	55	47	-8	0.17	0.15	22.7	22.3	C	C
		Intersection								24.1	27.6	C	C

Queens Midtown Tunnel (Manhattan) Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 37th Street & 3rd Avenue	NB	L	L	20	19	-1	0.09	0.09	4.1	4.1	A	A
			T	T	826	773	-53	0.60	0.56	6.8	6.4	A	A
		WB	T	T	728	745	17	0.58	0.59	18.6	18.9	B	B
			R	R	263	271	8	0.75	0.78	47.9	49.6	D	D
		Intersection								17.4	18.1	B	B
2	E 36th Street & 2nd Avenue	SB	L	L	438	415	-23	0.65	0.62	33.2	32.2	C	C
			T	T	1006	970	-36	0.52	0.50	12.1	11.8	B	B
		EB	T	T	431	408	-23	0.48	0.45	27.5	27.2	C	C
			TR	R	47	45	-2	-	-	-	-	-	-
		WB	L	L	515	515	0	1.67	1.61	340.7	311.9	F	F
		Intersection								93.6	88.9	F	F
3	E 34th Street & 3rd Avenue	NB	LT	L	94	88	-6	-	-	-	-	-	-
			T	T	1005	949	-56	0.54	0.51	19.4	18.9	B	B
			R	R	104	99	-5	1.02	0.98	116.9	104.1	F	F
		EB	T	T	416	379	-37	1.01	0.92	73.5	53.9	E	D
		WB	T	T	402	380	-22	1.04	0.98	84.1	69.6	F	E
			R	R	50	48	-2	0.18	0.18	21.3	21.2	C	C
		Intersection								47.5	39.9	D	D
4	E 35th Street & 3rd Avenue	NB	LT	L	109	103	-6	-	-	-	-	-	-
			T	T	946	894	-52	0.48	0.46	2.5	2.4	A	A
		WB	TR	T	574	535	-39	0.61	0.57	26.4	25.5	C	C
			R	R	55	52	-3	0.16	0.15	20.7	20.5	C	C
		Intersection								11.0	10.6	B	B
5	E 34th Street & 2nd Ave	SB	L	L	370	363	-7	0.66	0.65	34.1	34.1	C	C
			TR	T	1453	1422	-31	0.83	0.81	24.7	23.7	C	C
				R	120	117	-3	1.18	1.15	162.2	150.8	F	F
		EB	T	T	572	561	-11	0.76	0.74	34.8	34.2	C	C
			R	R	116	114	-2	0.63	0.62	42.3	41.7	D	D
		WB	T	T	195	191	-4	0.51	0.50	30.5	30.3	C	C
		Intersection								35.3	34.1	D	C
6	E 35th Street & 2nd Ave	SB	T	T	1393	1358	-35	0.56	0.55	16.1	16.2	B	B
			TR	R	175	172	-3	0.55	0.54	19.5	19.7	B	B
		EB	R	R	473	468	-5	0.64	0.64	26.8	26.6	C	C
		WB	T	T	87	86	-1	0.14	0.14	18.3	18.3	B	B
			L	L	77	76	-1	0.14	0.14	18.9	18.9	B	B
		Intersection								19.0	19.0	B	B

Queens Midtown Tunnel (Manhattan) Study Area - No-Action vs With-Action (Mitigation) - Midday Peak Hour

Intersection #	Intersection NMDe	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 37th Street & 3rd Avenue	NB	L	L	44	37	-7	0.16	0.15	6.5	7.7	A	A
			T	T	635	553	-82	0.49	0.47	5.9	7.3	A	A
		WB	T	T	577	638	61	0.95	0.98	49.3	52.9	D	D
			R	R	265	303	38	0.73	0.79	44.8	47.8	D	D
		Intersection								29.2	34.3	C	C
2	E 36th Street & 2nd Avenue	SB	L	L	242	248	6	0.43	0.46	28.6	29.9	C	C
			T	T	1035	990	-45	0.50	0.49	11.7	12.1	B	B
		EB	T	T	1278	1335	57	1.34	1.35	189.4	189.8	F	F
			TR	R	85	83	-2	-	-	-	-	-	-
		Intersection								106.1	109.7	F	F
3	E 34th Street & 3rd Avenue	NB	LT	L	24	21	-3	-	-	-	-	-	-
			T	T	1075	949	-126	0.48	0.42	18.5	17.8	B	B
			R	R	173	162	-11	0.78	0.73	47.2	41.9	D	D
		EB	T	T	445	367	-78	0.96	0.80	62.0	39.1	E	D
		WB	T	T	450	446	-4	0.98	0.97	65.0	63.1	E	E
			R	R	80	83	3	0.30	0.31	23.4	23.6	C	C
		Intersection								38.9	33.8	D	C
4	E 35th Street & 3rd Avenue	NB	LT	L	83	76	-7	-	-	-	-	-	-
			T	T	1072	956	-116	0.82	0.73	14.3	11.6	B	B
		WB	TR	T	519	490	-29	0.57	0.54	25.4	24.8	C	C
			R	R	60	58	-2	0.19	0.19	21.4	21.3	C	C
		Intersection								18.0	16.3	B	B
5	E 34th Street & 2nd Ave	SB	L	L	229	226	-3	0.37	0.37	29.5	30.0	C	C
			TR	T	1325	1271	-54	0.73	0.70	21.9	21.2	C	C
				R	45	43	-2	0.34	0.33	18.9	18.5	B	B
		EB	T	T	591	577	-14	0.75	0.73	34.3	33.6	C	C
			R	R	130	126	-4	0.59	0.57	37.9	36.9	D	D
		WB	T	T	253	234	-19	0.63	0.58	33.8	32.2	C	C
		Intersection								27.4	26.7	C	C
6	E 35th Street & 2nd Ave	SB	T	T	1040	992	-48	0.58	0.55	12.1	11.4	B	B
			TR	R	80	81	1	-	-	-	-	-	-
		EB	R	R	476	467	-9	0.62	0.61	26.1	25.9	C	C
		WB	T	T	88	86	-2	0.15	0.14	18.4	18.3	B	B
			L	L	83	81	-2	0.15	0.15	19.0	19.0	B	B
		Intersection								16.6	16.1	B	B

Queens Midtown Tunnel (Manhattan) Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour													
Intersection #	Intersection NPMe	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 37th Street & 3rd Avenue	NB	L	L	25	22	-3	-	-	-	-	-	-
			T	T	873	780	-93	0.52	0.46	2.9	2.6	A	A
		WB	T	T	618	628	10	0.51	0.51	17.2	17.3	B	B
			R	R	274	293	19	0.69	0.73	42.1	44.7	D	D
		Intersection								14.0	15.3	B	B
2	E 36th Street & 2nd Avenue	SB	L	L	364	421	57	0.55	0.64	30.2	32.3	C	C
			T	T	1567	1488	-79	0.67	0.64	14.4	13.7	B	B
		EB	T	T	1044	1209	165	0.79	0.90	33.4	39.6	C	D
			TR	R	61	59	-2	-	-	-	-	-	-
		Intersection								23.4	26.8	C	C
3	E 34th Street & 3rd Avenue	NB	LT	L	69	64	-5	-	-	-	-	-	-
			T	T	1418	1297	-121	0.65	0.59	21.2	20.2	C	C
			R	R	124	118	-6	0.68	0.65	38.6	36.2	D	D
		EB	T	T	386	320	-66	0.81	0.67	40.3	31.9	D	C
		WB	T	T	431	403	-28	1.04	0.97	80.6	63.5	F	E
			R	R	79	75	-4	0.30	0.28	23.4	23.1	C	C
		Intersection								35.9	30.9	D	C
4	E 35th Street & 3rd Avenue	NB	LT	L	173	163	-10	-	-	-	-	-	-
			T	T	1324	1209	-115	0.81	0.75	9.0	7.9	A	A
		WB	TR	T	429	375	-54	0.48	0.42	23.9	22.9	C	C
			R	R	35	31	-4	0.13	0.11	20.4	20.1	C	C
		Intersection								12.6	11.5	B	B
5	E 34th Street & 2nd Ave	SB	L	L	259	251	-8	0.42	0.41	24.3	24.8	C	C
			TR	T	1657	1581	-76	0.84	0.80	28.5	21.7	C	C
				R	55	52	-3	1.28	1.21	231.7	207.1	F	F
		EB	T	T	428	431	3	0.58	0.58	29.4	29.4	C	C
			R	R	111	108	-3	0.60	0.58	39.0	38.0	D	D
		WB	T	T	202	182	-20	0.50	0.45	30.0	28.8	C	C
		Intersection								33.5	28.9	C	C
6	E 35th Street & 2nd Ave	SB	T	T	1533	1454	-79	0.61	0.58	10.8	10.5	B	B
			TR	R	95	93	-2	0.29	0.29	10.2	10.2	B	B
		EB	R	R	437	430	-7	0.56	0.55	24.8	24.5	C	C
		WB	T	T	1	0	-1	-	-	17.0	-	B	-
			L	L	1	0	-1	-	-	17.0	-	B	-
		Intersection								13.8	13.6	B	B

Queens Midtown Tunnel (Manhattan) Study Area - No-Action vs With-Action (Mitigation) - Late Night Peak Hour													
					Volume (vph)			V/C		Delay (seconds)		LOS	
Intersection #	Intersection NLNe	Approach	Lane Group	Movement	No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 37th Street & 3rd Avenue	NB	L	L	25	20	-5	0.08	0.08	3.7	7.2	A	A
			T	T	1063	893	-170	0.55	0.56	4.9	9.0	A	A
		WB	T	T	372	477	105	0.29	0.33	14.4	11.6	B	B
			R	R	339	471	132	0.98	0.99	78.4	71.2	E	E
		Intersection								21.8	26.5	C	C
2	E 36th Street & 2nd Avenue	SB	L	L	421	628	207	0.53	0.78	29.6	37.4	C	D
			T	T	1530	1493	-37	0.67	0.66	14.3	14.0	B	B
		EB	T	T	580	816	236	0.56	0.76	28.7	33.3	C	C
			TR	R	50	43	-7	-	-	-	-	-	-
		Intersection								20.3	24.4	C	C
3	E 34th Street & 3rd Avenue	NB	LT	L	39	32	-7	-	-	-	-	-	-
			T	T	1257	1069	-188	0.52	0.44	18.9	17.9	B	B
			R	R	193	175	-18	0.57	0.52	25.8	24.1	C	C
		EB	T	T	500	417	-83	0.52	0.43	24.5	23.1	C	C
		WB	T	T	321	350	29	0.36	0.39	22.1	22.5	C	C
			R	R	100	113	13	0.33	0.37	23.6	24.5	C	C
		Intersection								21.3	20.6	C	C
4	E 35th Street & 3rd Avenue	NB	LT	L	54	47	-7	-	-	-	-	-	-
			T	T	1303	1135	-168	0.52	0.45	4.3	5.1	A	A
		WB	TR	T	461	427	-34	0.51	0.47	24.3	23.7	C	C
				R	60	57	-3	0.17	0.16	20.7	20.5	C	C
		Intersection								10.1	10.7	B	B
5	E 34th Street & 2nd Ave	SB	L	L	350	330	-20	0.57	0.53	26.7	25.5	C	C
			TR	T	1406	1357	-49	0.72	0.70	14.3	12.9	B	B
				R	105	82	-23	0.28	0.22	8.0	7.0	A	A
		EB	T	T	623	631	8	0.66	0.66	29.9	29.9	C	C
			R	R	75	72	-3	-	-	-	-	-	-
		WB	T	T	210	119	-91	0.28	0.16	24.5	23.1	C	C
		Intersection								20.6	19.7	C	B
6	E 35th Street & 2nd Ave	SB	T	T	1485	1438	-47	0.68	0.66	11.5	11.2	B	B
			TR	R	95	98	3	-	-	-	-	-	-
		EB	R	R	295	276	-19	0.37	0.34	21.2	20.8	C	C
		WB	T	T	86	59	-27	0.13	0.09	18.2	17.8	B	B
			L	L	81	55	-26	0.13	0.09	18.6	18.1	B	B
		Intersection								13.5	13.0	B	B

Upper East Study Area - No-Action vs With-Action (Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	14	11	-3	-	-	-	-	-	-
				T	296	226	-70	-	-	-	-	-	-
				R	487	371	-116	-	-	-	-	-	-
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	10	10	0	-	-	-	-	-	-
		Intersection	Unsignalized										
2	E 60th Street & 3rd Ave	NB	L	L	94	68	-26	0.24	0.18	19.8	19.6	B	B
			T	T	1000	713	-287	0.55	0.40	22.1	20.7	C	C
		WB	T	T	384	408	24	0.72	0.74	19.1	21.0	B	C
			R	R	242	250	8	1.11	1.09	110.3	99.0	F	F
		Intersection								33.5	34.1	C	C
3	E 60th Street & York Ave	NB	T	T	670	670	0	0.38	0.38	20.3	20.3	C	C
		SB	T	T	447	318	-129	0.27	0.19	18.9	18.0	B	B
		EB	L	L	219	90	-129	0.29	0.12	28.7	25.6	C	C
			T	T	0	0	0	0.31	0.13	29.0	25.8	C	C
			R	R	50	50	0	0.13	0.13	25.7	25.7	C	C
		WB	L	L	0	0	0	-	-	-	-	-	-
			T	T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								21.4	20.3	C	C
4	E 59th Street & 2nd Ave	EB	T	T	1023	727	-296	1.36	0.97	198.1	55.5	F	E
			RR2	R	15	14	-1	0.11	0.11	25.5	25.4	C	C
				R2	15	14	-1	-	-	-	-	-	-
		SB	L2	L2	1332	885	-447	0.88	0.58	27.1	13.9	C	B
			L2L	L	5	4	-1	-	-	-	-	-	-
			T	T	856	811	-45	0.46	0.43	7.1	10.9	A	B
		Intersection								75.9	25.4	E	C
5	E 60th Street & 2nd Ave	NWB	L2	L2	769	828	59	0.54	0.58	20.9	21.6	C	C
			L	L	577	621	44	0.65	0.69	24.1	25.5	C	C
		SB	LT	L2	10	10	0	-	-	-	-	-	-
				T	1420	871	-549	0.73	0.45	23.6	18.3	C	B
			R	R	39	27	-12	0.13	0.09	16.0	15.4	B	B
		WB	LT	L	4	1	-3	-	-	-	-	-	-
				T	10	10	0	0.03	0.02	15.4	15.4	B	B
		Intersection								22.8	21.3	C	C
6	E 60th Street & 1st Ave	NB	TR	T	1196	859	-337	0.51	0.37	16.5	14.8	B	B
				R	47	34	-13	-	-	-	-	-	-
		EB	L	L	275	275	0	0.77	0.77	43.8	43.8	D	D
			T	T	222	106	-116	0.20	0.10	16.4	15.4	B	B
		Intersection								20.6	20.9	C	C
7	E 60th Street & Lexington Ave	SB	TR	T	939	729	-210	0.58	0.45	20.4	18.4	C	B
				R	78	61	-17	0.25	0.19	17.9	17.0	B	B
		WB	L	L	101	101	0	0.34	0.34	34.1	33.7	C	C
			T	T	377	375	-2	0.45	0.45	34.8	34.5	C	C
		Intersection								25.0	24.5	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	104	86	-18	-	-	-	-	-	-
				T	917	751	-166	0.53	0.43	21.5	19.8	C	B
		WB	TR	T	357	357	0	0.59	0.56	30.6	29.7	C	C
				R	98	79	-19	-	-	-	-	-	-
		Intersection								24.5	23.4	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	1198	1166	-32	0.68	0.66	24.0	23.6	C	C
				R	95	92	-3	-	-	-	-	-	-
		WB	LT	L	80	80	0	-	-	-	-	-	-
				T	381	363	-18	0.58	0.56	15.3	13.7	B	B
		Intersection								21.6	20.9	C	C
9	E 60th Street & Madison Ave	NB	L	L	134	105	-29	0.32	0.25	20.5	19.3	C	B
			T	T	782	612	-170	0.61	0.48	18.3	15.8	B	B
		WB	TR	T	348	346	-2	0.59	0.55	21.7	21.1	C	C
				R	128	109	-19	-	-	-	-	-	-
		Intersection								19.7	18.2	B	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	681	491	-190	0.61	0.44	11.2	8.9	B	A
			R	R	715	517	-198	0.62	0.45	13.9	10.3	B	B
		EB	LT	L	10	8	-2	-	-	-	-	-	-
				T	232	184	-48	0.41	0.32	30.6	29.4	C	C
		Intersection								15.0	12.8	B	B
11	E 60th Street & 5th Ave	SB	T	T	851	652	-199	0.90	0.69	27.1	17.3	C	B
			R	R	274	210	-64	0.78	0.60	29.1	20.2	C	C
		WB	L	L	153	150	-3	0.44	0.43	27.4	27.2	C	C
			T	T	329	301	-28	0.41	0.37	24.2	23.7	C	C
		Intersection								26.8	20.5	C	C
12	E 63rd Street & York Ave	NB	TR	T	472	414	-58	0.81	0.71	40.9	35.2	D	D
				R	527	431	-96	0.65	0.52	7.9	4.9	A	A
		SB	L	L	353	332	-21	0.65	0.55	39.2	29.6	D	C
			TR	T	372	342	-30	0.47	0.44	13.8	13.3	B	B
				R	75	74	-1	-	-	-	-	-	-
		WB	L	L	270	216	-54	0.56	0.46	42.3	39.3	D	D
			TR	T	251	212	-39	0.58	0.49	39.9	37.7	D	D
				R	74	65	-9	-	-	-	-	-	-
		Intersection								26.5	23.1	C	C
13	E 53rd Street & FDR Drive	SB	R	R	233	221	-12	-	-	-	-	-	-
		SWB	R	R	258	233	-25	-	-	-	-	-	-
		Intersection	Unsignalized										
14	E 61st Street & 5th Ave	SB	T	T	867	657	-210	0.57	0.43	22.4	20.1	C	C
		WB	L	L	258	205	-53	0.26	0.20	18.8	18.3	B	B
		Intersection								21.6	19.7	C	B
15	E 65th Street & 5th Ave	SB	LT	L	89	78	-11	-	-	-	-	-	-
				T	773	681	-92	0.54	0.47	4.9	4.7	A	A
		EB	T	T	781	755	-26	0.97	0.94	55.7	49.9	E	D
			R	R	338	327	-11	0.97	0.93	69.7	63.1	E	E
		Intersection								36.0	33.6	D	C
16	E 66th Street & 5th Avenue	SB	TR	T	798	702	-96	0.70	0.63	21.0	19.5	C	B
				R	318	298	-20	-	-	-	-	-	-
		WB	LT	L	64	57	-7	-	-	-	-	-	-
				T	410	363	-47	0.54	0.48	28.1	27.1	C	C
		Intersection								23.1	21.7	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	74	67	-7	-	-	-	-	-	-
				T	660	601	-59	0.73	0.66	29.2	27.4	C	C
				R	99	87	-12	-	-	-	-	-	-
		EB	T	T	397	375	-22	0.74	0.70	39.8	38.1	D	D
			R	R	243	229	-14	1.03	0.97	101.2	86.7	F	F
		WB	L	L	98	90	-8	0.87	0.80	90.7	78.7	F	E
			T	T	441	390	-51	0.49	0.43	24.1	23.2	C	C
		Intersection								41.7	38.5	D	D
18	E 71st Street & York Ave	NB	LTR	L	53	48	-5	-	-	-	-	-	-
				T	380	307	-73	0.46	0.38	22.4	20.8	C	C
				R	0	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	0	-	-	-	-	-	-
				T	384	328	-56	0.43	0.37	21.7	20.7	C	C
				R	59	52	-7	-	-	-	-	-	-
		WB	L	L	160	157	-3	0.42	0.41	31.5	31.3	C	C
			TR	T	125	124	-1	0.62	0.59	37.9	36.6	D	D
				R	114	104	-10	-	-	-	-	-	-
		Intersection								26.3	25.6	C	C

Upper East Study Area - No-Action vs With-Action (No Mitigation) - Late Night Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph) No-Action	Volume (vph) With-Action	Volume (vph) Increment	V/C No-Action	V/C With-Action	Delay (seconds) No-Action	Delay (seconds) With-Action	LOS No-Action	LOS With-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	15	11	-4	-	-	-	-	-	-
				T	277	210	-67	-	-	-	-	-	-
				R	628	477	-151	-	-	-	-	-	-
		EB	LT	L	5	5	0	-	-	-	-	-	-
				T	15	8	-7	-	-	-	-	-	-
		Intersection	Unsignalized										
2	E 60th Street & 3rd Ave	NB	L	L	74	50	-24	0.19	0.13	19.0	18.1	B	B
			T	T	969	650	-319	0.58	0.39	22.7	20.0	C	B
		WB	T	T	264	265	1	0.55	0.56	4.8	4.5	A	A
			R	R	275	273	-2	1.05	1.04	88.7	85.5	F	F
		Intersection								29.4	29.0	C	C
3	E 60th Street & York Ave	NB	T	T	525	525	0	0.31	0.31	19.3	19.3	B	B
		SB	T	T	681	437	-244	0.39	0.25	20.4	18.6	C	B
		EB	L	L	412	227	-185	0.55	0.30	35.6	28.9	D	C
			T	T	0	0	0	0.57	0.32	36.5	29.3	D	C
			R	R	35	35	0	0.10	0.10	25.3	25.3	C	C
		WB	L	L	0	0	0	-	-	-	-	-	-
			T	T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								24.0	21.0	C	C
4	E 59th Street & 2nd Ave	EB	T	T	875	112	-763	1.02	0.13	65.5	20.7	E	C
			RR2	R	112	65	-47	0.47	0.34	27.2	24.4	C	C
				R2	70	64	-6	-	-	-	-	-	-
		SB	L2	L2	1044	120	-924	0.73	0.08	46.4	17.1	D	B
			L2L	L	6	3	-3	-	-	-	-	-	-
			T	T	1579	1367	-212	0.73	0.63	40.7	33.4	D	C
		Intersection								47.7	30.6	D	C
5	E 60th Street & 2nd Ave	NWB	L2	L2	963	975	12	0.79	0.80	28.8	29.5	C	C
			L	L	514	520	6	0.64	0.64	25.4	25.6	C	C
		SB	LT	L2	20	13	-7	-	-	-	-	-	-
				T	1656	509	-1147	0.87	0.27	40.8	17.5	D	B
			R	R	20	13	-7	0.06	0.04	14.9	14.6	B	B
		WB	LT	L	10	6	-4	-	-	-	-	-	-
				T	5	5	0	0.01	0.01	15.2	15.2	B	B
		Intersection								34.2	25.3	C	C
6	E 60th Street & 1st Ave	NB	TR	T	940	618	-322	0.44	0.29	15.7	14.1	B	B
				R	84	55	-29	-	-	-	-	-	-
		EB	L	L	280	278	-2	0.81	0.80	45.6	45.1	D	D
			T	T	363	207	-156	0.34	0.19	17.8	16.3	B	B
		Intersection								21.3	22.2	C	C
7	E 60th Street & Lexington Ave	SB	TR	T	938	644	-294	0.88	0.60	33.6	22.2	C	C
				R	69	47	-22	0.26	0.18	19.4	17.8	B	B
		WB	L	L	66	62	-4	0.25	0.24	18.7	18.6	B	B
			T	T	272	253	-19	0.29	0.27	17.9	17.9	B	B
		Intersection								29.0	20.7	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	64	49	-15	-	-	-	-	-	-
				T	900	688	-212	0.51	0.39	21.6	19.6	C	B
		WB	TR	T	266	225	-41	0.42	0.37	28.3	27.6	C	C
				R	75	75	0	-	-	-	-	-	-
		Intersection								23.4	21.9	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	915	858	-57	0.55	0.52	22.1	21.5	C	C
				R	99	93	-6	-	-	-	-	-	-
		WB	LT	L	116	116	0	-	-	-	-	-	-
				T	214	158	-56	0.43	0.37	13.8	13.0	B	B
		Intersection								20.0	19.5	B	B
9	E 60th Street & Madison Ave	NB	L	L	109	83	-26	0.27	0.21	19.7	18.6	B	B
			T	T	652	494	-158	0.51	0.38	14.5	12.8	B	B
		WB	TR	T	243	243	0	0.40	0.28	19.6	20.7	B	C
				R	70	8	-62	-	-	-	-	-	-
		Intersection								16.5	15.7	B	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	810	763	-47	0.67	0.63	12.3	11.5	B	B
			R	R	779	735	-44	0.69	0.65	16.0	14.6	B	B
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	206	147	-59	0.33	0.23	29.4	28.3	C	C
		Intersection								15.4	14.0	B	B
11	E 60th Street & 5th Ave	SB	T	T	632	433	-199	0.71	0.49	21.5	16.1	C	B
			R	R	286	196	-90	1.01	0.69	76.2	29.5	E	C
		WB	L	L	151	150	-1	0.42	0.42	27.0	26.9	C	C
			T	T	201	176	-25	0.25	0.22	22.1	21.7	C	C
		Intersection								33.9	21.4	C	C
12	E 63rd Street & York Ave	NB	TR	T	424	363	-61	0.73	0.62	36.8	32.3	D	C
				R	432	320	-112	0.67	0.50	16.1	11.8	B	B
		SB	L	L	428	376	-52	0.45	0.37	16.4	11.5	B	B
			TR	T	463	412	-51	0.40	0.35	8.0	7.4	A	A
				R	70	69	-1	-	-	-	-	-	-
		WB	L	L	317	210	-107	0.92	0.64	85.0	56.2	F	E
			TR	T	258	188	-70	0.94	0.66	73.6	50.8	E	D
				R	65	50	-15	-	-	-	-	-	-
		Intersection								34.2	23.8	C	C
13	E 53rd Street & FDR Drive	SB	R	R	149	134	-15	-	-	-	-	-	-
		SWB	R	R	353	300	-53	-	-	-	-	-	-
		Intersection	Unsignalized										
14	E 61st Street & 5th Ave	SB	T	T	628	449	-179	0.41	0.29	19.8	18.4	B	B
		WB	L	L	290	180	-110	0.28	0.17	19.1	17.9	B	B
		Intersection								19.6	18.2	B	B
15	E 65th Street & 5th Ave	SB	LT	L	85	76	-9	-	-	-	-	-	-
				T	533	474	-59	0.39	0.35	7.6	7.5	A	A
		EB	T	T	638	607	-31	0.75	0.71	34.2	32.8	C	C
			R	R	299	284	-15	0.88	0.83	54.5	48.9	D	D
		Intersection								27.5	26.3	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	538	478	-60	0.65	0.60	20.2	19.1	C	B
				R	410	388	-22	-	-	-	-	-	-
		WB	LT	L	80	72	-8	-	-	-	-	-	-
				T	474	427	-47	0.66	0.59	30.8	29.2	C	C
		Intersection								24.1	22.9	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	65	61	-4	-	-	-	-	-	-
				T	445	417	-28	0.66	0.61	27.7	26.6	C	C
				R	150	137	-13	-	-	-	-	-	-
		EB	T	T	458	425	-33	0.72	0.66	38.7	36.9	D	D
			R	R	189	175	-14	0.92	0.85	78.1	66.5	E	E
		WB	L	L	70	65	-5	0.82	0.76	92.6	83.4	F	F
			T	T	543	491	-52	0.56	0.50	25.1	24.2	C	C
		Intersection								36.9	34.4	D	C
18	E 71st Street & York Ave	NB	LTR	L	64	57	-7	-	-	-	-	-	-
				T	390	307	-83	0.49	0.39	23.0	21.1	C	C
				R	0	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	0	-	-	-	-	-	-
				T	348	262	-86	0.40	0.30	21.2	19.7	C	B
				R	55	44	-11	-	-	-	-	-	-
		WB	L	L	205	199	-6	0.66	0.64	41.1	40.2	D	D
			TR	T	160	158	-2	0.78	0.72	46.3	42.6	D	D
				R	139	124	-15	-	-	-	-	-	-
		Intersection								30.6	29.5	C	C

Upper East Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	5	2	-3	-	-	-	-	-	-
				T	130	67	-63	-	-	-	-	-	-
				R	328	169	-159	-	-	-	-	-	-
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	10	5	-5	-	-	-	-	-	-
		Intersection	Unsignalized										
2	E 60th Street & 3rd Ave	NB	L	L	92	61	-31	0.25	0.17	19.9	18.7	B	B
			T	T	892	591	-301	0.50	0.33	21.4	19.3	C	B
		WB	T	T	331	199	-132	0.53	0.32	7.0	4.2	A	A
			R	R	162	88	-74	0.75	0.41	40.6	24.9	D	C
		Intersection								20.4	16.7	C	B
3	E 60th Street & York Ave	NB	T	T	445	445	0	0.24	0.24	18.6	18.6	B	B
		SB	T	T	1016	624	-392	0.53	0.33	22.8	19.6	C	B
		EB	L	L	170	22	-148	0.26	0.05	28.1	24.5	C	C
			T	T	15	15	0	0.27	0.04	28.3	24.3	C	C
			R	R	45	45	0	0.11	0.11	25.3	25.3	C	C
		WB	L	L	0	0	0	-	-	-	-	-	-
			T	T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								22.4	19.6	C	B
4	E 59th Street & 2nd Ave	EB	T	T	1063	121	-942	1.20	0.14	127.9	20.8	F	C
			RR2	R	47	17	-30	0.41	0.29	25.9	23.6	C	C
				R2	104	88	-16	-	-	-	-	-	-
		SB	L2	L2	1561	110	-1451	1.12	0.08	78.7	11.1	E	B
			L2L	L	0	0	0	-	-	-	-	-	-
			T	T	1028	705	-323	0.49	0.34	8.9	13.5	A	B
		Intersection								72.4	15.2	E	B
5	E 60th Street & 2nd Ave	NWB	L2	L2	670	397	-273	0.41	0.24	19.0	17.2	B	B
			L	L	454	269	-185	0.41	0.24	19.3	17.3	B	B
		SB	LT	L2	10	7	-3	-	-	-	-	-	-
				T	1914	416	-1498	0.86	0.19	33.3	15.4	C	B
			R	R	39	18	-21	0.12	0.06	15.8	14.9	B	B
		WB	LT	L	5	2	-3	-	-	-	-	-	-
				T	0	0	0	-	-	15.2	15.0	B	B
		Intersection								27.8	16.5	C	B
6	E 60th Street & 1st Ave	NB	TR	T	1091	649	-442	0.46	0.27	15.8	13.9	B	B
				R	40	24	-16	-	-	-	-	-	-
		EB	L	L	148	116	-32	0.51	0.40	30.7	27.8	C	C
			T	T	190	58	-132	0.18	0.05	16.1	15.0	B	B
		Intersection								17.5	16.0	B	B
7	E 60th Street & Lexington Ave	SB	TR	T	724	418	-306	0.49	0.28	18.9	16.4	B	B
				R	58	33	-25	0.19	0.11	16.9	15.7	B	B
		WB	L	L	98	39	-59	0.32	0.13	19.4	17.3	B	B
			T	T	325	221	-104	0.35	0.24	18.1	17.9	B	B
		Intersection								18.7	16.9	B	B
8a	E 60th Street & Park Ave NB	NB	LT	L	77	54	-23	-	-	-	-	-	-
				T	1014	716	-298	0.53	0.37	21.3	18.7	C	B
		WB	TR	T	298	169	-129	0.40	0.28	26.4	24.7	C	C
				R	85	85	0	-	-	-	-	-	-
		Intersection								22.7	20.3	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	851	790	-61	0.50	0.47	20.5	20.0	C	B
				R	99	92	-7	-	-	-	-	-	-
		WB	LT	L	109	62	-47	-	-	-	-	-	-
				T	266	161	-105	0.44	0.26	12.4	13.1	B	B
		Intersection								18.1	18.5	B	B
9	E 60th Street & Madison Ave	NB	L	L	106	79	-27	0.26	0.20	19.5	18.4	B	B
			T	T	901	675	-226	0.77	0.57	23.0	17.5	C	B
		WB	TR	T	271	230	-41	0.41	0.26	14.1	17.3	B	B
				R	94	23	-71	-	-	-	-	-	-
		Intersection								20.4	17.6	C	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	387	197	-190	0.52	0.27	9.9	7.3	A	A
			R	R	816	418	-398	0.55	0.28	12.1	8.1	B	A
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	105	57	-48	0.17	0.09	27.6	26.8	C	C
		Intersection								12.1	9.4	B	A
11	E 60th Street & 5th Ave	SB	T	T	566	352	-214	0.68	0.42	15.2	4.0	B	A
			R	R	266	166	-100	0.85	0.53	37.6	9.9	D	A
		WB	L	L	150	124	-26	0.46	0.38	27.7	25.8	C	C
			T	T	227	185	-42	0.24	0.20	21.9	21.4	C	C
		Intersection								22.8	12.3	C	B
12	E 63rd Street & York Ave	NB	TR	T	389	264	-125	0.94	0.64	68.3	41.4	E	D
				R	239	127	-112	0.32	0.17	9.1	7.7	A	A
		SB	L	L	416	354	-62	1.00	0.89	97.1	73.8	F	E
			TR	T	671	600	-71	0.86	0.69	44.0	30.6	D	C
				R	75	74	-1	-	-	-	-	-	-
		WB	L	L	398	297	-101	0.51	0.40	39.3	36.2	D	D
			TR	T	171	140	-31	0.52	0.40	36.8	34.4	D	C
				R	15	13	-2	-	-	-	-	-	-
		Intersection								49.4	37.5	D	D
13	E 53rd Street & FDR Drive	SB	R	R	207	178	-29	-	-	-	-	-	-
		SWB	R	R	321	266	-55	-	-	-	-	-	-
		Intersection	Unsignalized										
14	E 61st Street & 5th Ave	SB	T	T	661	509	-152	0.47	0.36	20.6	19.1	C	B
		WB	L	L	171	9	-162	0.18	0.01	18.0	16.3	B	B
		Intersection								20.1	19.1	C	B
15	E 65th Street & 5th Ave	SB	LT	L	65	60	-5	-	-	-	-	-	-
				T	656	604	-52	0.42	0.39	7.3	7.1	A	A
		EB	T	T	737	696	-41	0.88	0.83	42.9	38.8	D	D
			R	R	361	341	-20	0.97	0.92	71.2	60.3	E	E
		Intersection								34.4	30.8	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	631	586	-45	0.71	0.67	21.6	20.7	C	C
				R	378	367	-11	-	-	-	-	-	-
		WB	LT	L	90	78	-12	-	-	-	-	-	-
				T	517	448	-69	0.65	0.57	30.6	28.7	C	C
		Intersection								24.8	23.3	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	69	67	-2	-	-	-	-	-	-
				T	561	546	-15	0.72	0.70	29.2	28.5	C	C
				R	178	169	-9	-	-	-	-	-	-
		EB	T	T	416	373	-43	0.73	0.65	39.1	36.5	D	D
			R	R	216	194	-22	0.99	0.89	90.9	69.6	F	E
		WB	L	L	50	45	-5	0.53	0.48	58.7	54.8	E	D
			T	T	554	485	-69	0.60	0.52	26.1	24.6	C	C
		Intersection								38.1	34.3	D	C
18	E 71st Street & York Ave	NB	LTR	L	35	29	-6	-	-	-	-	-	-
				T	421	294	-127	0.47	0.33	22.4	20.1	C	C
				R	0	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	0	-	-	-	-	-	-
				T	556	469	-87	0.65	0.56	26.8	24.3	C	C
				R	84	76	-8	-	-	-	-	-	-
		WB	L	L	115	110	-5	0.31	0.30	29.0	28.7	C	C
			TR	T	125	124	-1	0.52	0.48	33.7	32.6	C	C
				R	94	81	-13	-	-	-	-	-	-
		Intersection								26.6	25.0	C	C

Upper East Study Area - No-Action vs With-Action (No Mitigation) - Late Night Peak Hour														
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	E 60th Street & Queensboro Bridge Exit	NB	LTR	L	10	9	-1	-	-	-	-	-	-
				T	89	78	-11	-	-	-	-	-	-
				R	308	269	-39	-	-	-	-	-	-
		EB	LT	L	0	0	0	-	-	-	-	-	-
				T	30	10	-20	-	-	-	-	-	-
		Intersection	Unsignalized										
2	E 60th Street & 3rd Ave	NB	L	L	79	67	-12	0.16	0.13	18.2	17.9	B	B
			T	T	1059	901	-158	0.52	0.44	21.5	20.5	C	C
		WB	T	T	378	194	-184	0.66	0.34	13.3	15.6	B	B
			R	R	160	27	-133	0.74	0.12	43.2	33.6	D	C
		Intersection								21.6	19.8	C	B
3	E 60th Street & York Ave	NB	T	T	475	475	0	0.27	0.27	18.8	18.8	B	B
		SB	T	T	635	275	-360	0.32	0.14	19.5	17.4	B	B
		EB	L	L	247	230	-17	0.34	0.32	29.6	29.1	C	C
			T	T	0	0	0	0.35	0.33	30.0	29.5	C	C
			R	R	45	22	-23	0.11	0.05	25.2	24.4	C	C
		WB	L	L	0	0	0	-	-	-	-	-	-
			T	T	0	0	0	-	-	-	-	-	-
			R	R	0	0	0	-	-	-	-	-	-
		Intersection								21.4	21.1	C	C
4	E 59th Street & 2nd Ave	EB	T	T	819	131	-688	0.90	0.14	41.2	20.8	D	C
			RR2	R	166	68	-98	0.86	0.48	50.2	28.0	D	C
				R2	120	91	-29	-	-	-	-	-	-
		SB	L2	L2	1151	127	-1024	0.80	0.09	17.3	2.5	B	A
			L2L	L	11	2	-9	-	-	-	-	-	-
			T	T	1209	616	-593	0.58	0.29	7.7	3.2	A	A
		Intersection								22.7	9.5	C	A
5	E 60th Street & 2nd Ave	NWB	L2	L2	474	142	-332	0.29	0.09	17.6	15.8	B	B
			L	L	444	133	-311	0.40	0.12	19.2	16.2	B	B
		SB	LT	L2	30	10	-20	-	-	-	-	-	-
				T	1892	598	-1294	0.82	0.26	25.9	16.0	C	B
			R	R	89	83	-6	0.24	0.22	17.2	17.0	B	B
		WB	LT	L	5	5	0	-	-	-	-	-	-
				T	5	5	0	0.01	0.01	15.2	15.2	B	B
		Intersection								23.1	16.1	C	B
6	E 60th Street & 1st Ave	NB	TR	T	1290	1073	-217	0.52	0.43	16.5	15.5	B	B
				R	99	82	-17	-	-	-	-	-	-
		EB	L	L	145	109	-36	0.41	0.31	27.3	25.4	C	C
			T	T	193	170	-23	0.18	0.15	16.1	15.9	B	B
		Intersection								17.5	16.4	B	B
7	E 60th Street & Lexington Ave	SB	TR	T	1113	604	-509	0.94	0.51	40.4	20.4	D	C
				R	70	38	-32	0.17	0.09	16.7	15.8	B	B
		WB	L	L	160	46	-114	0.37	0.11	21.4	20.4	C	C
			T	T	297	215	-82	0.35	0.25	19.8	21.9	B	C
		Intersection								33.3	20.6	C	C
8a	E 60th Street & Park Ave NB	NB	LT	L	55	52	-3	-	-	-	-	-	-
				T	552	517	-35	0.32	0.30	18.7	18.5	B	B
		WB	TR	T	332	218	-114	0.46	0.32	28.9	26.7	C	C
				R	35	35	0	-	-	-	-	-	-
		Intersection								22.8	21.2	C	C
8b	E 60th Street & Park Ave NB	SB	TR	T	877	737	-140	0.54	0.45	21.8	20.5	C	C
				R	104	87	-17	-	-	-	-	-	-
		WB	LT	L	110	96	-14	-	-	-	-	-	-
				T	277	174	-103	0.48	0.34	10.0	11.7	B	B
		Intersection								18.3	18.2	B	B
9	E 60th Street & Madison Ave	NB	L	L	82	71	-11	0.16	0.14	17.5	17.3	B	B
			T	T	911	788	-123	0.66	0.57	17.7	15.7	B	B
		WB	TR	T	266	227	-39	0.48	0.32	16.1	18.0	B	B
				R	115	34	-81	-	-	-	-	-	-
		Intersection								17.2	16.4	B	B
10	E 62nd Street & Queensboro Bridge Exit	NB	T	T	982	1099	117	0.70	0.78	13.0	15.4	B	B
			R	R	746	838	92	0.71	0.79	16.7	21.2	B	C
		EB	LT	L	10	6	-4	-	-	-	-	-	-
				T	142	89	-53	0.25	0.16	28.5	27.4	C	C
		Intersection								15.4	17.7	B	B
11	E 60th Street & 5th Ave	SB	T	T	876	497	-379	0.91	0.52	26.0	8.8	C	A
			R	R	284	161	-123	0.71	0.40	20.1	9.3	C	A
		WB	L	L	169	146	-23	0.37	0.32	24.9	24.0	C	C
			T	T	179	152	-27	0.21	0.18	21.7	21.3	C	C
		Intersection								24.3	13.1	C	B
12	E 63rd Street & York Ave	NB	TR	T	189	151	-38	0.46	0.37	35.1	33.0	D	C
				R	377	240	-137	0.47	0.30	7.9	6.2	A	A
		SB	L	L	370	310	-60	0.50	0.41	25.7	21.8	C	C
			TR	T	385	323	-62	0.46	0.38	19.3	18.0	B	B
				R	50	49	-1	-	-	-	-	-	-
		WB	L	L	330	170	-160	0.54	0.30	40.2	34.1	D	C
			TR	T	295	177	-118	0.54	0.30	37.2	32.9	D	C
				R	25	17	-8	-	-	-	-	-	-
		Intersection								25.3	21.9	C	C
13	E 53rd Street & FDR Drive	SB	R	R	158	119	-39	-	-	-	-	-	-
		SWB	R	R	365	298	-67	-	-	-	-	-	-
		Intersection	Unsignalized										
14	E 61st Street & 5th Ave	SB	T	T	976	607	-369	0.59	0.37	22.6	19.1	C	B
		WB	L	L	184	51	-133	0.19	0.05	18.2	16.8	B	B
		Intersection								21.8	18.9	C	B
15	E 65th Street & 5th Ave	SB	LT	L	75	65	-10	-	-	-	-	-	-
				T	731	638	-93	0.47	0.41	6.6	6.6	A	A
		EB	T	T	669	652	-17	0.74	0.73	33.6	32.9	C	C
			R	R	205	200	-5	0.58	0.57	32.7	32.2	C	C
		Intersection								20.0	20.4	C	C
16	E 66th Street & 5th Avenue	SB	TR	T	747	650	-97	0.56	0.50	18.2	17.2	B	B
				R	255	238	-17	-	-	-	-	-	-
		WB	LT	L	59	53	-6	-	-	-	-	-	-
				T	468	419	-49	0.60	0.54	29.4	28.1	C	C
		Intersection								22.1	21.1	C	C
17	E 79th Street & 5th Ave	SB	LTR	L	60	55	-5	-	-	-	-	-	-
				T	617	564	-53	0.56	0.51	25.1	24.3	C	C
				R	70	62	-8	-	-	-	-	-	-
		EB	T	T	354	331	-23	0.56	0.53	34.1	33.4	C	C
			R	R	110	103	-7	0.38	0.35	33.0	32.5	C	C
		WB	L	L	54	47	-7	0.55	0.48	57.9	53.2	E	D
			T	T	388	329	-59	0.40	0.34	22.5	21.7	C	C
		Intersection								28.1	27.3	C	C
18	E 71st Street & York Ave	NB	LTR	L	10	8	-2	-	-	-	-	-	-
				T	236	104	-132	0.21	0.10	18.4	17.1	B	B
				R	0	0	0	-	-	-	-	-	-
		SB	LTR	L	0	0	0	-	-	-	-	-	-
				T	317	181	-136	0.32	0.18	19.8	18.1	B	B
				R	40	26	-14	-	-	-	-	-	-
		WB	L	L	80	75	-5	0.20	0.19	26.7	26.5	C	C
			TR	T	180	178	-2	0.59	0.52	35.3	33.1	D	C
				R	100	70	-30	-	-	-	-	-	-
		Intersection								24.6	24.8	C	C

Upper West Study Area - No-Action vs With-Action (No Mitigation) - AM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph) No-Action	Volume (vph) With-Action	Volume (vph) Increment	V/C No-Action	V/C With-Action	Delay (seconds) No-Action	Delay (seconds) With-Action	LOS No-Action	LOS With-Action
1	W 72nd Street & West End Ave	NB	L	L	104	98	-6	0.36	0.34	20.4	19.7	C	B
			T	T	187	177	-10	0.35	0.33	16.7	16.4	B	B
			R	R	64	60	-4	0.22	0.20	15.7	15.5	B	B
		SB	TR	T	414	406	-8	0.60	0.59	27.8	27.6	C	C
				R	30	30	0	-	-	-	-	-	-
		EB	LTR	L	10	8	-2	-	-	-	-	-	-
				T	131	105	-26	0.64	0.50	37.4	33.2	D	C
				R	116	90	-26	-	-	-	-	-	-
		WB	LTR	L	84	74	-10	-	-	-	-	-	-
				T	138	125	-13	0.75	0.64	43.9	37.7	D	D
				R	44	40	-4	-	-	-	-	-	-
		Intersection								30.0	27.5	C	C
2	W 61st Street & West End Ave	NB	LTR	L	19	15	-4	-	-	-	-	-	-
				T	370	272	-98	0.47	0.35	10.1	9.4	B	A
				R	57	45	-12	-	-	-	-	-	-
		SB	L	L	55	55	0	0.25	0.21	14.8	13.9	B	B
			TR	T	574	450	-124	0.36	0.29	13.4	12.7	B	B
				R	35	35	0	-	-	-	-	-	-
		EB	LTR	L	20	19	-1	-	-	-	-	-	-
				T	15	11	-4	0.34	0.33	28.9	28.8	C	C
				R	55	55	0	-	-	-	-	-	-
		Intersection								13.5	13.2	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	60	57	-3	-	-	-	-	-	-
				T	30	30	0	0.66	0.61	48.3	43.5	D	D
				R	10	10	0	-	-	-	-	-	-
		SB	LTR	L	15	15	0	-	-	-	-	-	-
				T	130	130	0	1.03	1.00	87.9	81.7	F	F
				R	154	147	-7	-	-	-	-	-	-
		EB	TR	L	5	4	-1	-	-	-	-	-	-
				T	502	448	-54	0.59	0.53	12.6	11.5	B	B
				R	330	295	-35	-	-	-	-	-	-
		WB	TR	L	5	5	0	-	-	-	-	-	-
				T	590	547	-43	0.46	0.43	10.6	10.3	B	B
				R	25	24	-1	-	-	-	-	-	-
		Intersection								26.7	25.5	C	C
4a	W 56th Street & 12th Avenue	NB	TR	L	212	207	-5	0.35	0.34	22.2	22.1	C	C
				R	100	99	-1	-	-	-	-	-	-
		EB	LT	L	465	464	-1	-	-	-	-	-	-
				T	705	702	-3	0.86	0.86	7.0	6.8	A	A
		Intersection								10.6	10.4	B	B
4b	W 56th Street & West Side Highway	NB	T	T	2143	2128	-15	1.05	1.05	65.6	63.2	E	E
		SB	L	L	1170	1166	-4	0.91	0.90	47.9	47.5	D	D
			T	T	2958	2936	-22	0.52	0.51	0.7	0.6	A	A
		Intersection								32.1	31.2	C	C
5a	W 55th Street & West Side Highway	NB	L	L	75	75	0	1.01	1.01	206.8	206.8	F	F
			T	T	2013	2002	-11	0.59	0.58	15.6	15.4	B	B
		SB	TR	T	2958	2936	-22	0.92	0.92	33.2	32.7	C	C
				R	0	0	0	-	-	-	-	-	-
		WB	LT	L	126	122	-4	-	-	-	-	-	-
				T	30	29	-1	0.77	0.75	30.1	27.9	C	C
			R	R	130	126	-4	0.36	0.35	6.2	6.2	A	A
		Intersection								28.2	27.8	C	C
5b	W 55th Street & 12th Avenue	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	282	277	-5	0.36	0.35	11.8	11.7	B	B
		SB	TR	T	0	0	0	-	-	-	-	-	-
				R	0	0	0	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	286	277	-9	0.54	0.52	57.9	57.5	E	E
				R	30	29	-1	-	-	-	-	-	-
		Intersection								36.2	35.8	D	D
5c	W 55th Street & West Side Highway Arterial	SB	T	T	0	0	0	-	-	-	-	-	-
		WB	L	L	105	104	-1	0.41	0.40	37.2	35.2	D	D
		Intersection								37.2	35.2	D	D
6	W 60th Street & Broadway	NB	L	L	328	317	-11	0.78	0.76	48.5	46.8	D	D
			T	T	503	486	-17	0.42	0.40	14.3	14.2	B	B
		SB	TR	T	845	689	-156	0.89	0.72	27.7	20.9	C	C
				R	64	52	-12	-	-	-	-	-	-
		Intersection								27.9	24.3	C	C
7	W 60th Street & Columbus Ave	SB	TR	T	972	752	-220	0.73	0.56	5.9	4.6	A	A
				R	78	60	-18	-	-	-	-	-	-
		WB	L	L	235	215	-20	0.92	0.84	46.5	36.6	D	D
			T	T	157	154	-3	0.29	0.29	3.8	3.7	A	A
		Intersection								12.5	10.5	B	B
8	W 60th Street & Amsterdam Ave	NB	LT	L	91	69	-22	-	-	-	-	-	-
				T	912	687	-225	0.47	0.36	14.5	13.2	B	B
		WB	T	T	170	150	-20	0.48	0.43	44.6	46.4	D	D
			R	R	65	64	-1	0.31	0.31	42.9	45.9	D	D
		Intersection								20.9	21.4	C	C
9	W 60th Street & West End Ave	NB	L	L	19	14	-5	0.09	0.06	11.1	10.5	B	B
			T	T	372	276	-96	0.34	0.25	12.3	11.4	B	B
		SB	TR	T	609	489	-120	0.33	0.26	3.1	3.5	A	A
				R	20	16	-4	-	-	-	-	-	-
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	0	0	0	0.12	0.12	21.3	21.3	C	C
				R	30	30	0	-	-	-	-	-	-
		WB	LTR	L	140	137	-3	-	-	-	-	-	-
				T	52	31	-21	0.68	0.58	56.0	54.5	E	D
				R	69	51	-18	-	-	-	-	-	-
		Intersection								16.7	16.7	B	B
10	W 61st Street & Amsterdam Ave	NB	TR	T	972	747	-225	0.44	0.34	3.2	3.6	A	A
				R	5	4	-1	-	-	-	-	-	-
		EB	LT	L	117	102	-15	-	-	-	-	-	-
				T	10	9	-1	0.46	0.40	38.9	39.0	D	D
		WB	R	R	10	10	0	0.04	0.04	23.6	23.6	C	C
		Intersection								8.1	9.0	A	A
11	W 61st Street & Columbus Ave	SB	LT	L	182	156	-26	-	-	-	-	-	-
				T	1050	812	-238	0.77	0.61	22.2	18.1	C	B
		Intersection								22.2	18.1	C	B
12	W 61st Street & Broadway	NB	TR	T	493	476	-17	0.34	0.33	9.6	9.6	A	A
				R	10	10	0	-	-	-	-	-	-
		SB	LT	L	20	0	-20	-	-	-	-	-	-
				T	801	650	-151	0.56	0.40	19.7	17.2	B	B
		EB	LTR	L	30	26	-4	-	-	-	-	-	-
				T	44	39	-5	0.54	0.46	25.7	26.5	C	C
				R	108	91	-17	-	-	-	-	-	-
		Intersection								17.0	15.5	B	B
13	W 61st Street & Columbus Ave	NB	T	T	598	575	-23	0.32	0.31	13.4	13.3	B	B
		EB	L	L	74	49	-25	0.23	0.15	28.1	18.9	C	B
		Intersection								15.1	13.8	B	B
14	W 81st Street & Central Park West	NB	LTR	L	15	14	-1	-	-	-	-	-	-
				T	224	219	-5	0.28	0.27	19.1	19.0	B	B
				R	169	164	-5	0.44	0.42	23.2	22.9	C	C
		SB	LTR	L	165	162	-3	0.57	0.56	28.7	28.2	C	C
				T	385	379	-6	0.88	0.86	43.6	41.1	D	D
				R	45	42	-3	-	-	-	-	-	-
		EB	L	L	15	13	-2	0.18	0.15	44.0	43.2	D	D
			TR	T	312	278	-34	0.92	0.82	61.6	48.2	E	D
				R	10	9	-1	0.04	0.03	23.5	23.4	C	C
		WB	L	L	167	151	-16	0.84	0.68	52.4	34.8	D	C
			T	T	224	188	-36	0.71	0.60	40.8	35.4	D	D
			R	R	118	107	-11	0.41	0.37	30.1	29.2	C	C
		Intersection								39.7	34.4	D	C
15	W 66th Street & Central Park West	NB	LT	L	65	62	-3	-	-	-	-	-	-
				T	353	335	-18	0.43	0.40	3.4	3.2	A	A
		SB	TR	T	656	612	-44	0.57	0.54	20.4	19.6	C	B
				R	45	44	-1	-	-	-	-	-	-
		WB	L	L	177	162	-15	0.51	0.47	31.3	30.2	C	C
			T	T	314	285	-29	0.80	0.73	44.6	39.4	D	D
			R	R	231	211	-20	0.65	0.60	37.0	34.6	D	C
		Intersection								23.6	21.7	C	C
16	W 65th Street & Central Park West	NB	TR	T	388	369	-19	0.84	0.81	37.7	36.2	D	D
				R	255	254	-1	-	-	-	-	-	-
		SB	LT	L	370	345	-25	0.98	0.90	59.2	43.3	E	D
				T	463	429	-34	0.56	0.52	9.8	8.8	A	A
		EB	L	L	30	28	-2	0.09	0.09	22.9	22.9	C	C
			TR	T	499	462	-37	0.77	0.71	36.1	33.6	D	C
				R	25	23	-2	-	-	-	-	-	-
		Intersection								35.2	30.9	D	C

Upper West Study Area - No-Action vs With-Action (With Mitigation) - Midday Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph) No-Action	Volume (vph) With-Action	Volume (vph) Increment	V/C No-Action	V/C With-Action	Delay (seconds) No-Action	Delay (seconds) With-Action	LOS No-Action	LOS With-Action
1	W 72nd Street & West End Ave	NB	L	L	115	107	-8	0.34	0.31	19.0	18.2	B	B
			T	T	284	265	-19	0.49	0.45	19.8	19.1	B	B
			R	R	70	65	-5	0.23	0.22	16.5	16.2	B	B
		SB	TR	T	329	312	-17	0.57	0.55	29.4	28.9	C	C
				R	55	55	0	-	-	-	-	-	-
		EB	LTR	L	25	19	-6	-	-	-	-	-	-
				T	108	81	-27	0.63	0.46	38.5	33.6	D	C
				R	89	62	-27	-	-	-	-	-	-
		WB	LTR	L	80	67	-13	-	-	-	-	-	-
				T	155	137	-18	0.89	0.73	59.6	43.7	E	D
				R	50	44	-6	-	-	-	-	-	-
		Intersection								34.2	29.1	C	C
2	W 61st Street & West End Ave	NB	LTR	L	5	4	-1	-	-	-	-	-	-
				T	366	251	-115	0.42	0.29	9.5	10.3	A	B
				R	60	41	-19	-	-	-	-	-	-
		SB	L	L	14	14	0	0.07	0.06	12.6	12.3	B	B
			TR	T	568	375	-193	0.32	0.22	14.0	13.0	B	B
				R	15	15	0	-	-	-	-	-	-
		EB	LTR	L	5	5	0	-	-	-	-	-	-
				T	20	20	0	0.17	0.17	24.0	24.0	C	C
				R	35	35	0	-	-	-	-	-	-
		Intersection								12.8	12.9	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	70	66	-4	-	-	-	-	-	-
				T	45	45	0	0.46	0.43	31.6	30.5	C	C
				R	5	5	0	-	-	-	-	-	-
		SB	LTR	L	5	5	0	-	-	-	-	-	-
				T	65	65	0	0.68	0.65	38.8	37.4	D	D
				R	130	122	-8	-	-	-	-	-	-
		EB	TR	L	20	17	-3	-	-	-	-	-	-
				T	313	265	-48	0.53	0.44	12.7	11.5	B	B
				R	357	303	-54	-	-	-	-	-	-
		WB	TR	L	0	0	0	-	-	-	-	-	-
				T	533	483	-50	0.38	0.34	10.6	10.2	B	B
				R	50	48	-2	-	-	-	-	-	-
		Intersection								16.8	16.3	B	B
4a	W 56th Street & 12th Avenue	NB	TR	L	258	252	-6	0.25	0.25	4.0	3.9	A	A
				R	85	84	-1	-	-	-	-	-	-
		EB	LT	L	270	265	-5	-	-	-	-	-	-
				T	290	285	-5	0.84	0.82	16.8	15.5	B	B
		Intersection								11.6	10.8	B	B
4b	W 56th Street & West Side Highway	NB	T	T	2417	2398	-19	0.78	0.78	10.5	10.1	B	B
		SB	L	L	560	550	-10	0.91	0.89	63.0	60.8	E	E
			T	T	2307	2255	-52	0.81	0.79	49.6	49.4	D	D
		Intersection								33.6	33.0	C	C
5a	W 55th Street & West Side Highway	NB	L	L	155	155	0	1.05	1.05	165.1	165.1	F	F
			T	T	2232	2222	-10	0.71	0.70	19.0	18.9	B	B
		SB	TR	T	2307	2255	-52	0.91	0.89	79.9	79.3	E	E
				R	0	0	0	-	-	-	-	-	-
		WB	LT	L	162	155	-7	-	-	-	-	-	-
				T	65	62	-3	0.80	0.77	26.5	23.2	C	C
			R	R	185	176	-9	0.42	0.40	5.9	5.7	A	A
		Intersection								50.5	49.9	D	D
5b	W 55th Street & 12th Avenue	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	298	293	-5	0.43	0.43	15.5	15.4	B	B
		SB	TR	T	0	0	0	-	-	-	-	-	-
				R	0	0	0	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	412	393	-19	0.56	0.53	42.7	42.1	D	D
				R	45	43	-2	-	-	-	-	-	-
		Intersection								31.9	31.3	C	C
5c	W 55th Street & West Side Highway Arterial	SB	T	T	0	0	0	-	-	-	-	-	-
		WB	L	L	220	217	-3	0.57	0.57	66.0	62.0	E	E
		Intersection								66.0	62.0	E	E
6	W 60th Street & Broadway	NB	L	L	338	327	-11	0.83	0.81	52.2	49.9	D	D
			T	T	450	436	-14	0.36	0.35	13.6	13.5	B	B
		SB	TR	T	753	544	-209	0.86	0.62	34.5	21.6	C	C
				R	79	57	-22	-	-	-	-	-	-
		Intersection								32.6	26.3	C	C
7	W 60th Street & Columbus Ave	SB	TR	T	967	636	-331	0.74	0.48	6.6	4.2	A	A
				R	123	81	-42	-	-	-	-	-	-
		WB	L	L	214	181	-33	0.75	0.63	25.2	19.1	C	B
			T	T	203	203	0	0.32	0.32	3.5	3.1	A	A
		Intersection								8.8	6.5	A	A
8	W 60th Street & Amsterdam Ave	NB	LT	L	64	46	-18	-	-	-	-	-	-
				T	1031	735	-296	0.48	0.35	14.6	13.0	B	B
		WB	T	T	241	199	-42	0.60	0.50	45.3	45.2	D	D
			R	R	85	85	0	0.36	0.36	41.1	44.1	D	D
		Intersection								22.0	22.3	C	C
9	W 60th Street & West End Ave	NB	L	L	10	7	-3	0.05	0.03	10.3	9.9	B	A
			T	T	356	221	-135	0.29	0.18	11.8	10.8	B	B
		SB	TR	T	588	400	-188	0.30	0.21	5.2	5.2	A	A
				R	15	10	-5	-	-	-	-	-	-
		EB	LTR	L	0	0	0	-	-	-	-	-	-
				T	0	0	0	0.07	0.07	20.6	20.6	C	C
				R	20	20	0	-	-	-	-	-	-
		WB	LTR	L	170	170	0	-	-	-	-	-	-
				T	60	0	-60	0.72	0.63	47.9	45.8	D	D
				R	75	75	0	-	-	-	-	-	-
		Intersection								17.9	18.4	B	B
10	W 61st Street & Amsterdam Ave	NB	TR	T	1106	812	-294	0.47	0.35	3.6	4.3	A	A
				R	10	8	-2	-	-	-	-	-	-
		EB	LT	L	84	67	-17	-	-	-	-	-	-
				T	10	8	-2	0.28	0.23	34.0	32.4	C	C
		WB	R	R	20	20	0	0.06	0.06	23.9	23.9	C	C
		Intersection								6.8	7.5	A	A
11	W 61st Street & Columbus Ave	SB	LT	L	224	187	-37	-	-	-	-	-	-
				T	1090	717	-373	0.82	0.57	23.8	17.3	C	B
		Intersection								23.8	17.3	C	B
12	W 61st Street & Broadway	NB	TR	T	442	435	-7	0.28	0.27	5.1	5.1	A	A
				R	8	1	-7	-	-	-	-	-	-
		SB	LT	L	30	6	-24	-	-	-	-	-	-
				T	688	483	-205	0.53	0.34	19.2	16.6	B	B
		EB	LTR	L	45	39	-6	-	-	-	-	-	-
				T	35	30	-5	0.66	0.55	37.9	38.6	D	D
				R	144	118	-26	-	-	-	-	-	-
		Intersection								18.0	16.1	B	B
13	W 61st Street & Columbus Ave	NB	T	T	617	578	-39	0.34	0.32	13.6	13.3	B	B
		EB	L	L	73	37	-36	0.25	0.13	24.0	9.4	C	A
		Intersection								14.7	13.1	B	B
14	W 81st Street & Central Park West	NB	LTR	L	40	37	-3	-	-	-	-	-	-
				T	395	386	-9	0.50	0.48	21.7	21.4	C	C
				R	255	247	-8	0.91	0.88	60.8	55.9	E	E
		SB	LTR	L	85	79	-6	0.48	0.44	29.3	27.6	C	C
				T	305	287	-18	0.77	0.72	35.8	32.3	D	C
				R	40	35	-5	-	-	-	-	-	-
		EB	L	L	15	13	-2	0.20	0.16	44.7	43.8	D	D
			TR	T	299	263	-36	0.74	0.65	40.7	36.1	D	D
				R	30	27	-3	0.19	0.17	27.2	26.8	C	C
		WB	L	L	178	159	-19	0.91	0.77	64.5	42.3	E	D
			T	T	261	219	-42	0.64	0.54	36.0	32.4	D	C
			R	R	158	142	-16	0.57	0.51	35.2	33.3	D	C
		Intersection								38.7	34.1	D	C
15	W 66th Street & Central Park West	NB	LT	L	45	43	-2	-	-	-	-	-	-
				T	474	453	-21	0.44	0.41	1.6	1.5	A	A
		SB	TR	T	585	523	-62	0.55	0.50	20.6	19.6	C	B
				R	55	53	-2	-	-	-	-	-	-
		WB	L	L	218	197	-21	0.65	0.59	36.1	33.7	D	C
			T	T	387	347	-40	0.98	0.88	71.1	52.5	E	D
			R	R	273	246	-27	0.81	0.73	49.0	42.3	D	D
		Intersection								30.9	25.5	C	C
16	W 65th Street & Central Park West	NB	TR	T	464	447	-17	0.81	0.79	34.6	33.5	C	C
				R	200	199	-1	-	-	-	-	-	-
		SB	LT	L	332	300	-32	0.78	0.69	34.0	29.0	C	C
				T	471	420	-51	0.54	0.48	11.0	10.3	B	B
		EB	L	L	55	49	-6	0.18	0.15	25.5	25.2	C	C
			TR	T	363	321	-42	0.61	0.54	32.0	30.4	C	C
				R	30	27	-3	-	-	-	-	-	-
		Intersection								28.1	26.6	C	C

Upper West Study Area - No-Action vs With-Action (No Mitigation) - PM Peak Hour

Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	W 72nd Street & West End Ave	NB	L	L	150	136	-14	0.37	0.32	18.3	16.7	B	B
			T	T	626	568	-58	0.87	0.79	34.0	27.4	C	C
			R	R	135	122	-13	0.34	0.31	15.8	15.2	B	B
		SB	TR	T	363	325	-38	0.64	0.58	35.7	34.1	D	C
				R	30	30	0	-	-	-	-	-	-
		EB	LTR	L	20	13	-7	-	-	-	-	-	-
				T	96	62	-34	0.65	0.38	41.7	33.8	D	C
				R	90	48	-42	-	-	-	-	-	-
		WB	LTR	L	79	59	-20	-	-	-	-	-	-
				T	120	102	-18	0.83	0.63	55.3	40.9	E	D
				R	45	38	-7	-	-	-	-	-	-
		Intersection								35.6	29.3	D	C
2	W 61st Street & West End Ave	NB	LTR	L	15	11	-4	-	-	-	-	-	-
				T	746	490	-256	0.68	0.45	10.9	9.8	B	A
				R	48	37	-11	-	-	-	-	-	-
		SB	L	L	35	35	0	0.23	0.14	15.6	12.7	B	B
			TR	T	723	495	-228	0.39	0.28	13.6	12.4	B	B
				R	20	20	0	-	-	-	-	-	-
		EB	LTR	L	25	23	-2	-	-	-	-	-	-
				T	20	0	-20	0.27	0.08	27.2	24.1	C	C
				R	35	0	-35	-	-	-	-	-	-
		Intersection								13.0	11.4	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	40	36	-4	-	-	-	-	-	-
				T	185	185	0	0.78	0.75	46.6	44.3	D	D
				R	15	15	0	-	-	-	-	-	-
		SB	LTR	L	5	5	0	-	-	-	-	-	-
				T	60	59	-1	0.62	0.57	39.0	36.8	D	D
				R	99	87	-12	-	-	-	-	-	-
		EB	TR	L	60	51	-9	-	-	-	-	-	-
				T	605	507	-98	0.78	0.64	17.1	13.1	B	B
				R	352	295	-57	-	-	-	-	-	-
		WB	TR	L	0	0	0	-	-	-	-	-	-
				T	419	345	-74	0.41	0.35	9.5	9.0	A	A
				R	156	146	-10	-	-	-	-	-	-
		Intersection								20.6	18.5	C	B
4a	W 56th Street & 12th Avenue	NB	TR	L	290	277	-13	0.28	0.27	4.2	4.2	A	A
				R	129	124	-5	-	-	-	-	-	-
		EB	LT	L	160	158	-2	-	-	-	-	-	-
				T	410	404	-6	0.76	0.75	17.2	15.8	B	B
		Intersection								11.4	10.7	B	B
4b	W 56th Street & West Side Highway	NB	T	T	2667	2625	-42	0.79	0.78	8.7	8.2	A	A
		SB	L	L	570	562	-8	0.92	0.91	77.6	74.9	E	E
			T	T	2014	1970	-44	0.36	0.35	0.2	0.2	A	A
		Intersection								13.9	13.3	B	B
5a	W 55th Street & West Side Highway	NB	L	L	15	15	0	0.21	0.21	73.1	73.1	E	E
			T	T	2478	2448	-30	0.68	0.67	15.9	15.7	B	B
		SB	TR	T	2014	1970	-44	0.66	0.64	23.7	23.3	C	C
				R	0	0	0	-	-	-	-	-	-
		WB	LT	L	315	301	-14	0.80	0.75	25.3	21.6	C	C
				T	10	10	0	0.88	0.84	39.1	33.5	D	C
			R	R	189	177	-12	0.77	0.74	22.9	21.7	C	C
		Intersection								20.8	20.1	C	C
5b	W 55th Street & 12th Avenue	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	399	382	-17	0.46	0.44	13.4	13.1	B	B
		SB	TR	T	0	0	0	-	-	-	-	-	-
				R	0	0	0	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	514	488	-26	0.76	0.72	64.7	62.8	E	E
				R	20	19	-1	-	-	-	-	-	-
		Intersection								42.6	41.3	D	D
5c	W 55th Street & West Side Highway Arterial	SB	T	T	0	0	0	-	-	-	-	-	-
		WB	L	L	25	25	0	0.08	0.08	7.1	6.7	A	A
		Intersection								7.1	6.7	A	A
6	W 60th Street & Broadway	NB	L	L	303	289	-14	0.71	0.68	44.1	42.6	D	D
			T	T	640	611	-29	0.49	0.47	15.3	14.9	B	B
		SB	TR	T	847	599	-248	0.93	0.66	43.8	22.5	D	C
				R	88	62	-26	-	-	-	-	-	-
		Intersection								34.1	23.3	C	C
7	W 60th Street & Columbus Ave	SB	TR	T	1133	653	-480	0.82	0.47	8.1	4.2	A	A
				R	126	73	-53	-	-	-	-	-	-
		WB	L	L	190	162	-28	0.69	0.59	25.9	20.8	C	C
			T	T	201	189	-12	0.35	0.33	5.0	4.3	A	A
		Intersection								9.7	6.7	A	A
8	W 60th Street & Amsterdam Ave	NB	LT	L	97	66	-31	-	-	-	-	-	-
				T	1371	926	-445	0.65	0.44	17.1	14.0	B	B
		WB	T	T	222	183	-39	0.60	0.50	45.7	49.3	D	D
			R	R	105	79	-26	0.49	0.37	46.1	49.1	D	D
		Intersection								22.6	21.7	C	C
9	W 60th Street & West End Ave	NB	L	L	10	7	-3	0.05	0.03	10.5	9.9	B	A
			T	T	679	432	-247	0.54	0.34	15.1	12.3	B	B
		SB	TR	T	748	488	-260	0.39	0.25	5.8	5.1	A	A
				R	10	7	-3	-	-	-	-	-	-
		EB	LTR	L	10	10	0	-	-	-	-	-	-
				T	0	0	0	0.10	0.10	21.0	21.0	C	C
				R	25	25	0	-	-	-	-	-	-
		WB	LTR	L	130	116	-14	-	-	-	-	-	-
				T	69	37	-32	0.74	0.59	44.2	42.1	D	D
				R	120	96	-24	-	-	-	-	-	-
		Intersection								16.9	16.2	B	B
10	W 61st Street & Amsterdam Ave	NB	TR	T	1456	991	-465	0.61	0.42	3.4	3.1	A	A
				R	20	14	-6	-	-	-	-	-	-
		EB	LT	L	98	60	-38	-	-	-	-	-	-
				T	5	12	7	0.32	0.22	32.5	39.8	C	D
		WB	R	R	20	19	-1	0.07	0.06	23.9	23.9	C	C
		Intersection								5.7	6.1	A	A
11	W 61st Street & Columbus Ave	SB	LT	L	194	141	-53	-	-	-	-	-	-
				T	1259	726	-533	0.83	0.50	24.4	16.2	C	B
		Intersection								24.4	16.2	C	B
12	W 61st Street & Broadway	NB	TR	T	630	601	-29	0.38	0.36	5.3	5.2	A	A
				R	10	10	0	-	-	-	-	-	-
		SB	LT	L	40	4	-36	-	-	-	-	-	-
				T	814	576	-238	0.60	0.37	20.6	16.8	C	B
		EB	LTR	L	35	27	-8	-	-	-	-	-	-
				T	38	29	-9	0.51	0.36	32.7	34.4	C	C
				R	121	85	-36	-	-	-	-	-	-
		Intersection								16.2	13.4	B	B
13	W 61st Street & Columbus Ave	NB	T	T	806	761	-45	0.42	0.40	14.5	14.2	B	B
		EB	L	L	88	43	-45	0.29	0.14	26.1	14.8	C	B
		Intersection								15.7	14.3	B	B
14	W 81st Street & Central Park West	NB	LTR	L	25	23	-2	-	-	-	-	-	-
				T	621	603	-18	0.61	0.59	22.8	22.4	C	C
				R	255	245	-10	0.80	0.77	41.6	38.9	D	D
		SB	LTR	L	59	56	-3	0.44	0.40	30.8	28.5	C	C
				T	272	261	-11	0.65	0.61	29.1	27.9	C	C
				R	34	31	-3	-	-	-	-	-	-
		EB	L	L	25	21	-4	0.28	0.23	47.1	45.5	D	D
			TR	T	306	252	-54	0.89	0.73	55.4	40.6	E	D
				R	25	21	-4	0.13	0.11	25.5	25.1	C	C
		WB	L	L	204	182	-22	0.99	0.78	79.0	40.7	E	D
			T	T	283	237	-46	0.74	0.62	40.9	35.0	D	D
			R	R	209	186	-23	0.75	0.67	45.6	40.0	D	D
		Intersection								40.2	32.4	D	C
15	W 66th Street & Central Park West	NB	LT	L	35	33	-2	-	-	-	-	-	-
				T	645	614	-31	0.55	0.52	13.0	9.5	B	A
		SB	TR	T	586	522	-64	0.54	0.49	20.3	19.4	C	B
				R	40	38	-2	-	-	-	-	-	-
		WB	L	L	173	141	-32	0.46	0.37	29.7	27.9	C	C
			T	T	391	343	-48	1.03	0.90	85.6	57.8	F	E
			R	R	292	258	-34	0.85	0.75	51.7	42.7	D	D
		Intersection								34.6	26.4	C	C
16	W 65th Street & Central Park West	NB	TR	T	630	603	-27	0.94	0.91	51.0	43.9	D	D
				R	250	249	-1	-	-	-	-	-	-
		SB	LT	L	326	287	-39	0.91	0.78	95.3	87.5	F	F
				T	433	376	-57	0.50	0.43	9.8	9.0	A	A
		EB	L	L	50	44	-6	0.17	0.14	25.4	25.1	C	C
			TR	T	462	404	-58	0.78	0.68	38.3	34.0	D	C
				R	40	35	-5	-	-	-	-	-	-
		Intersection								46.0	41.0	D	D

Upper West Study Area - No-Action vs With-Action (No Mitigation) - Late Night Peak Hour													
Intersection #	Intersection Name	Approach	Lane Group	Movement	Volume (vph)			V/C		Delay (seconds)		LOS	
					No-Action	With-Action	Increment	No-Action	With-Action	No-Action	With-Action	No-Action	With-Action
1	W 72nd Street & West End Ave	NB	L	L	93	83	-10	0.23	0.20	16.0	15.0	B	B
			T	T	133	119	-14	0.20	0.17	15.1	13.6	B	B
			R	R	59	53	-6	0.15	0.13	15.0	13.6	B	B
		SB	TR	T	295	273	-22	0.41	0.35	26.2	24.1	C	C
				R	25	25	0	-	-	-	-	-	-
		EB	LTR	L	10	8	-2	-	-	-	-	-	-
				T	104	81	-23	0.46	0.32	33.1	29.9	C	C
				R	79	56	-23	-	-	-	-	-	-
		WB	LTR	L	65	48	-17	-	-	-	-	-	-
				T	126	102	-24	0.58	0.41	36.5	31.5	D	C
				R	30	24	-6	-	-	-	-	-	-
		Intersection								27.0	23.8	C	C
2	W 61st Street & West End Ave	NB	LTR	L	10	7	-3	-	-	-	-	-	-
				T	269	146	-123	0.26	0.14	8.2	11.4	A	B
				R	24	14	-10	-	-	-	-	-	-
		SB	L	L	30	30	0	0.10	0.08	12.7	11.9	B	B
			TR	T	555	335	-220	0.28	0.17	13.5	12.0	B	B
				R	15	15	0	-	-	-	-	-	-
		EB	LTR	L	10	9	-1	-	-	-	-	-	-
				T	20	20	0	0.16	0.15	23.8	22.9	C	C
				R	25	25	0	-	-	-	-	-	-
		Intersection								12.5	12.9	B	B
3a	W 79th Street & Riverside Drive	NB	LTR	L	40	38	-2	-	-	-	-	-	-
				T	35	35	0	0.25	0.23	26.1	25.1	C	C
				R	5	5	0	-	-	-	-	-	-
		SB	LTR	L	5	5	0	-	-	-	-	-	-
				T	50	49	-1	0.46	0.42	30.4	28.6	C	C
				R	85	79	-6	-	-	-	-	-	-
		EB	TR	L	5	4	-1	-	-	-	-	-	-
				T	396	307	-89	0.42	0.32	11.1	9.5	B	A
				R	173	134	-39	-	-	-	-	-	-
		WB	TR	L	0	0	0	-	-	-	-	-	-
				T	484	444	-40	0.36	0.32	10.4	9.6	B	A
				R	30	29	-1	-	-	-	-	-	-
		Intersection								13.8	12.9	B	B
4a	W 56th Street & 12th Avenue	NB	TR	L	161	136	-25	0.13	0.11	1.5	1.5	A	A
				R	44	38	-6	-	-	-	-	-	-
		EB	LT	L	140	135	-5	-	-	-	-	-	-
				T	280	271	-9	0.76	0.63	14.6	6.2	B	A
		Intersection								10.0	4.7	A	A
4b	W 56th Street & West Side Highway	NB	T	T	2966	2884	-82	0.85	0.81	21.3	12.5	C	B
		SB	L	L	420	406	-14	0.84	0.69	60.8	48.5	E	D
			T	T	1338	1274	-64	0.25	0.24	0.1	0.1	A	A
		Intersection								19.0	12.5	B	B
5a	W 55th Street & West Side Highway	NB	L	L	5	5	0	0.06	0.05	55.0	52.6	D	D
			T	T	2696	2648	-48	0.83	0.79	24.6	20.7	C	C
		SB	TR	T	1338	1274	-64	0.55	0.50	23.7	21.6	C	C
				R	0	0	0	-	-	-	-	-	-
		WB	LT	L	105	93	-12	-	-	-	-	-	-
				T	5	4	-1	0.39	0.31	6.9	6.3	A	A
			R	R	270	236	-34	0.54	0.43	7.4	6.1	A	A
		Intersection								22.7	19.7	C	B
5b	W 55th Street & 12th Avenue	NB	LT	L	0	0	0	-	-	-	-	-	-
				T	195	165	-30	0.26	0.21	12.7	11.3	B	B
		SB	TR	T	0	0	0	-	-	-	-	-	-
				R	0	0	0	-	-	-	-	-	-
		WB	LTR	L	0	0	0	-	-	-	-	-	-
				T	380	333	-47	0.45	0.36	40.4	36.7	D	D
				R	10	9	-1	-	-	-	-	-	-
		Intersection								31.1	28.4	C	C
5c	W 55th Street & West Side Highway Arterial	SB	T	T	0	0	0	-	-	-	-	-	-
		WB	L	L	10	9	-1	0.03	0.02	2.5	2.3	A	A
		Intersection								2.5	2.3	A	A
6	W 60th Street & Broadway	NB	L	L	312	291	-21	0.68	0.46	42.1	31.5	D	C
			T	T	476	444	-32	0.34	0.28	13.3	9.6	B	A
		SB	TR	T	620	363	-257	0.76	0.43	25.6	20.7	C	C
				R	85	50	-35	-	-	-	-	-	-
		Intersection								25.3	19.3	C	B
7	W 60th Street & Columbus Ave	SB	TR	T	1024	476	-548	0.70	0.32	5.8	4.0	A	A
				R	70	33	-37	-	-	-	-	-	-
		WB	L	L	235	180	-55	0.75	0.55	28.6	19.1	C	B
			T	T	162	161	-1	0.27	0.26	4.9	4.3	A	A
		Intersection								9.4	7.4	A	A
8	W 60th Street & Amsterdam Ave	NB	LT	L	40	34	-6	-	-	-	-	-	-
				T	949	777	-172	0.40	0.32	13.5	12.2	B	B
		WB	T	T	147	127	-20	0.38	0.32	44.0	44.9	D	D
			R	R	85	67	-18	0.30	0.23	43.6	44.3	D	D
		Intersection								20.0	19.2	B	B
9	W 60th Street & West End Ave	NB	L	L	15	9	-6	0.06	0.03	10.4	9.3	B	A
			T	T	258	120	-138	0.18	0.08	10.8	9.5	B	A
		SB	TR	T	570	354	-216	0.29	0.17	5.2	5.0	A	A
				R	10	6	-4	-	-	-	-	-	-
		EB	LTR	L	0	0	0	-	-	-	-	-	-
				T	0	0	0	0.04	0.03	20.0	19.3	B	B
				R	15	15	0	-	-	-	-	-	-
		WB	LTR	L	100	94	-6	-	-	-	-	-	-
				T	42	20	-22	0.47	0.39	41.8	39.9	D	D
				R	45	47	2	-	-	-	-	-	-
		Intersection								13.8	15.3	B	B
10	W 61st Street & Amsterdam Ave	NB	TR	T	1019	831	-188	0.43	0.35	5.0	4.4	A	A
				R	15	13	-2	-	-	-	-	-	-
		EB	LT	L	70	60	-10	-	-	-	-	-	-
				T	4	4	0	0.20	0.16	30.3	28.9	C	C
		WB	R	R	25	24	-1	0.07	0.07	22.6	21.8	C	C
		Intersection								7.2	6.7	A	A
11	W 61st Street & Columbus Ave	SB	LT	L	184	156	-28	-	-	-	-	-	-
				T	1094	509	-585	0.70	0.36	19.8	13.9	B	B
		Intersection								19.8	13.9	B	B
12	W 61st Street & Broadway	NB	TR	T	476	444	-32	0.26	0.24	5.0	7.0	A	A
				R	0	0	0	-	-	-	-	-	-
		SB	LT	L	20	0	-20	-	-	-	-	-	-
				T	590	317	-273	0.39	0.18	17.1	14.3	B	B
		EB	LTR	L	40	37	-3	-	-	-	-	-	-
				T	29	23	-6	0.49	0.39	34.8	36.1	C	D
				R	115	96	-19	-	-	-	-	-	-
		Intersection								15.4	14.7	B	B
13	W 61st Street & Columbus Ave	NB	T	T	683	609	-74	0.34	0.30	13.6	12.6	B	B
		EB	L	L	49	23	-26	0.16	0.07	19.0	1.8	B	A
		Intersection								14.0	12.2	B	B
14	W 81st Street & Central Park West	NB	LTR	L	30	29	-1	-	-	-	-	-	-
				T	320	318	-2	0.38	0.37	20.5	19.6	C	B
				R	170	164	-6	0.36	0.33	21.4	20.3	C	C
		SB	LTR	L	55	45	-10	0.19	0.15	19.5	18.3	B	B
				T	201	172	-29	0.50	0.42	24.4	21.8	C	C
				R	25	20	-5	-	-	-	-	-	-
		EB	L	L	15	14	-1	0.18	0.15	44.0	41.7	D	D
			TR	T	244	219	-25	0.66	0.57	36.4	32.3	D	C
				R	30	28	-2	0.09	0.08	24.2	23.4	C	C
		WB	L	L	93	76	-17	0.37	0.27	21.2	18.2	C	B
			T	T	210	163	-47	0.56	0.42	32.7	28.5	C	C
			R	R	137	111	-26	0.43	0.34	30.2	27.4	C	C
		Intersection								26.8	24.1	C	C
15	W 66th Street & Central Park West	NB	LT	L	30	29	-1	-	-	-	-	-	-
				T	444	429	-15	0.34	0.31	1.2	1.1	A	A
		SB	TR	T	403	316	-87	0.36	0.28	17.5	16.0	B	B
				R	30	29	-1	-	-	-	-	-	-
		WB	L	L	104	69	-35	0.29	0.18	26.3	24.0	C	C
			T	T	360	293	-67	0.86	0.67	49.0	35.0	D	C
			R	R	242	200	-42	0.73	0.58	41.4	33.1	D	C
		Intersection								24.5	18.5	C	B
16	W 65th Street & Central Park West	NB	TR	T	439	425	-14	0.84	0.79	35.8	32.5	D	C
				R	305	302	-3	-	-	-	-	-	-
		SB	LT	L	212	165	-47	0.57	0.43	22.3	14.0	C	B
				T	295	220	-75	0.32	0.24	6.8	4.2	A	A
		EB	L	L	35	33	-2	0.10	0.09	24.5	23.6	C	C
			TR	T	419	395	-24	0.61	0.55	31.6	29.6	C	C
				R	30	29	-1	-	-	-	-	-	-
		Intersection								28.0	25.6	C	C

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.6, Transportation:
Highway Capacity Software Files

August 2022

Three highway segments were analyzed which operate at speeds of 40 mph or higher using the HCS as a screening tool at spot locations to determine if further detailed analysis was needed.

- Bayonne Bridge
- RFK Bridge Queens Leg
- New Jersey Turnpike - Eastern Spur

The results of the HCS screening analysis shown in **Table 4B.6-1** indicate that all three highways have sufficient capacity to absorb additional traffic volumes with only minor changes in density, speeds, and travel times for all tolling scenarios.

Table 4B.6-1 Summary of Highway Capacity Software Results

DIRECTION	LOCATION	HOURLY VOLUME			
		EXISTING CONDITION	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume					
Northbound	Bayonne Bridge	1,075	1,091	1,467	376
	RFK Bridge	4,452	4,575	5,083	508
	Eastern Spur I-95 (Pre-ramp)	152	152	208	56
	Merge from 495	641	660	657	-3
	Eastern Spur I-95 (Post-ramp)	793	811	865	53
Southbound	Bayonne Bridge	659	678	759	81
	RFK Bridge	4,951	5,127	5,524	396
	Eastern Spur I-95 (Pre-ramp)	1,063	1,145	1,244	98
	Diverge to 495	630	627	686	59
	Eastern Spur I-95 (Post-ramp)	433	519	558	39
Density (pc/mi/ln)					
Northbound	Bayonne Bridge	15.4	15.6	20.5	4.9
	RFK Bridge	31.1	32	35.6	3.6
	Eastern Spur I-95 (Pre-ramp)	1.4	1.4	1.8	0.4
	Merge from 495	8.2	8.4	8.6	0.2
	Eastern Spur I-95 (Post-ramp)	6.5	6.7	7.1	0.4
Southbound	Bayonne Bridge	10.5	10.8	11.8	1
	RFK Bridge	34.4	35.6	38.3	2.7
	Eastern Spur I-95 (Pre-ramp)	8.6	9.3	9.9	0.6
	Diverge to 495	4.9	5.2	5.6	0.4
	Eastern Spur I-95 (Post-ramp)	3.4	4.1	4.3	0.2

DIRECTION	LOCATION	HOURLY VOLUME			
		EXISTING CONDITION	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Level of Service (LOS)					
Northbound	Bayonne Bridge	B	B	C	—
	RFK Bridge	D	D	E	X
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Merge from 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—
Southbound	Bayonne Bridge	A	A	B	—
	RFK Bridge	D	E	E	X
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Diverge to 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.917	5744	8800	0.65	41.8	34.4	D

Facility Time Period Results

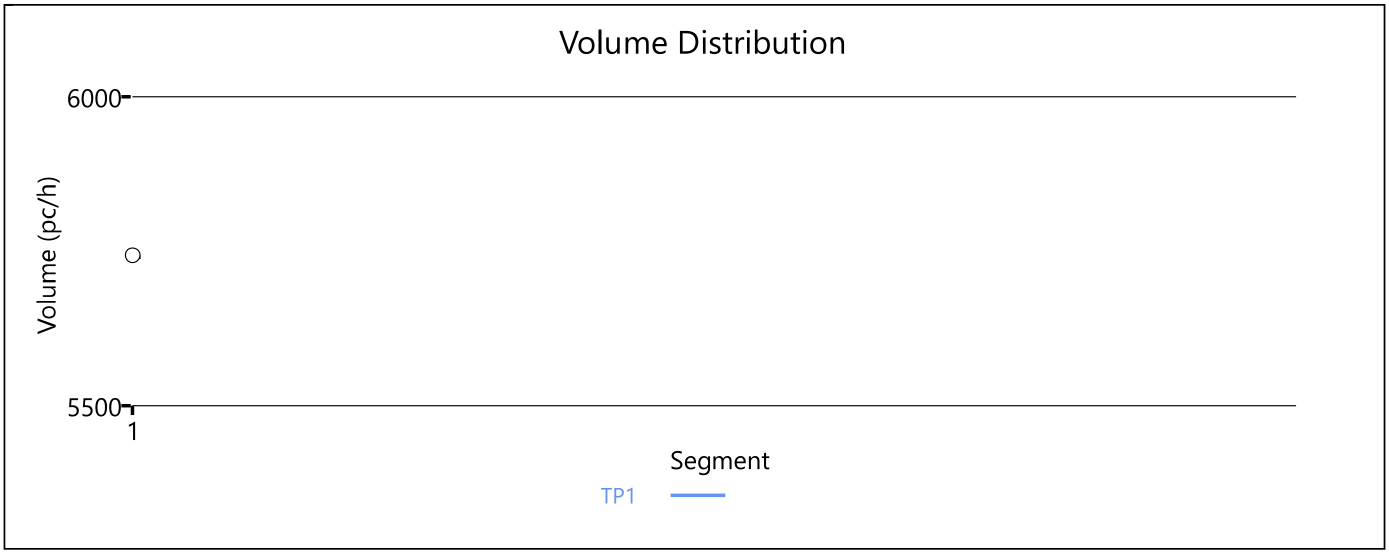
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	34.4	31.5	1.00	D

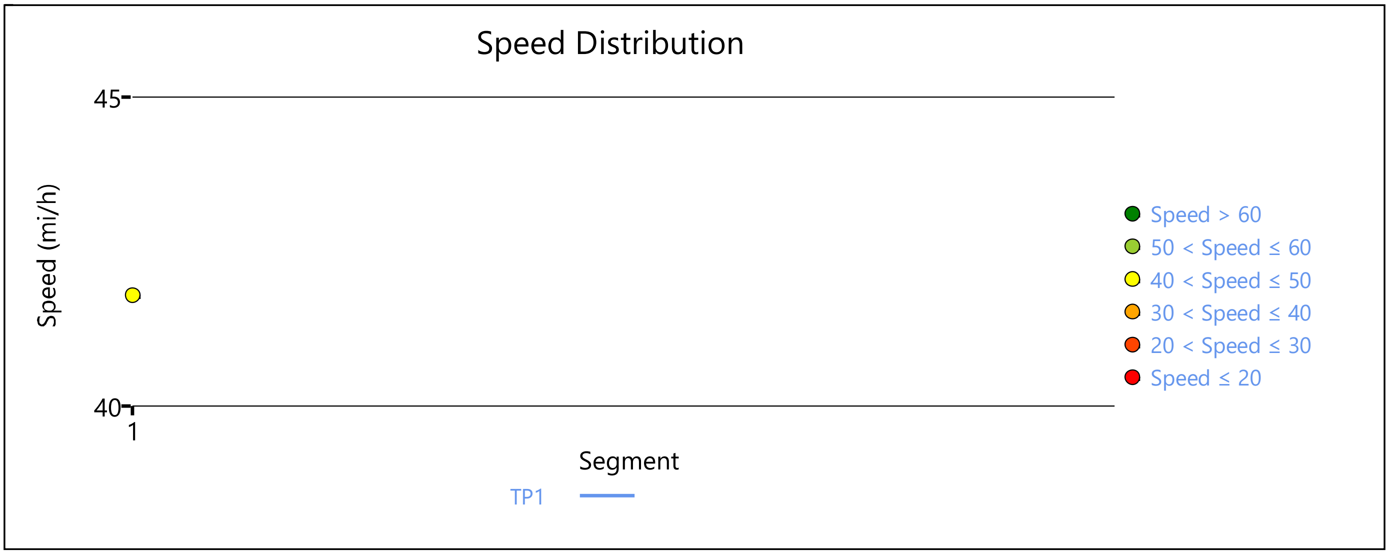
Facility Overall Results

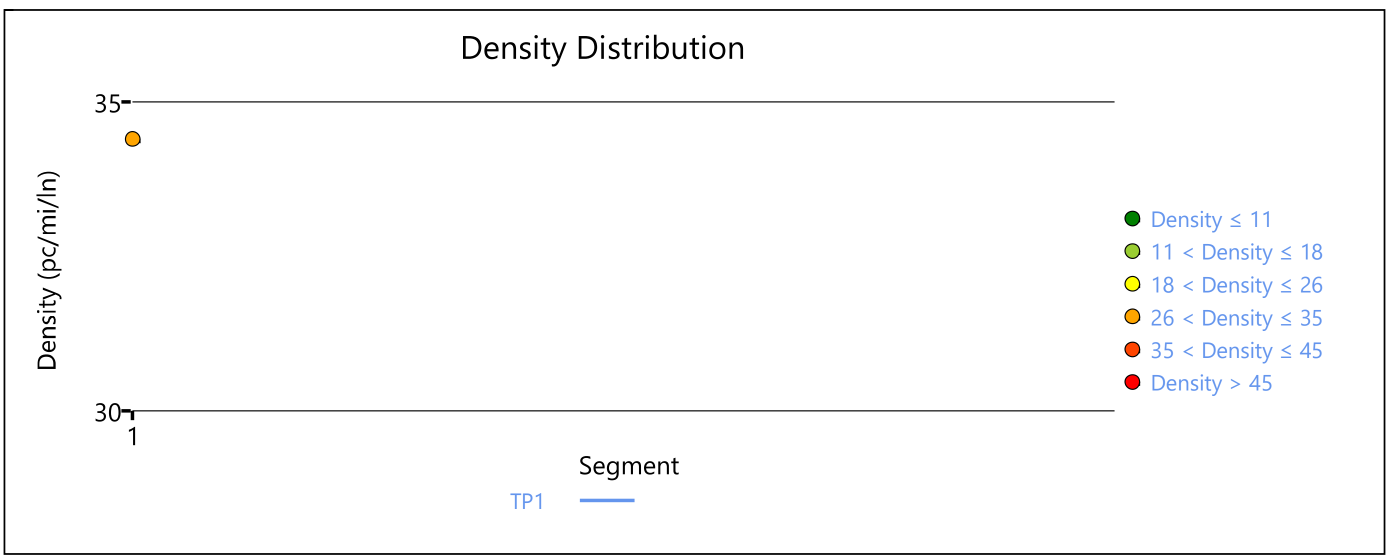
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	31.5
Average Travel Time, min	1.00	Density, pc/mi/ln	34.4

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.883	4132	8800	0.47	41.8	24.7	C

Facility Time Period Results

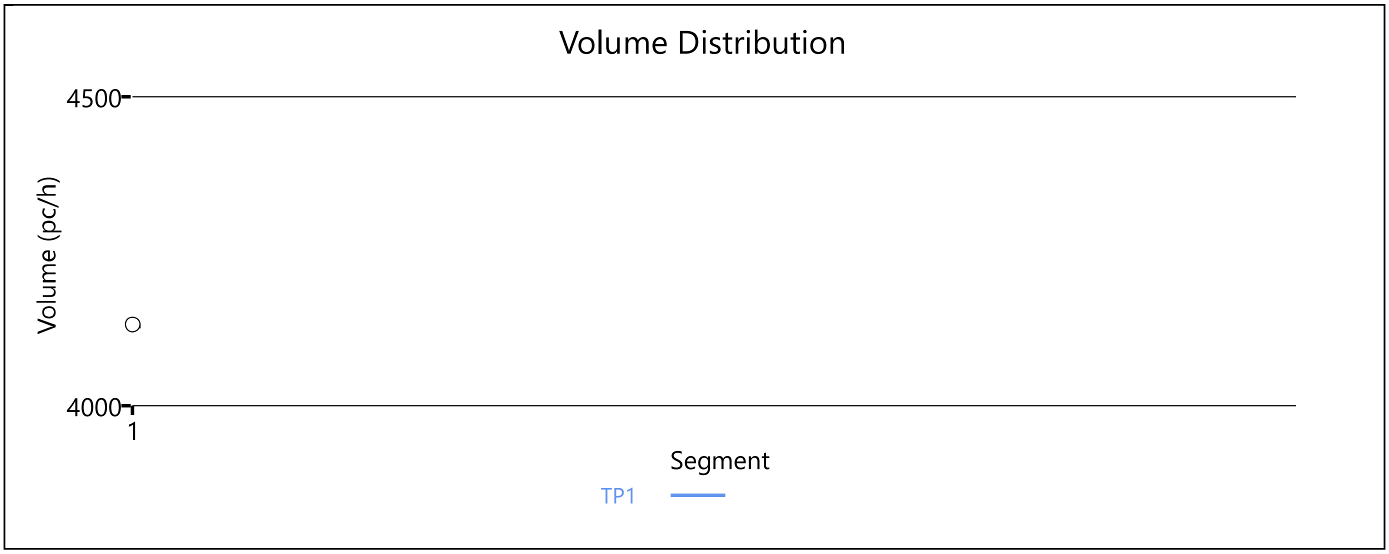
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	24.7	21.8	1.00	C

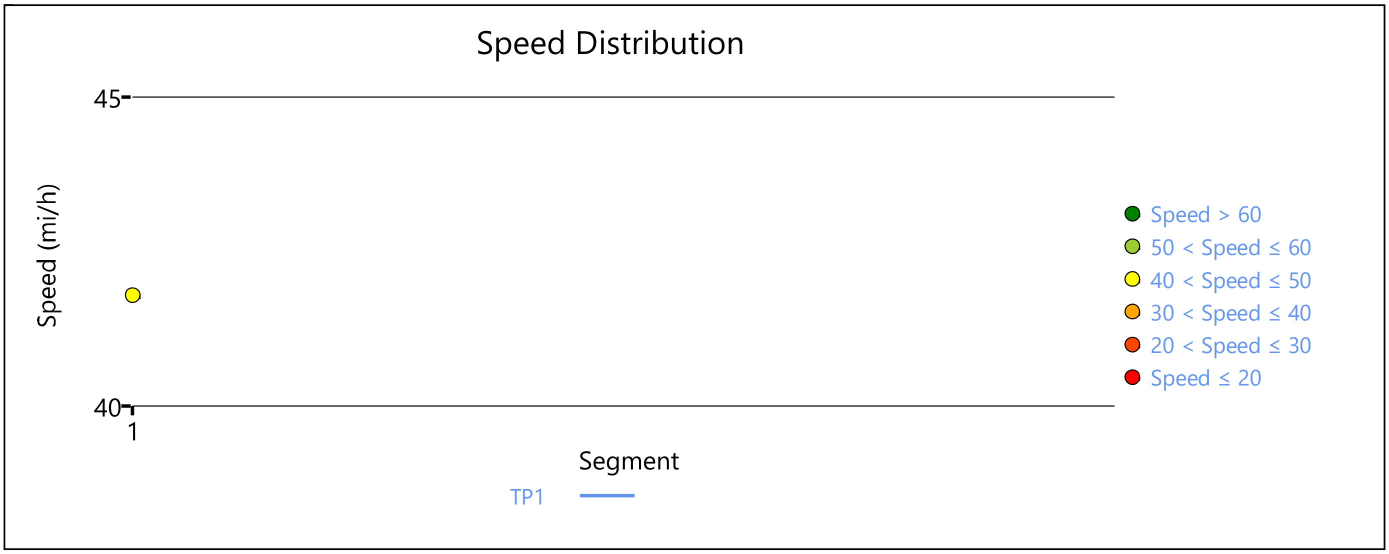
Facility Overall Results

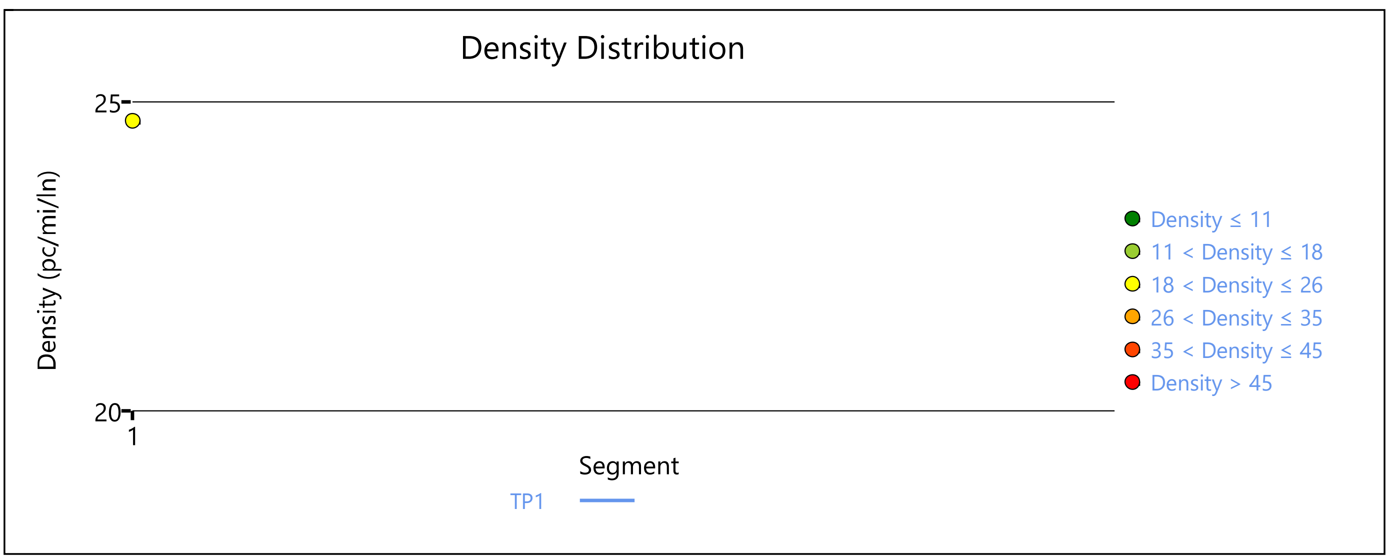
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	21.8
Average Travel Time, min	1.00	Density, pc/mi/ln	24.7

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.949	4662	8800	0.53	41.8	27.9	D

Facility Time Period Results

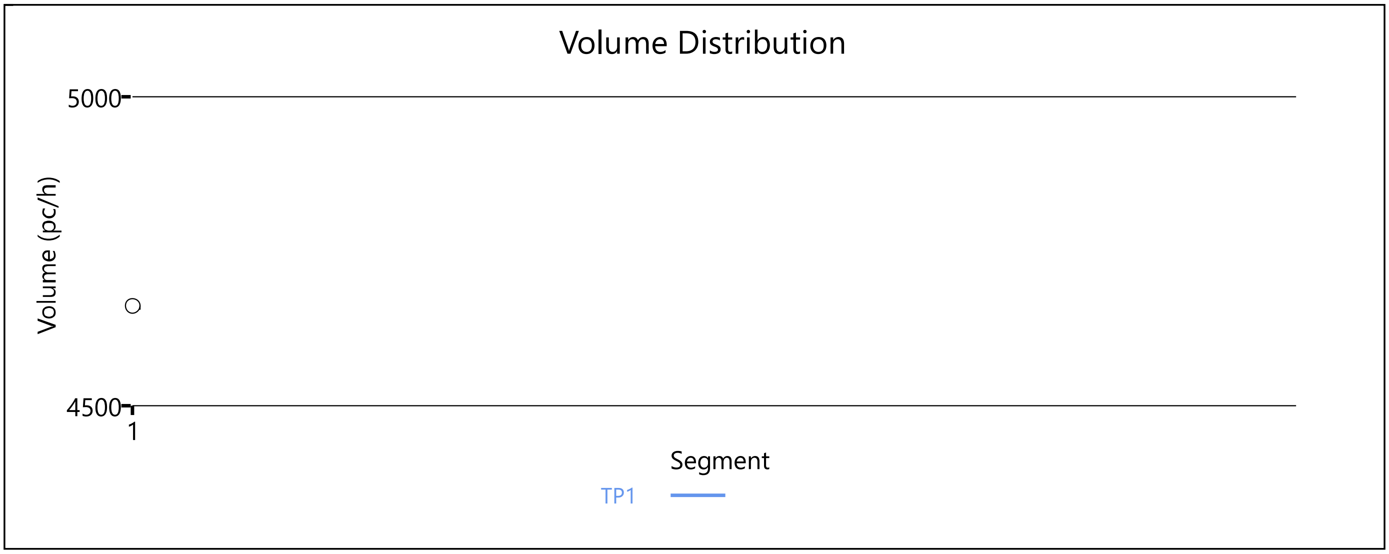
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	27.9	26.5	1.00	D

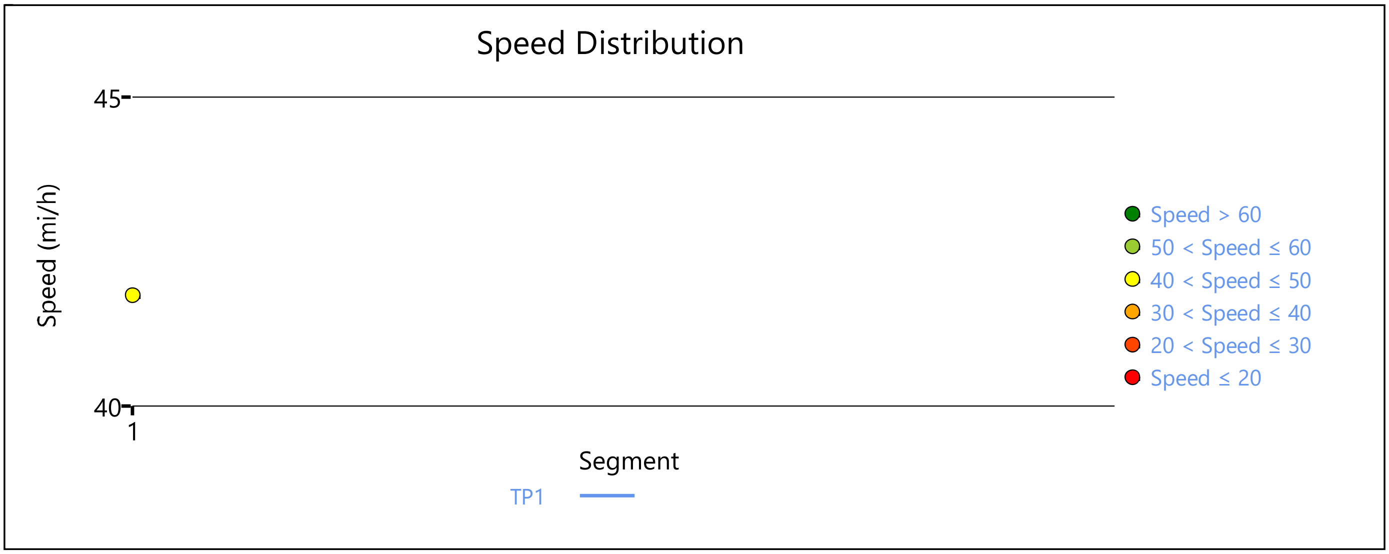
Facility Overall Results

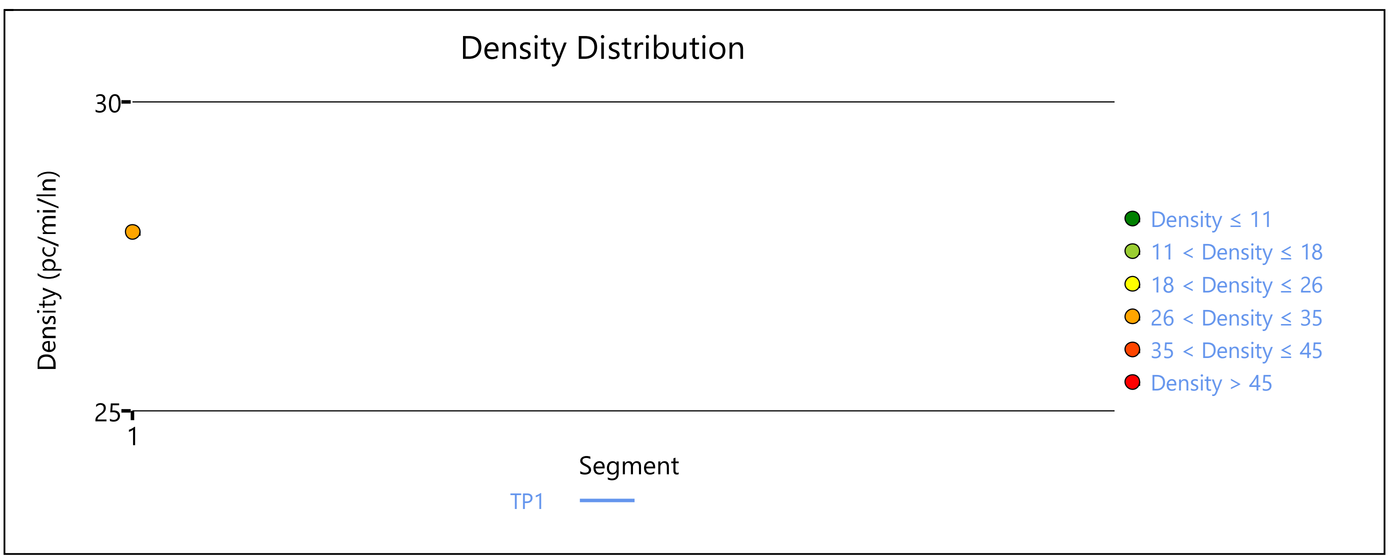
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	26.5
Average Travel Time, min	1.00	Density, pc/mi/ln	27.9

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.896	989	8800	0.11	41.8	5.9	A

Facility Time Period Results

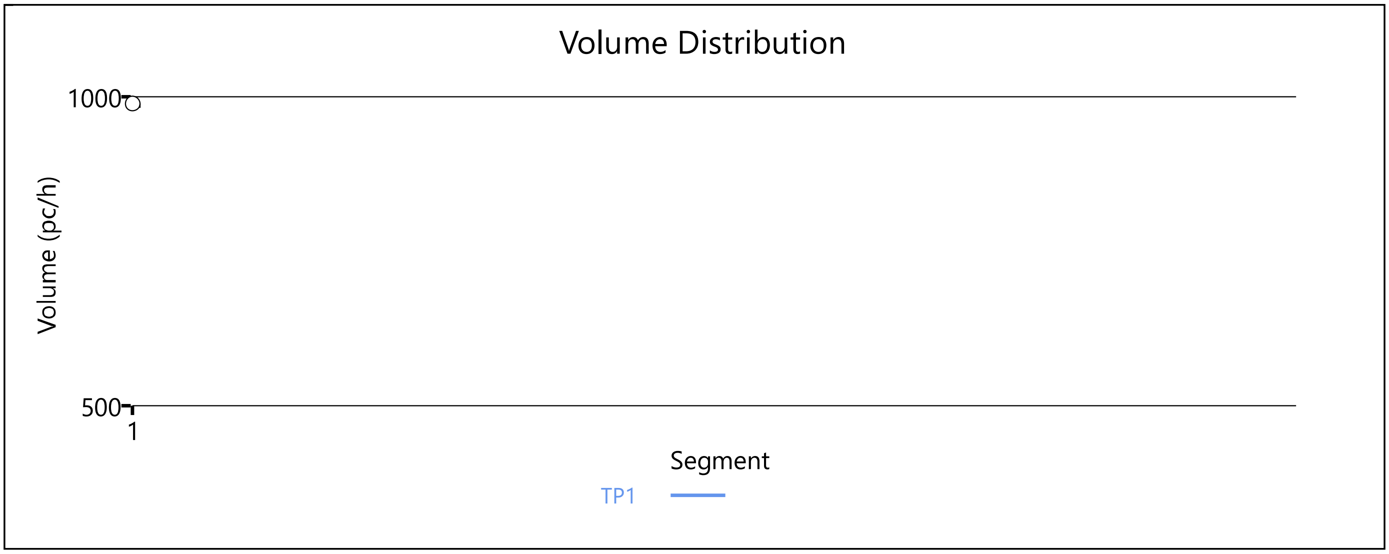
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	5.9	5.3	1.00	A

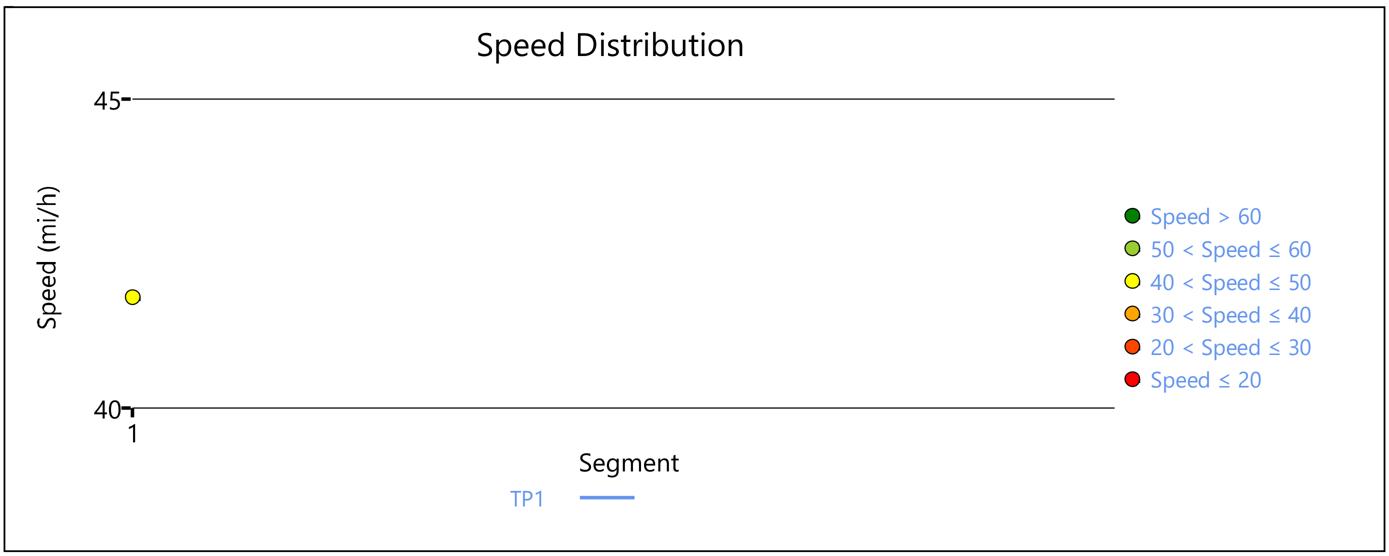
Facility Overall Results

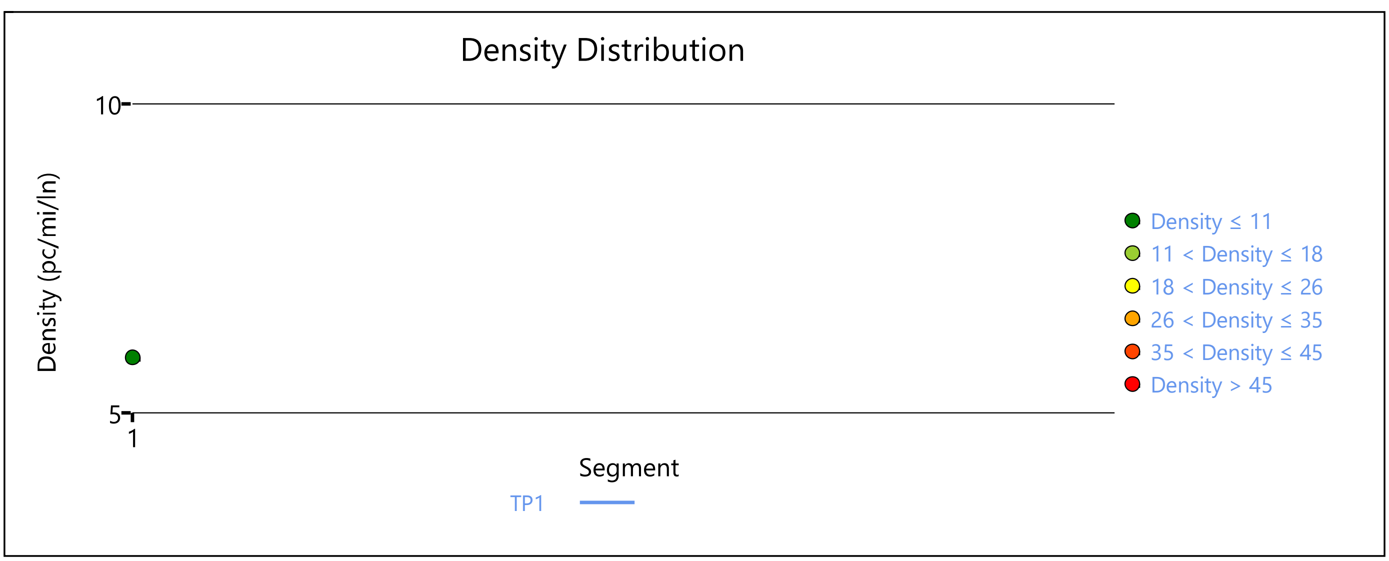
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	5.3
Average Travel Time, min	1.00	Density, pc/mi/ln	5.9

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.911	5199	8800	0.59	41.8	31.1	D

Facility Time Period Results

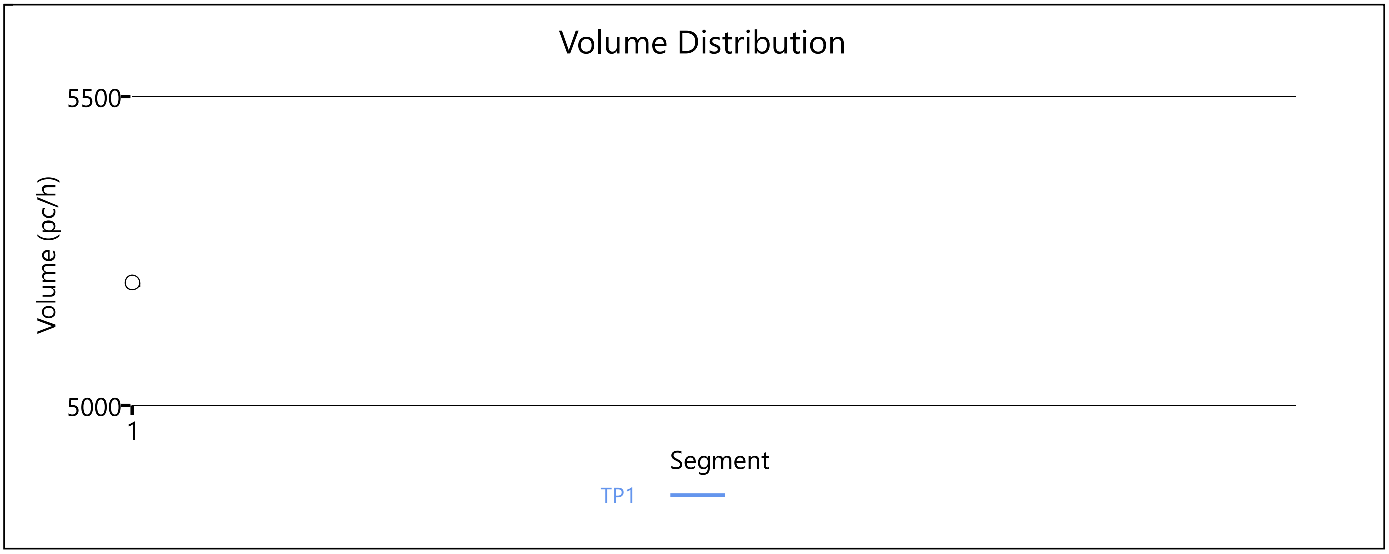
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	31.1	28.3	1.00	D

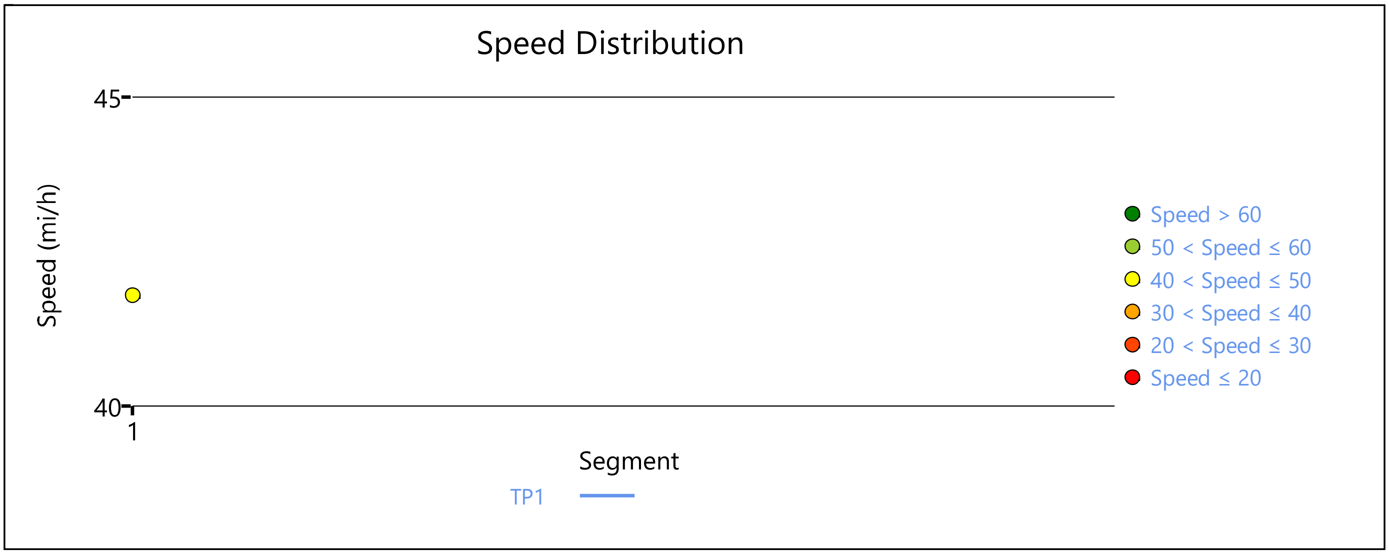
Facility Overall Results

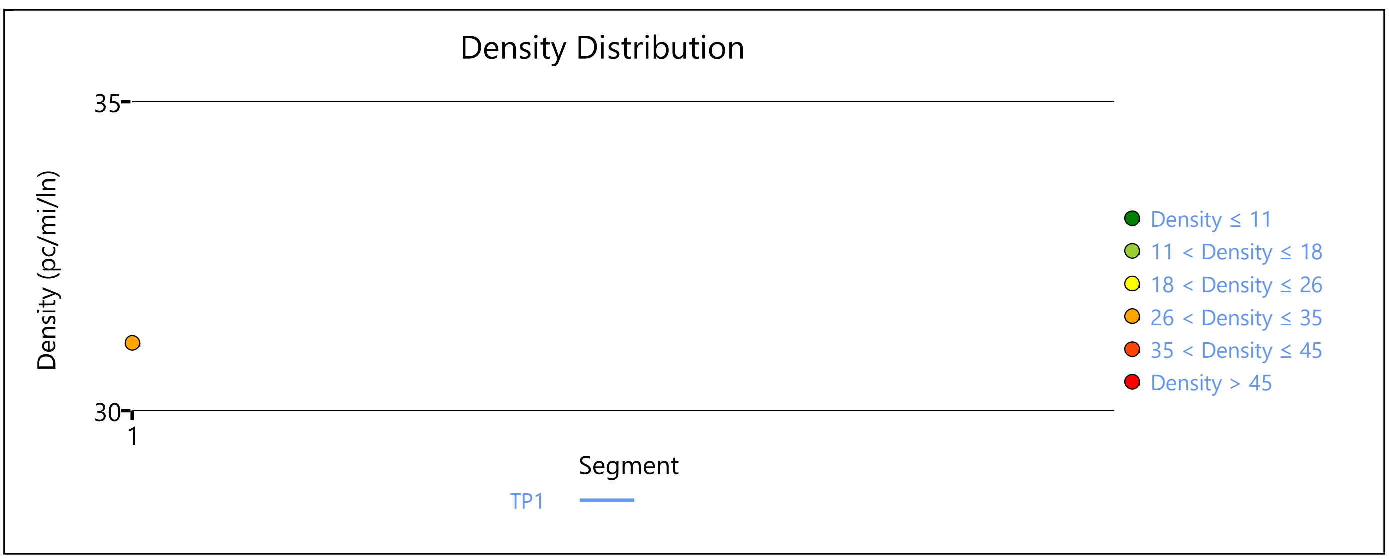
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	28.3
Average Travel Time, min	1.00	Density, pc/mi/ln	31.1

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.906	5078	8800	0.58	41.8	30.4	D

Facility Time Period Results

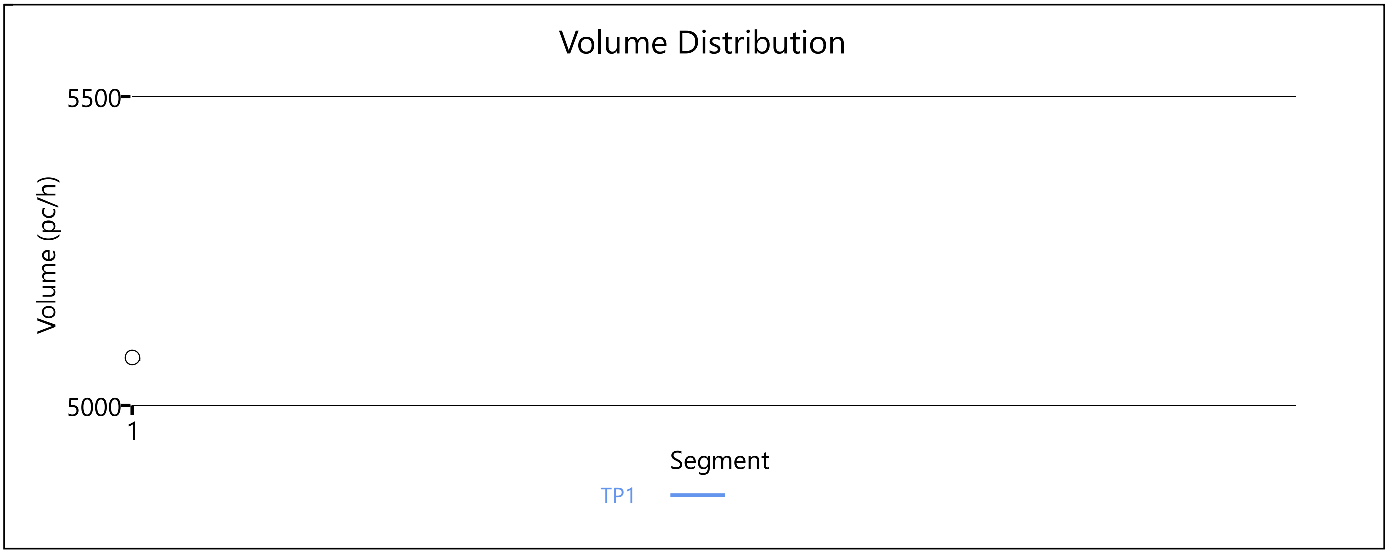
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	30.4	27.5	1.00	D

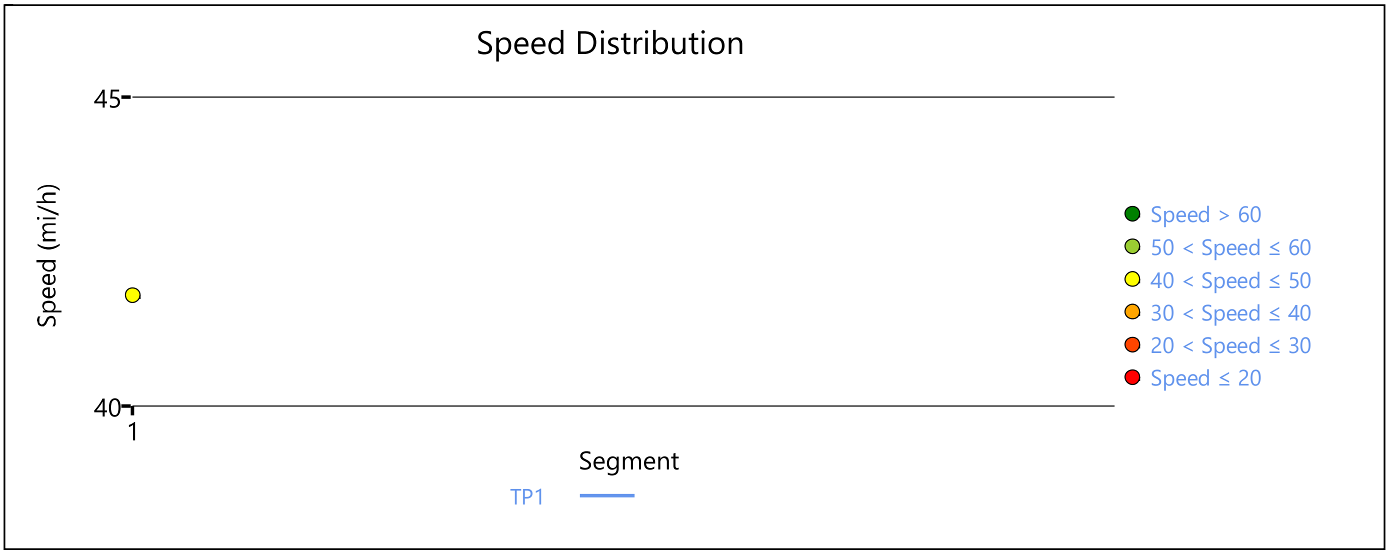
Facility Overall Results

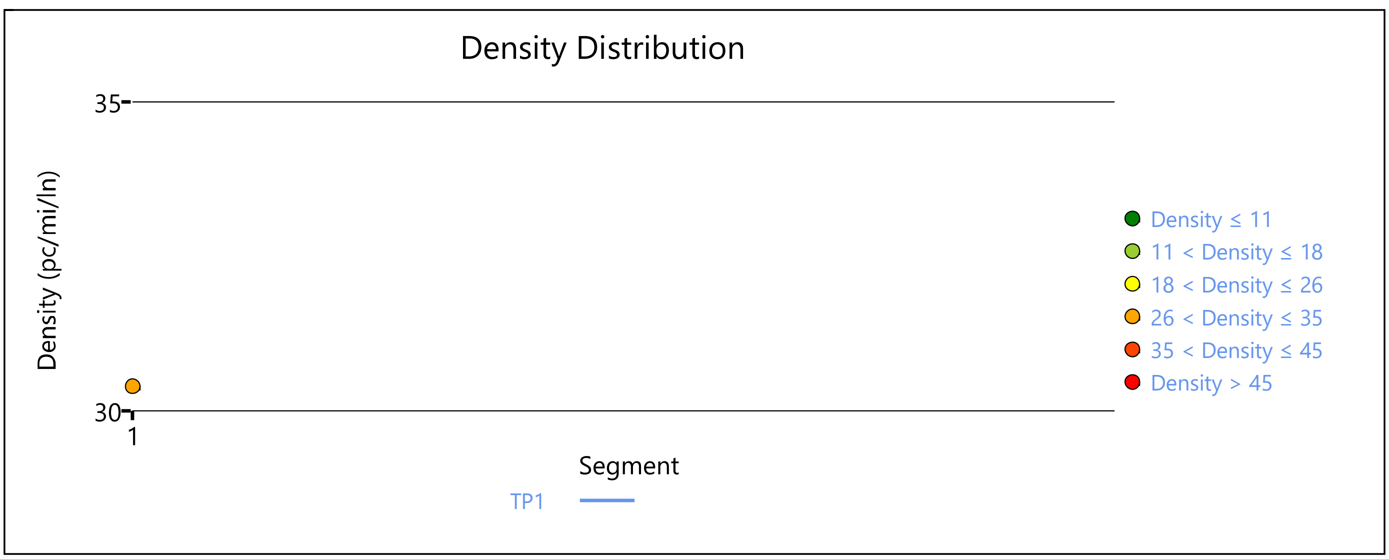
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	27.5
Average Travel Time, min	1.00	Density, pc/mi/ln	30.4

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.958	5230	8800	0.59	41.8	31.3	D

Facility Time Period Results

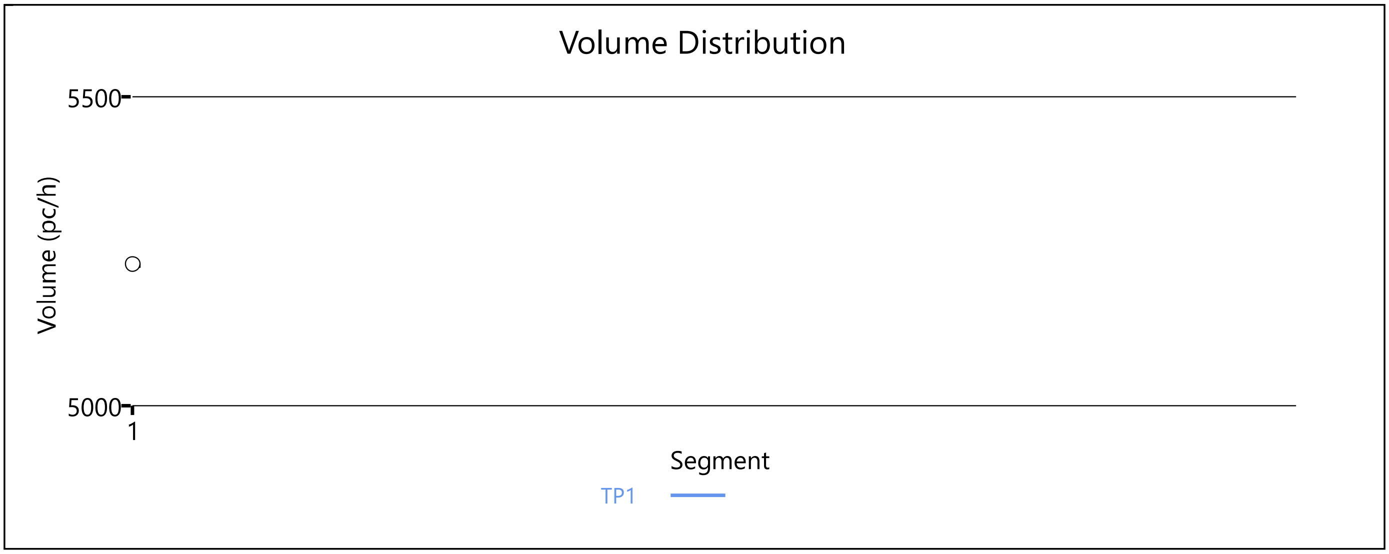
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	31.3	30.0	1.00	D

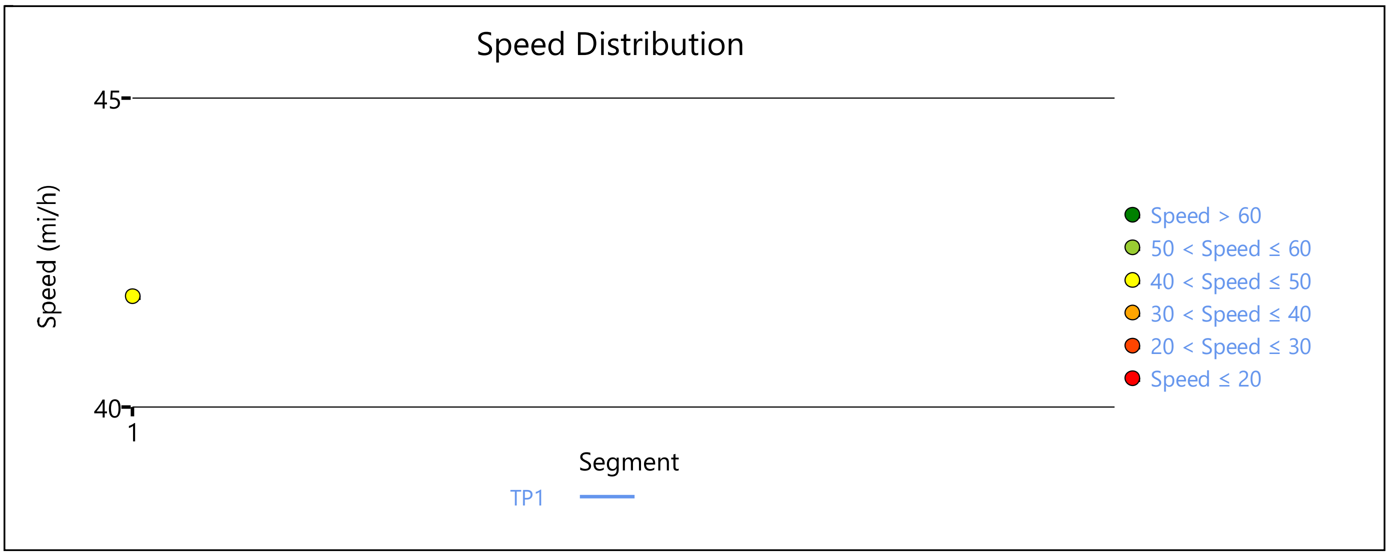
Facility Overall Results

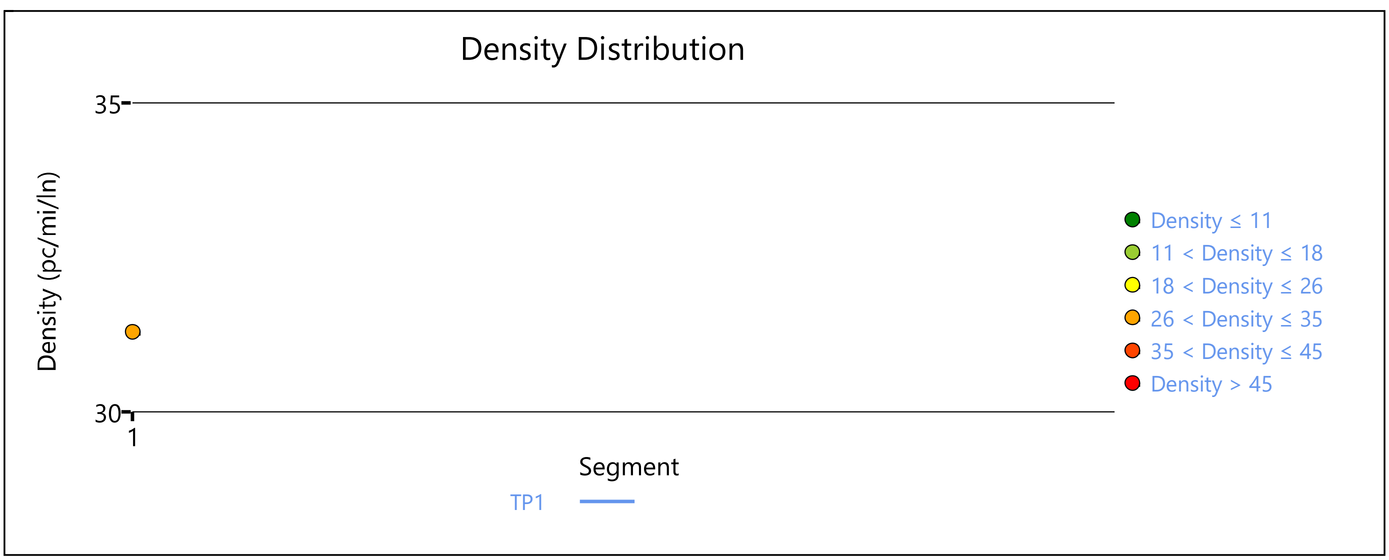
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	30.0
Average Travel Time, min	1.00	Density, pc/mi/ln	31.3

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.879	1025	8800	0.12	41.8	6.1	A

Facility Time Period Results

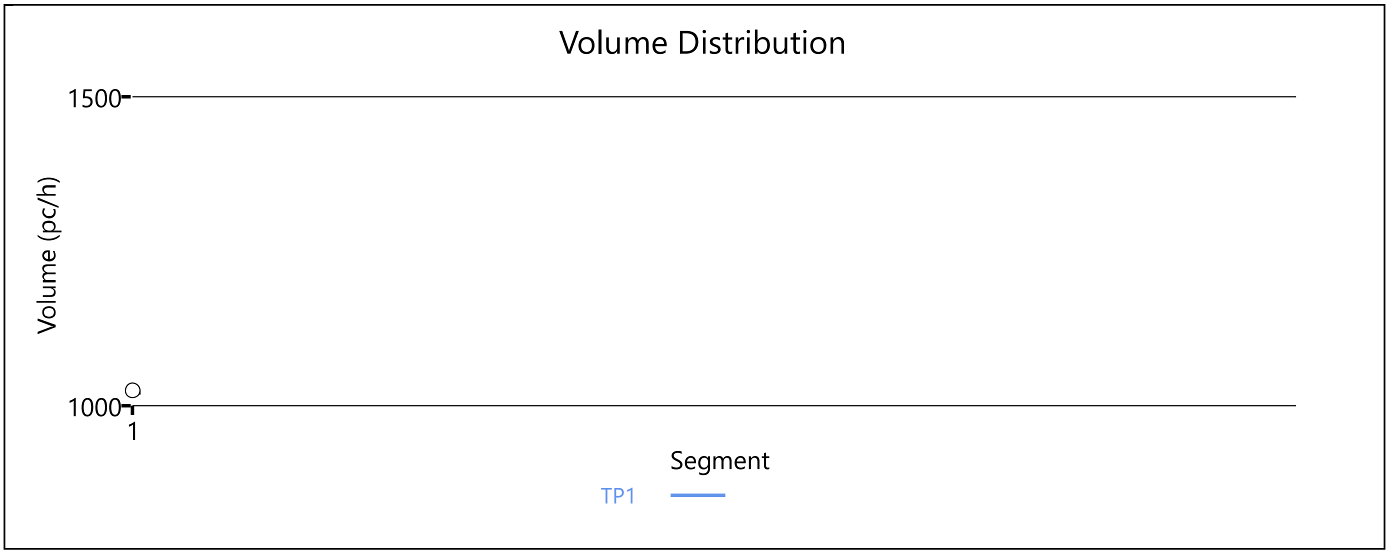
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	6.1	5.4	1.00	A

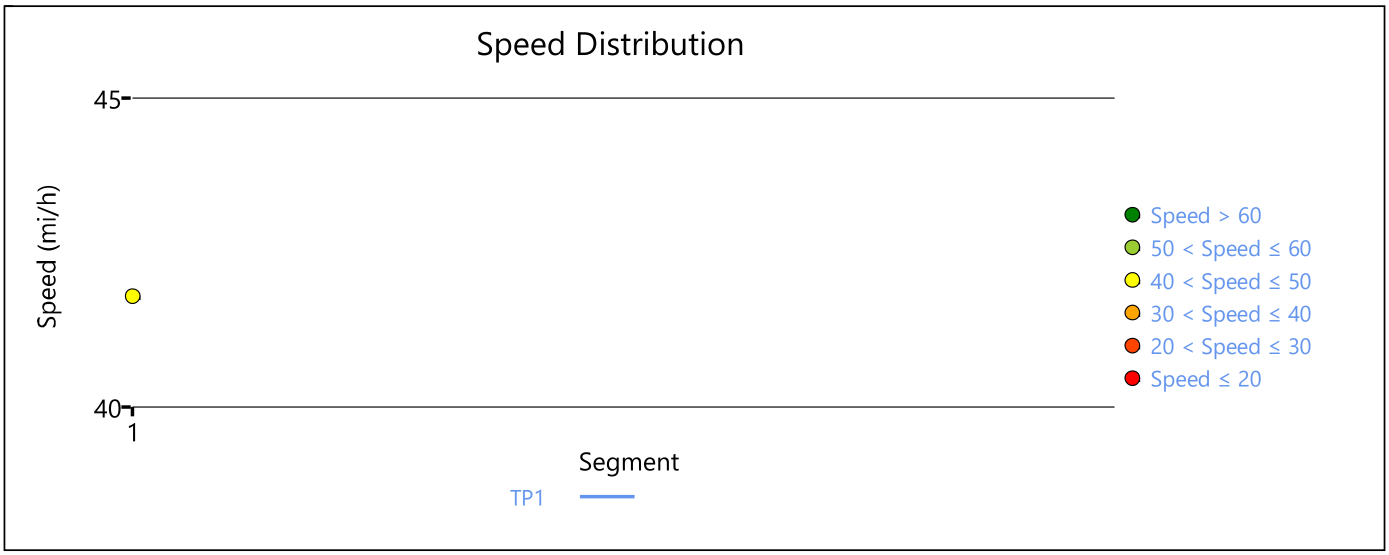
Facility Overall Results

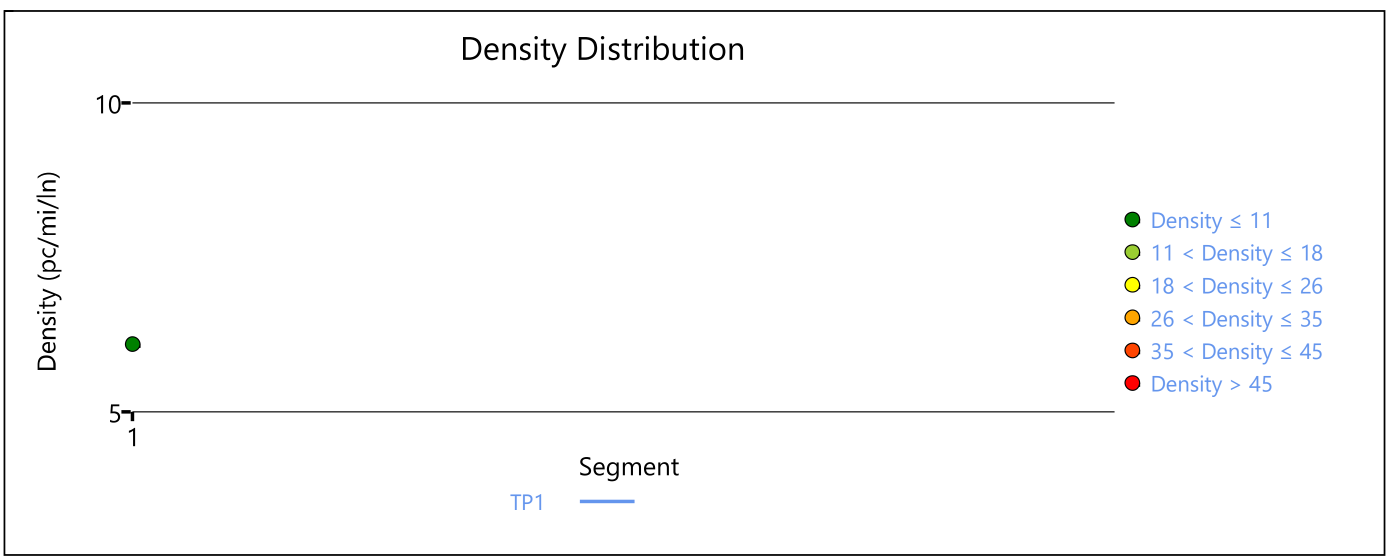
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	5.4
Average Travel Time, min	1.00	Density, pc/mi/ln	6.1

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.917	5948	8800	0.68	41.8	35.6	E

Facility Time Period Results

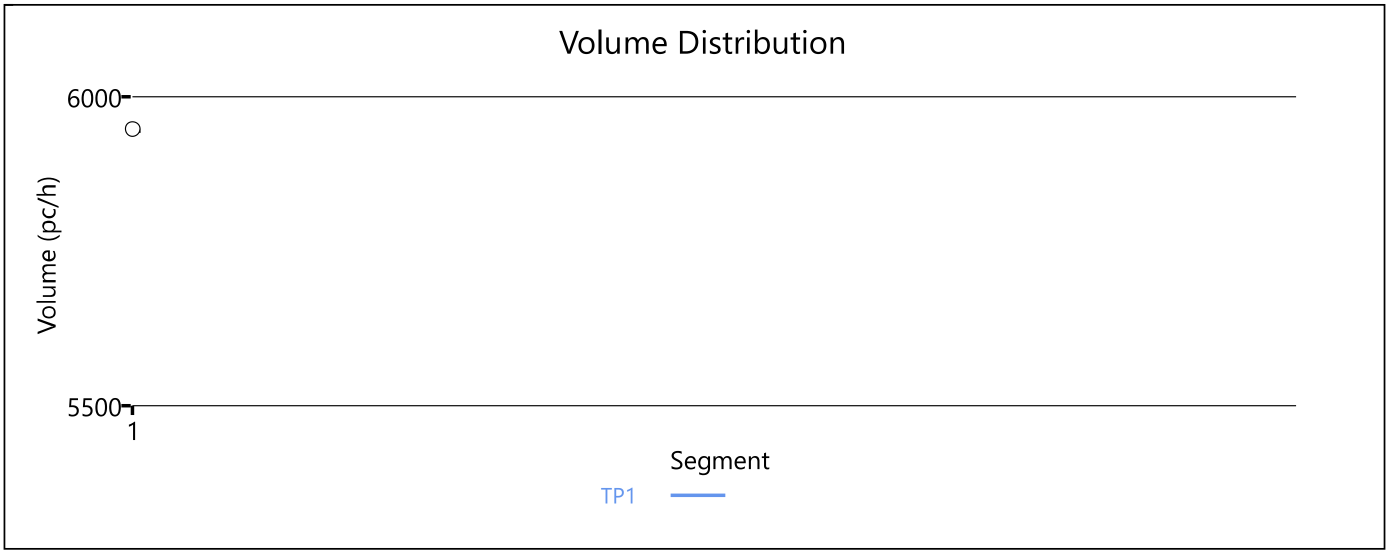
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	35.6	32.6	1.00	E

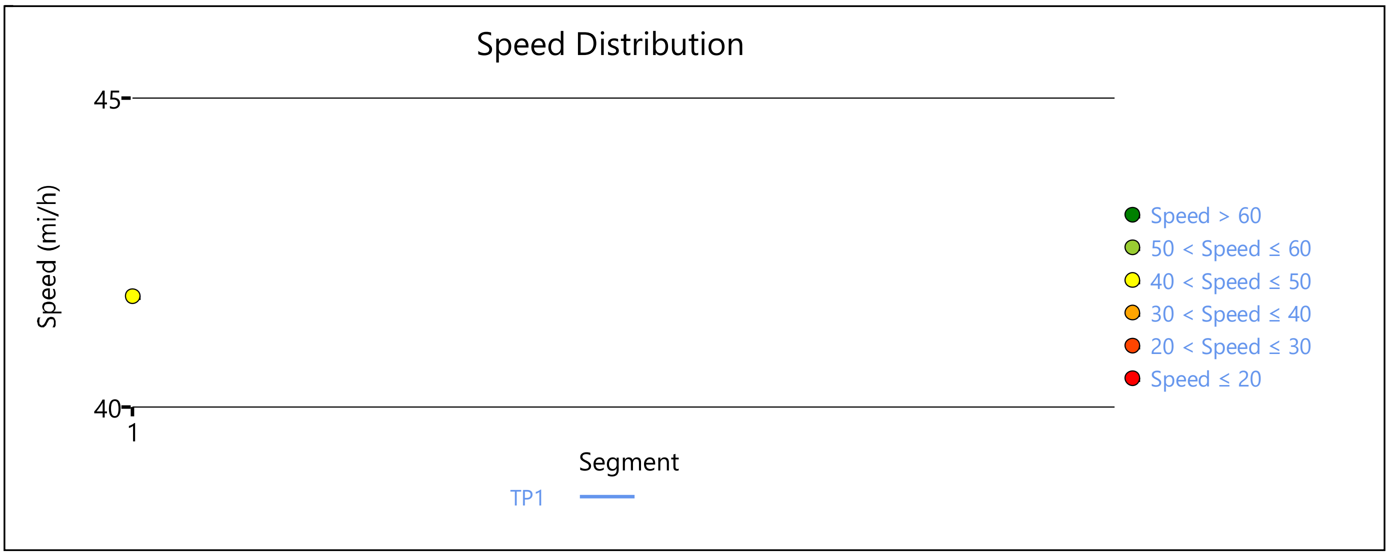
Facility Overall Results

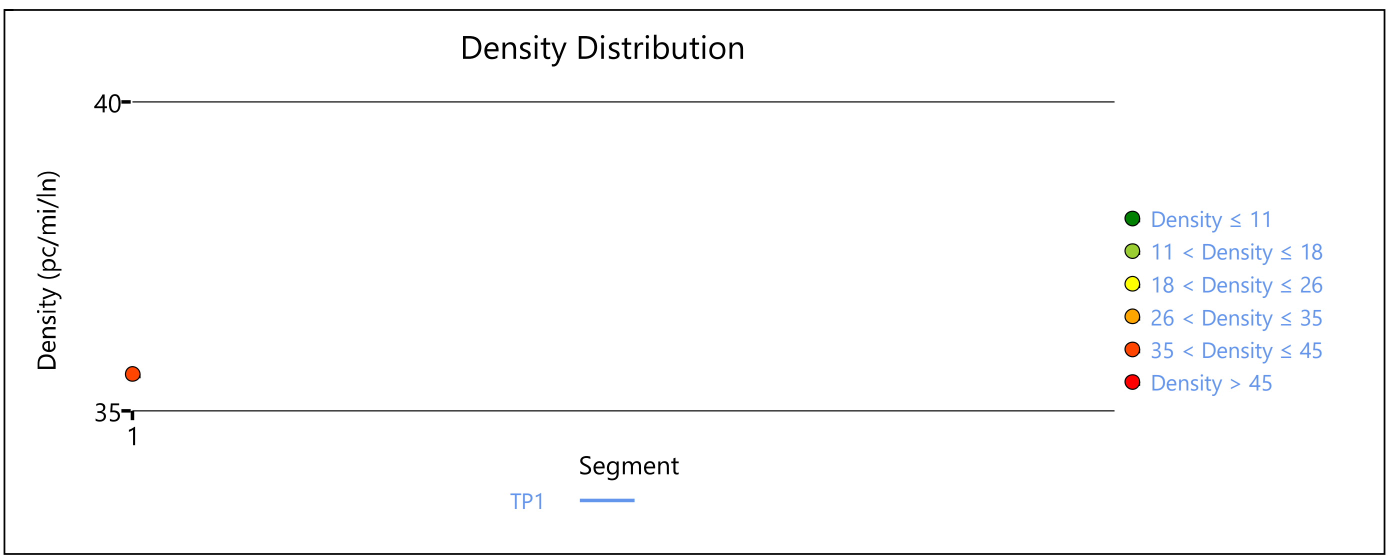
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	32.6
Average Travel Time, min	1.00	Density, pc/mi/ln	35.6

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.883	4278	8800	0.49	41.8	25.6	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	25.6	22.6	1.00	C

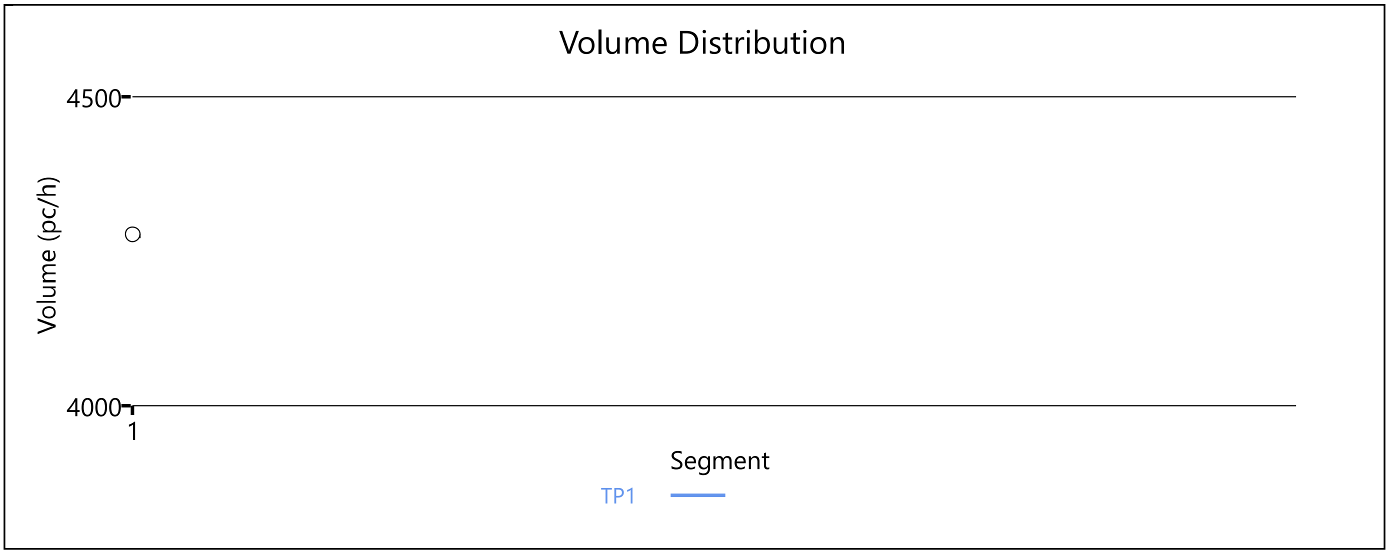
Facility Overall Results

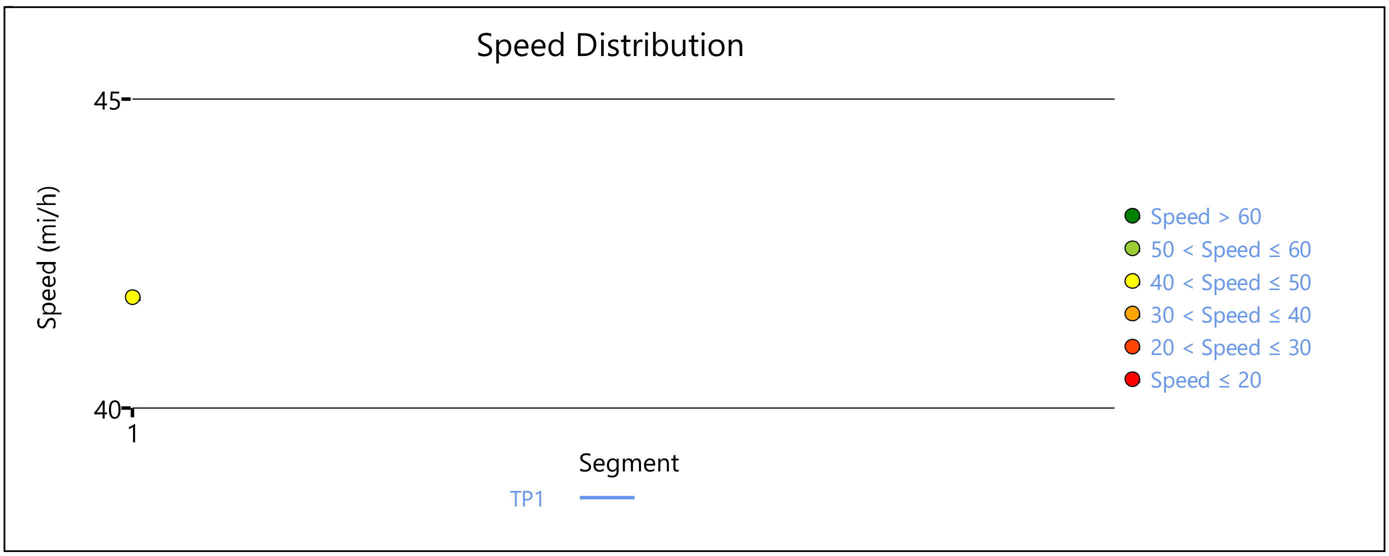
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	22.6
Average Travel Time, min	1.00	Density, pc/mi/ln	25.6

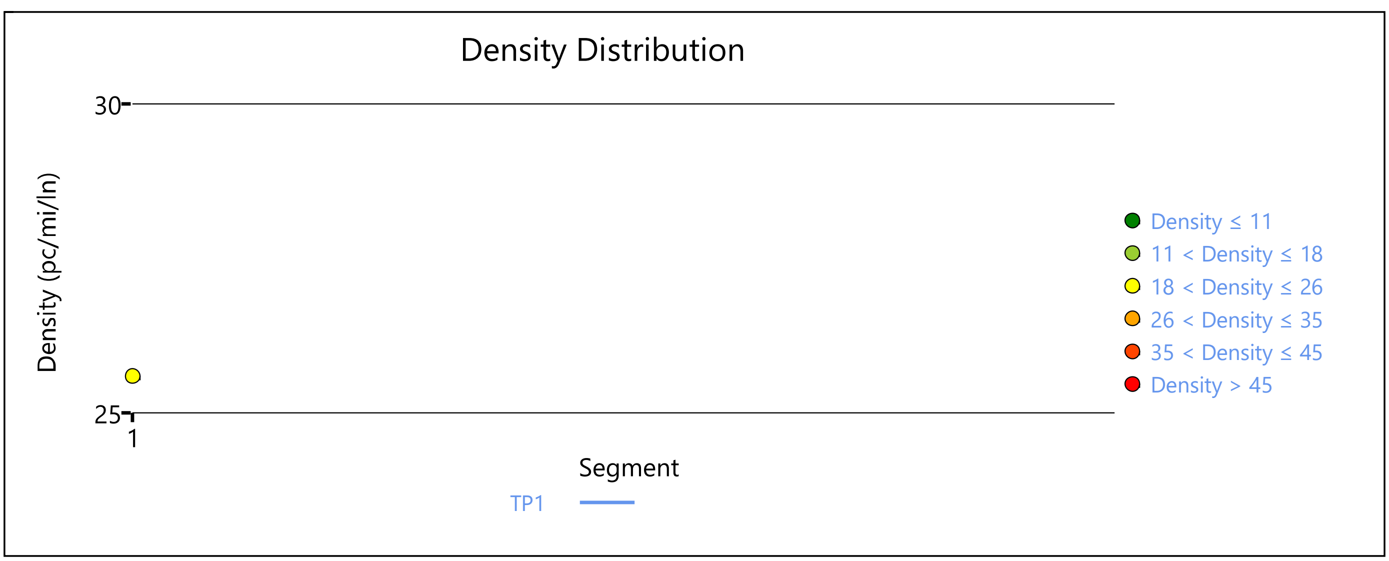
Messages

INFORMATION 1	Density for segment 1 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.949	4870	8800	0.55	41.8	29.1	D

Facility Time Period Results

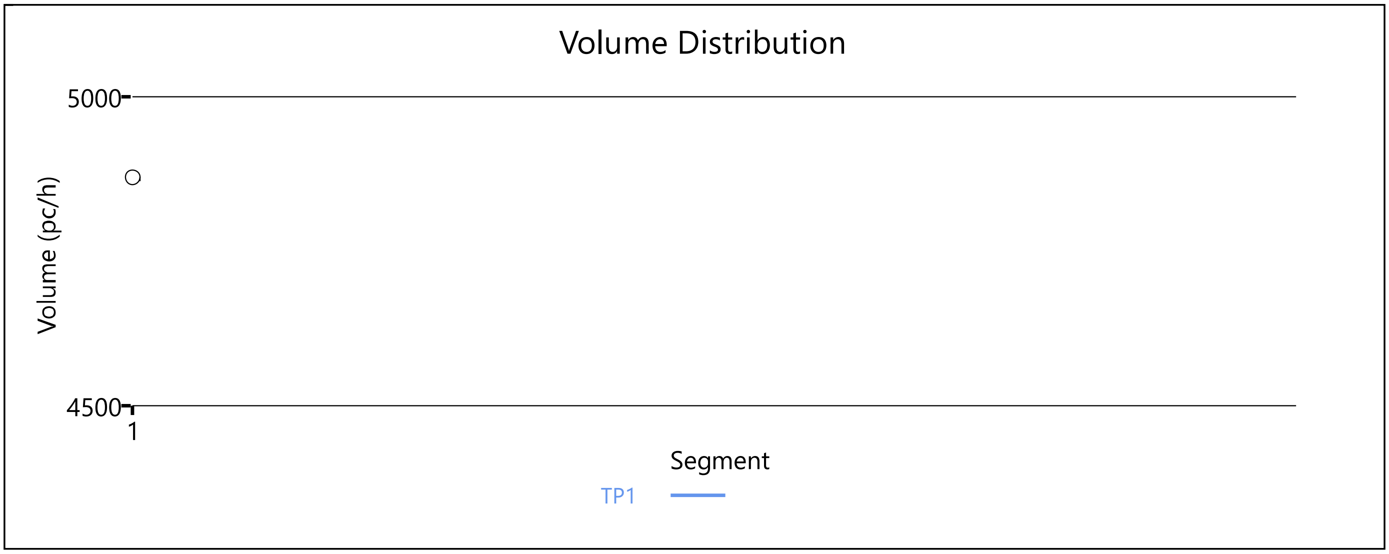
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	29.1	27.6	1.00	D

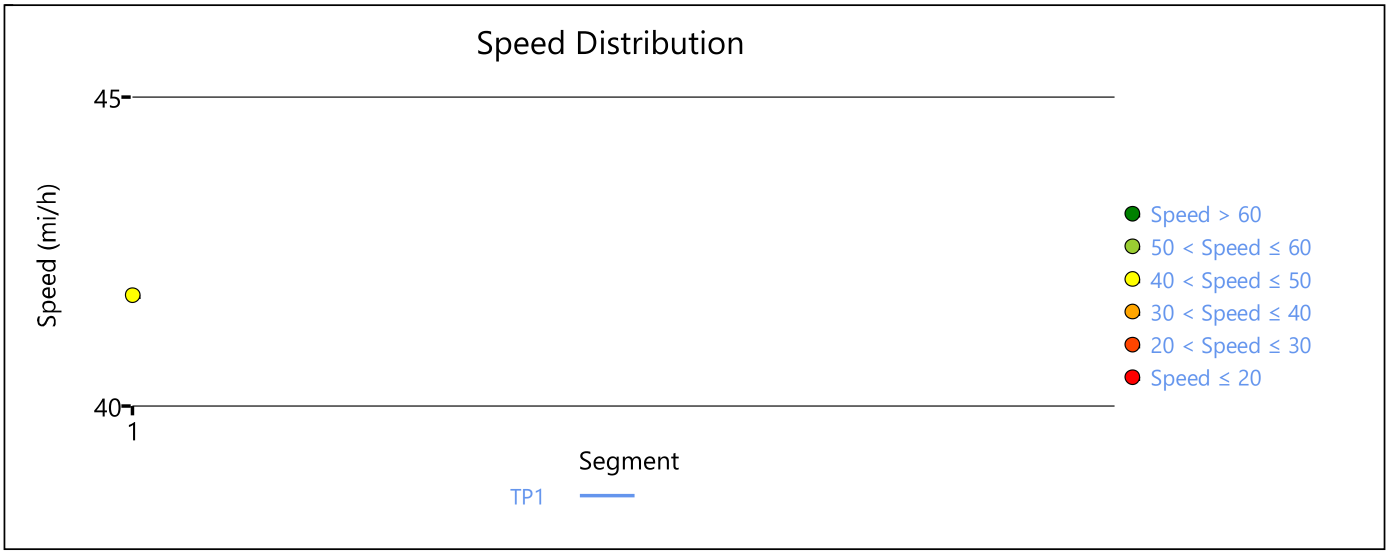
Facility Overall Results

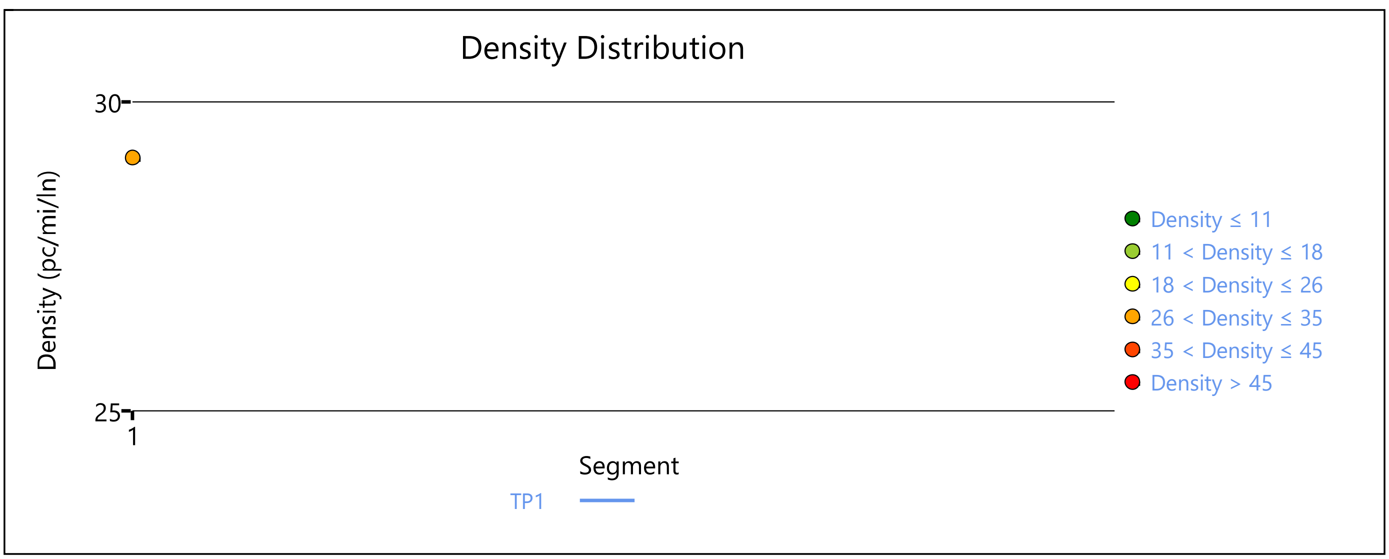
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	27.6
Average Travel Time, min	1.00	Density, pc/mi/ln	29.1

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.896	1028	8800	0.12	41.8	6.1	A

Facility Time Period Results

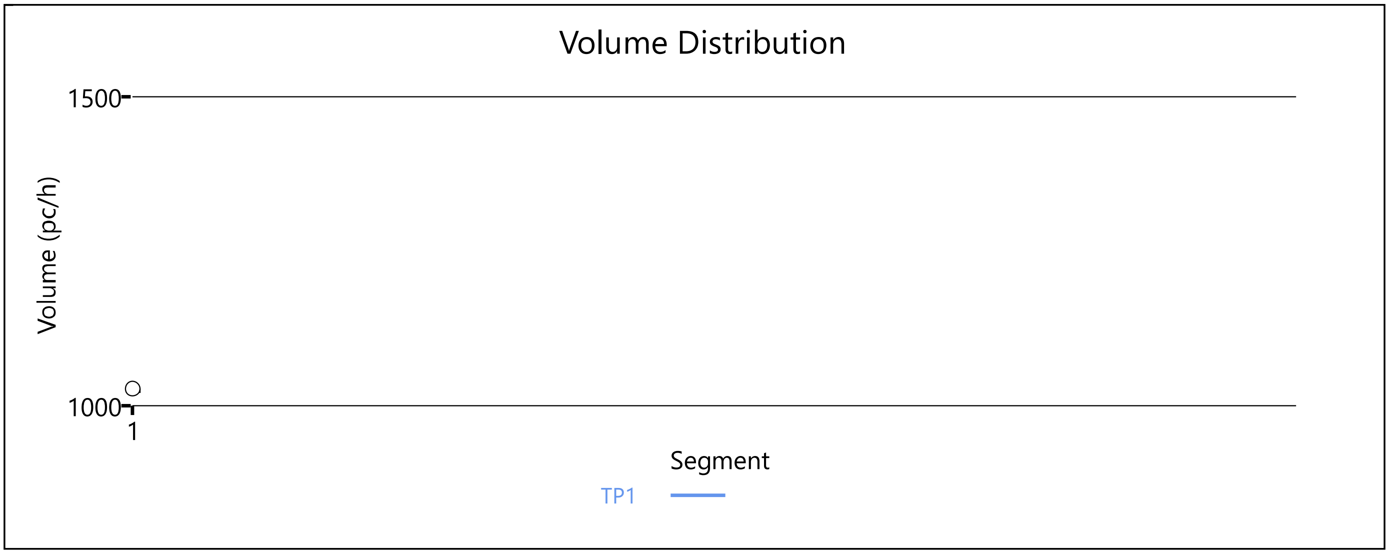
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	6.1	5.5	1.00	A

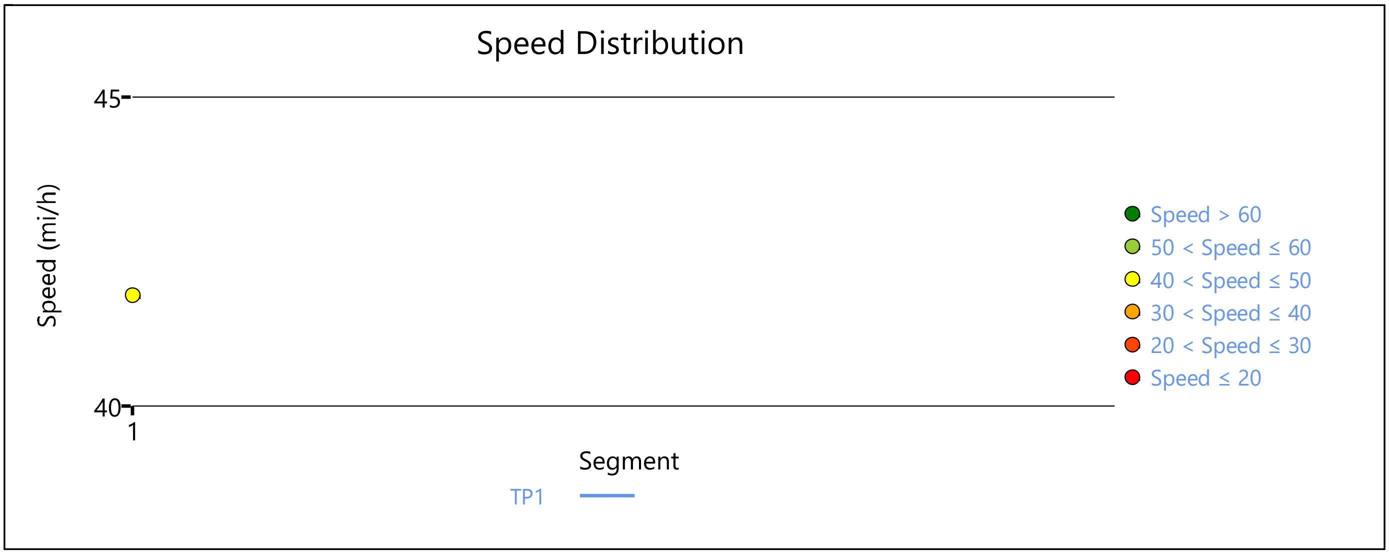
Facility Overall Results

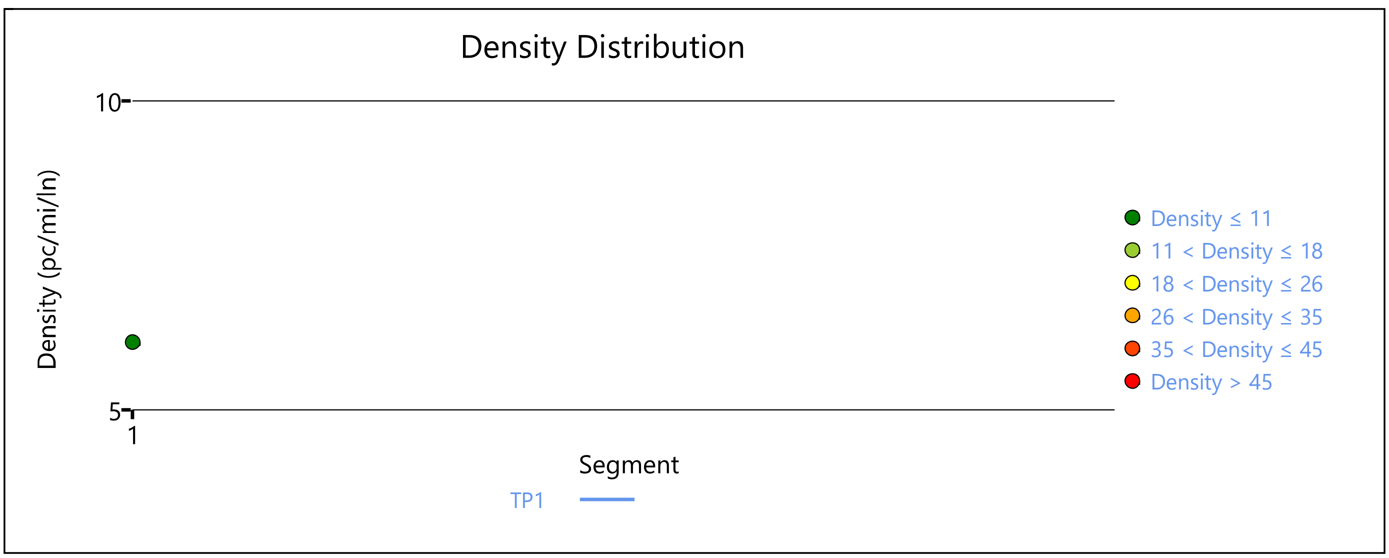
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	5.5
Average Travel Time, min	1.00	Density, pc/mi/ln	6.1

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.911	5343	8800	0.61	41.8	32.0	D

Facility Time Period Results

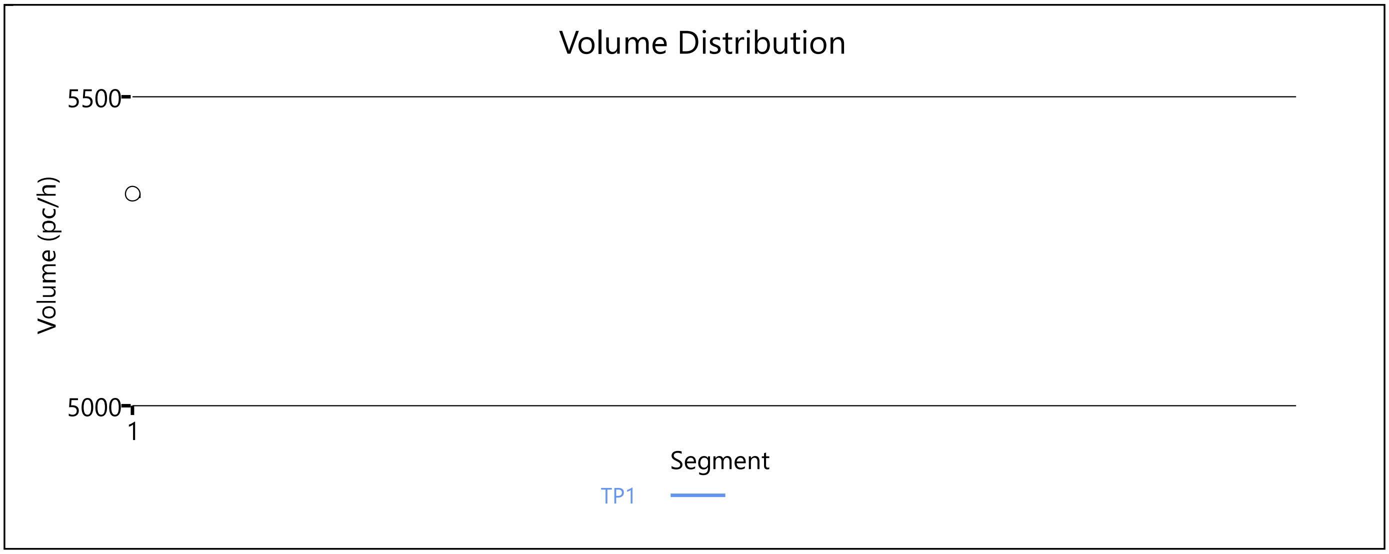
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	32.0	29.2	1.00	D

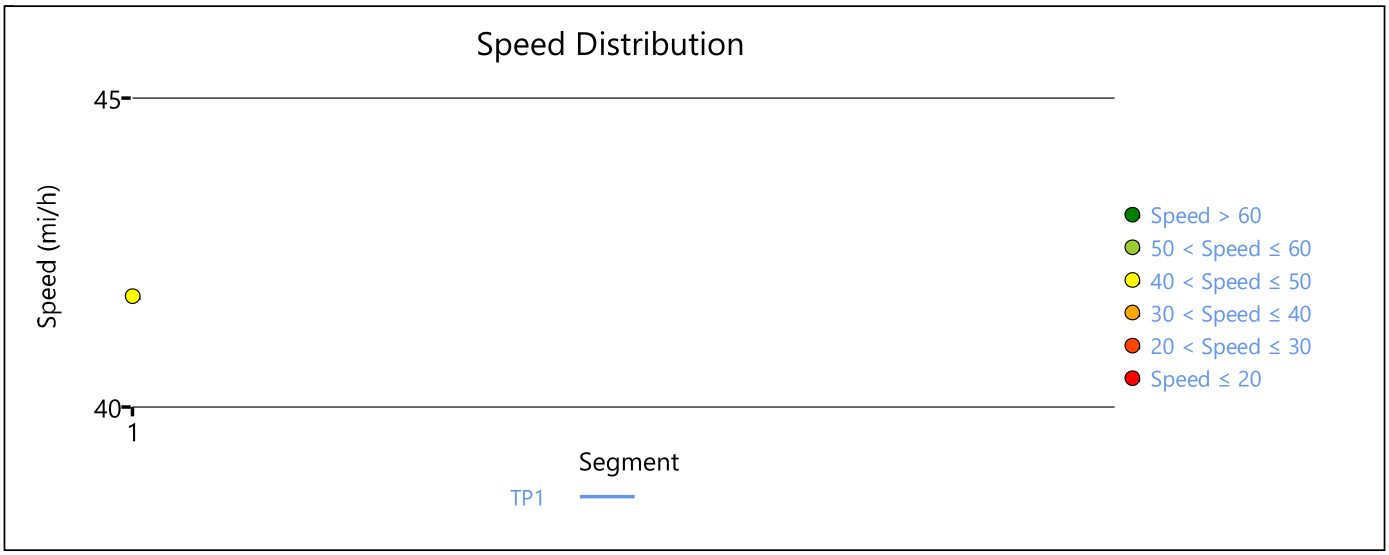
Facility Overall Results

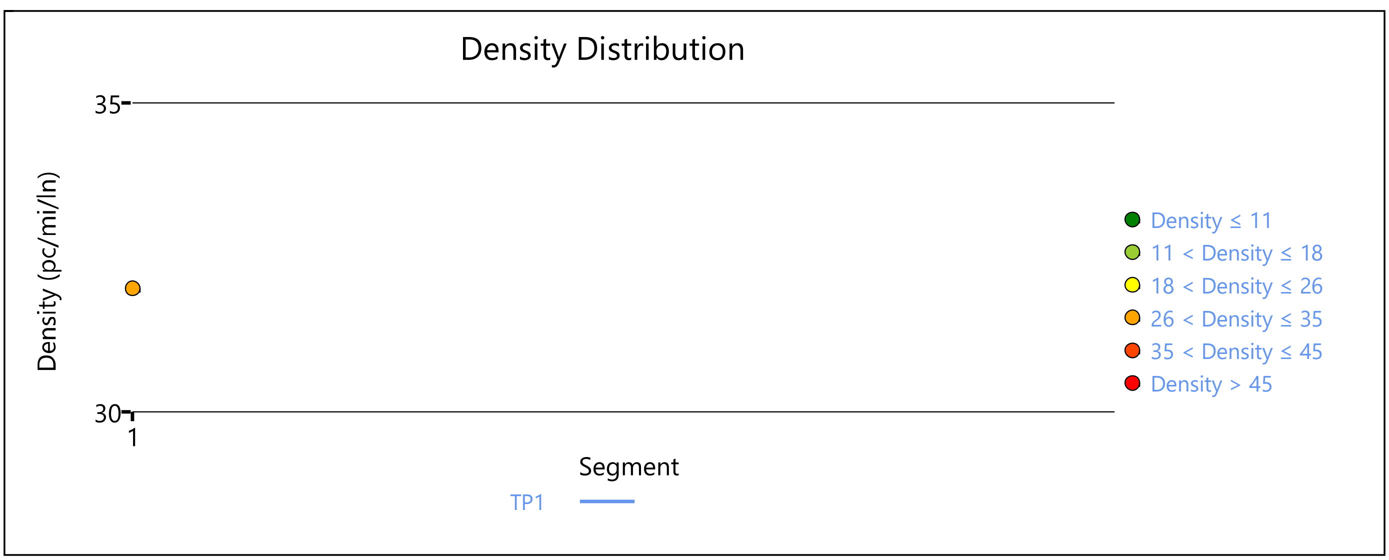
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	29.2
Average Travel Time, min	1.00	Density, pc/mi/ln	32.0

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.906	5144	8800	0.58	41.8	30.8	D

Facility Time Period Results

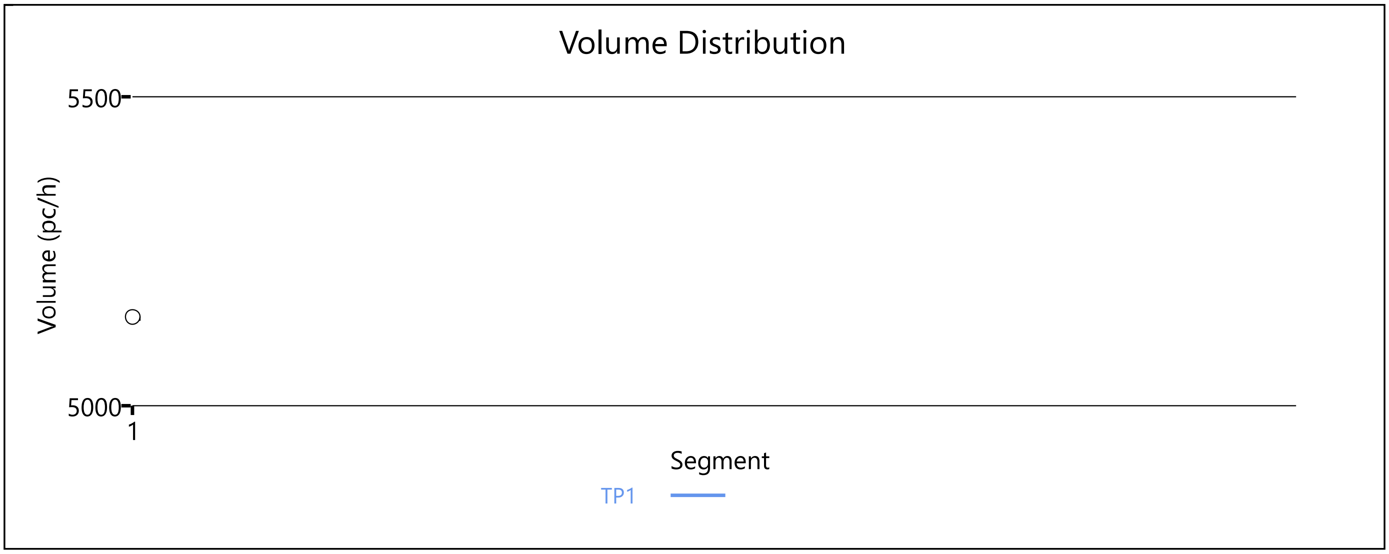
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	30.8	27.9	1.00	D

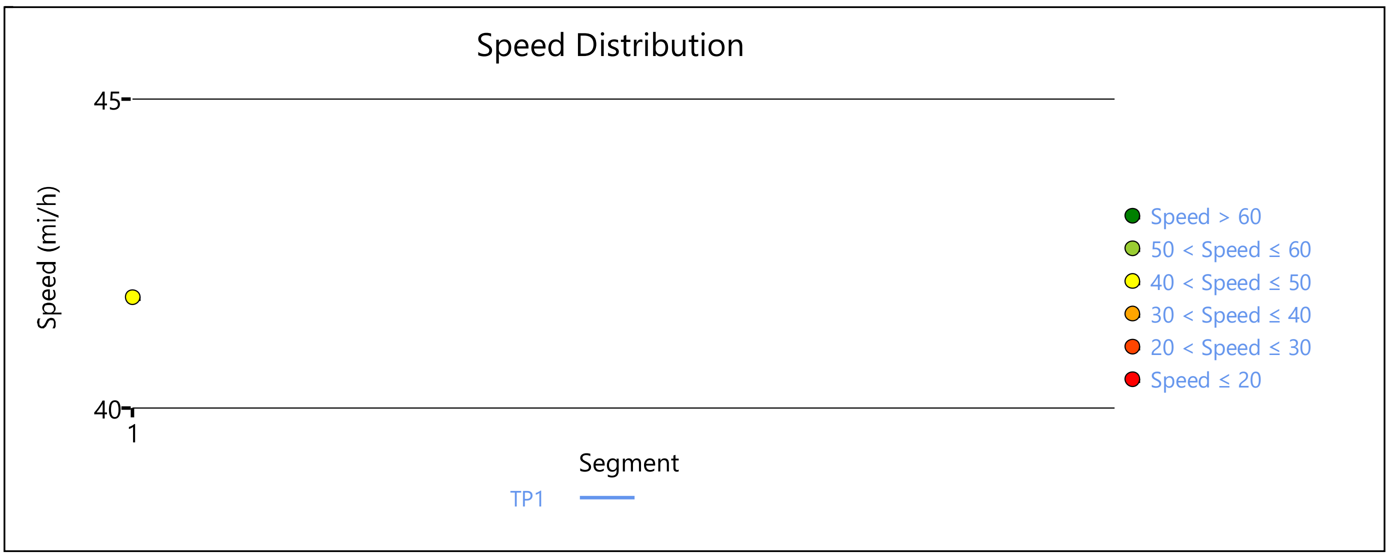
Facility Overall Results

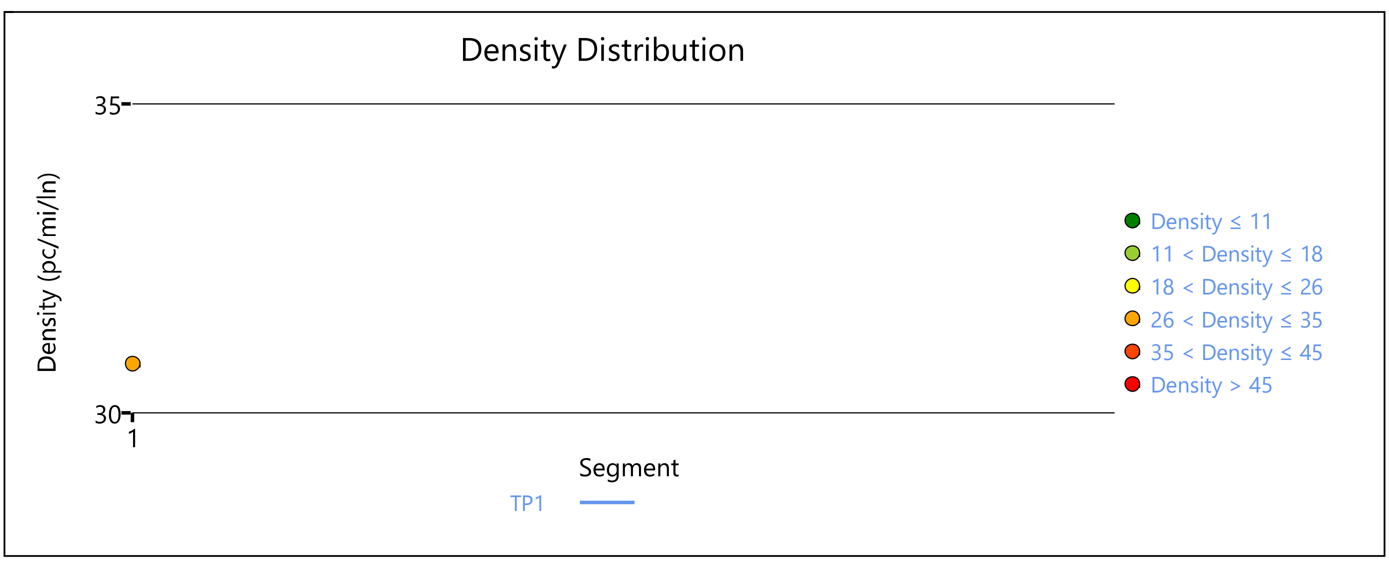
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	27.9
Average Travel Time, min	1.00	Density, pc/mi/ln	30.8

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.958	5224	8800	0.59	41.8	31.2	D

Facility Time Period Results

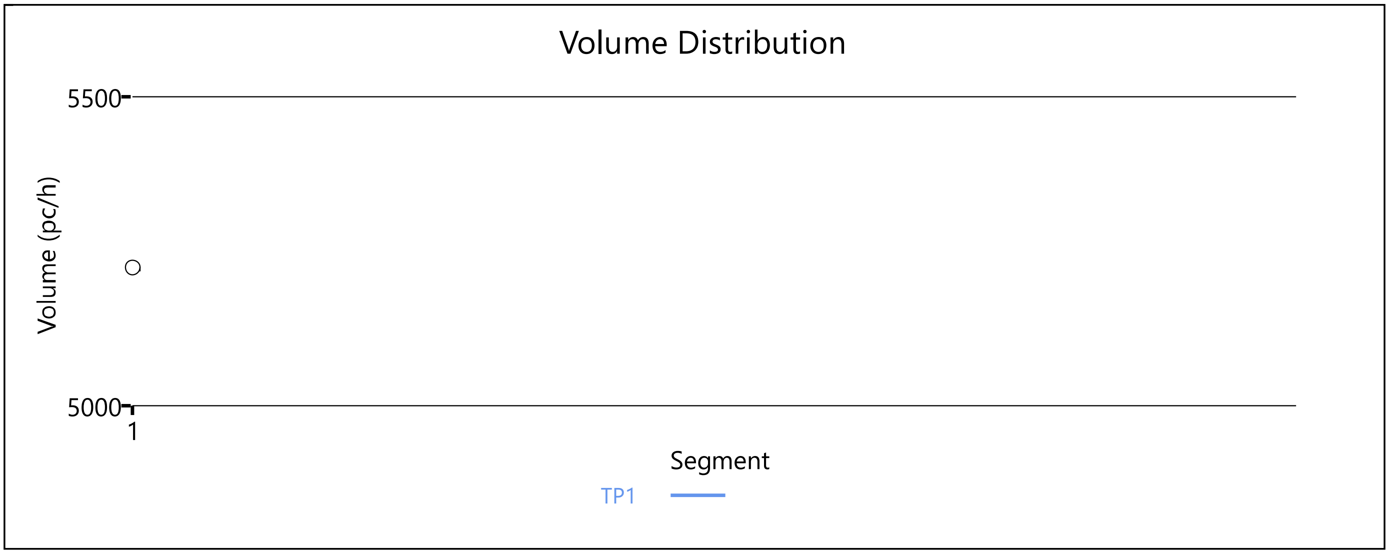
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	31.2	29.9	1.00	D

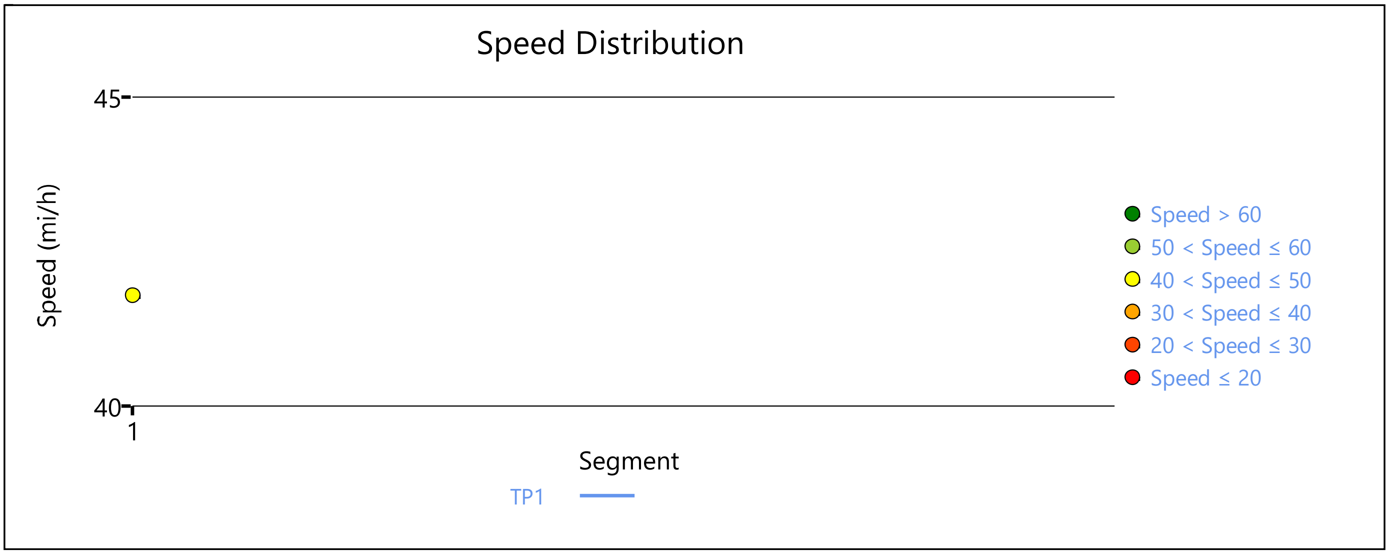
Facility Overall Results

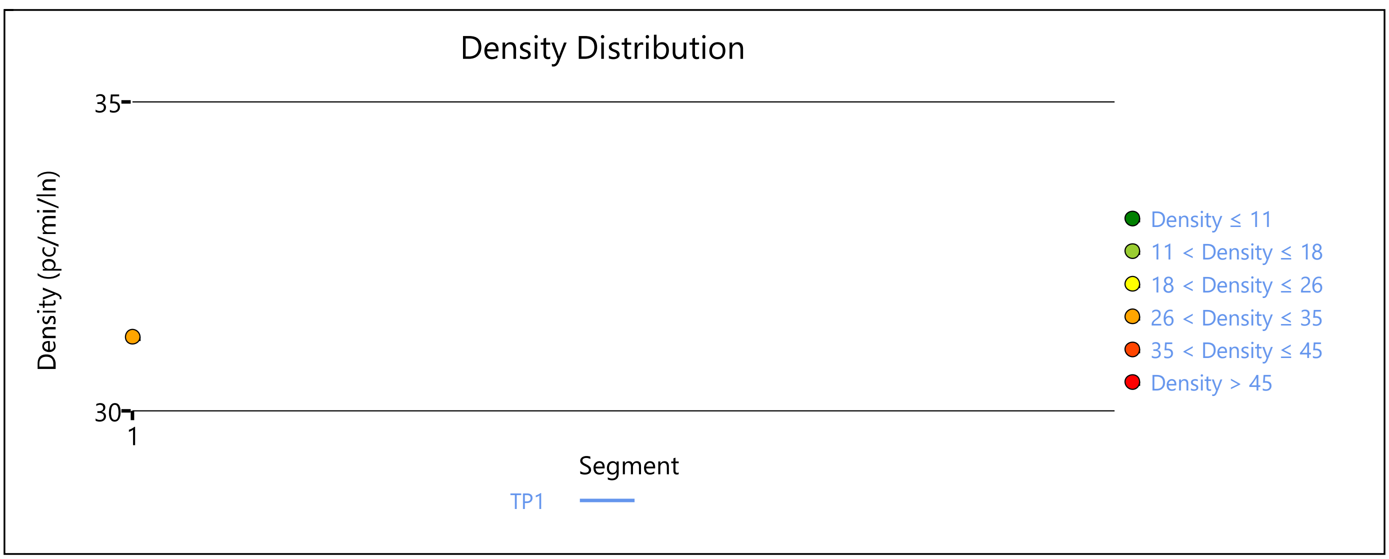
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	29.9
Average Travel Time, min	1.00	Density, pc/mi/ln	31.2

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.879	1048	8800	0.12	41.8	6.3	A

Facility Time Period Results

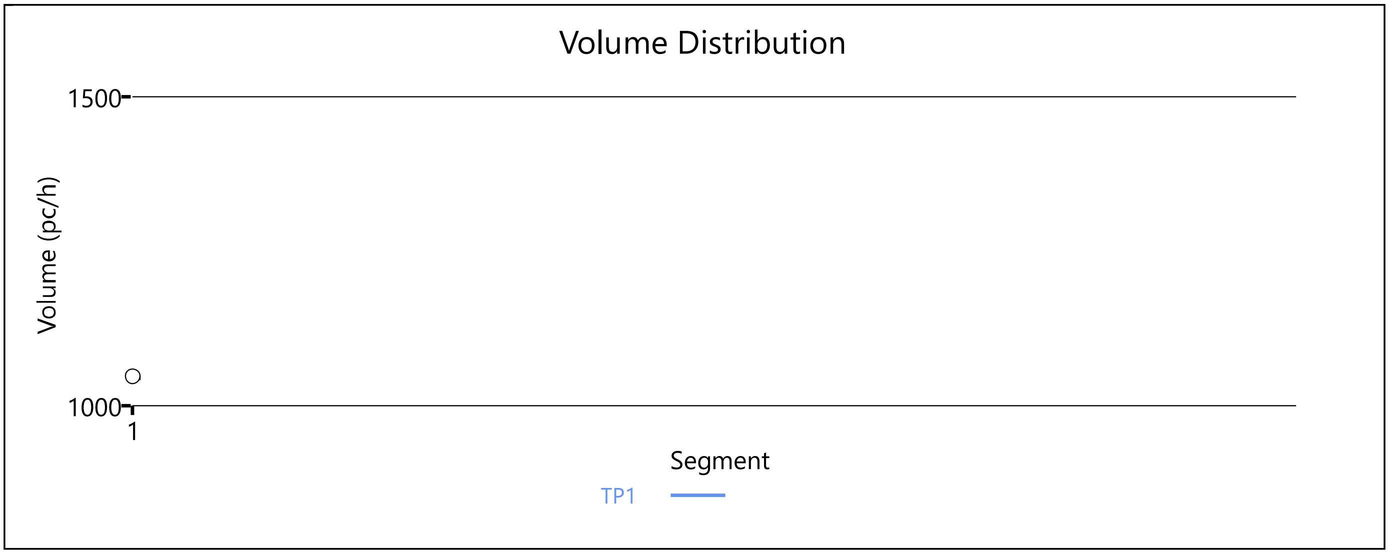
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	6.3	5.5	1.00	A

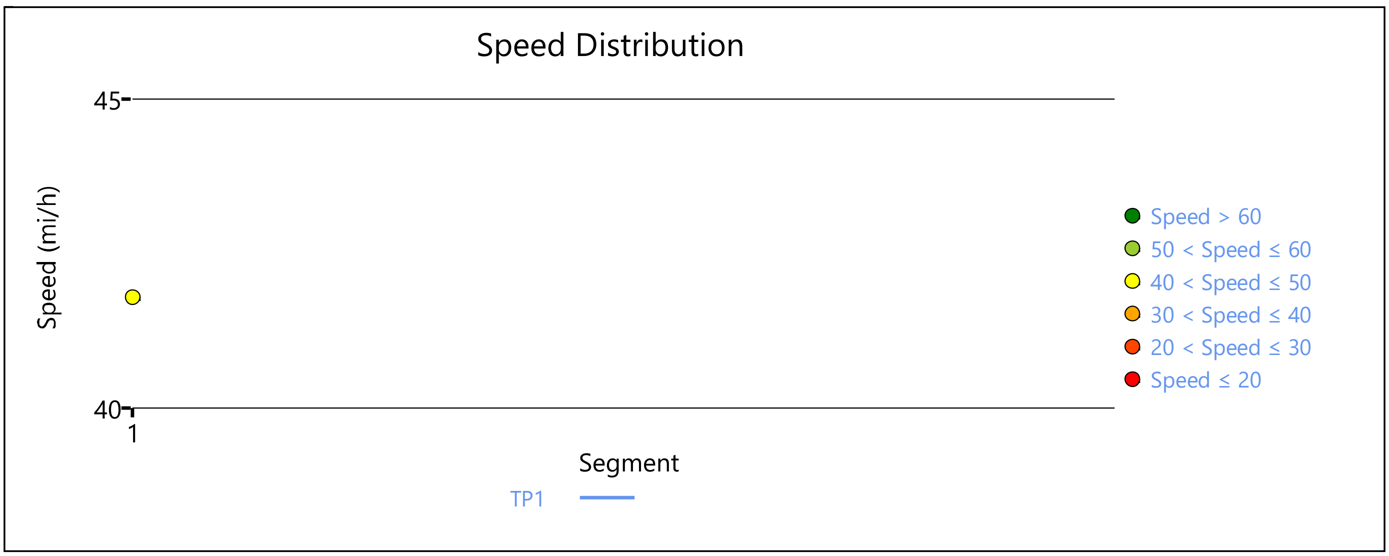
Facility Overall Results

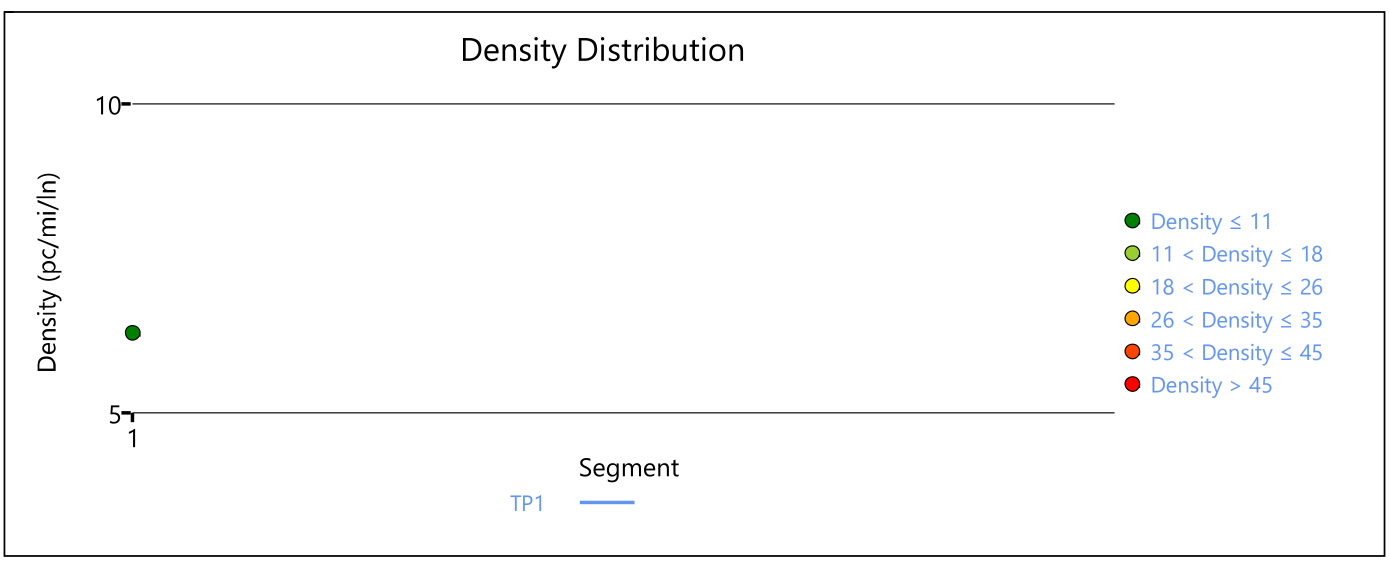
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	5.5
Average Travel Time, min	1.00	Density, pc/mi/ln	6.3

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.909	5949	8800	0.68	41.8	35.6	E

Facility Time Period Results

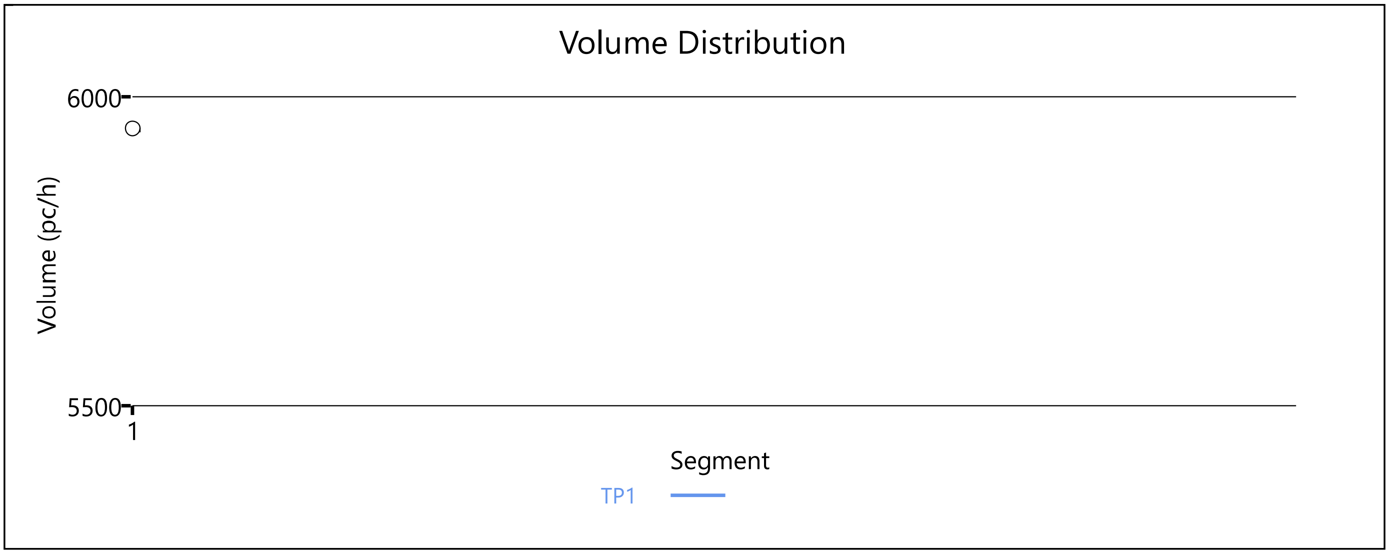
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	35.6	32.4	1.00	E

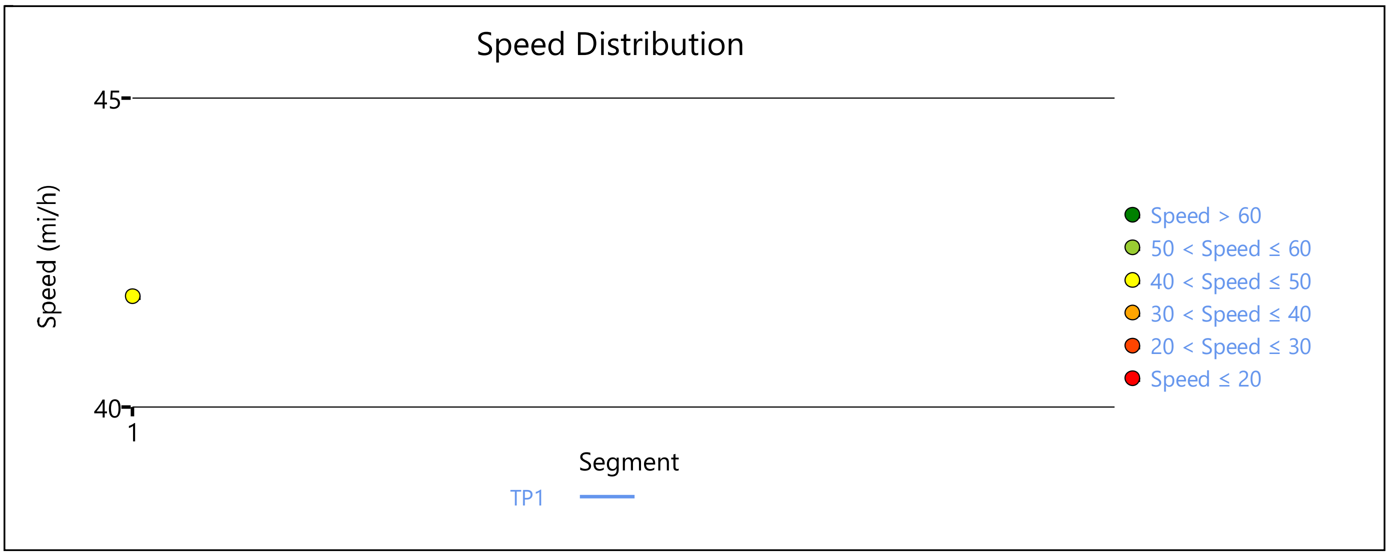
Facility Overall Results

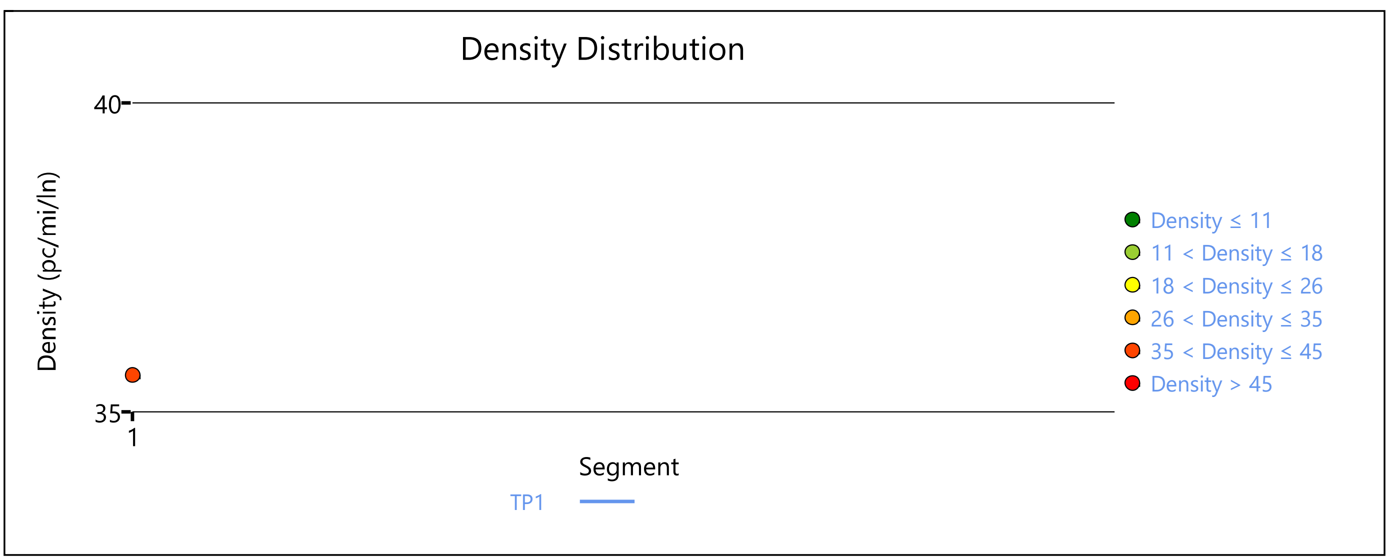
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	32.4
Average Travel Time, min	1.00	Density, pc/mi/ln	35.6

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.891	5542	8800	0.63	41.8	33.2	D

Facility Time Period Results

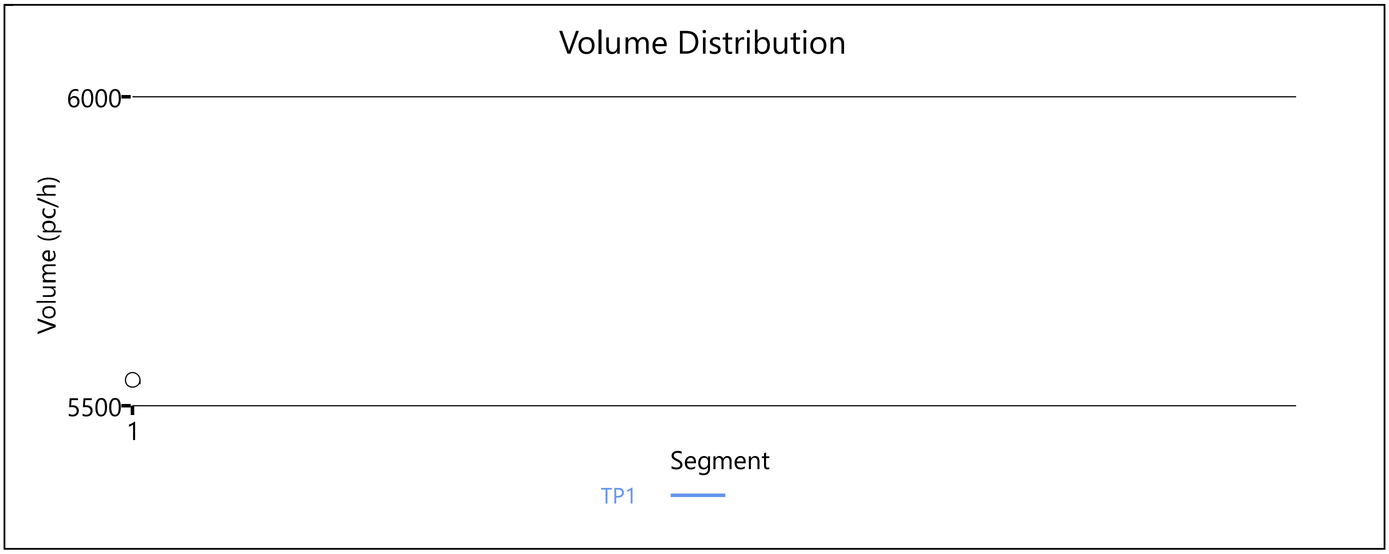
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	33.2	29.6	1.00	D

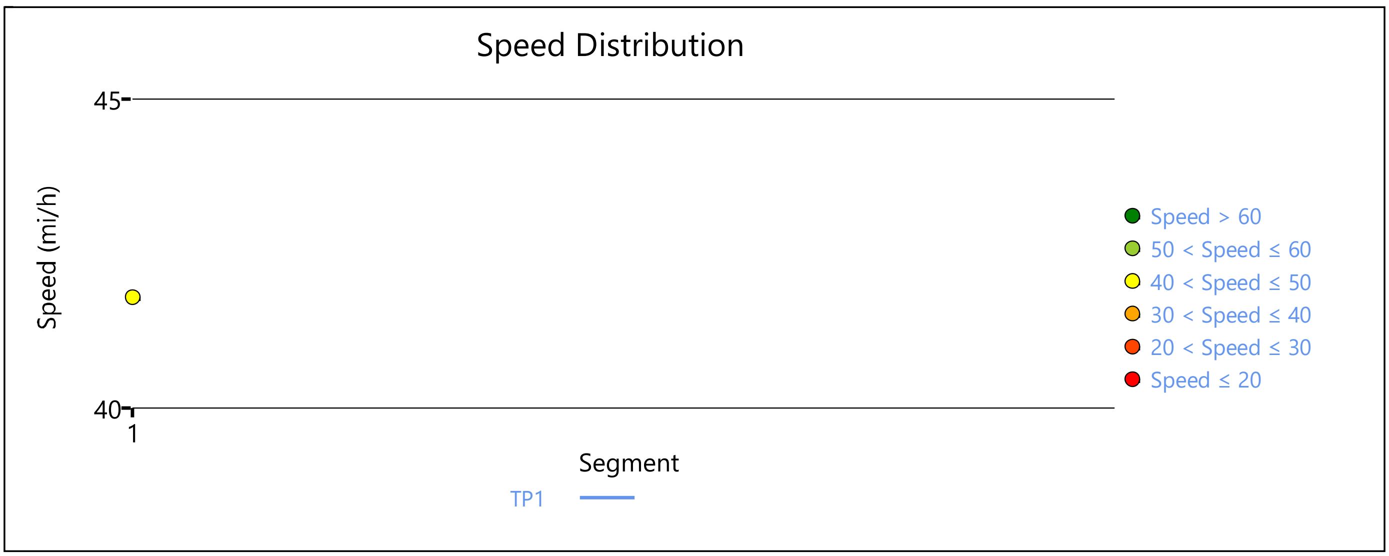
Facility Overall Results

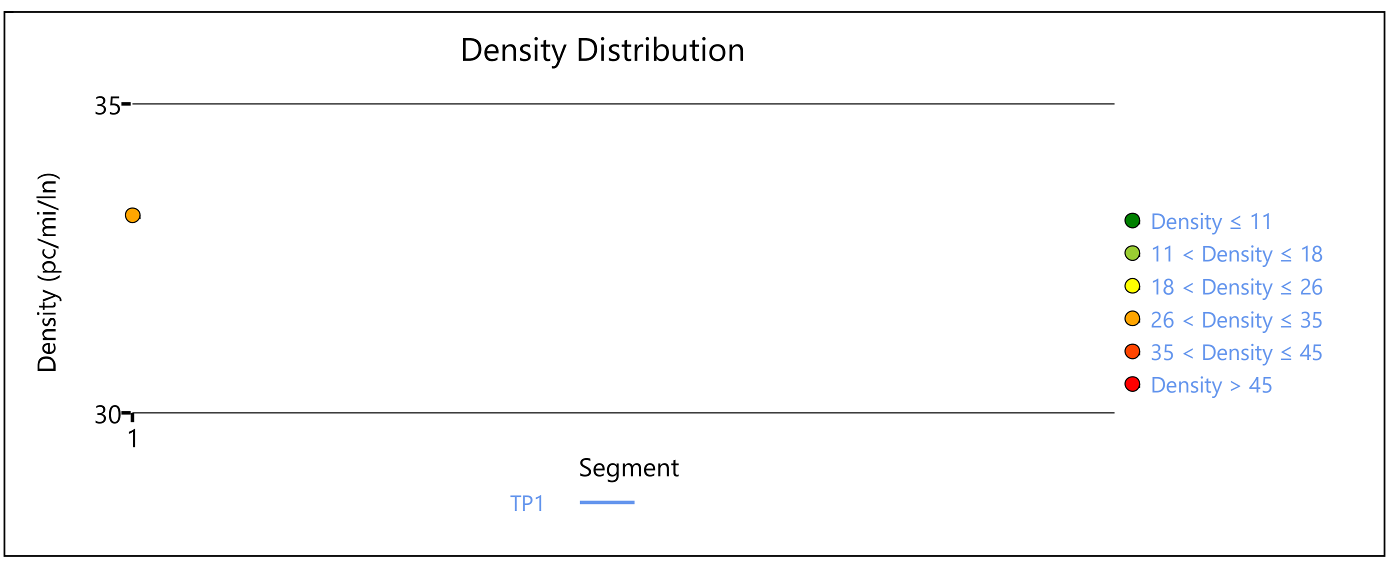
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	29.6
Average Travel Time, min	1.00	Density, pc/mi/ln	33.2

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.952	5964	8800	0.68	41.8	35.7	E

Facility Time Period Results

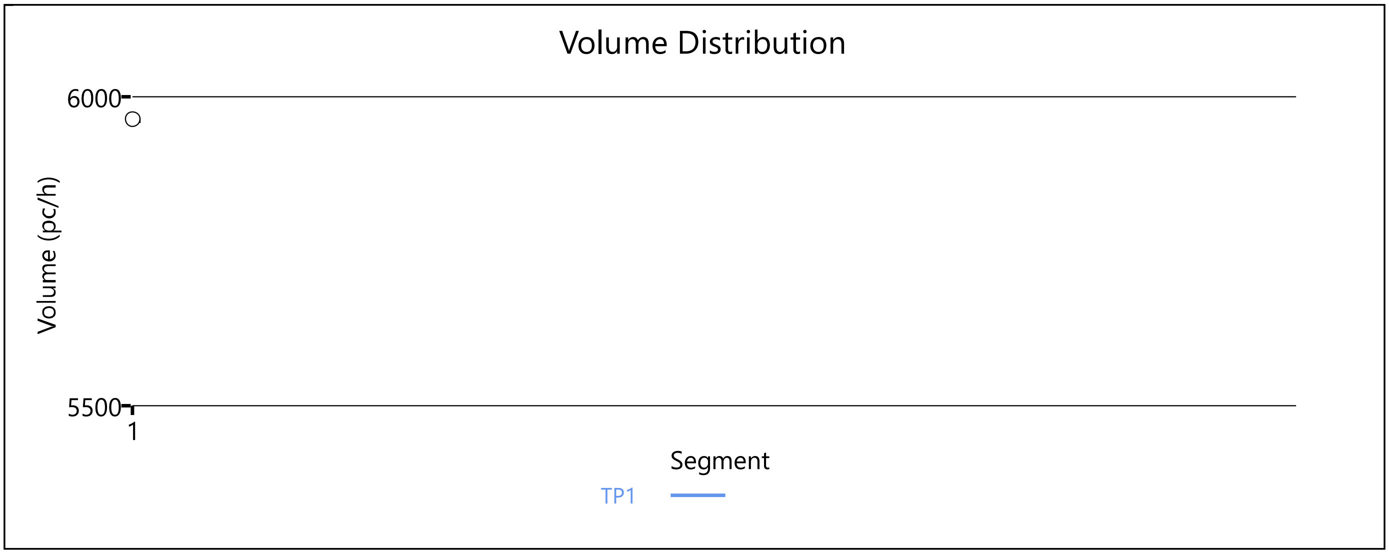
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	35.7	34.0	1.00	E

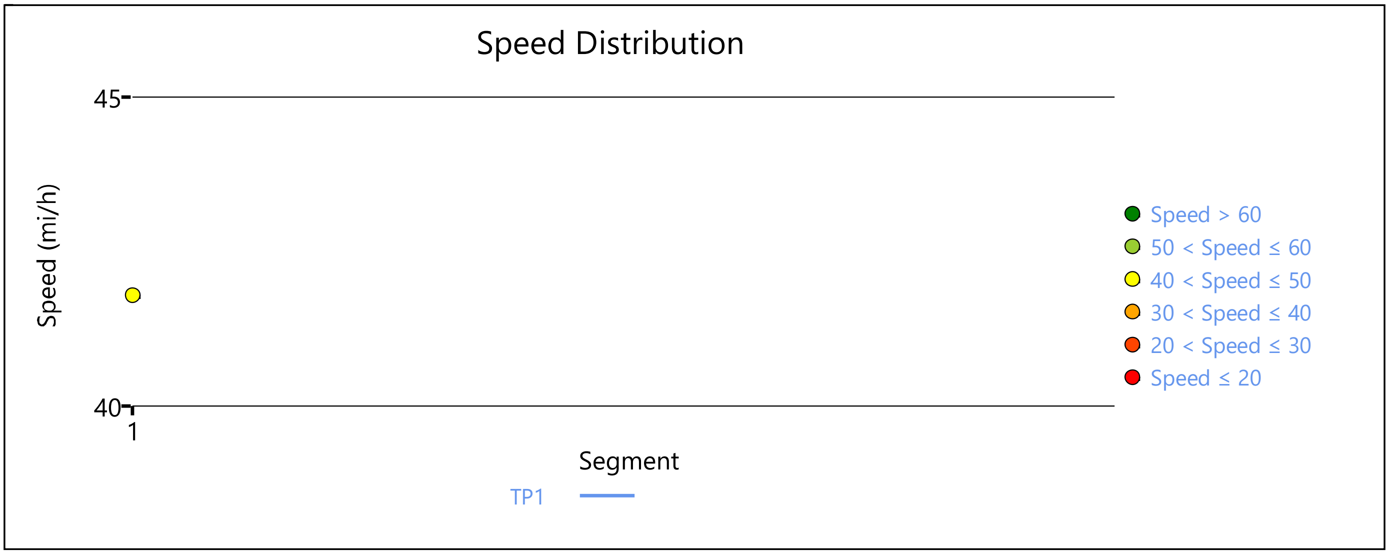
Facility Overall Results

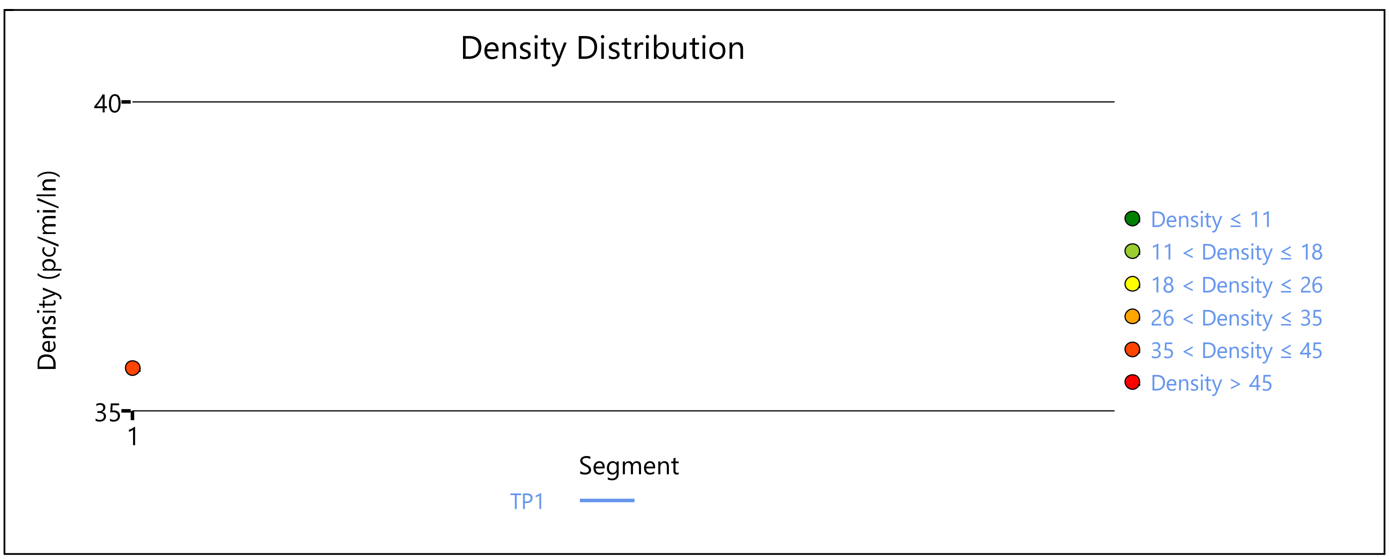
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	34.0
Average Travel Time, min	1.00	Density, pc/mi/ln	35.7

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.870	1173	8800	0.13	41.8	7.0	A

Facility Time Period Results

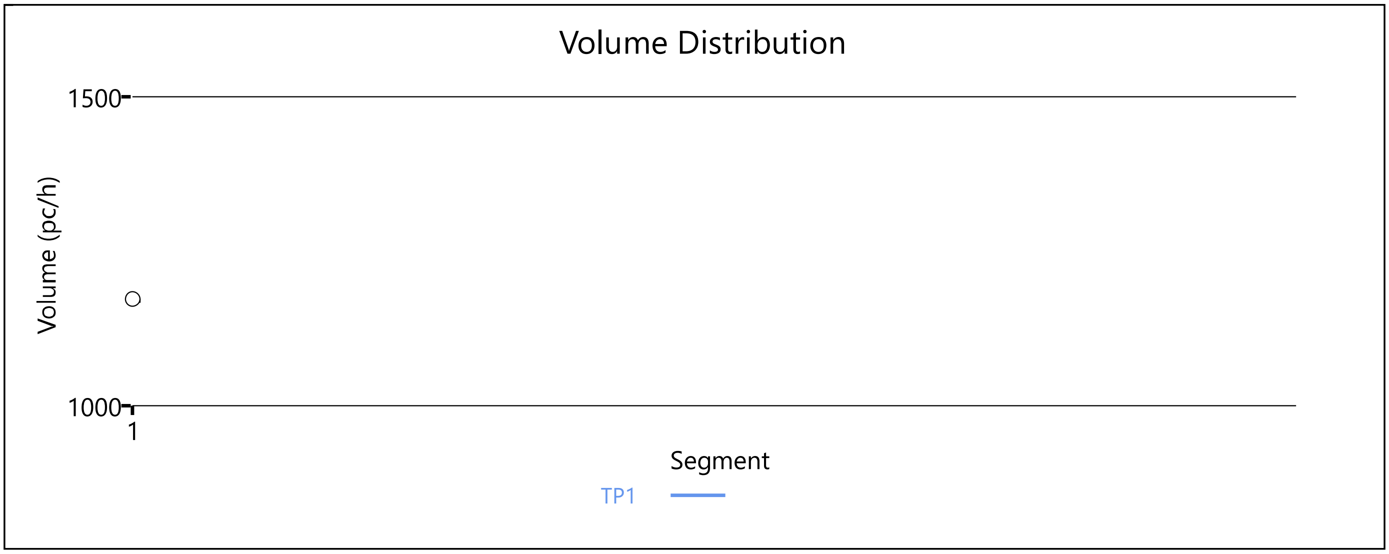
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	7.0	6.1	1.00	A

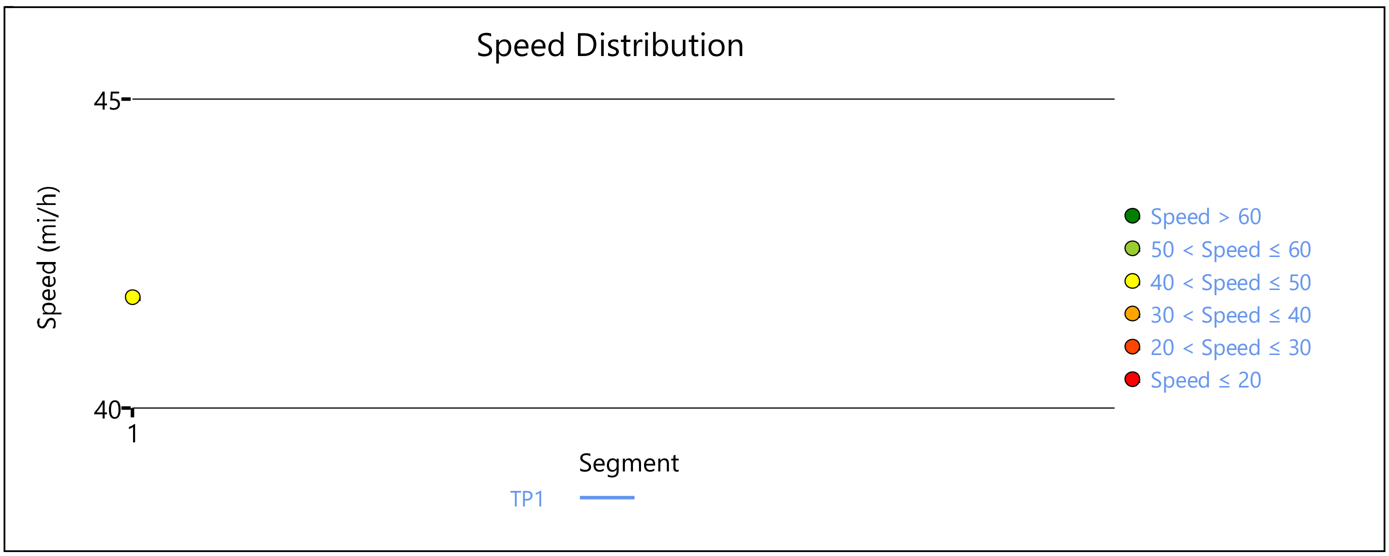
Facility Overall Results

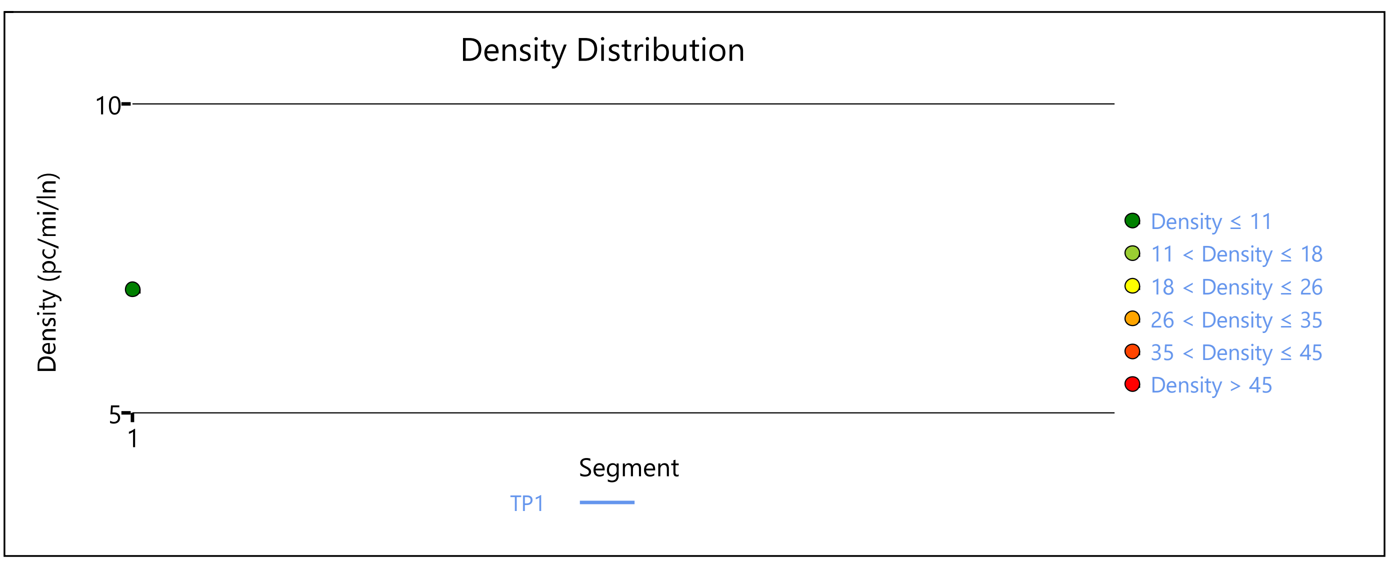
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	6.1
Average Travel Time, min	1.00	Density, pc/mi/ln	7.0

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.917	6409	8800	0.73	41.8	38.3	E

Facility Time Period Results

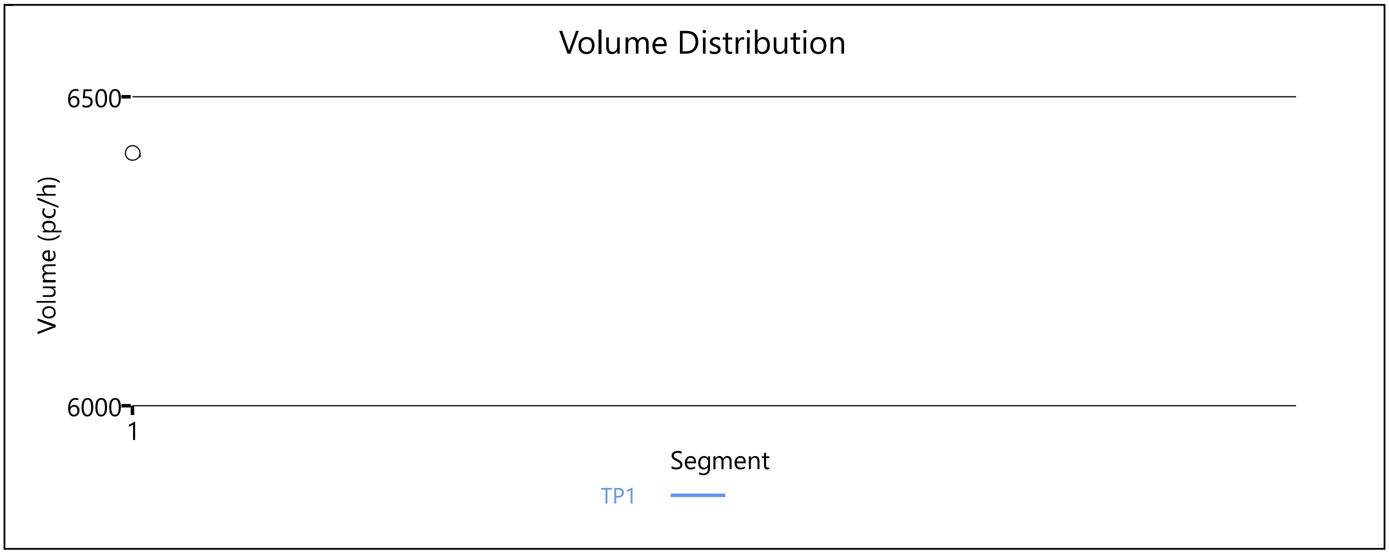
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	38.3	35.1	1.00	E

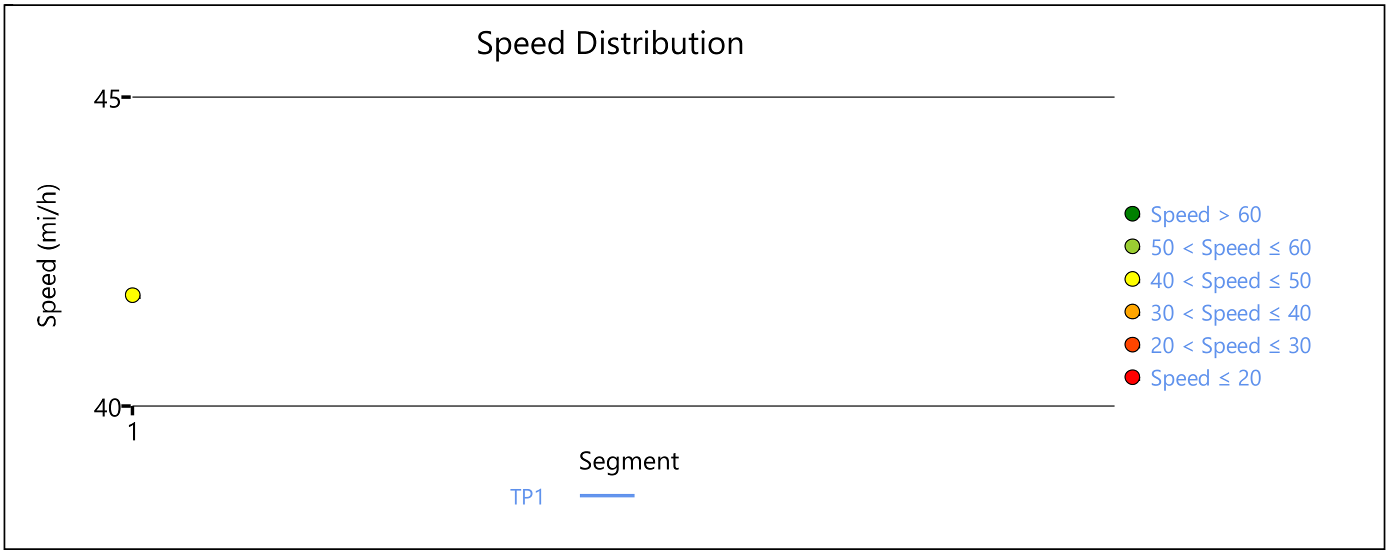
Facility Overall Results

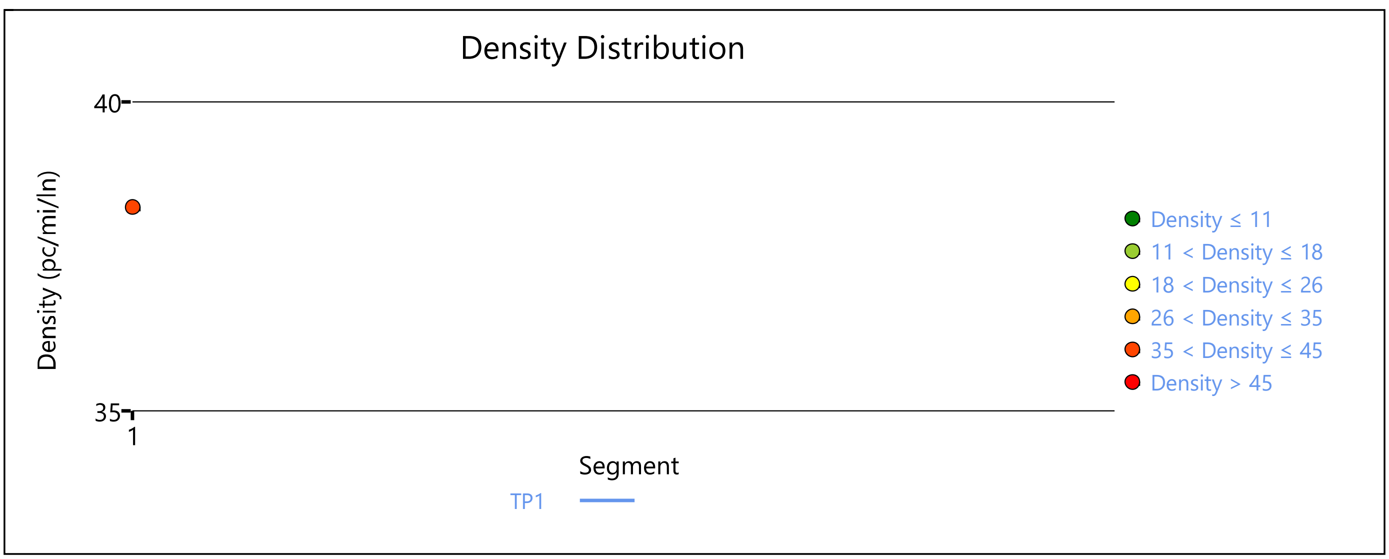
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	35.1
Average Travel Time, min	1.00	Density, pc/mi/ln	38.3

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.888	4822	8800	0.55	41.8	28.9	D

Facility Time Period Results

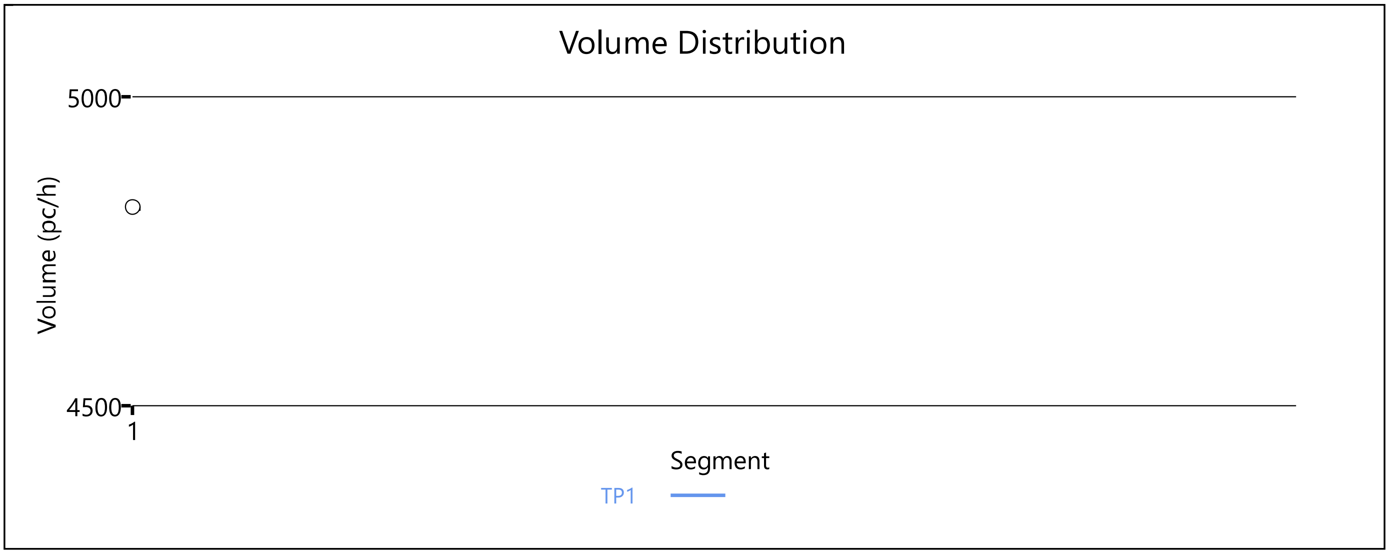
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	28.9	25.7	1.00	D

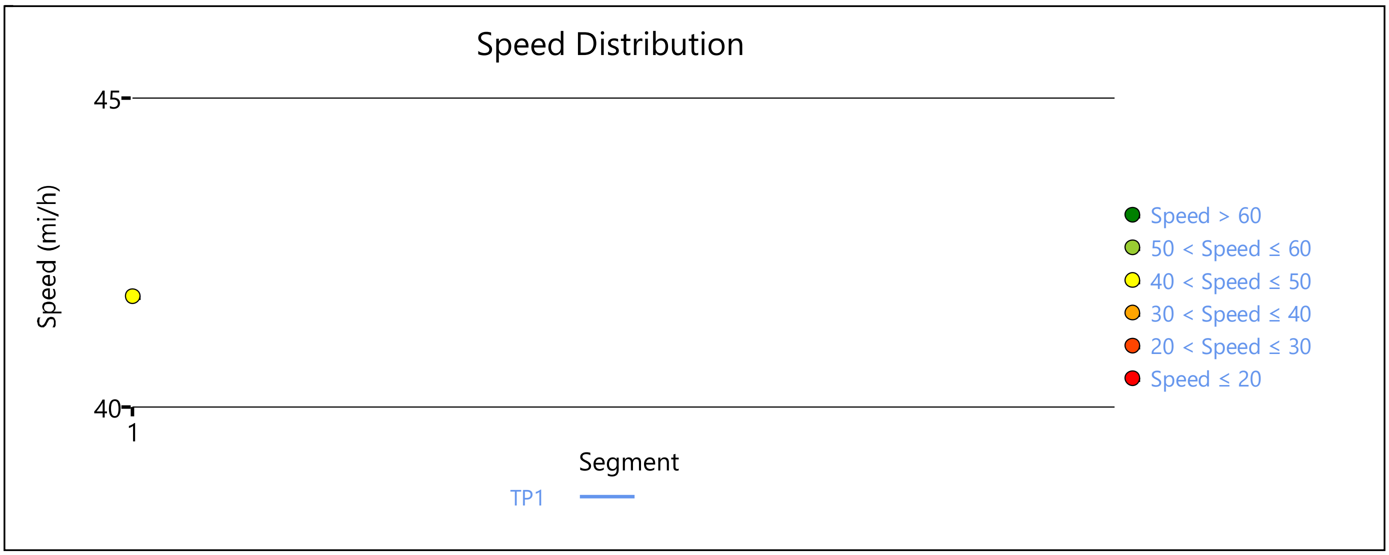
Facility Overall Results

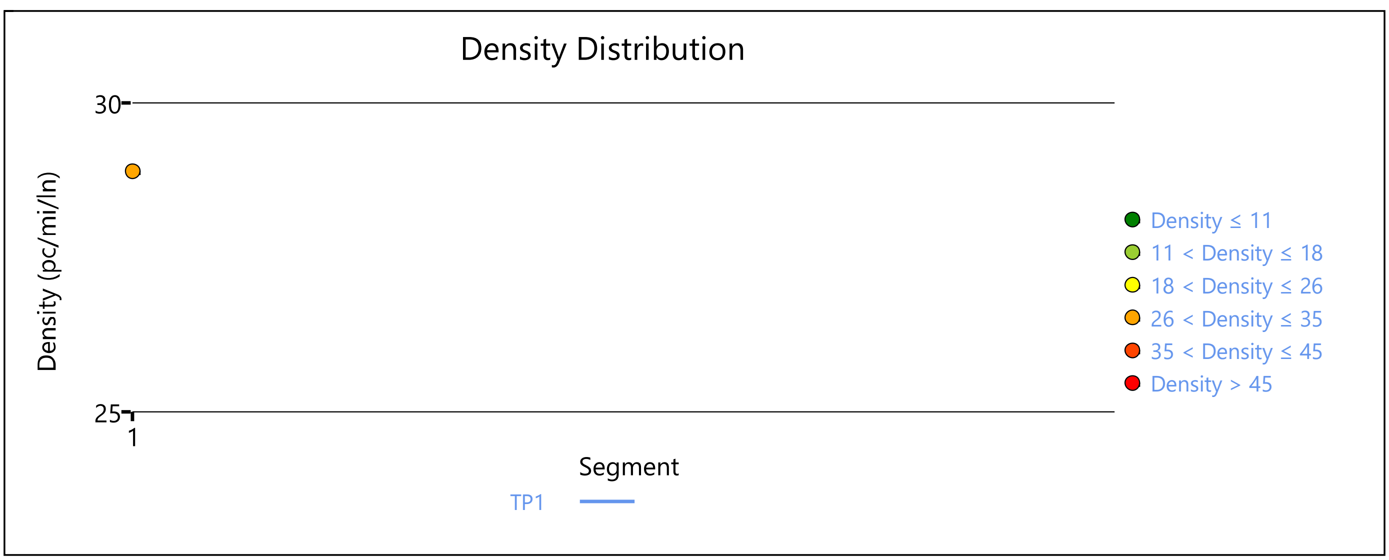
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	25.7
Average Travel Time, min	1.00	Density, pc/mi/ln	28.9

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.951	5545	8800	0.63	41.8	33.2	D

Facility Time Period Results

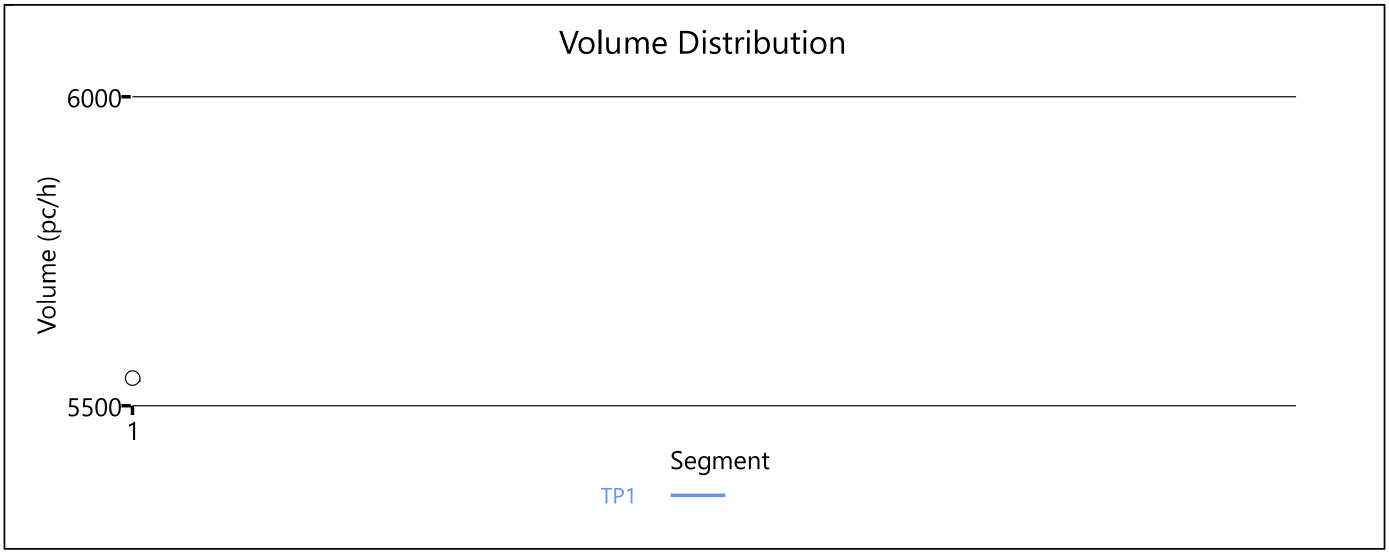
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	33.2	31.6	1.00	D

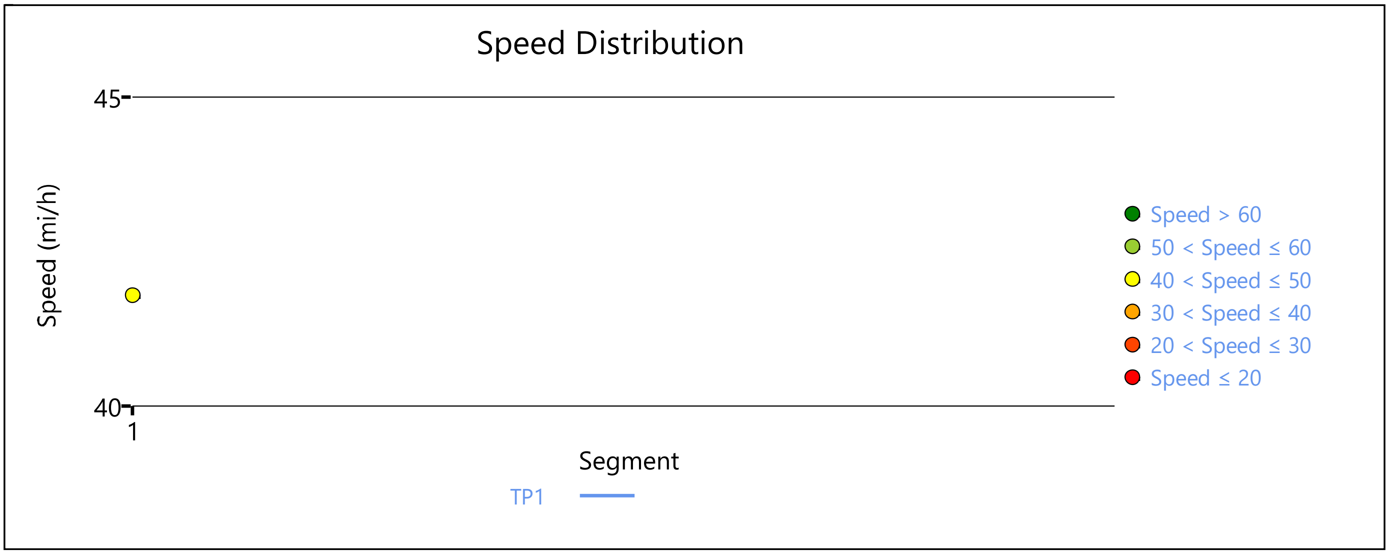
Facility Overall Results

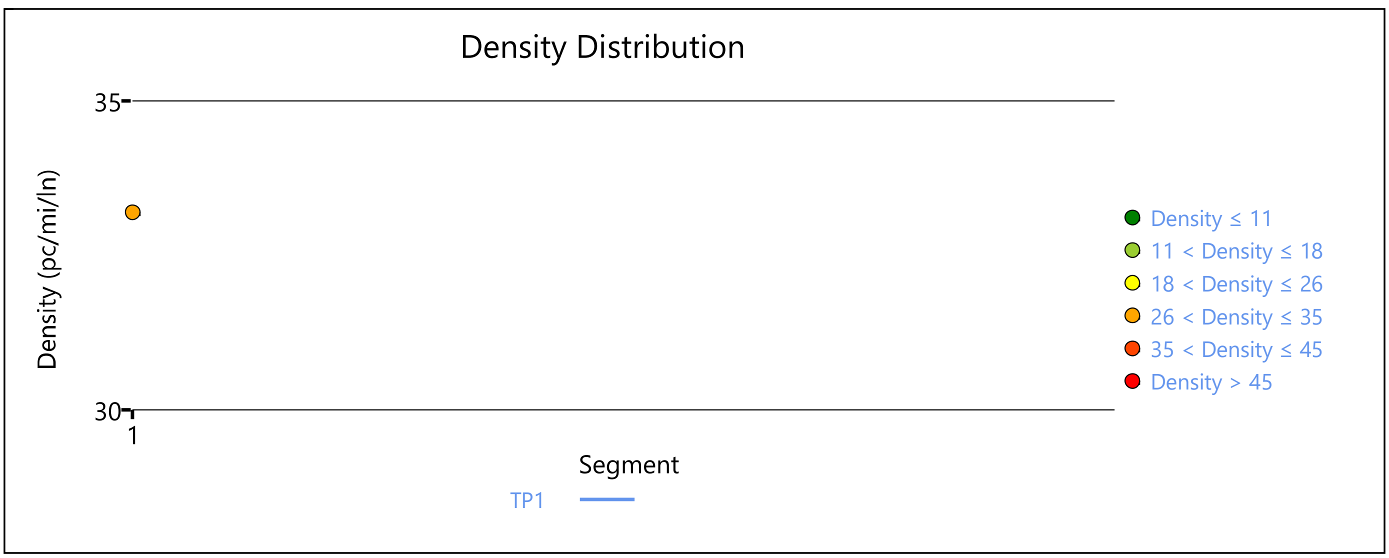
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	31.6
Average Travel Time, min	1.00	Density, pc/mi/ln	33.2

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	0.69		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		3634	4

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.924	1665	8800	0.19	41.8	10.0	A

Facility Time Period Results

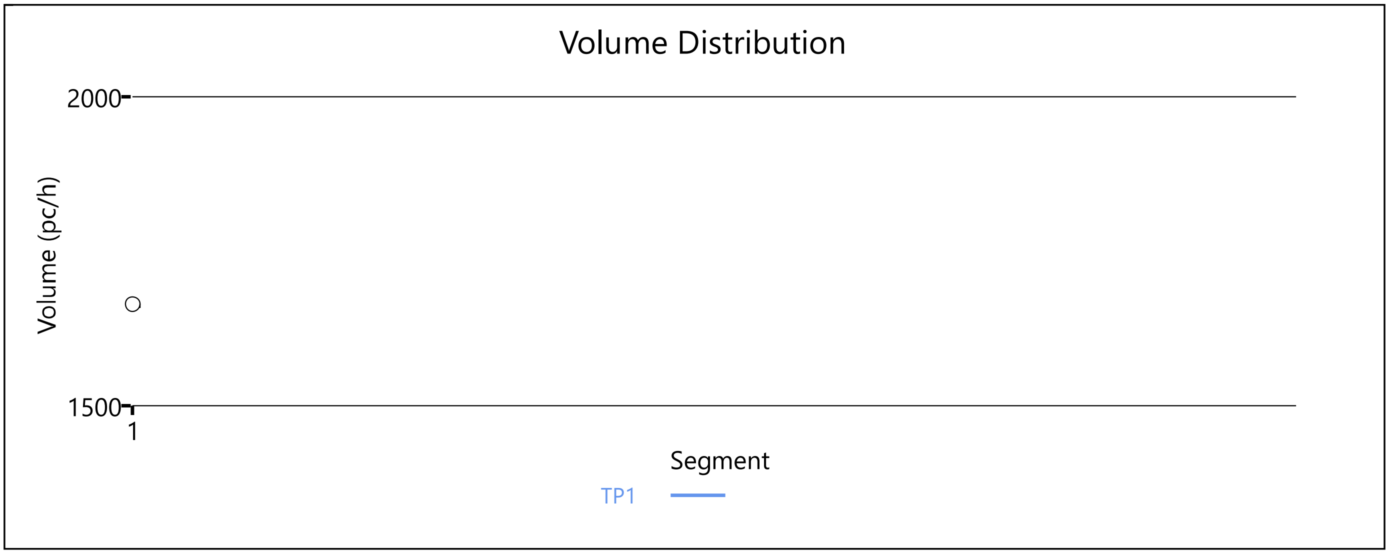
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	10.0	9.2	1.00	A

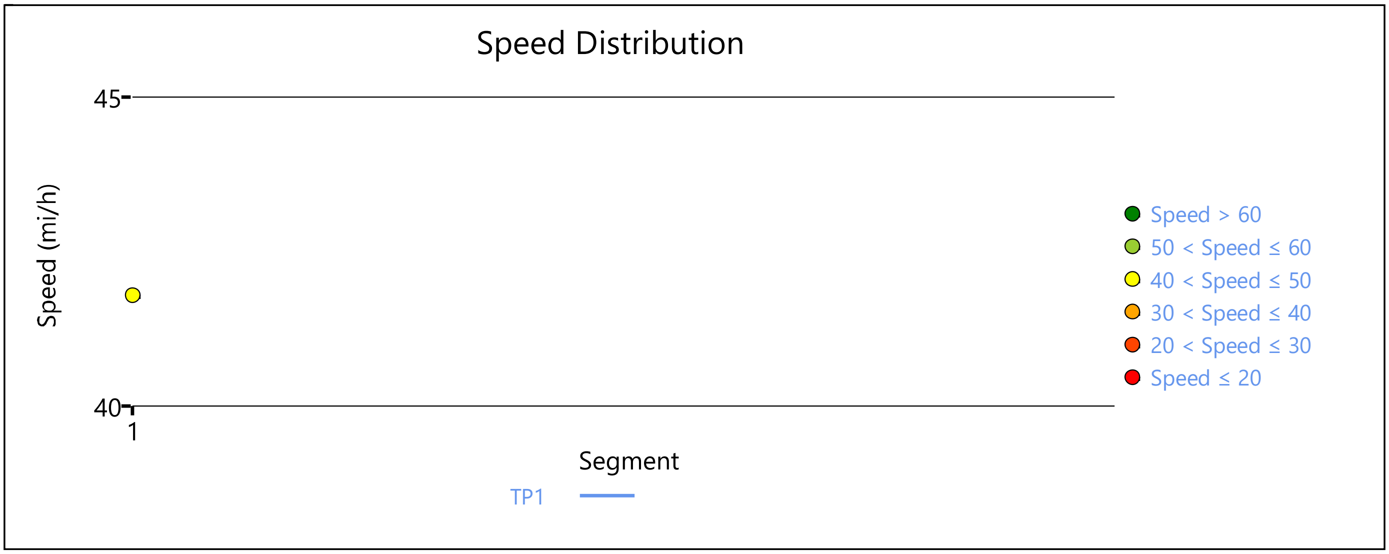
Facility Overall Results

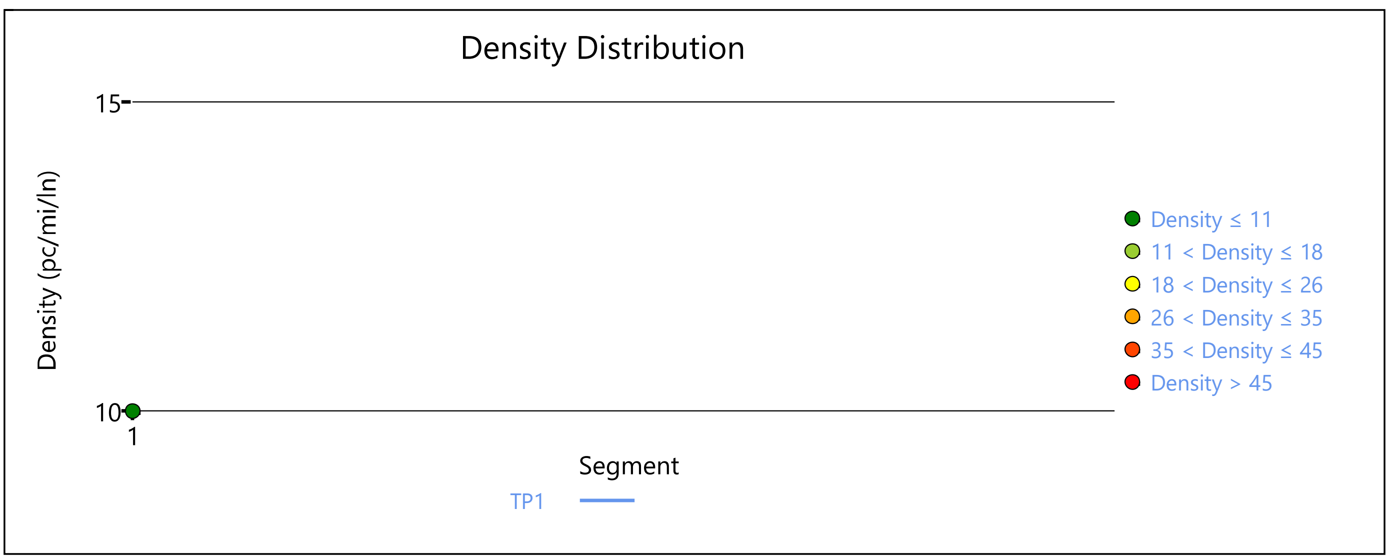
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	9.2
Average Travel Time, min	1.00	Density, pc/mi/ln	10.0

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.888	1288	4400	0.29	41.8	15.4	B

Facility Time Period Results

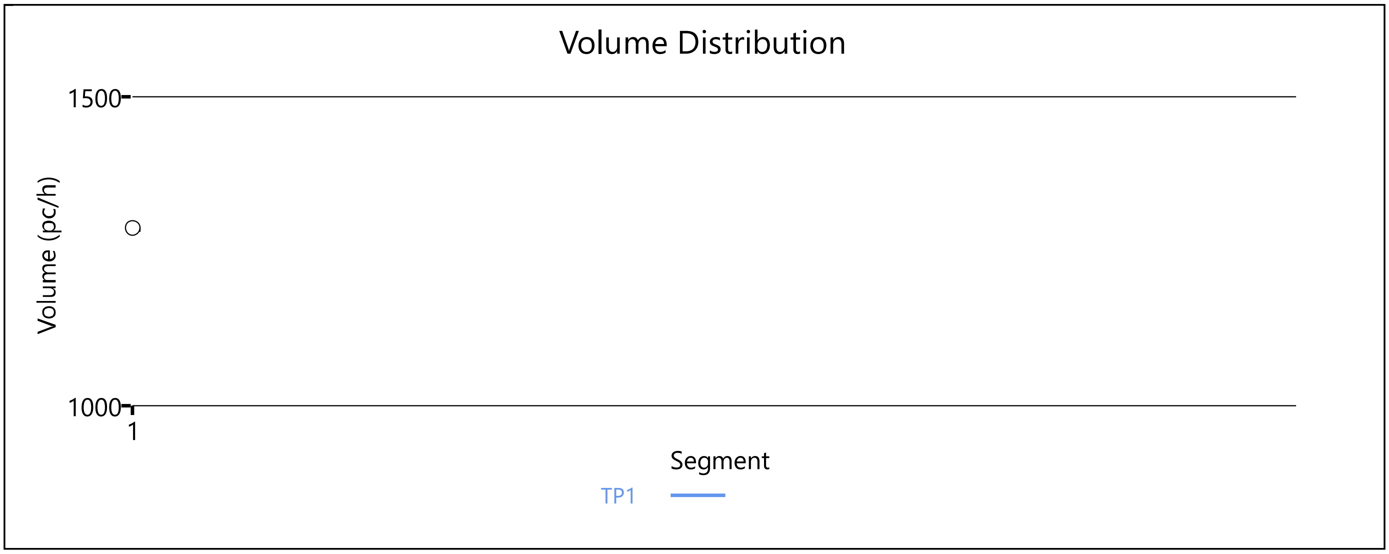
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	15.4	13.7	1.40	B

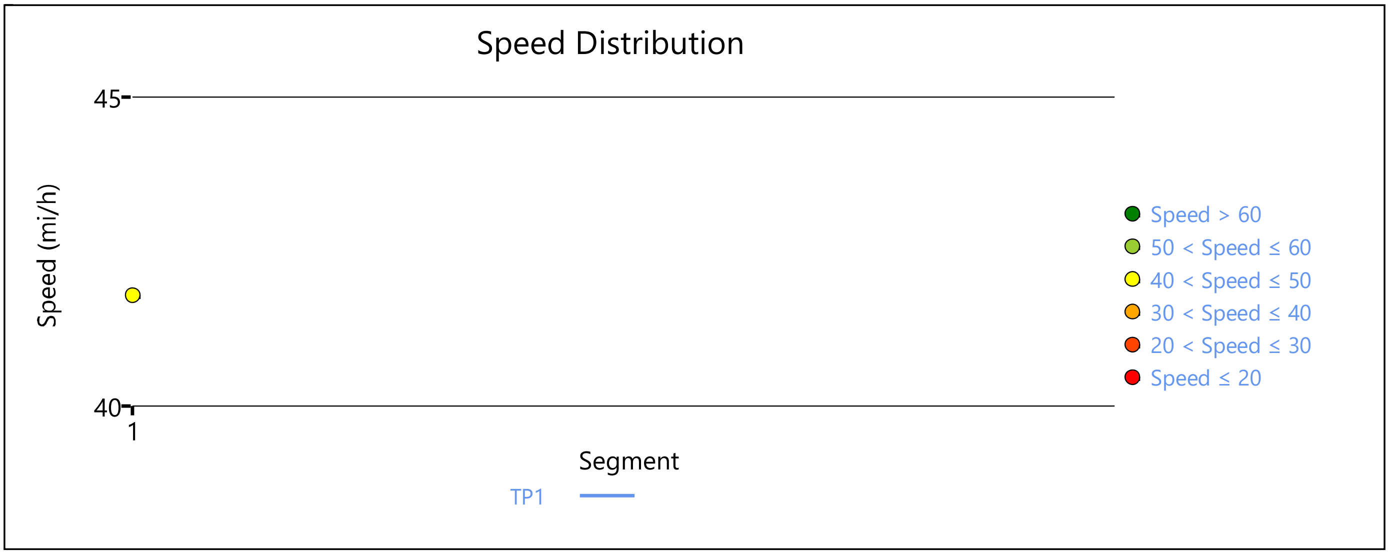
Facility Overall Results

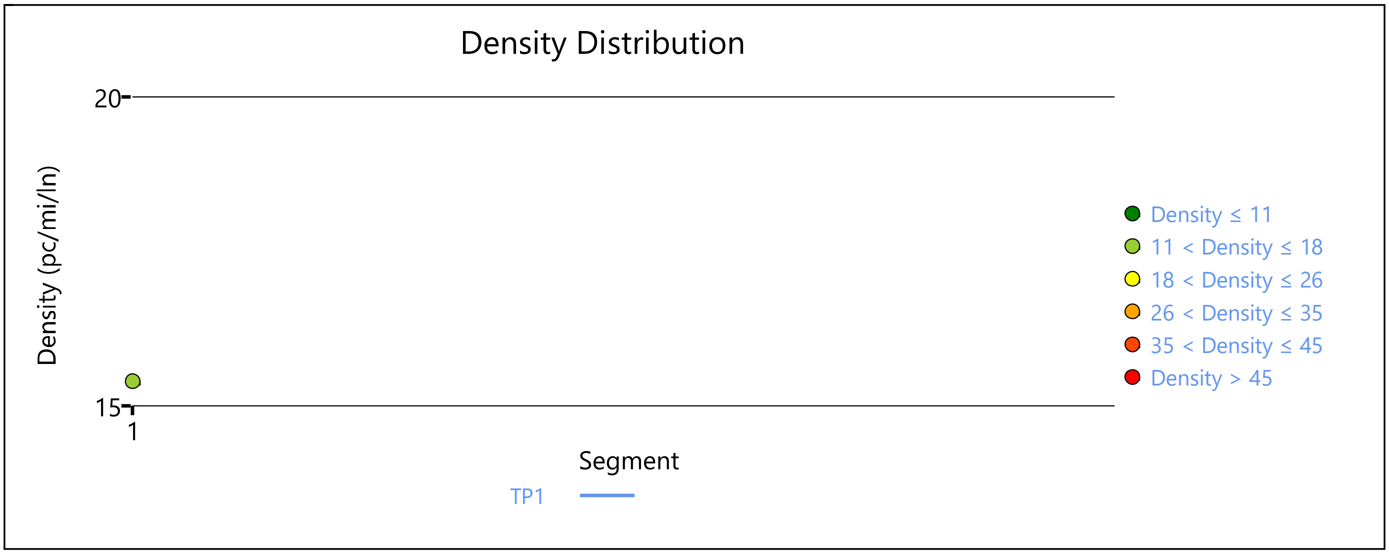
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	13.7
Average Travel Time, min	1.40	Density, pc/mi/ln	15.4

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.792	617	4400	0.14	41.8	7.4	A

Facility Time Period Results

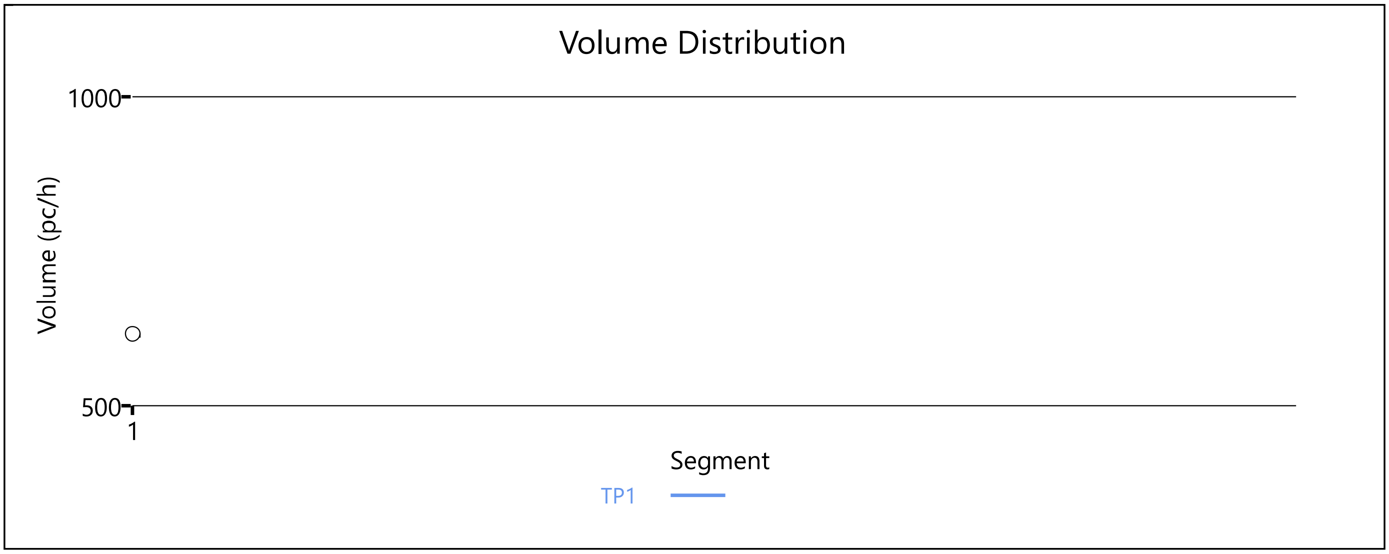
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	7.4	5.9	1.40	A

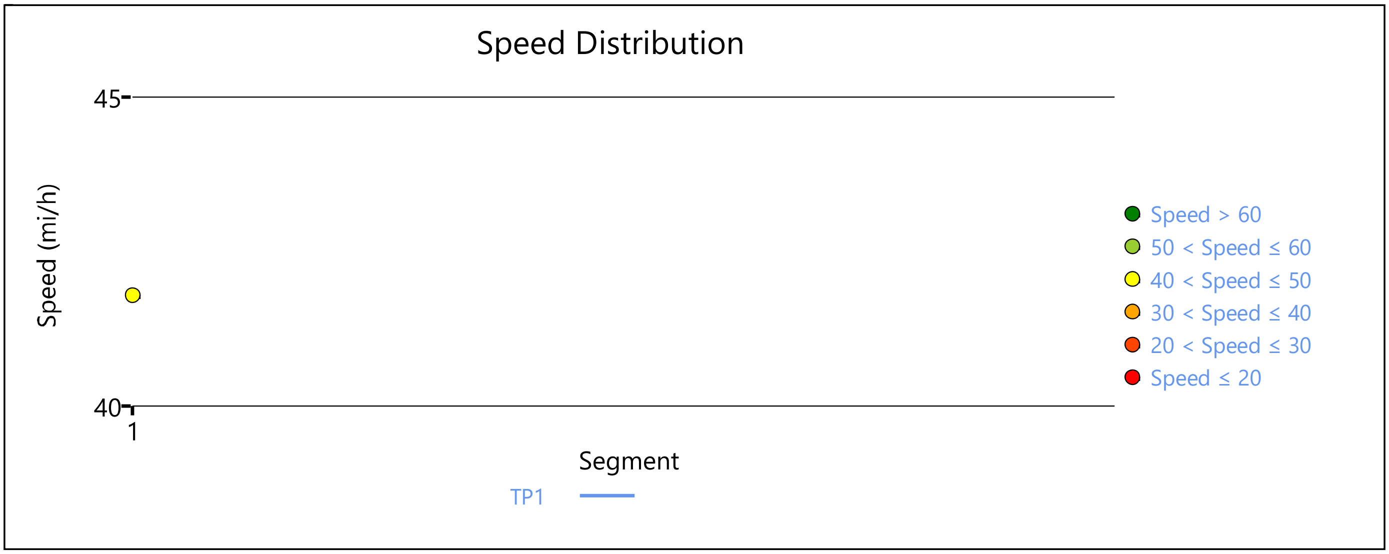
Facility Overall Results

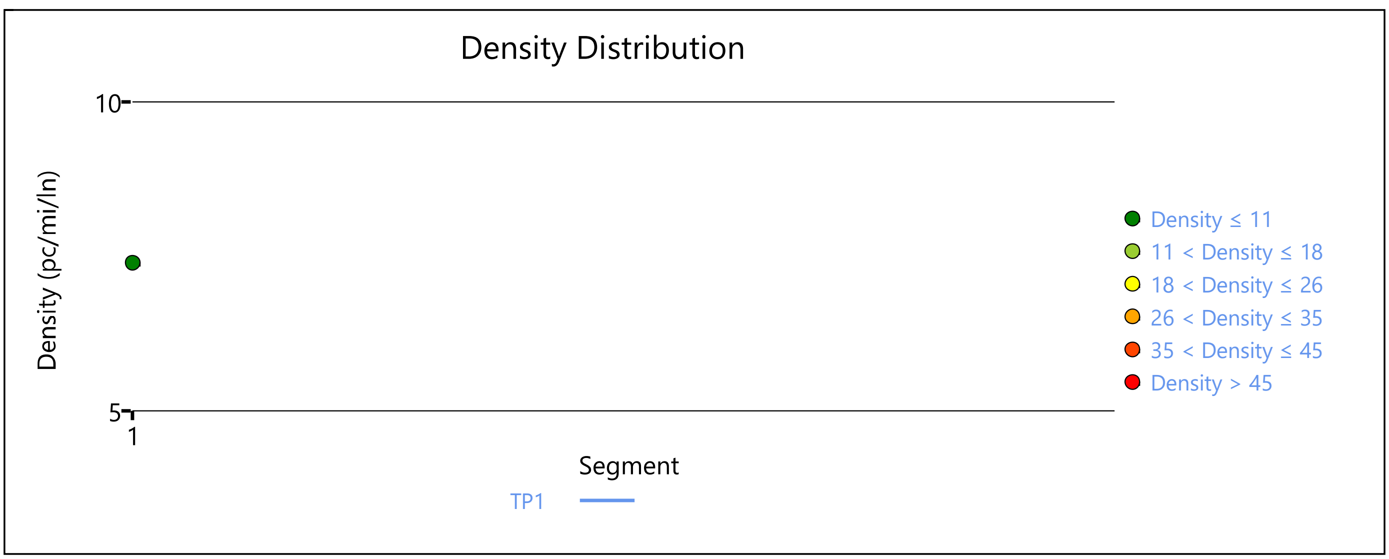
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	5.9
Average Travel Time, min	1.40	Density, pc/mi/ln	7.4

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.919	652	4400	0.15	41.8	7.8	A

Facility Time Period Results

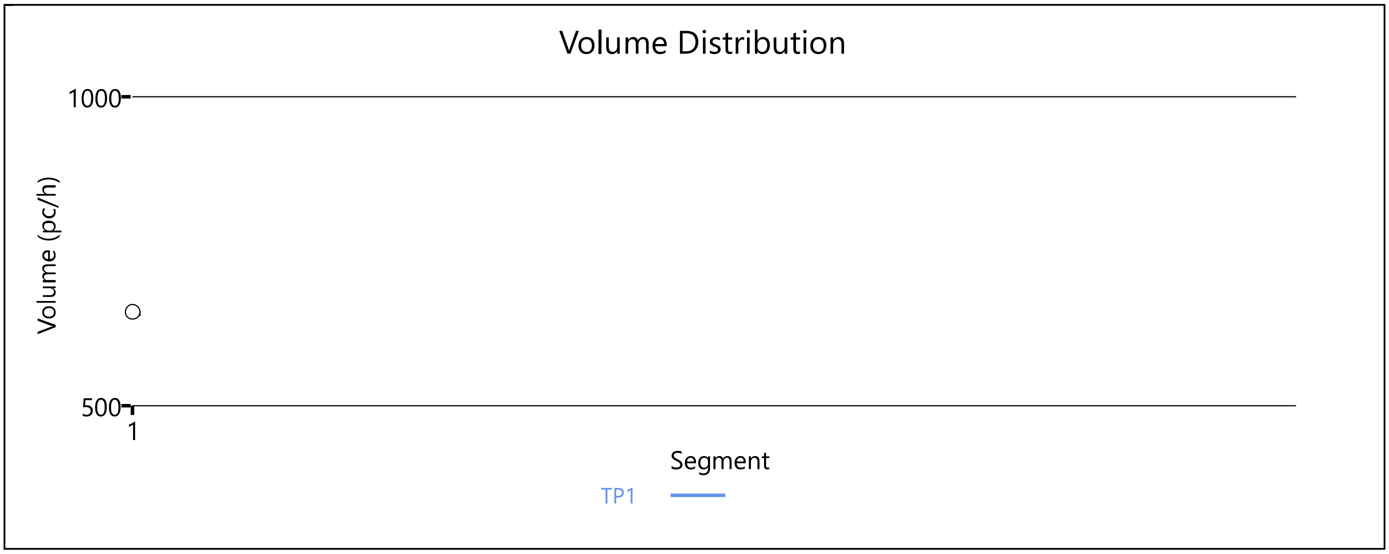
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	7.8	7.2	1.40	A

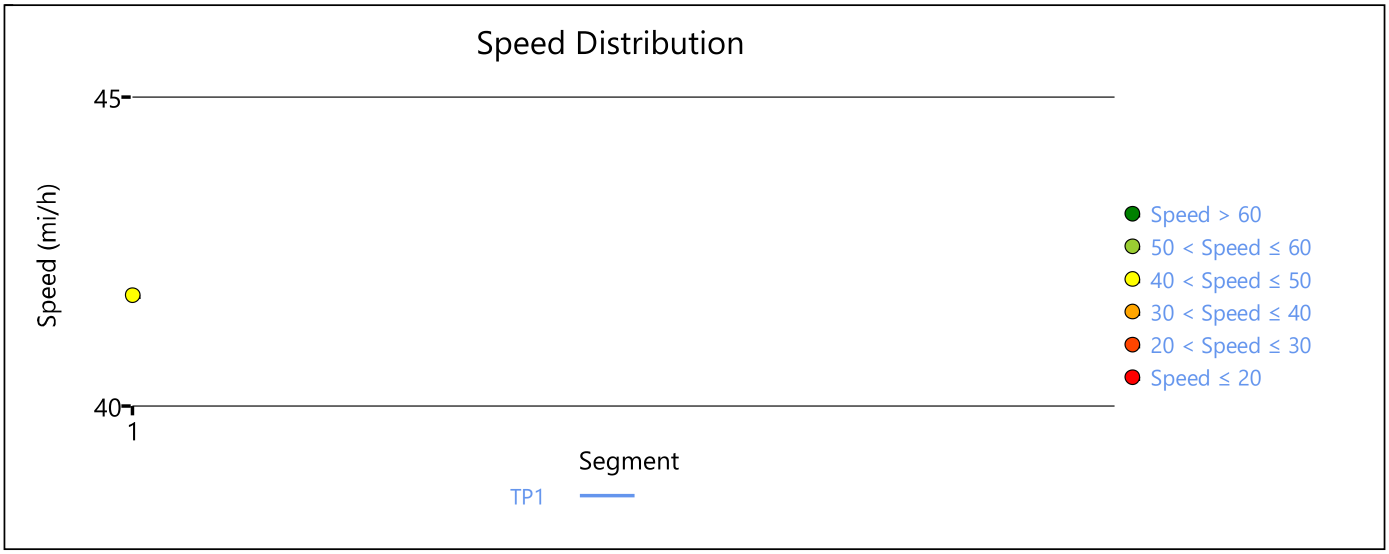
Facility Overall Results

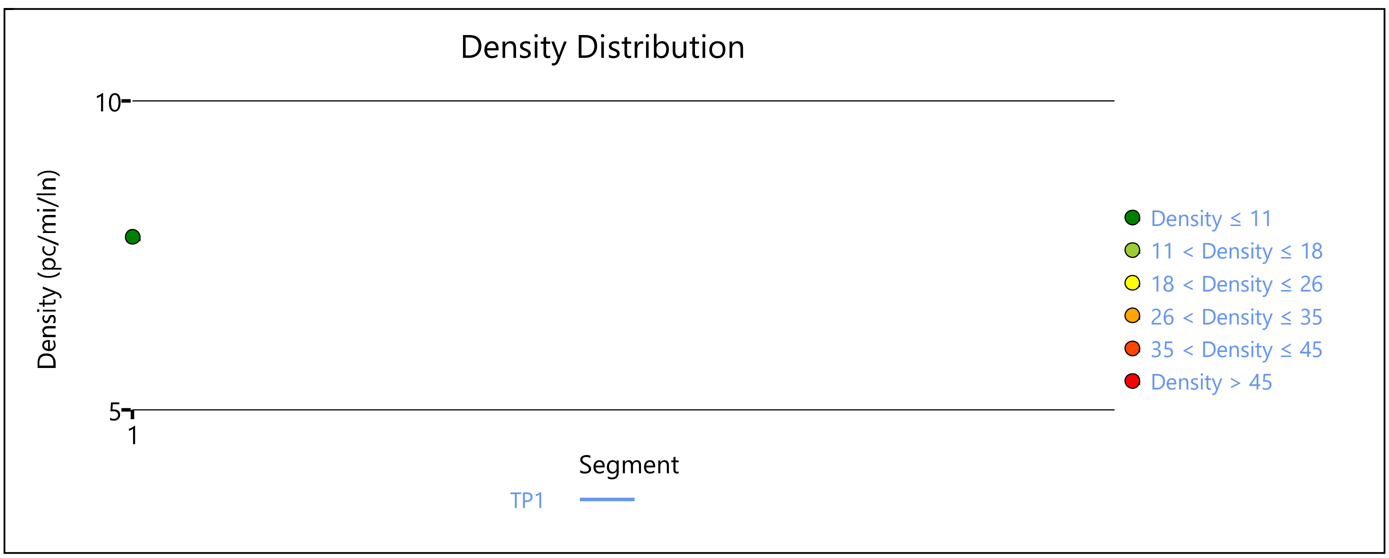
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	7.2
Average Travel Time, min	1.40	Density, pc/mi/ln	7.8

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.847	217	4400	0.05	41.8	2.6	A

Facility Time Period Results

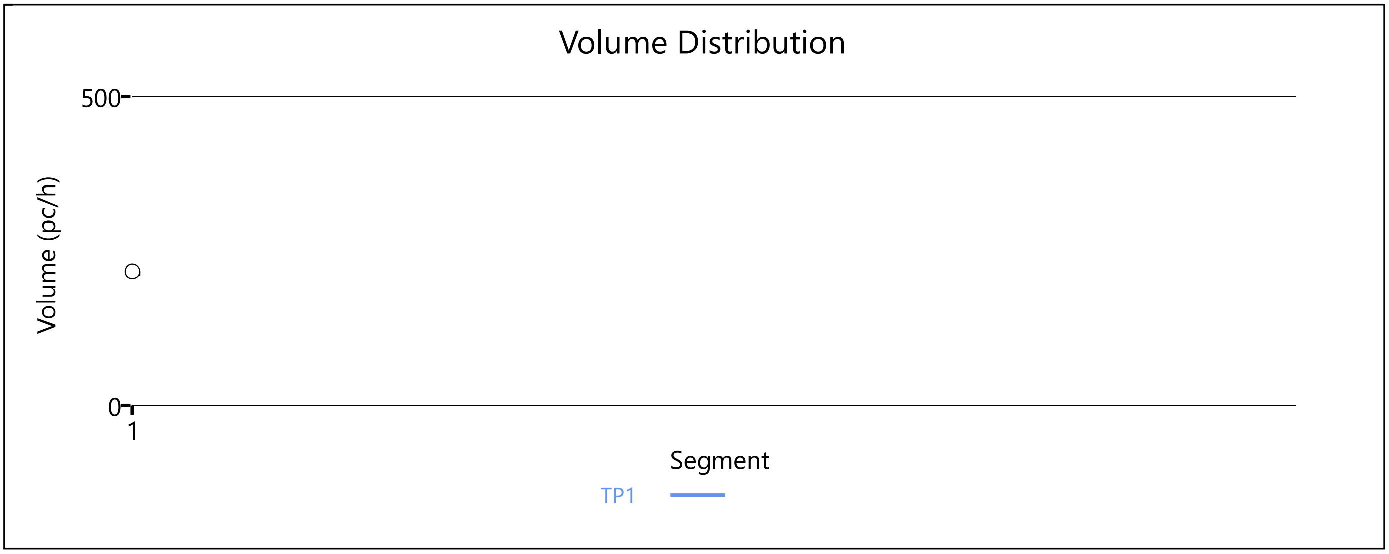
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	2.6	2.2	1.40	A

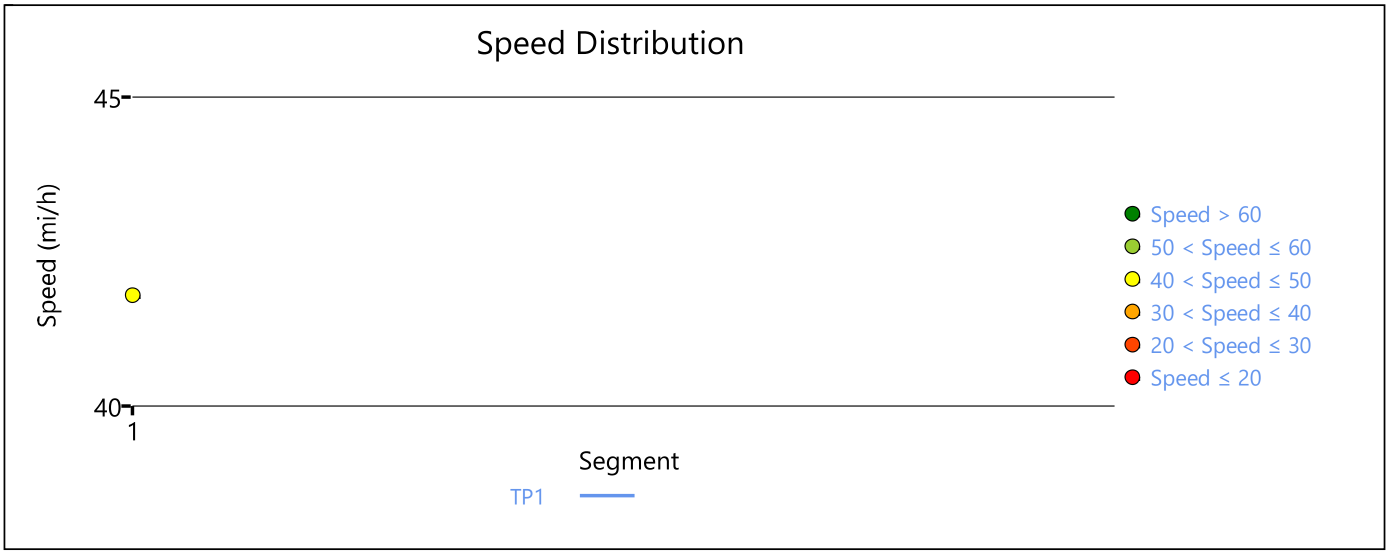
Facility Overall Results

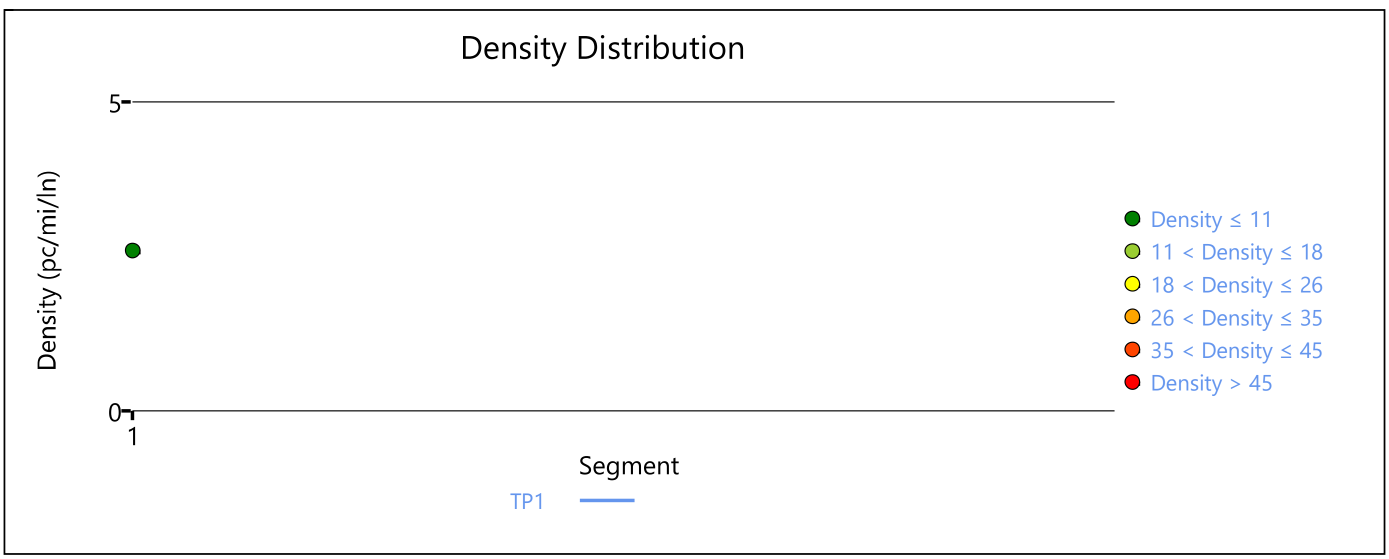
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	2.2
Average Travel Time, min	1.40	Density, pc/mi/ln	2.6

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.797	880	4400	0.20	41.8	10.5	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	10.5	8.4	1.40	A

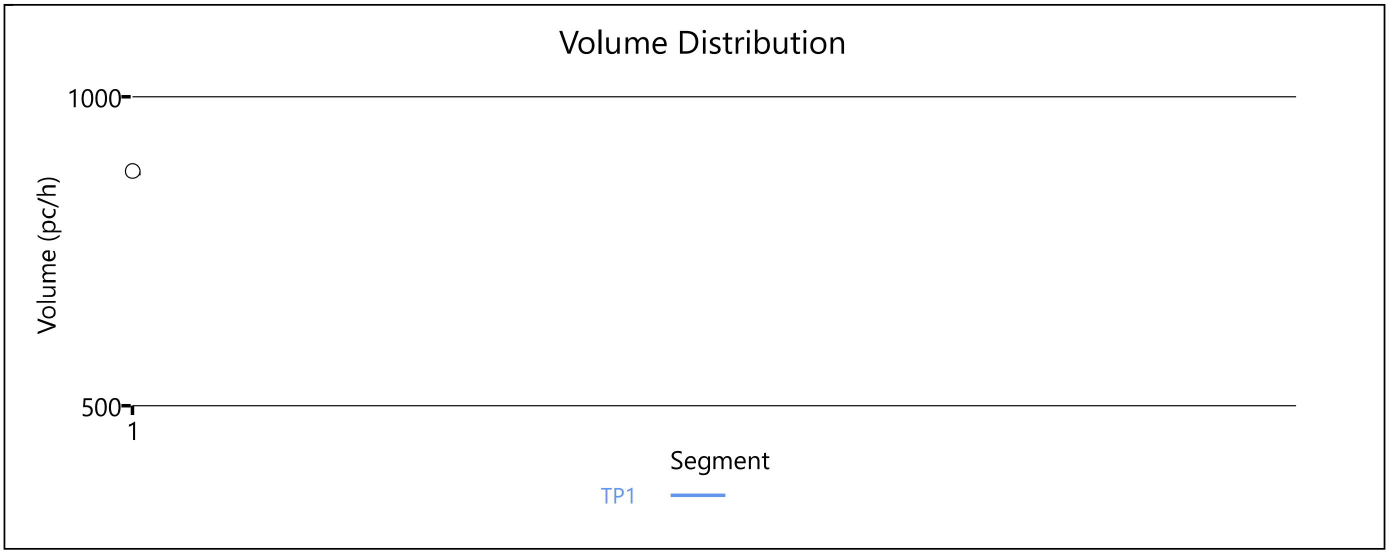
Facility Overall Results

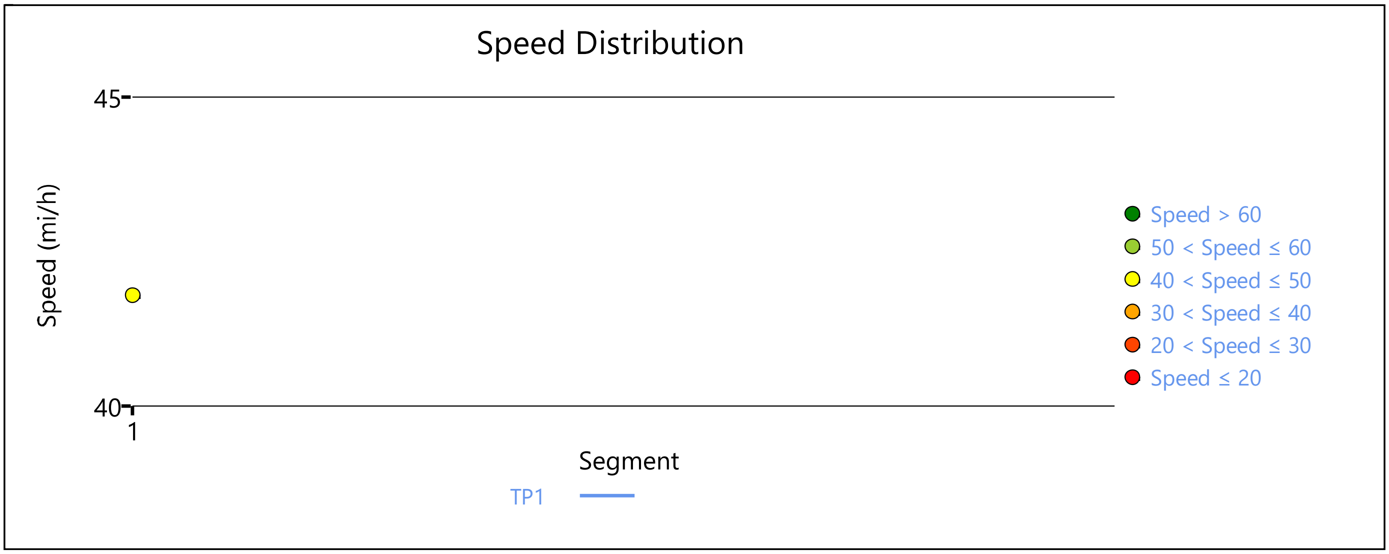
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	8.4
Average Travel Time, min	1.40	Density, pc/mi/ln	10.5

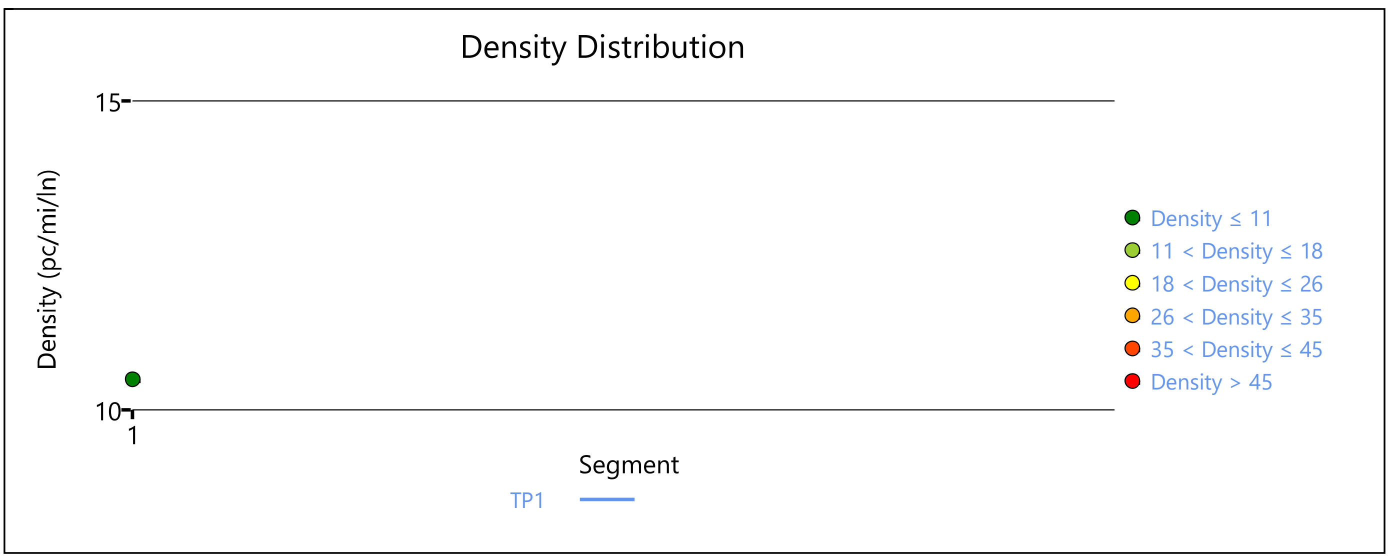
Messages

INFORMATION 1	Density for segment 1 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.773	815	4400	0.19	41.8	9.8	A

Facility Time Period Results

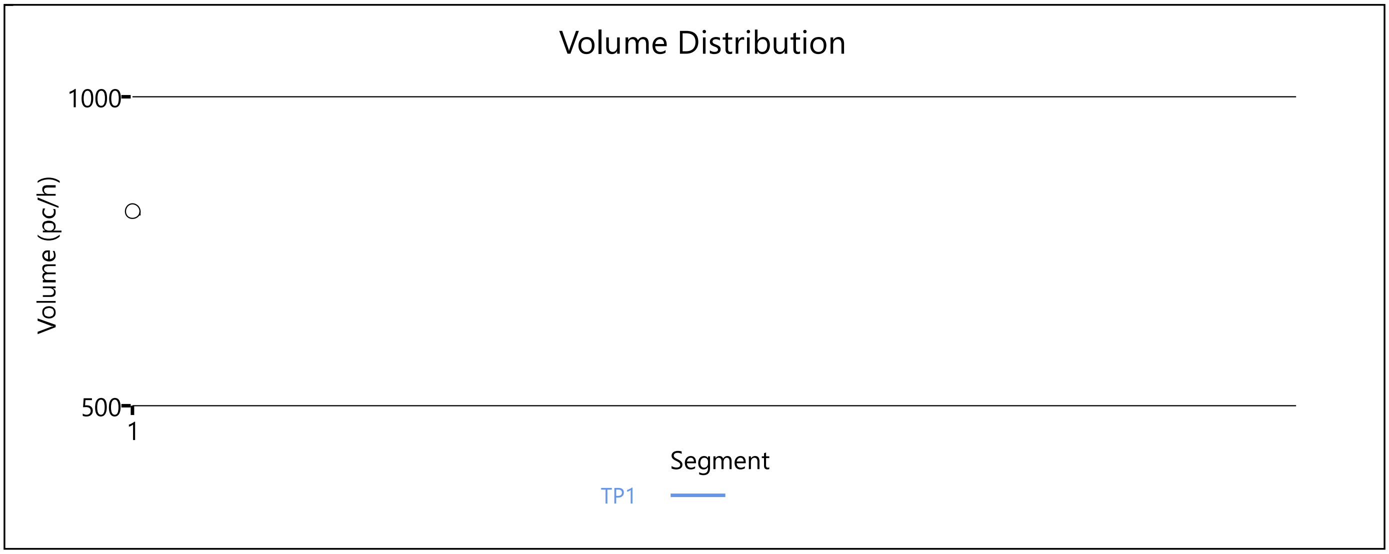
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	9.8	7.6	1.40	A

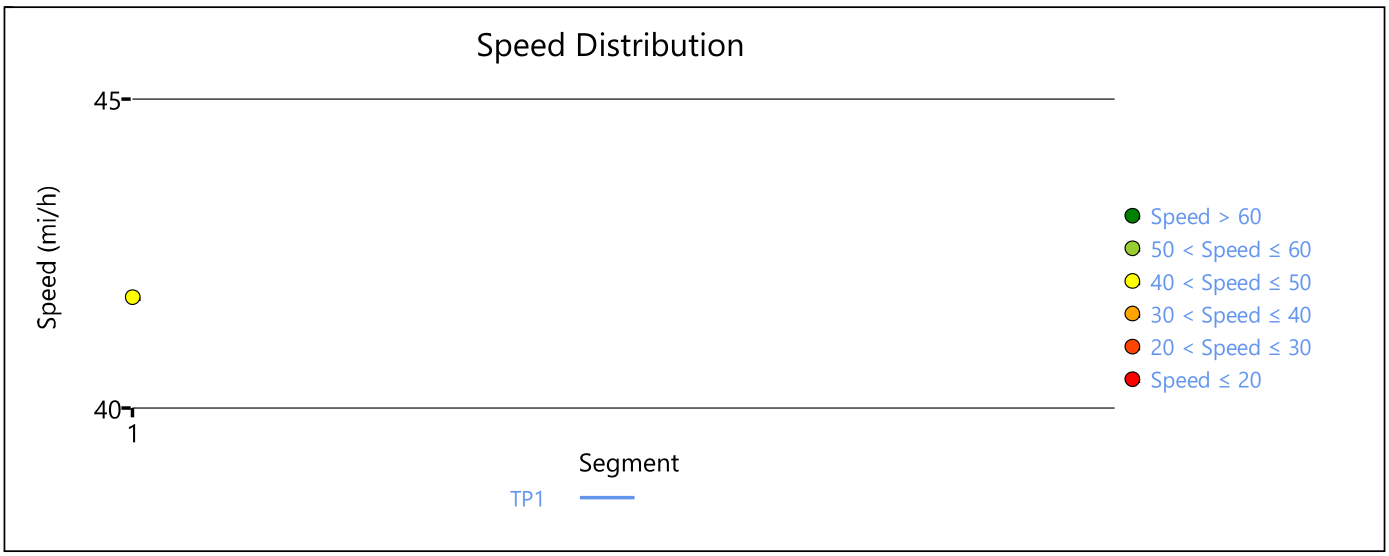
Facility Overall Results

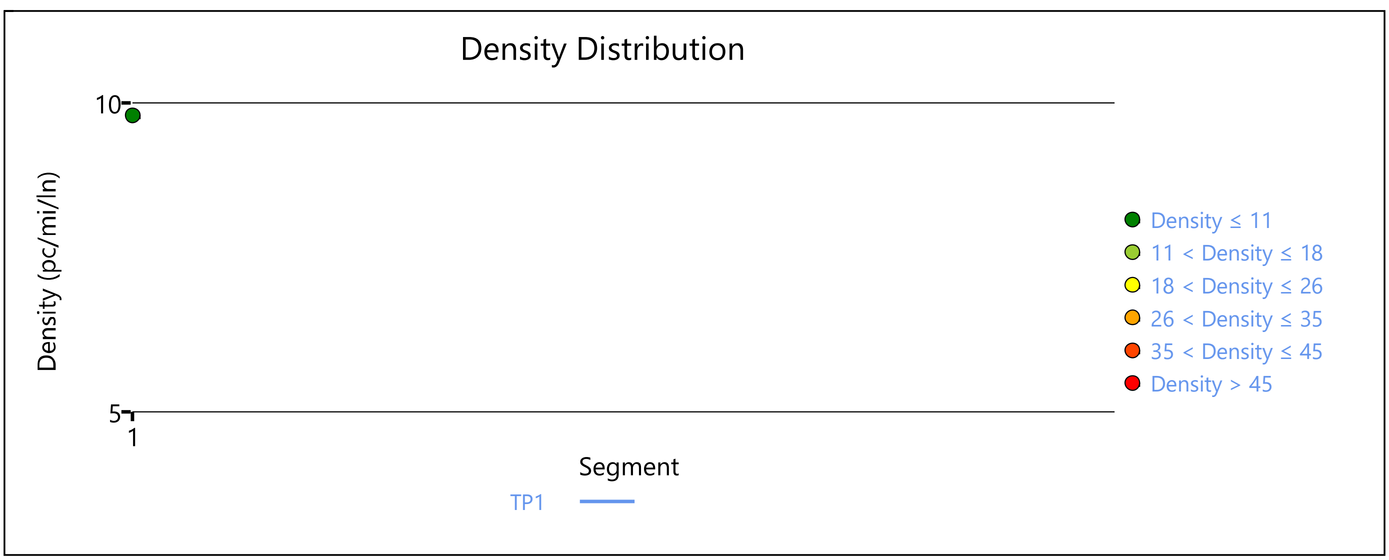
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	7.6
Average Travel Time, min	1.40	Density, pc/mi/ln	9.8

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.896	939	4400	0.21	41.8	11.2	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	11.2	10.0	1.40	B

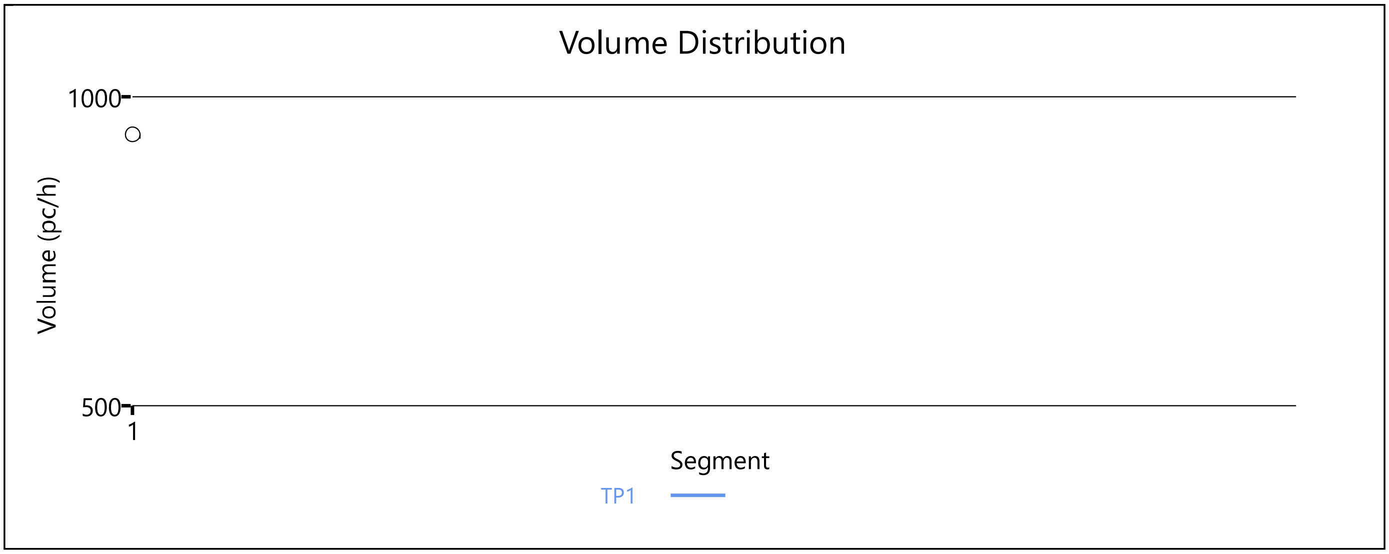
Facility Overall Results

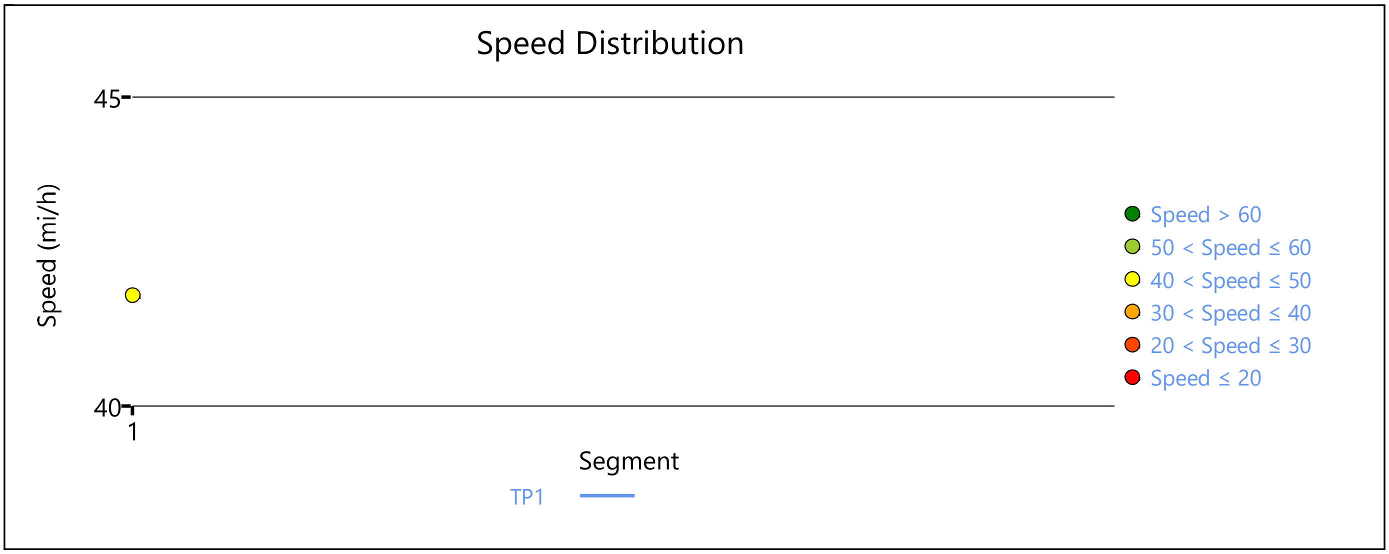
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	10.0
Average Travel Time, min	1.40	Density, pc/mi/ln	11.2

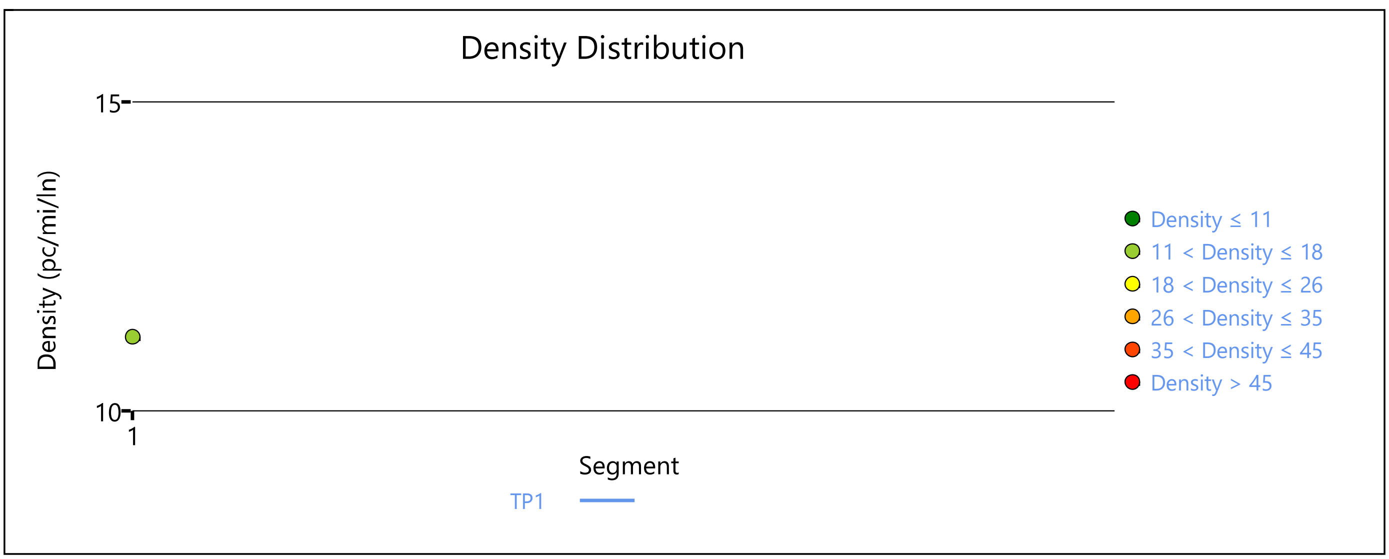
Messages

INFORMATION 1	Density for segment 1 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.812	271	4400	0.06	41.8	3.3	A

Facility Time Period Results

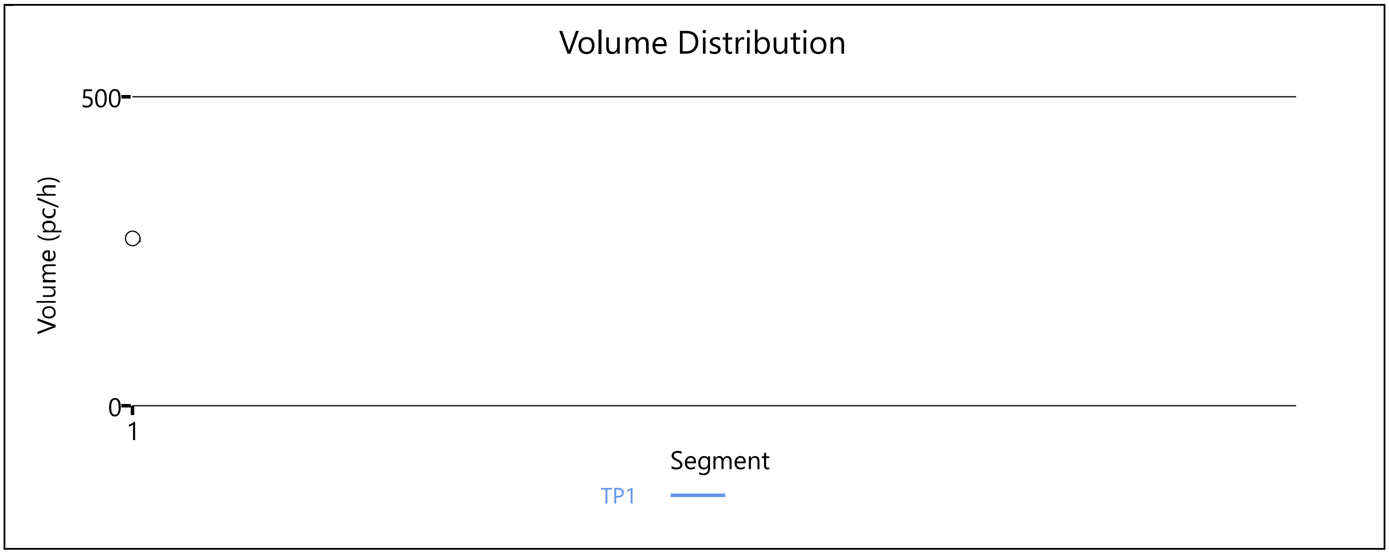
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	3.3	2.7	1.40	A

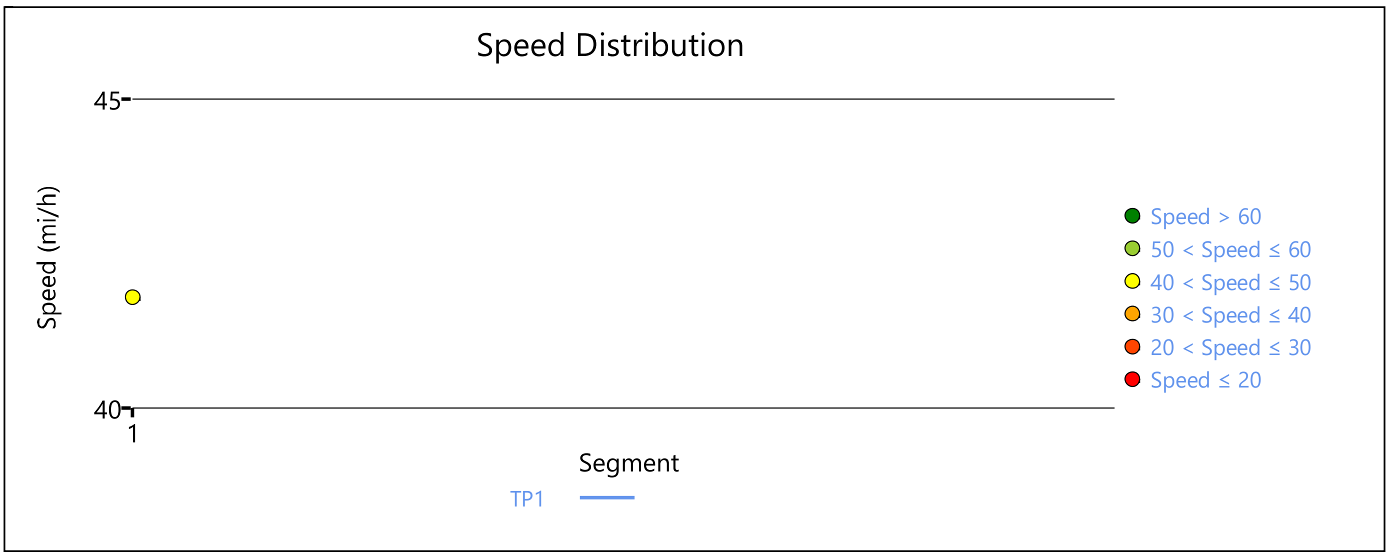
Facility Overall Results

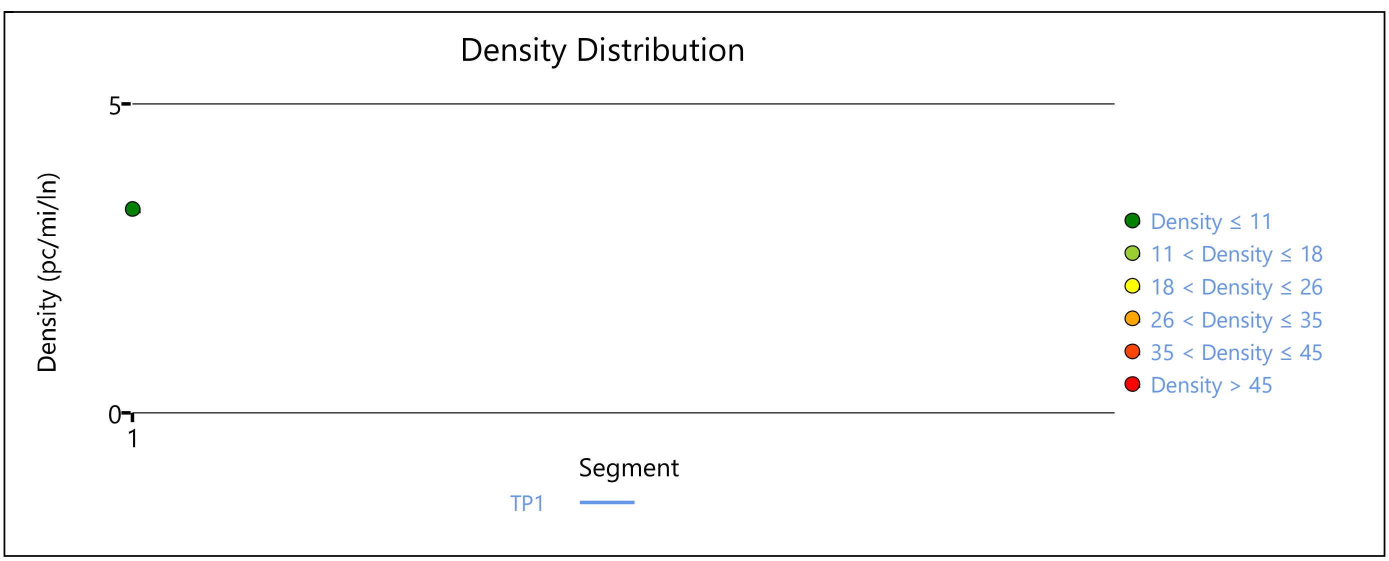
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	2.7
Average Travel Time, min	1.40	Density, pc/mi/ln	3.3

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.888	1307	4400	0.30	41.8	15.6	B

Facility Time Period Results

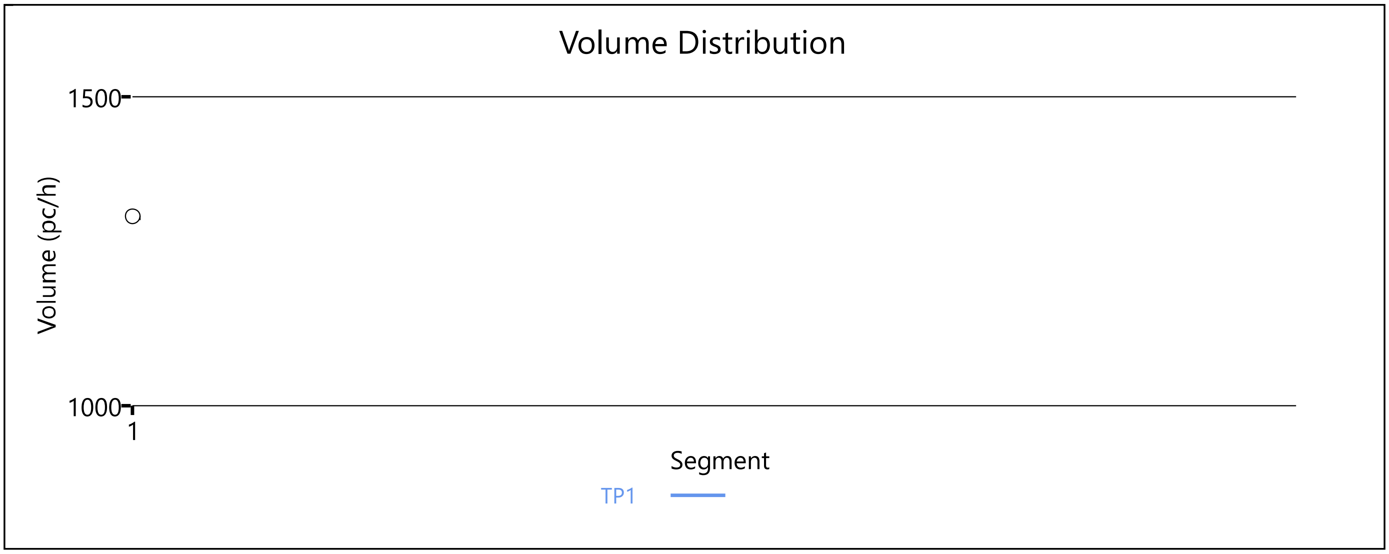
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	15.6	13.9	1.40	B

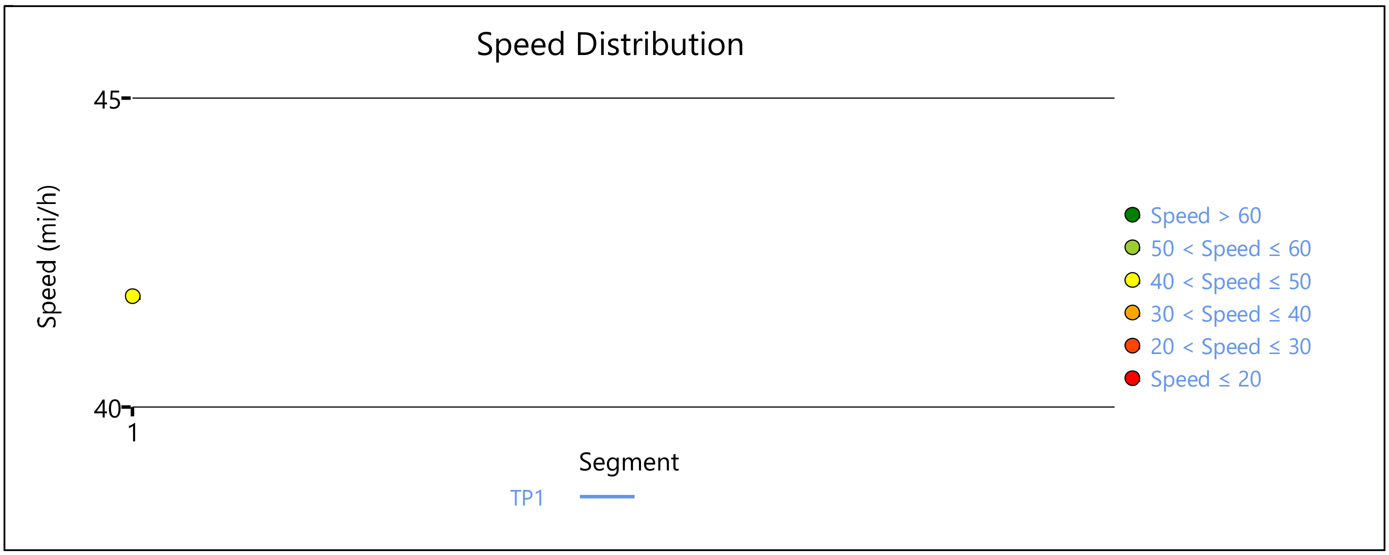
Facility Overall Results

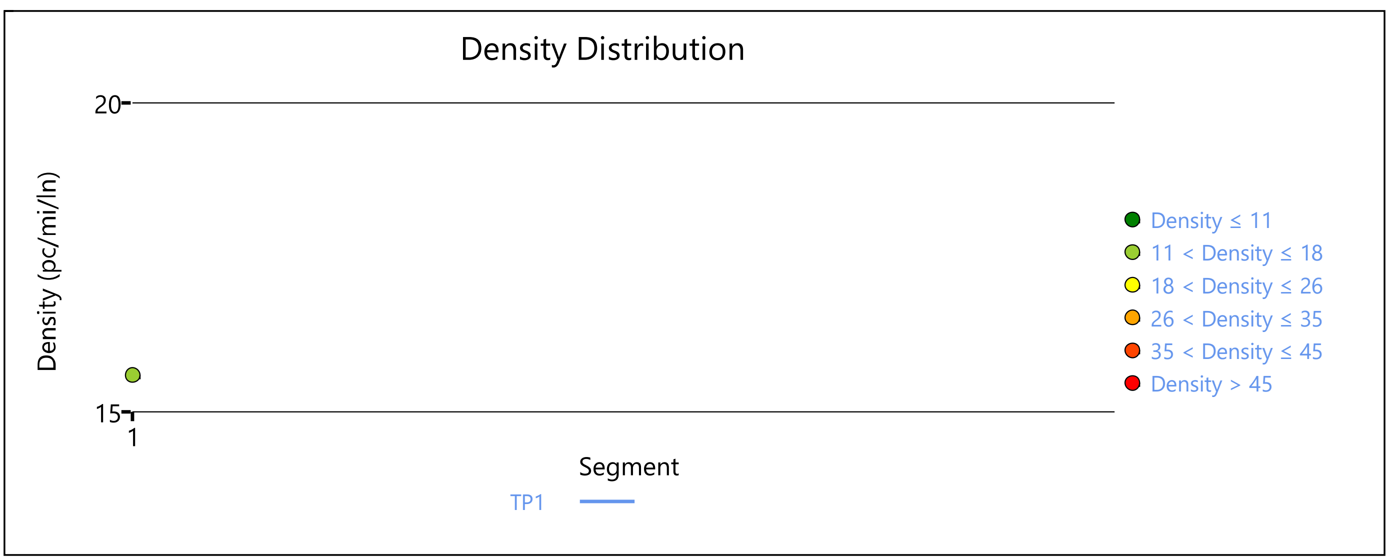
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	13.9
Average Travel Time, min	1.40	Density, pc/mi/ln	15.6

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.792	583	4400	0.13	41.8	7.0	A

Facility Time Period Results

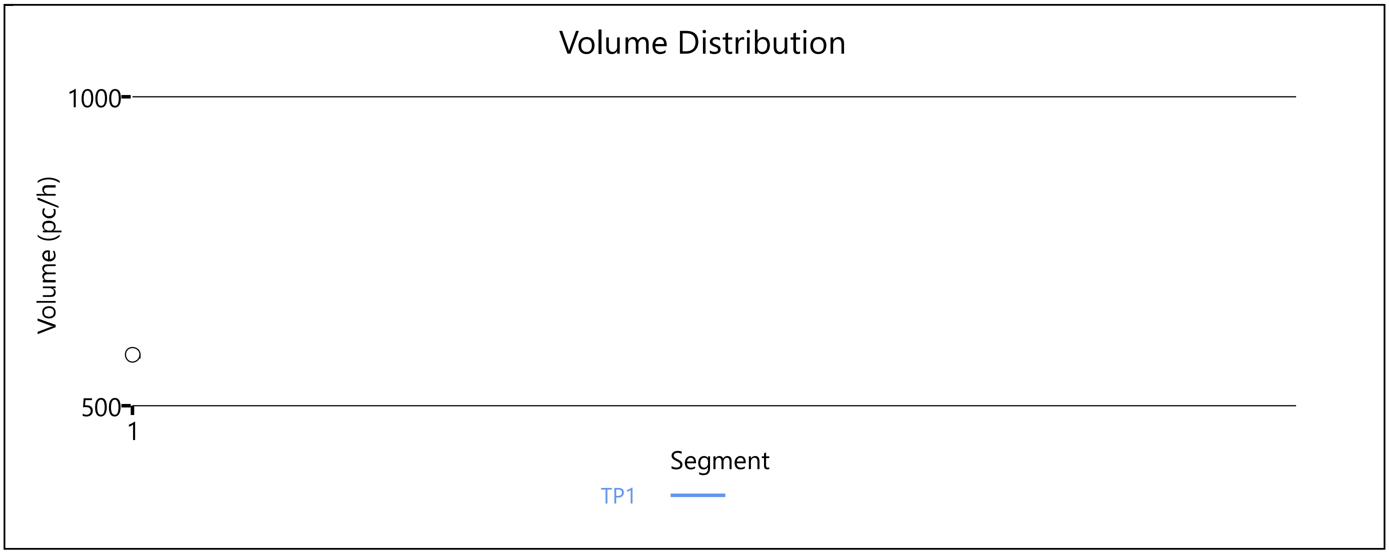
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	7.0	5.5	1.40	A

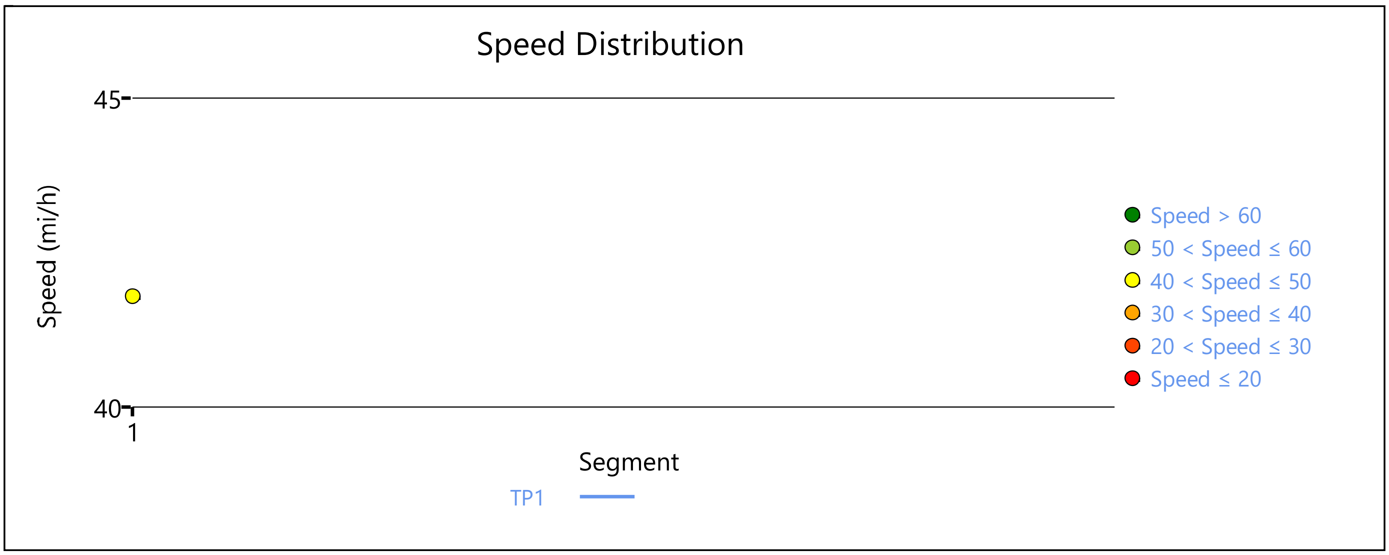
Facility Overall Results

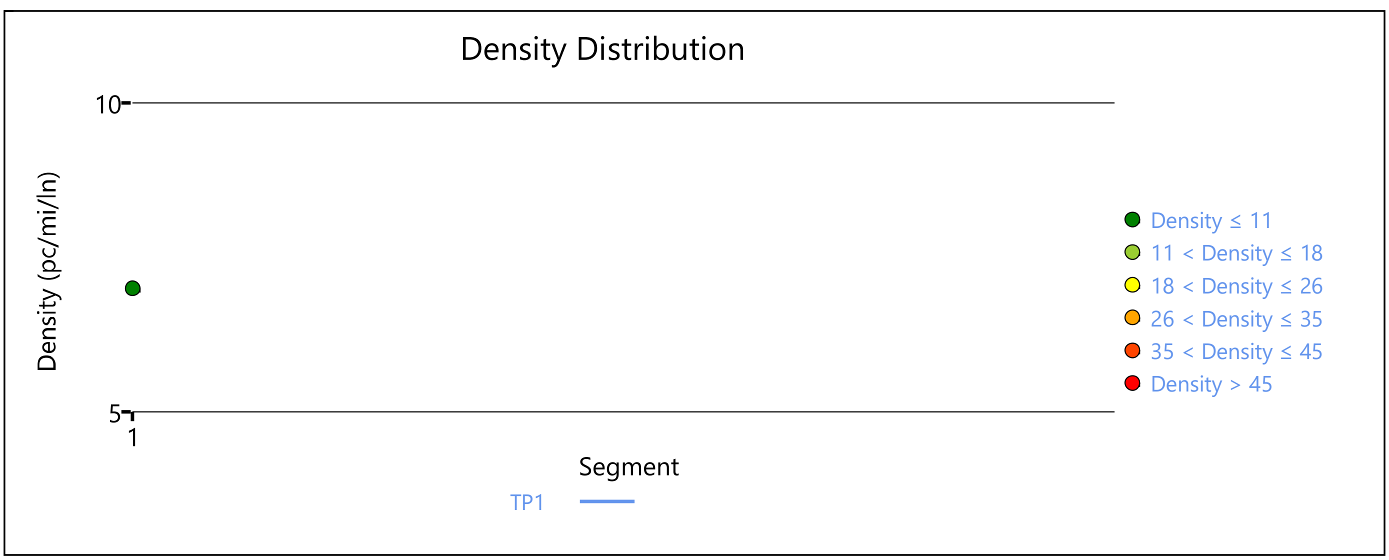
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	5.5
Average Travel Time, min	1.40	Density, pc/mi/ln	7.0

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.919	660	4400	0.15	41.8	7.9	A

Facility Time Period Results

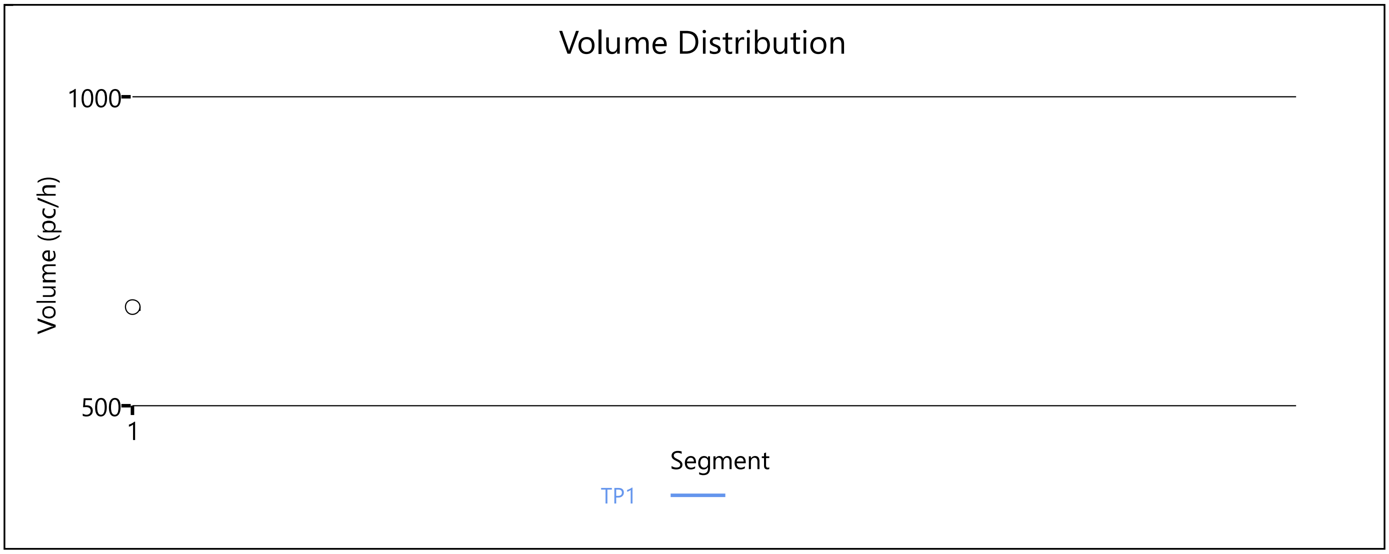
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	7.9	7.3	1.40	A

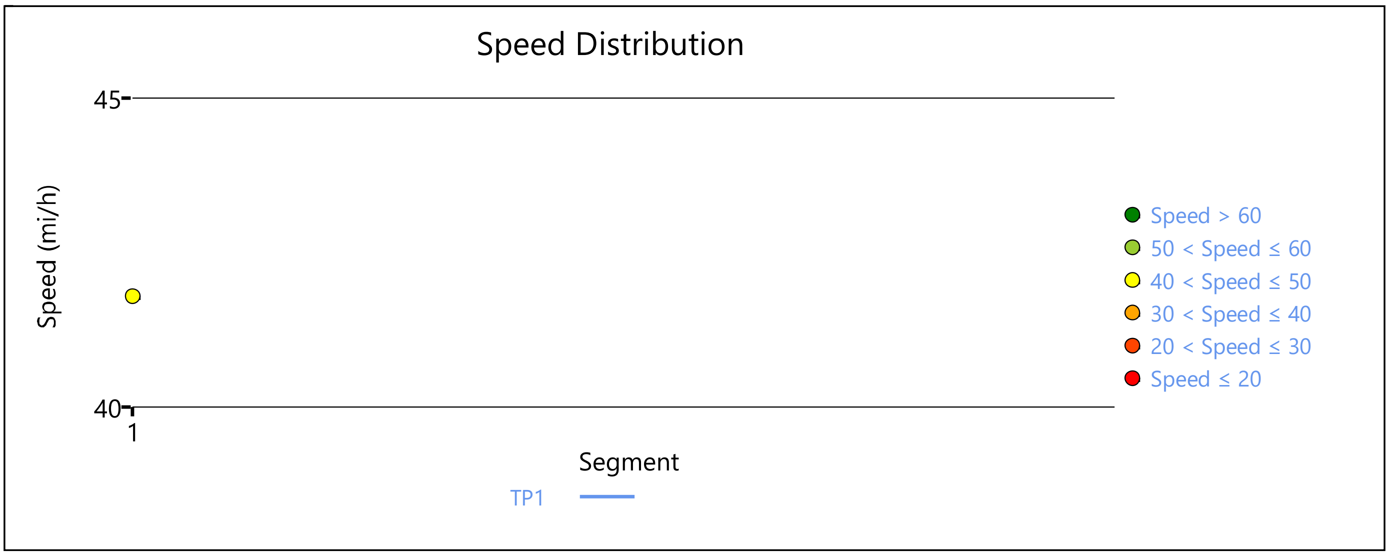
Facility Overall Results

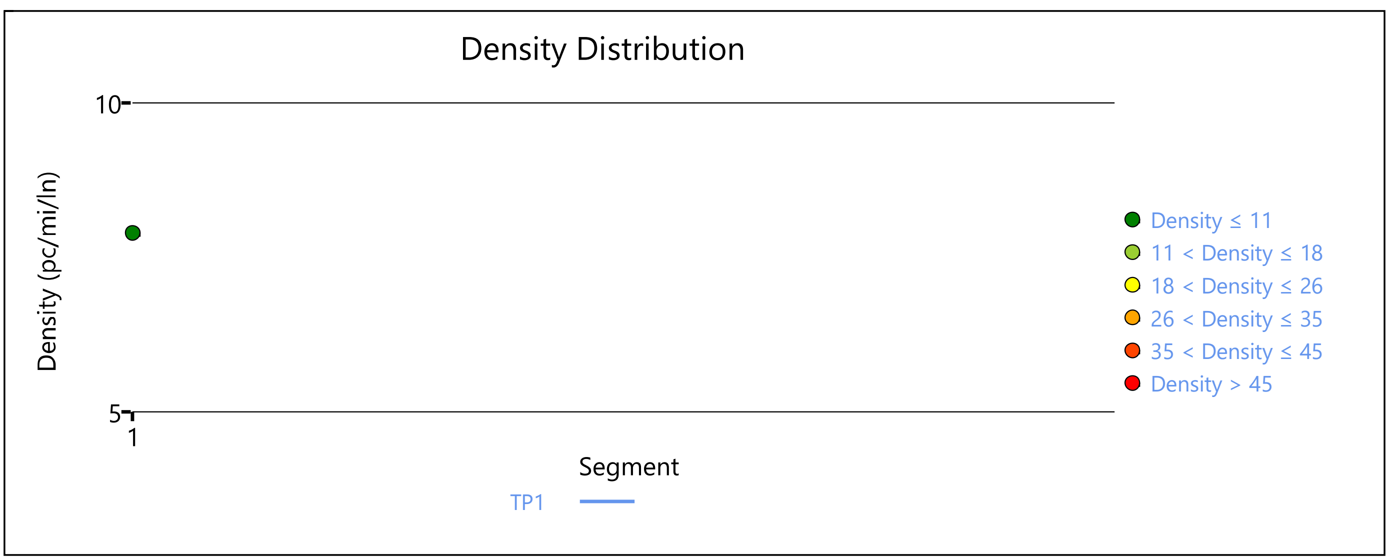
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	7.3
Average Travel Time, min	1.40	Density, pc/mi/ln	7.9

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.847	220	4400	0.05	41.8	2.6	A

Facility Time Period Results

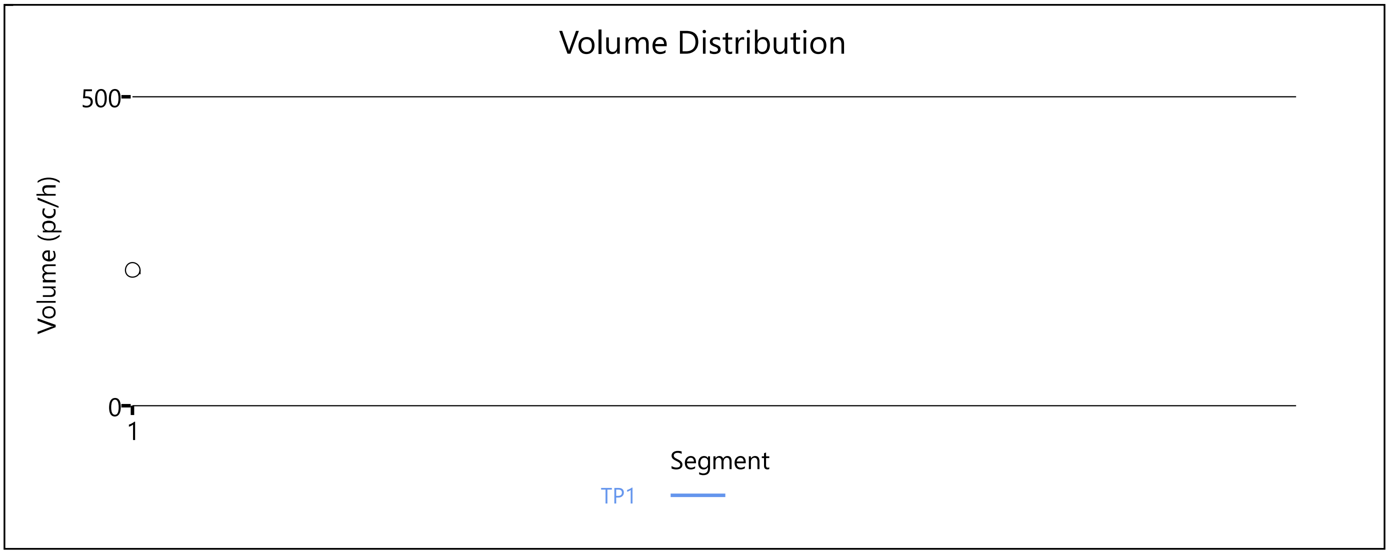
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	2.6	2.2	1.40	A

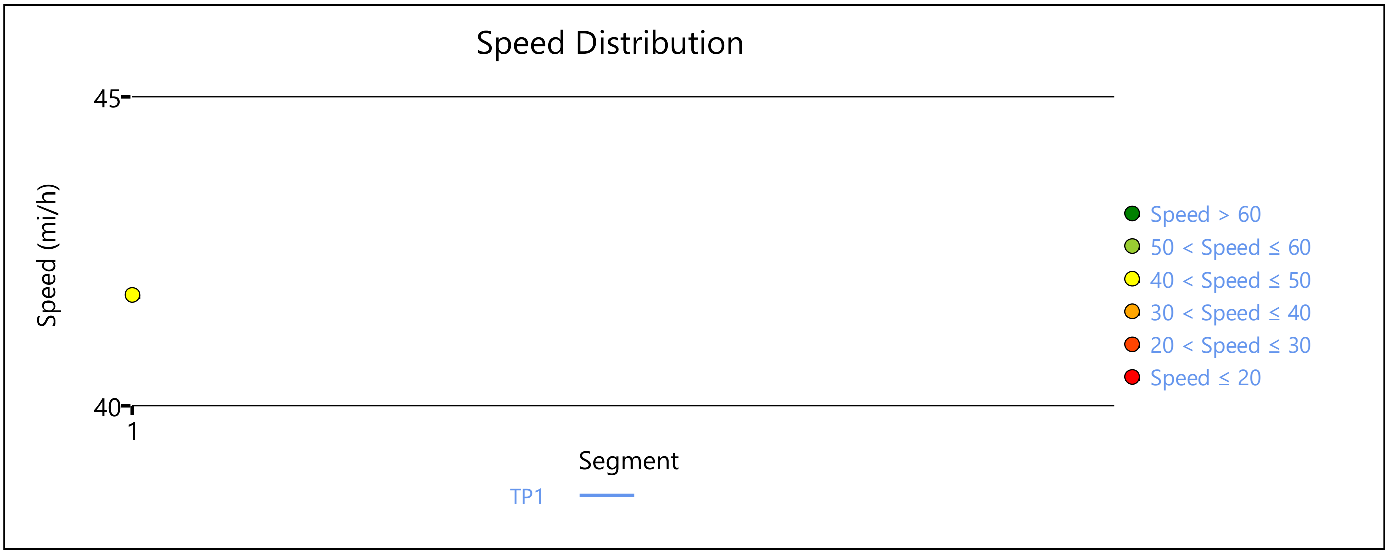
Facility Overall Results

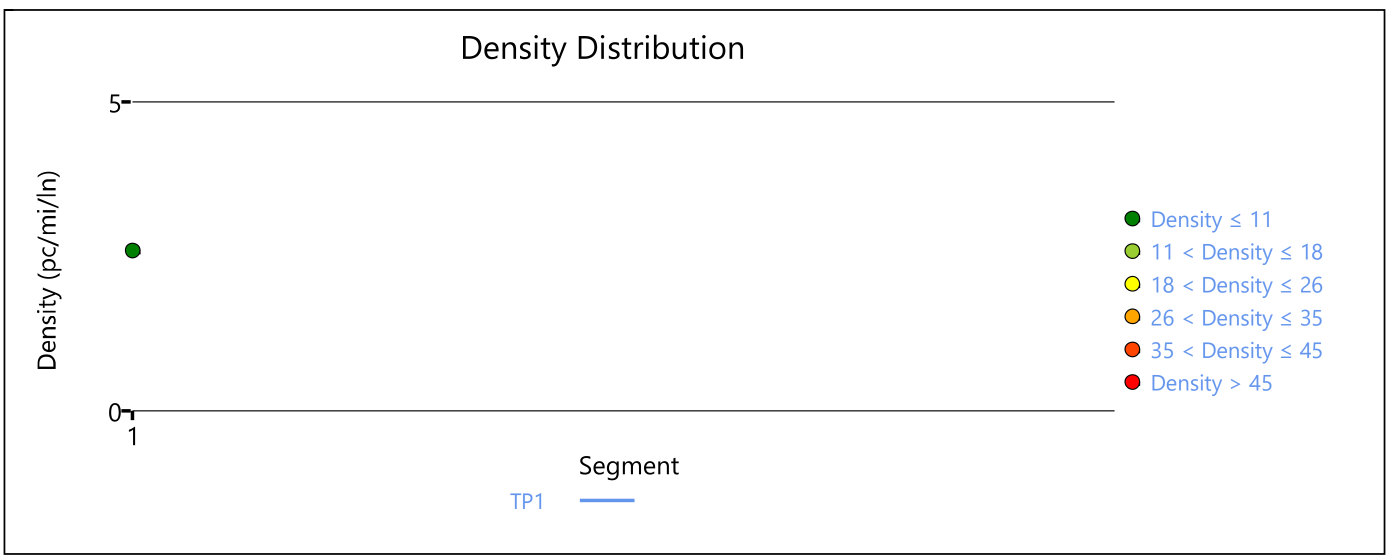
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	2.2
Average Travel Time, min	1.40	Density, pc/mi/ln	2.6

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.797	905	4400	0.21	41.8	10.8	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	10.8	8.6	1.40	A

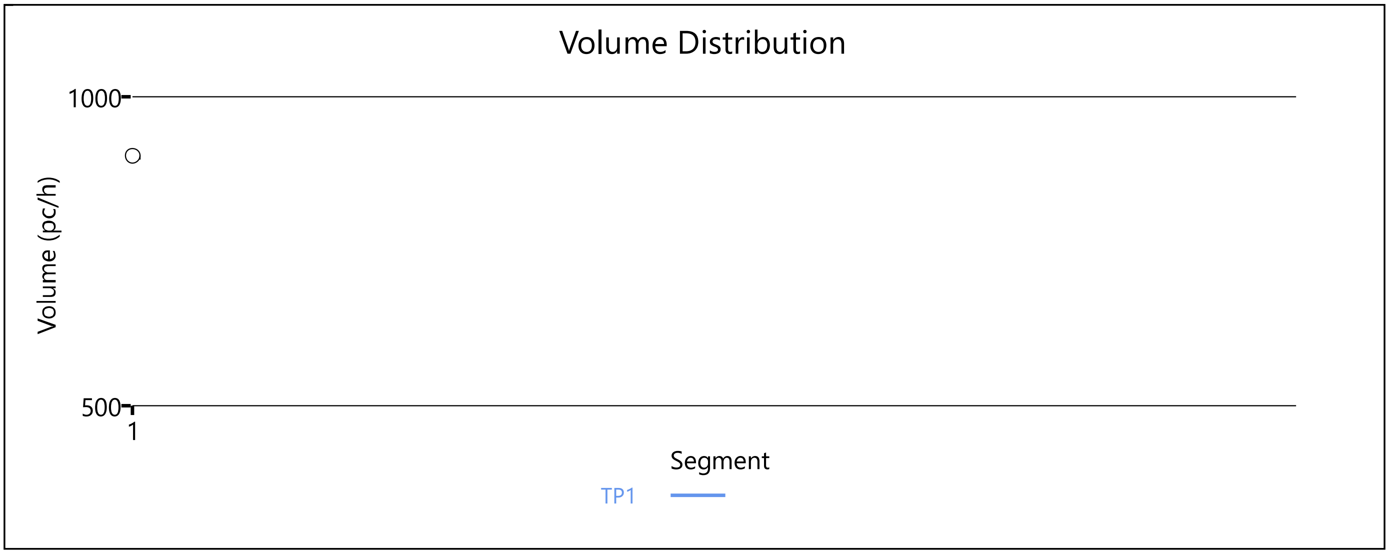
Facility Overall Results

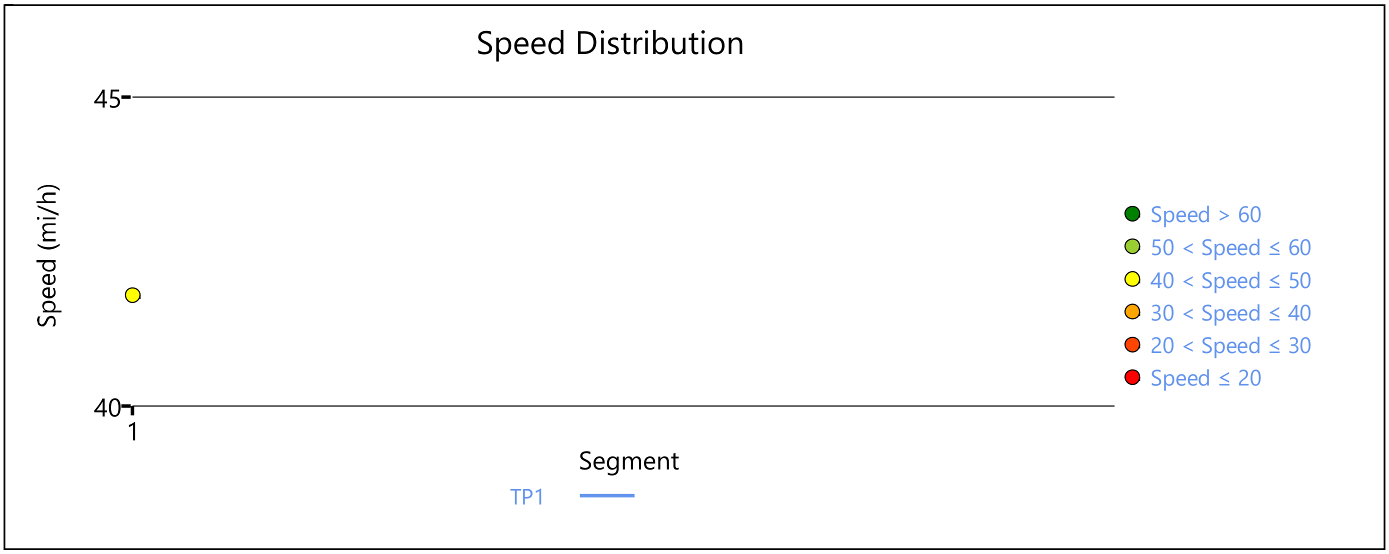
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	8.6
Average Travel Time, min	1.40	Density, pc/mi/ln	10.8

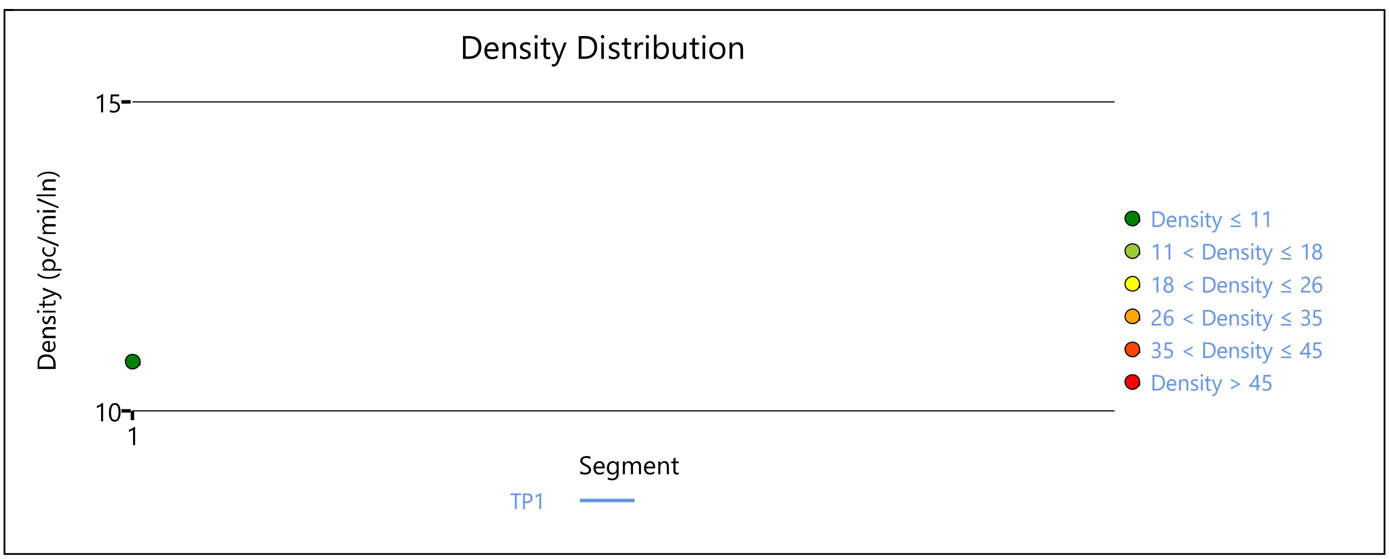
Messages

INFORMATION 1	Density for segment 1 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.773	805	4400	0.18	41.8	9.6	A

Facility Time Period Results

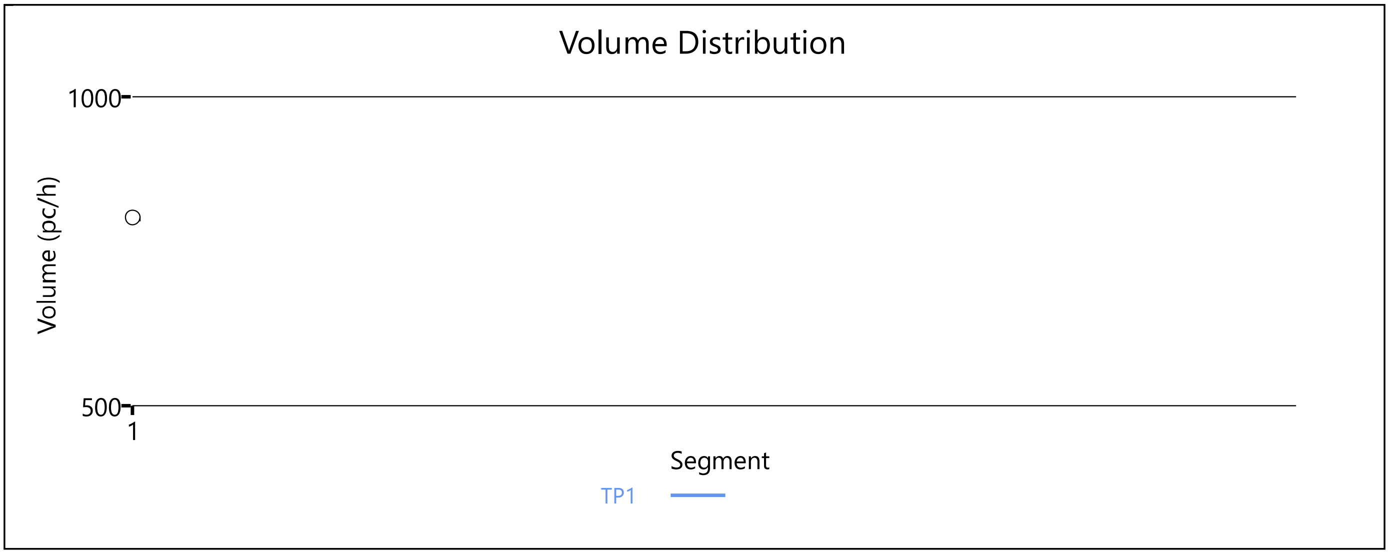
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	9.6	7.4	1.40	A

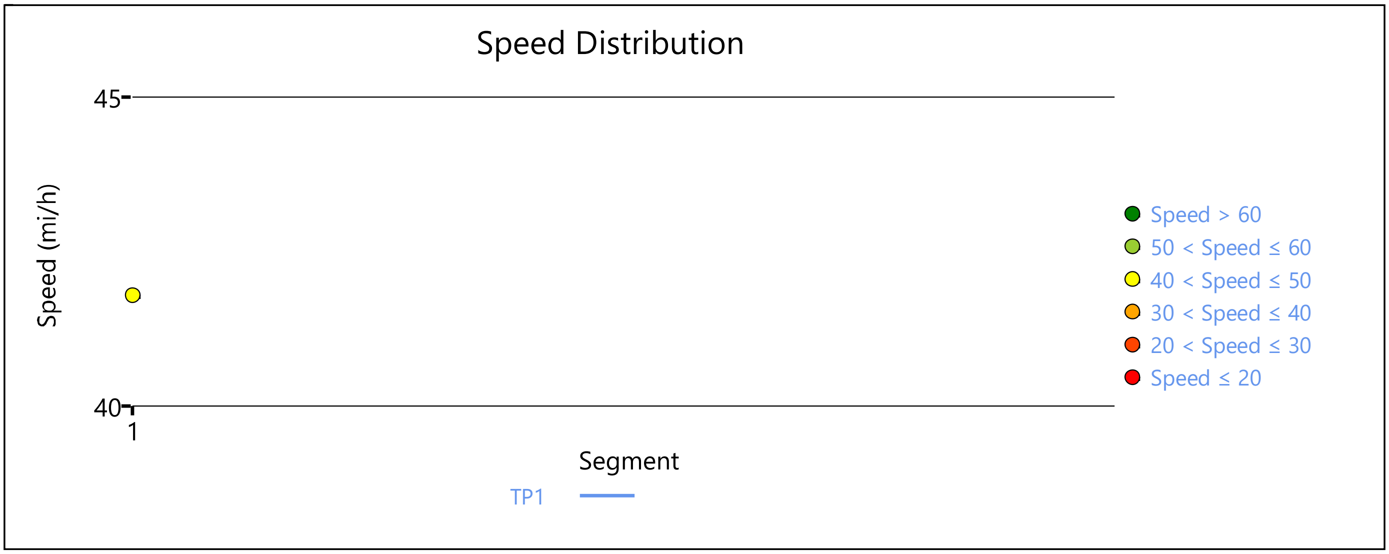
Facility Overall Results

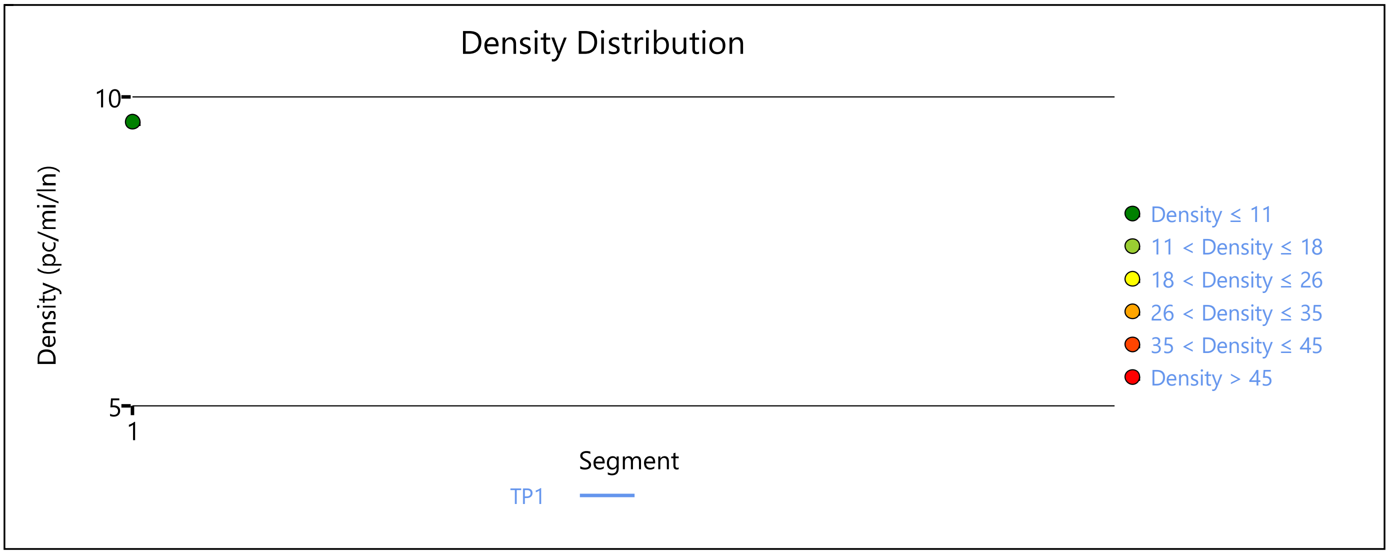
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	7.4
Average Travel Time, min	1.40	Density, pc/mi/ln	9.6

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.896	966	4400	0.22	41.8	11.6	B

Facility Time Period Results

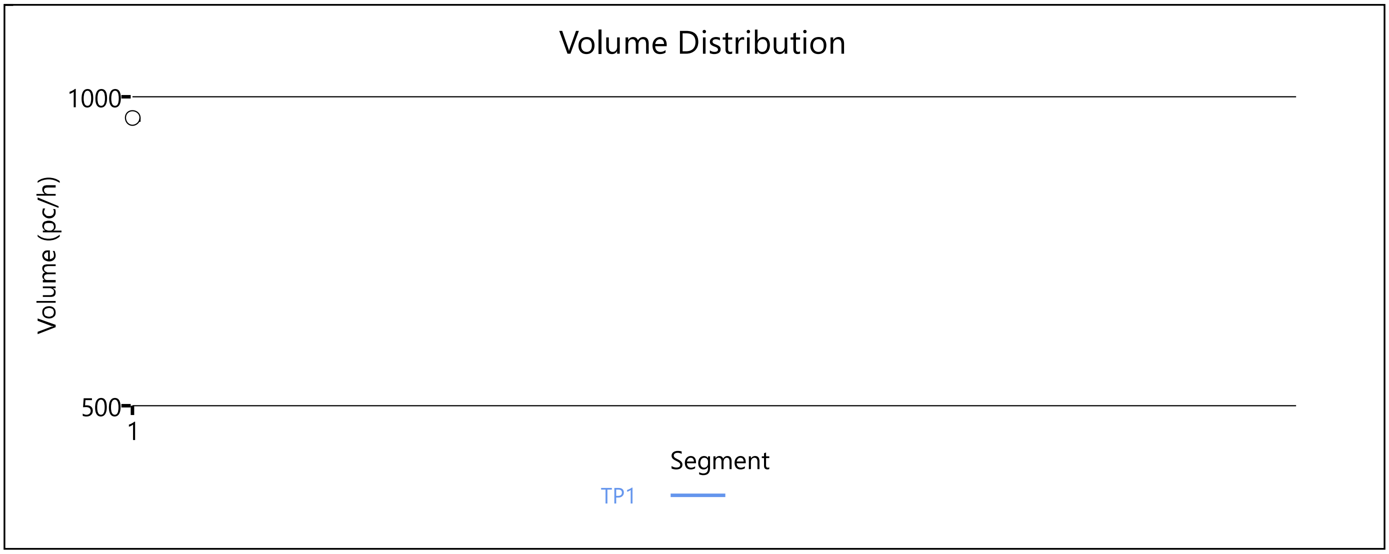
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	11.6	10.4	1.40	B

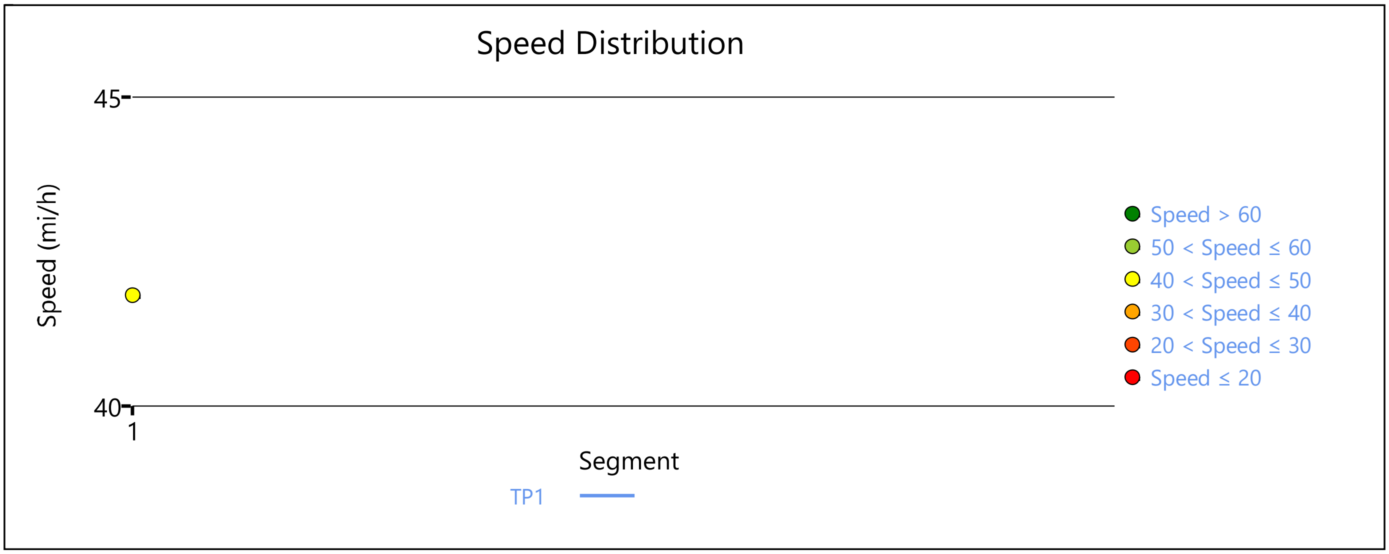
Facility Overall Results

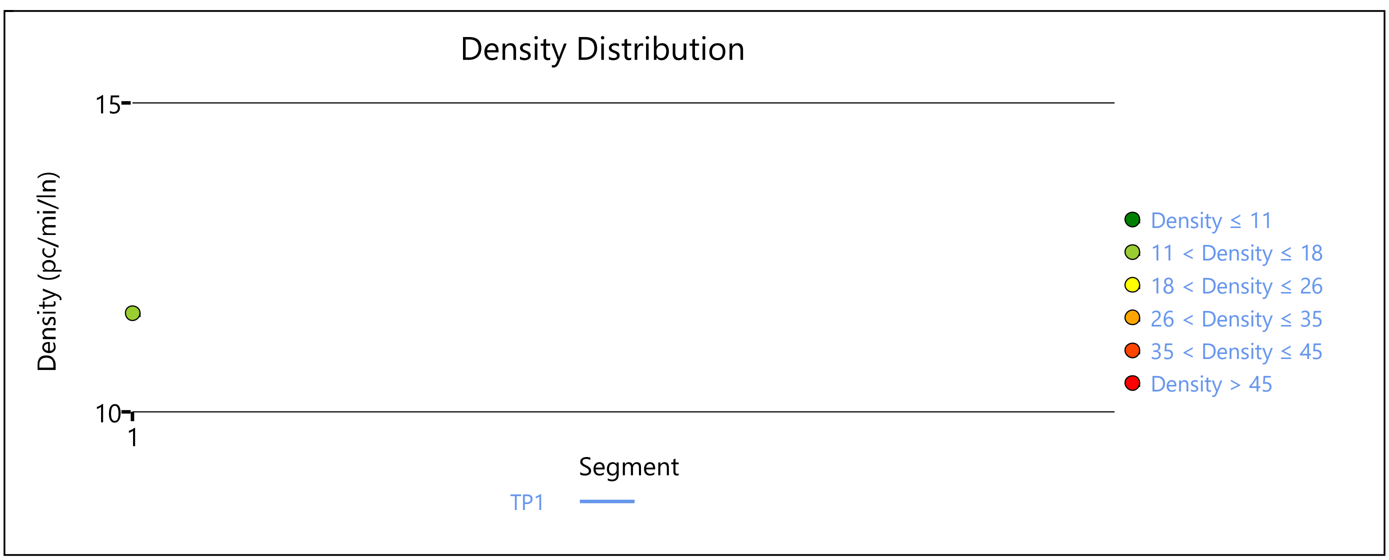
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	10.4
Average Travel Time, min	1.40	Density, pc/mi/ln	11.6

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.812	271	4400	0.06	41.8	3.3	A

Facility Time Period Results

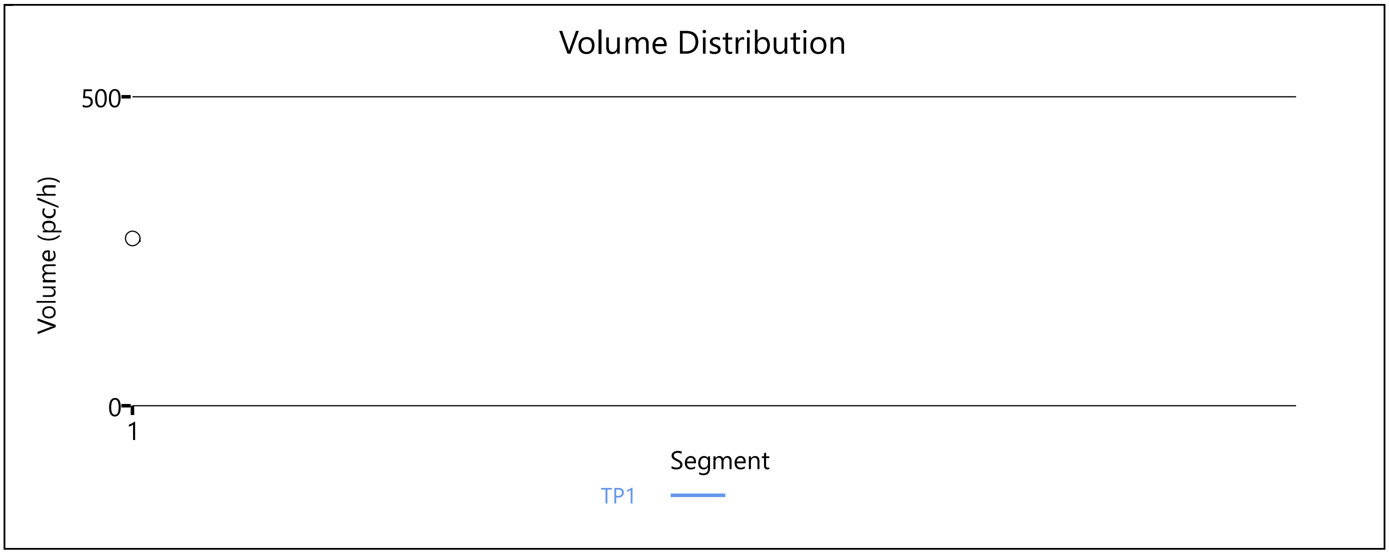
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	3.3	2.7	1.40	A

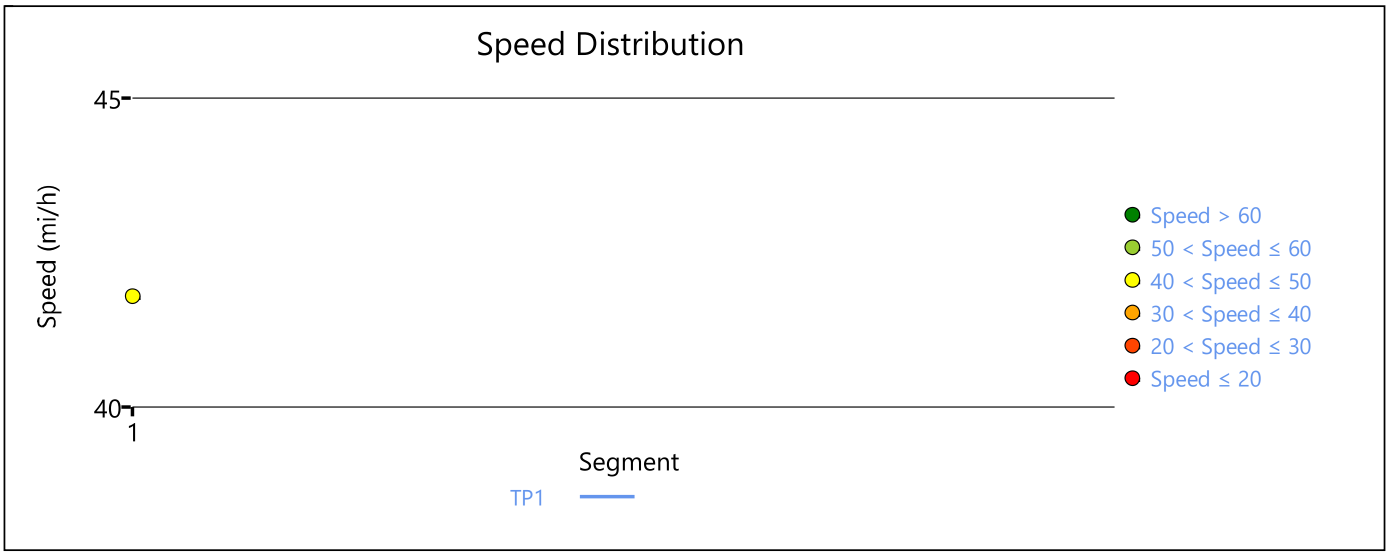
Facility Overall Results

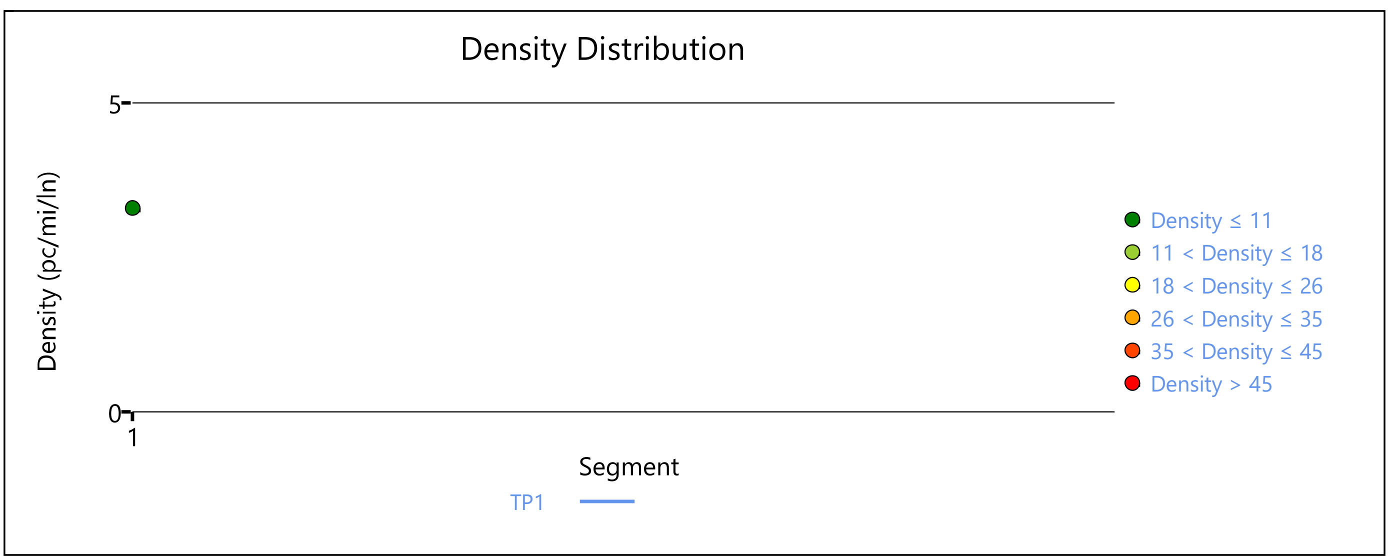
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	2.7
Average Travel Time, min	1.40	Density, pc/mi/ln	3.3

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.817	988	4400	0.22	41.8	11.8	B

Facility Time Period Results

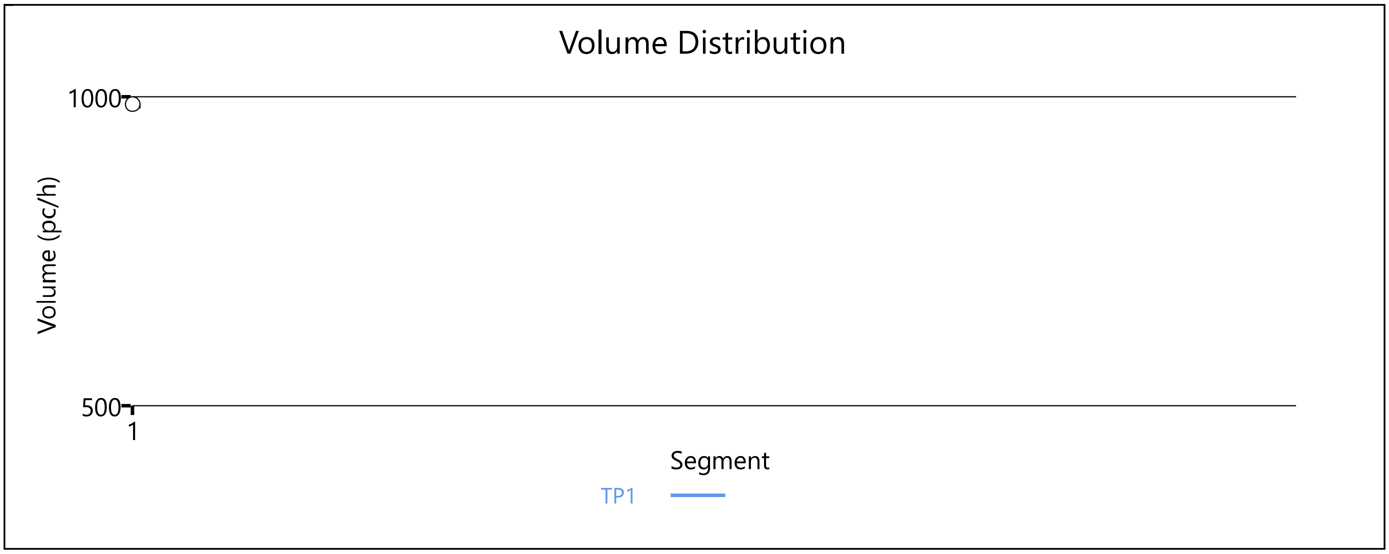
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	11.8	9.6	1.40	B

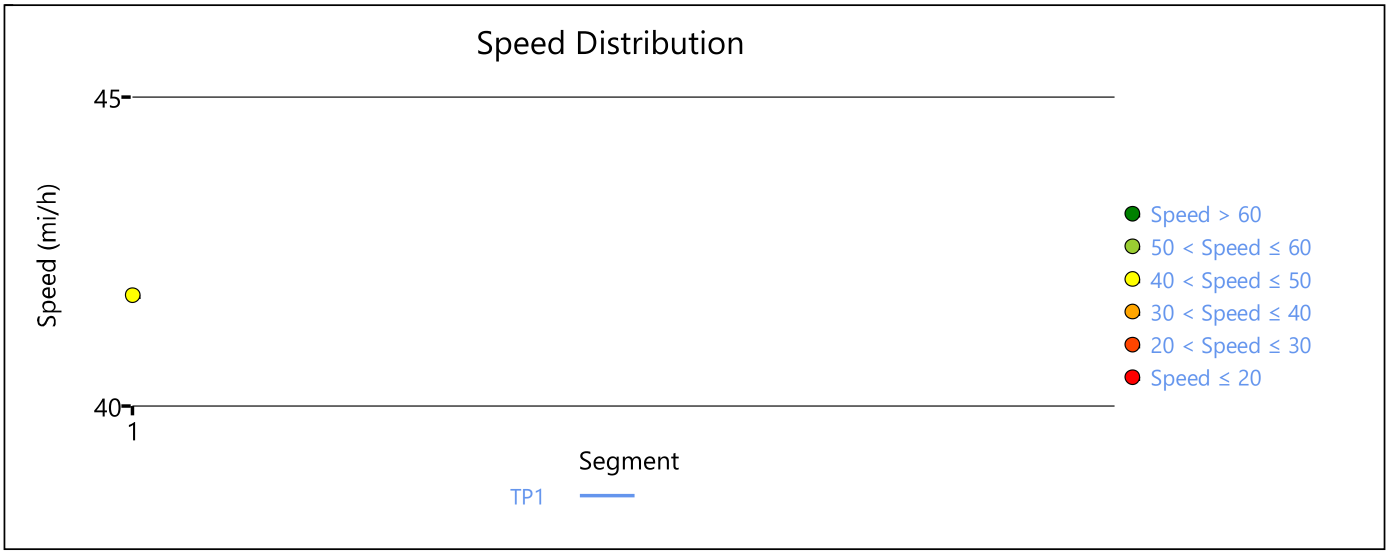
Facility Overall Results

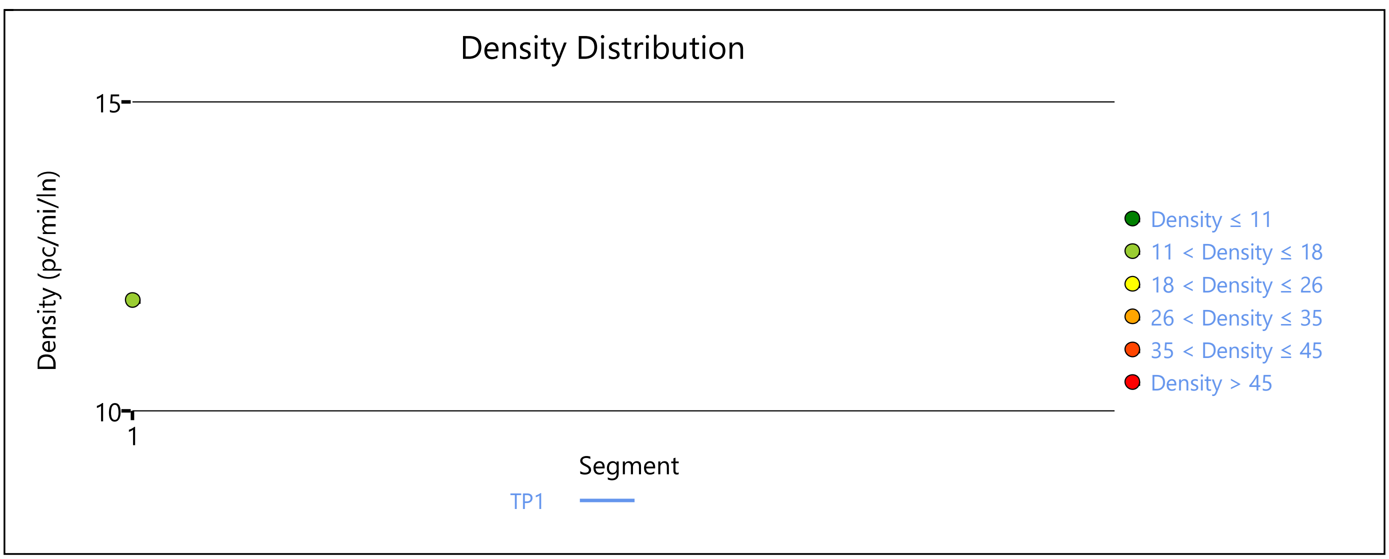
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	9.6
Average Travel Time, min	1.40	Density, pc/mi/ln	11.8

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.797	912	4400	0.21	41.8	10.9	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	10.9	8.7	1.40	A

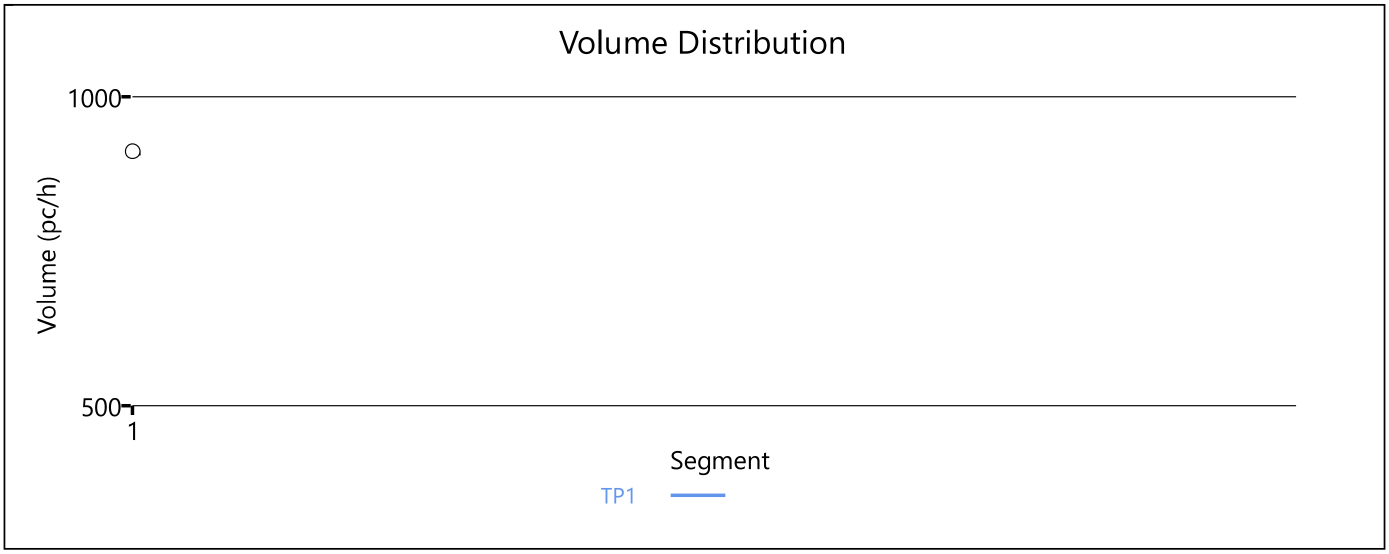
Facility Overall Results

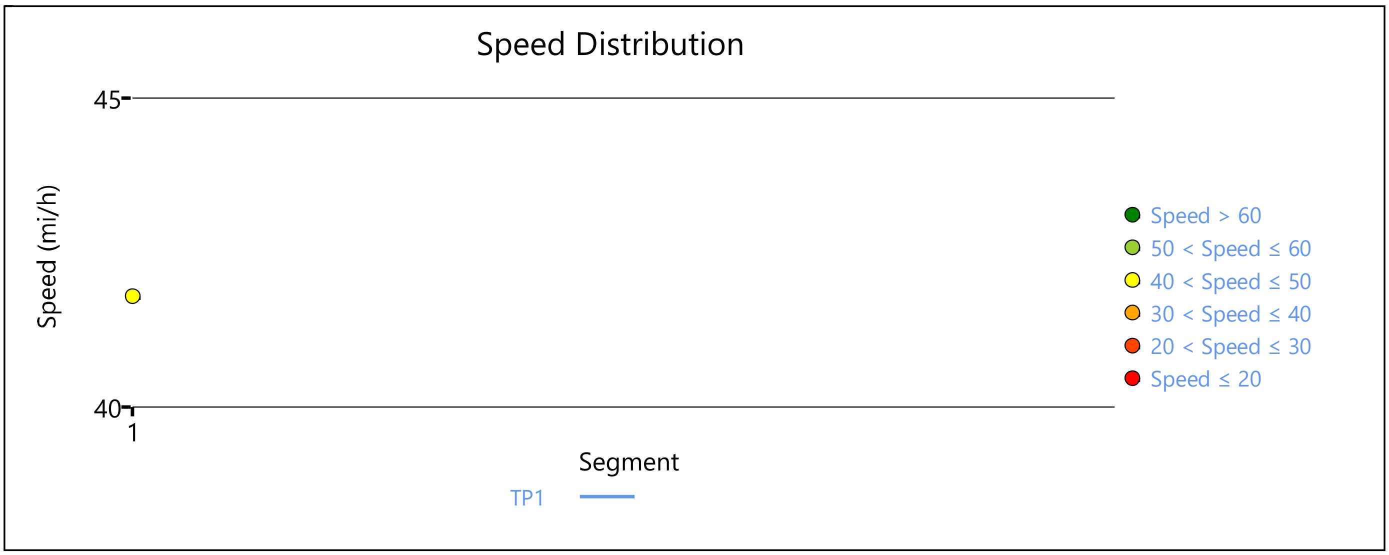
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	8.7
Average Travel Time, min	1.40	Density, pc/mi/ln	10.9

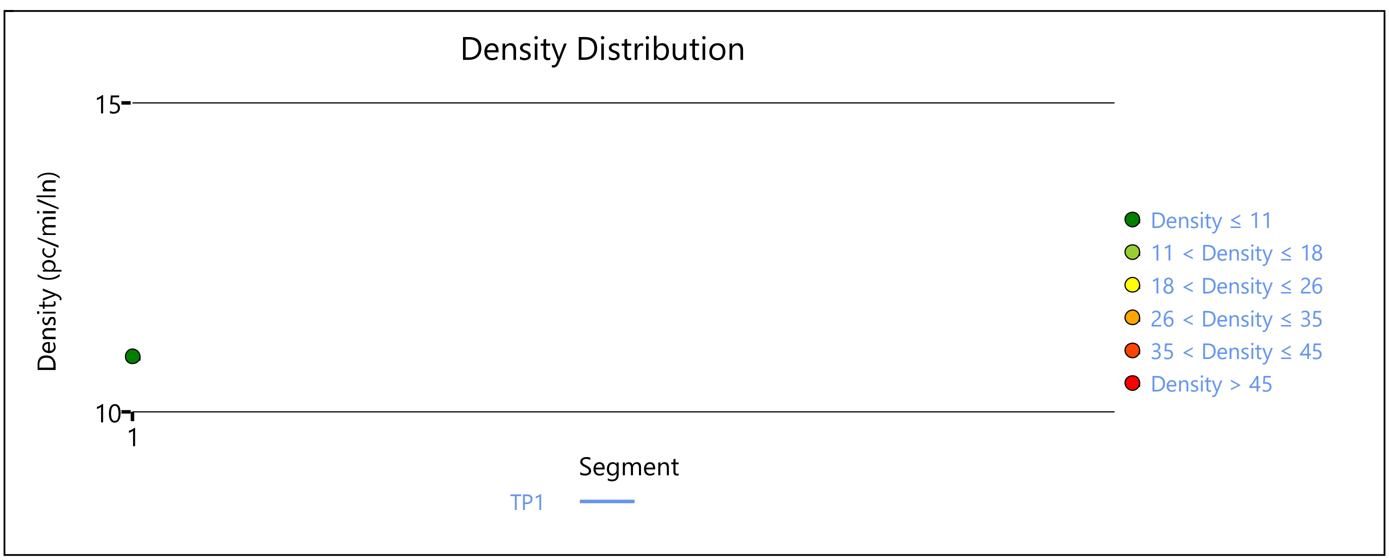
Messages

INFORMATION 1	Density for segment 1 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.912	1122	4400	0.26	41.8	13.4	B

Facility Time Period Results

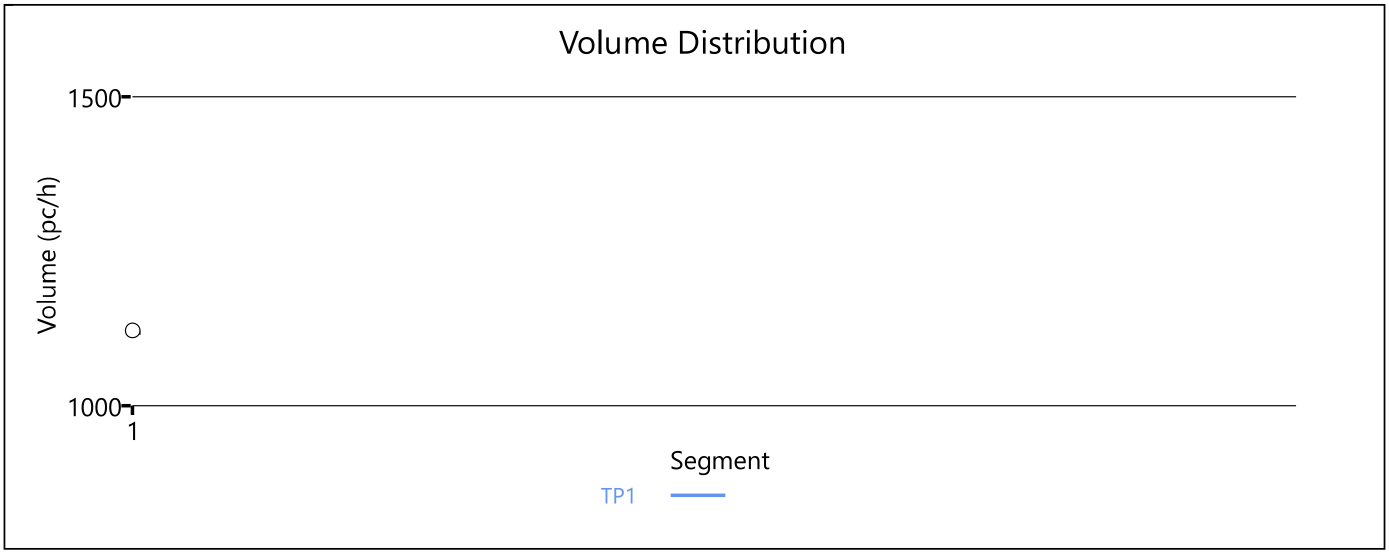
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	13.4	12.2	1.40	B

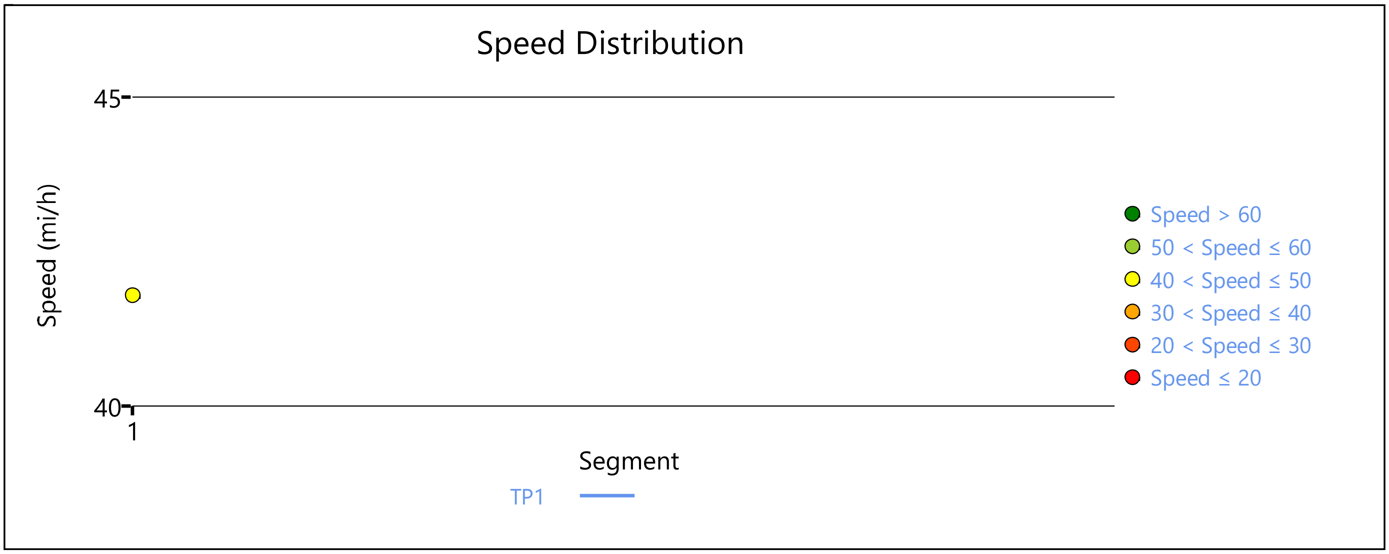
Facility Overall Results

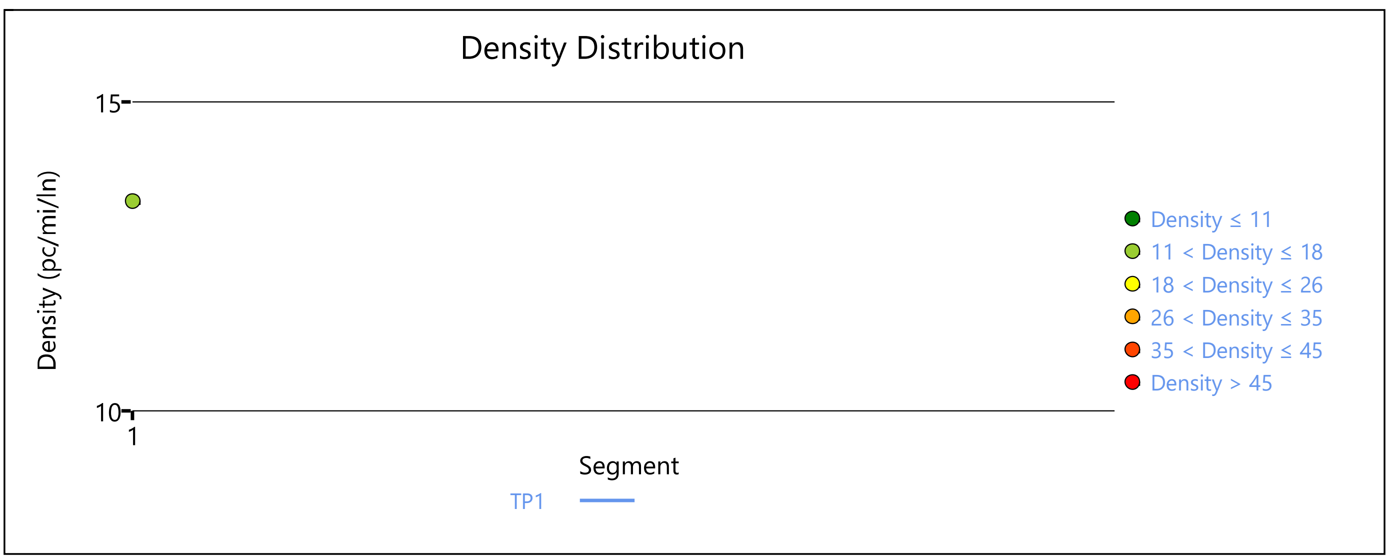
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	12.2
Average Travel Time, min	1.40	Density, pc/mi/ln	13.4

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.809	274	4400	0.06	41.8	3.3	A

Facility Time Period Results

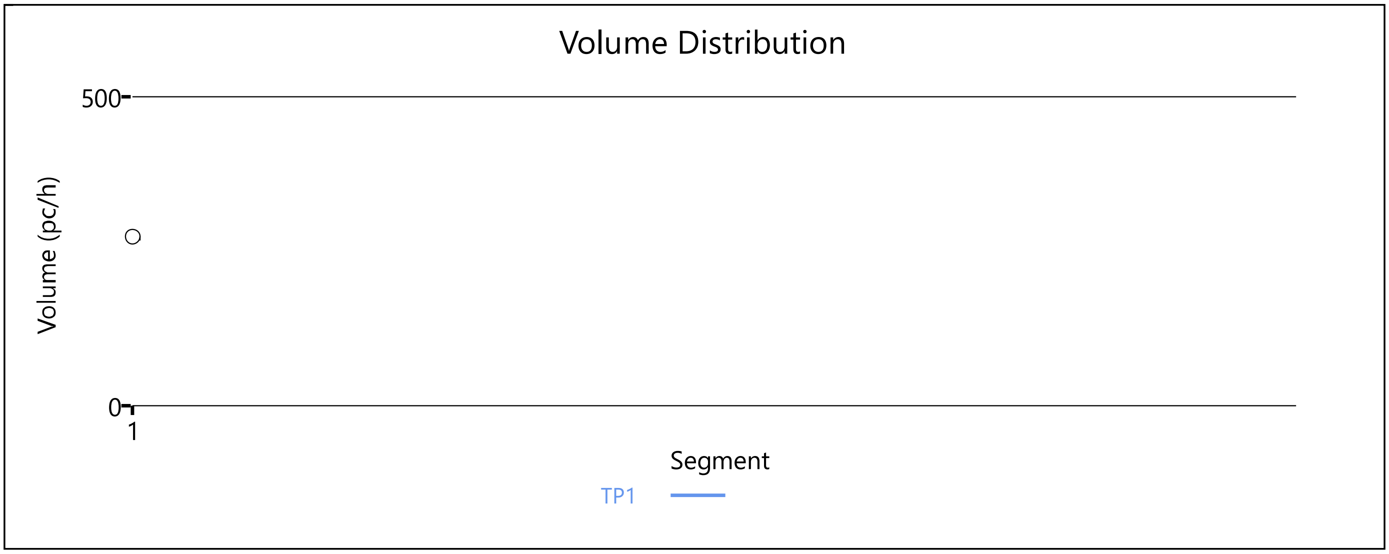
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	3.3	2.7	1.40	A

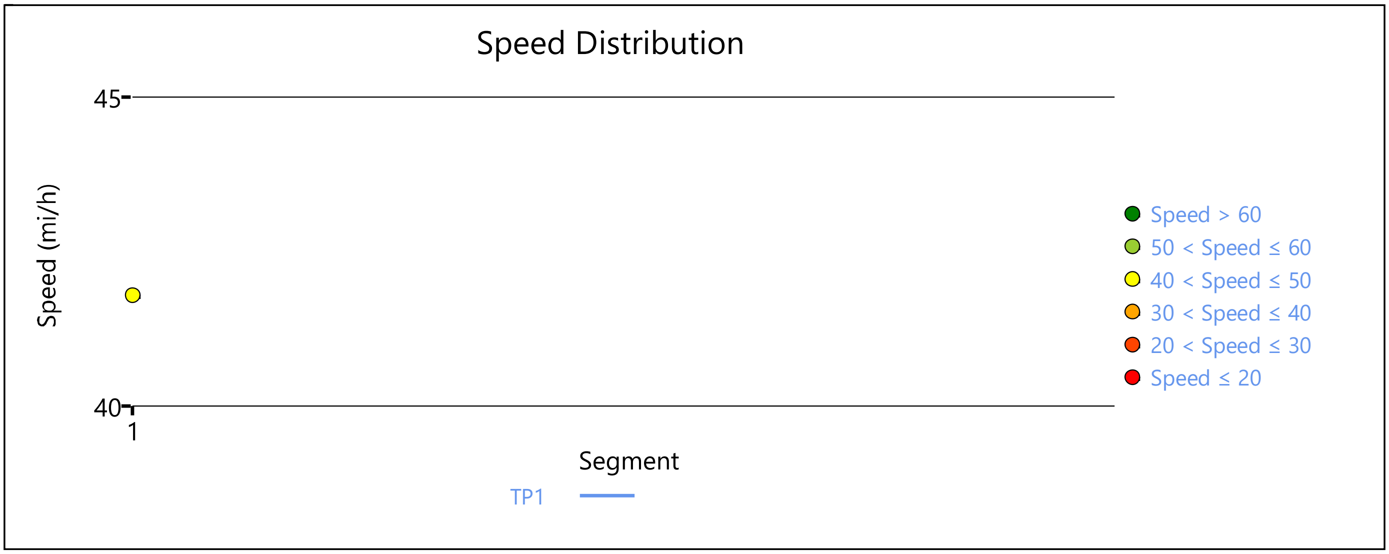
Facility Overall Results

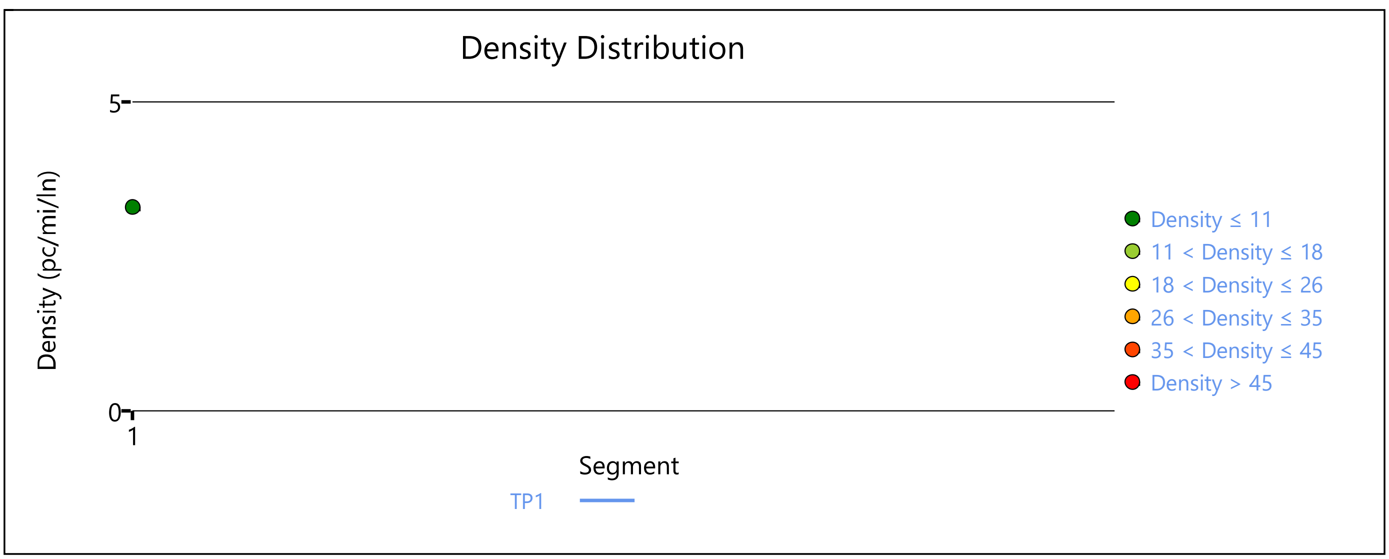
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	2.7
Average Travel Time, min	1.40	Density, pc/mi/ln	3.3

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.909	1717	4400	0.39	41.8	20.5	C

Facility Time Period Results

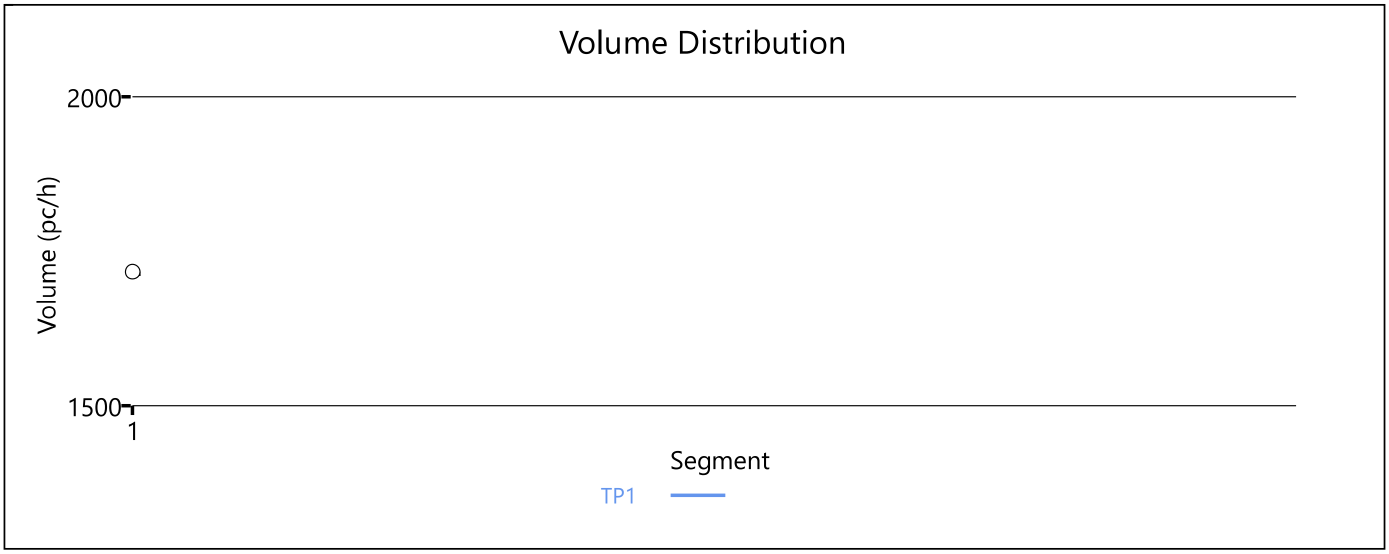
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	20.5	18.6	1.40	C

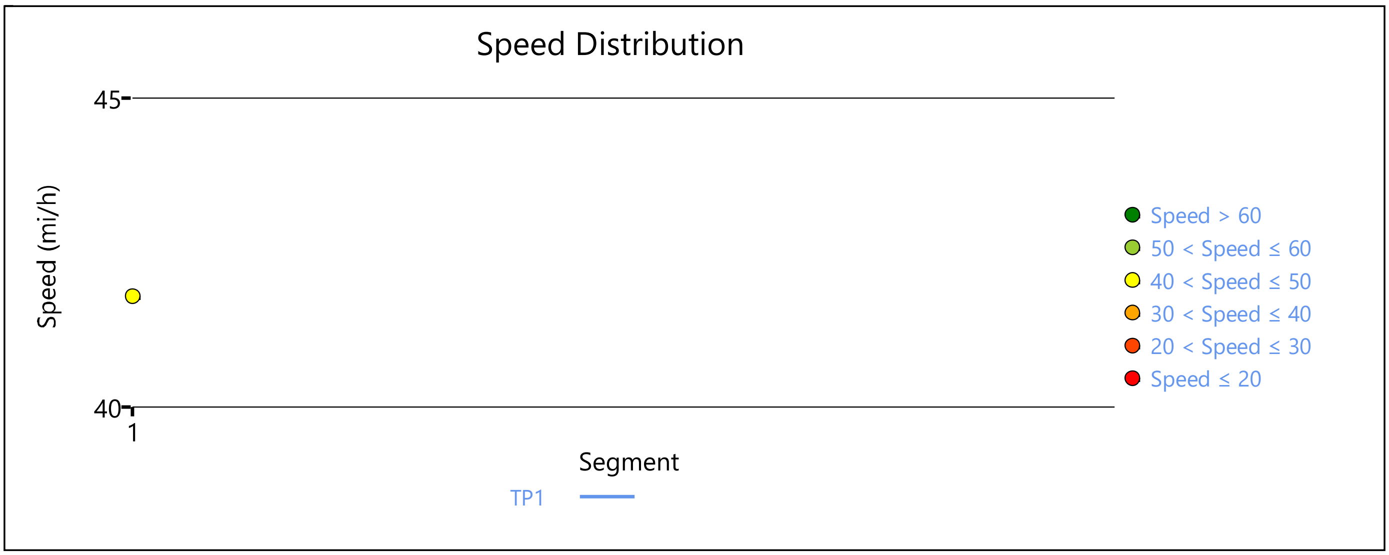
Facility Overall Results

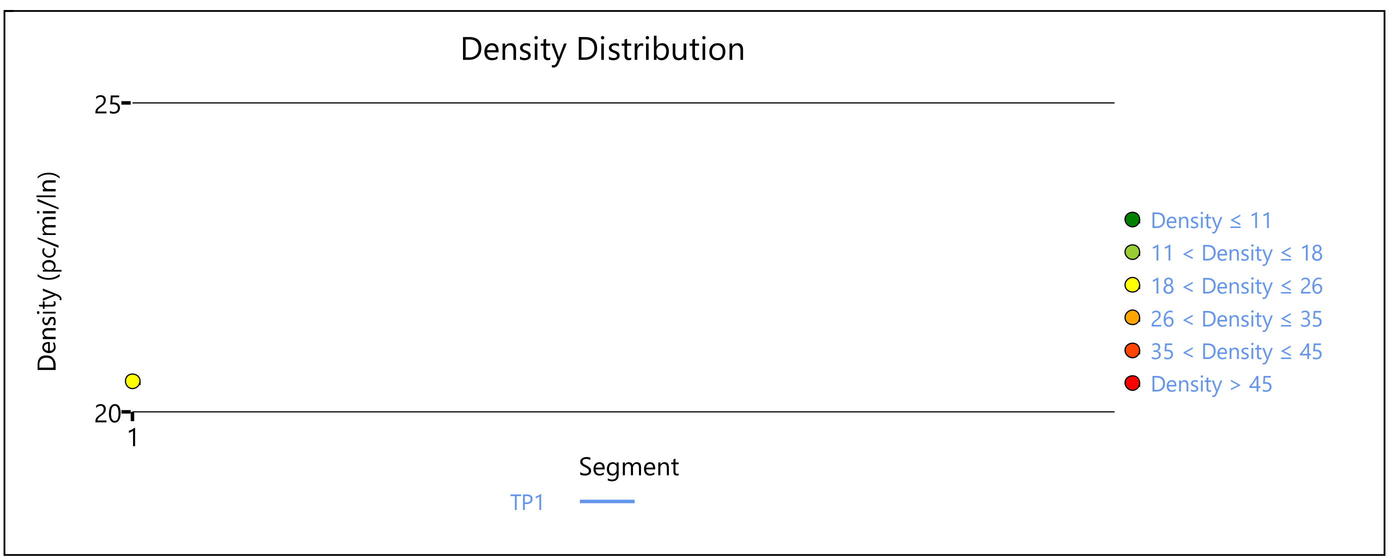
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	18.6
Average Travel Time, min	1.40	Density, pc/mi/ln	20.5

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.846	944	4400	0.21	41.8	11.3	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	11.3	9.6	1.40	B

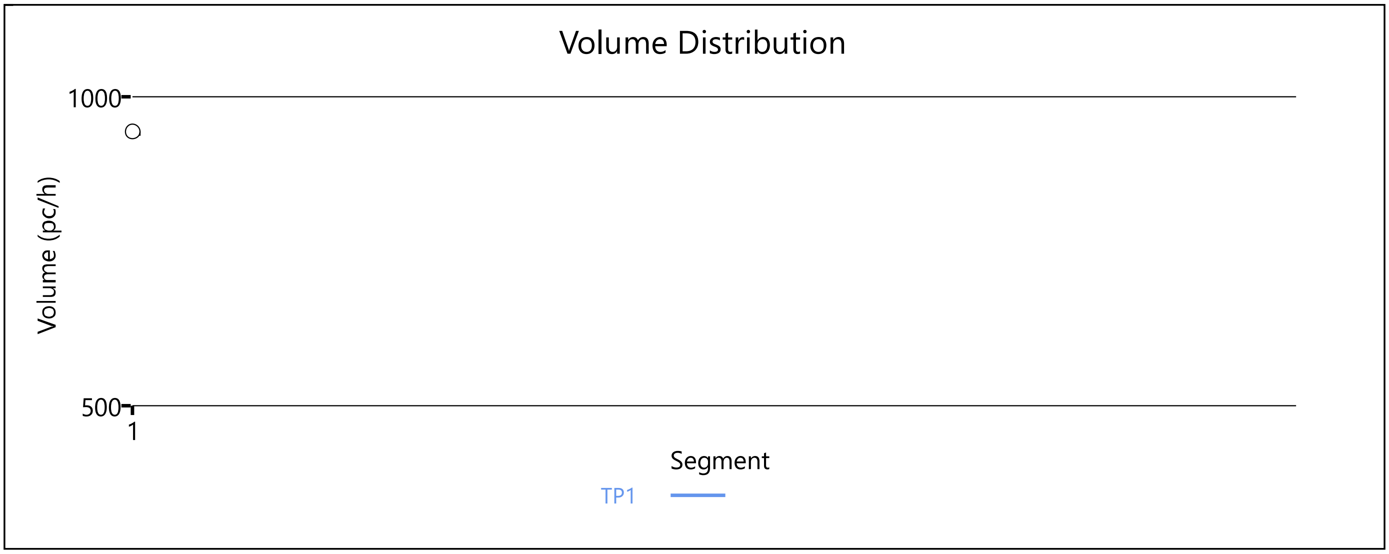
Facility Overall Results

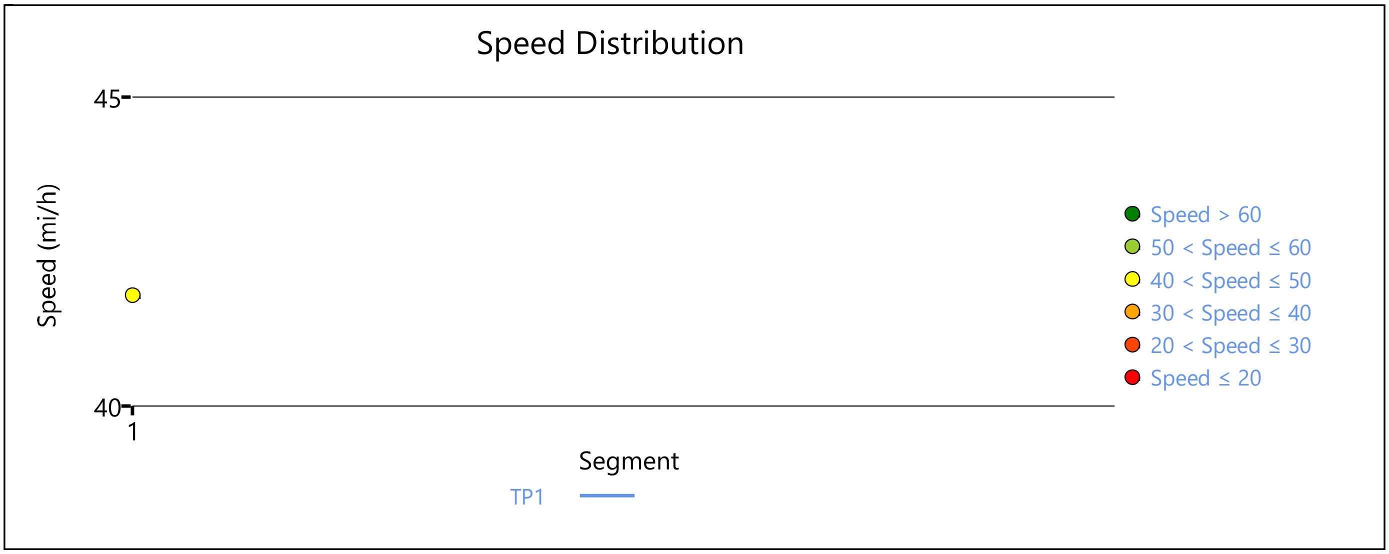
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	9.6
Average Travel Time, min	1.40	Density, pc/mi/ln	11.3

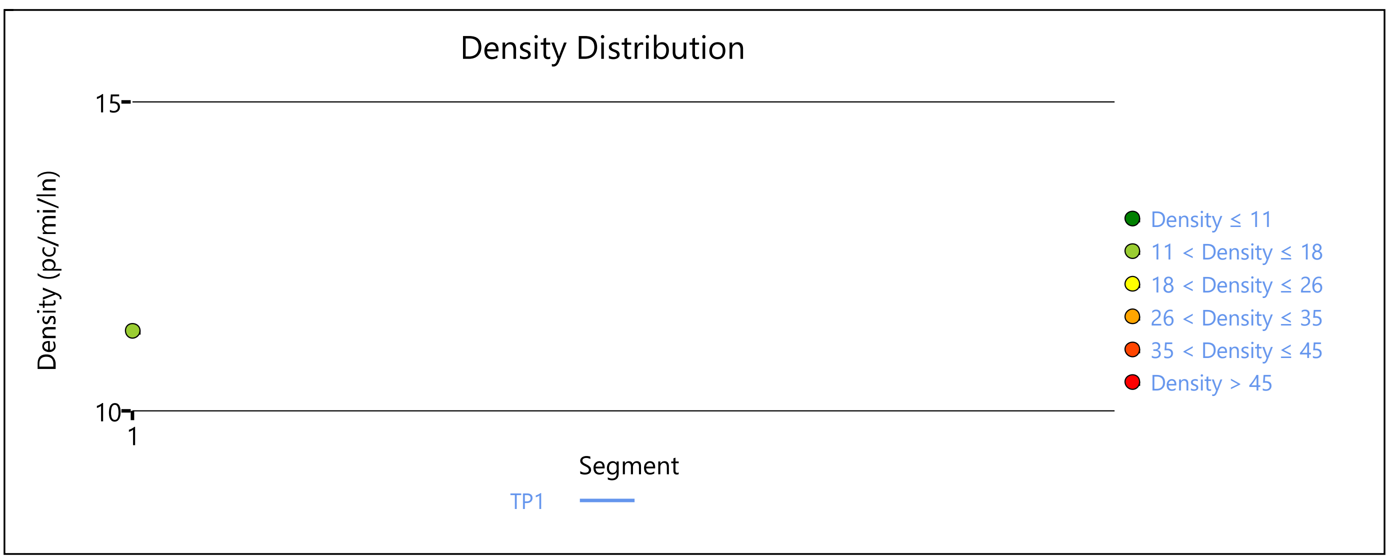
Messages

INFORMATION 1	Density for segment 1 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.933	893	4400	0.20	41.8	10.7	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	10.7	10.0	1.40	A

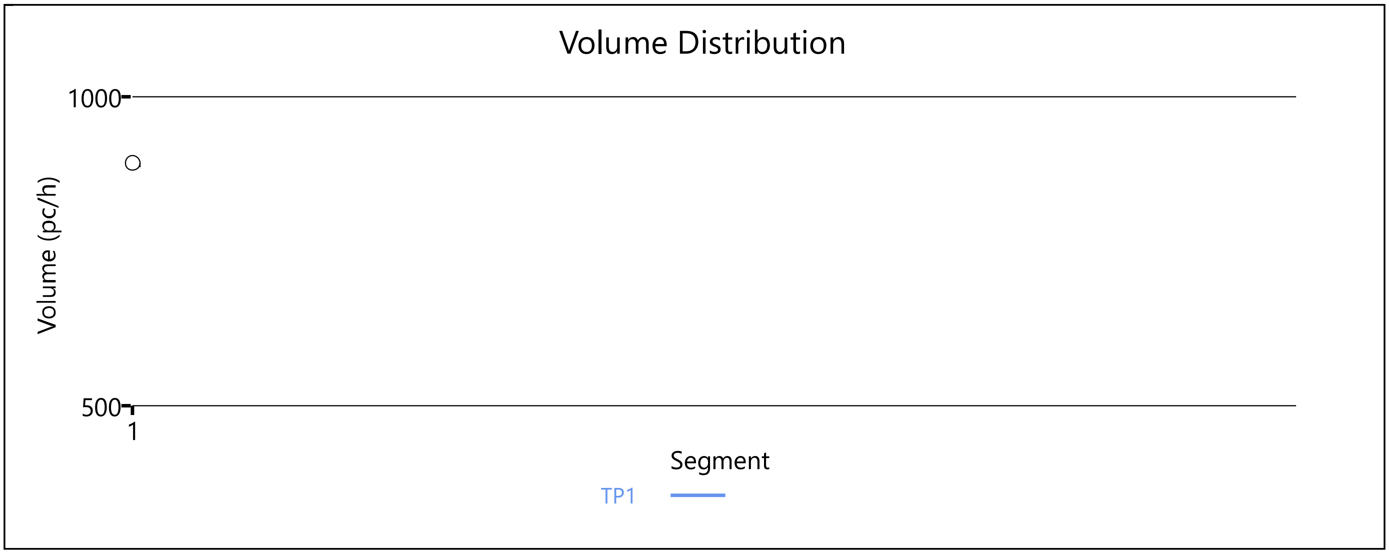
Facility Overall Results

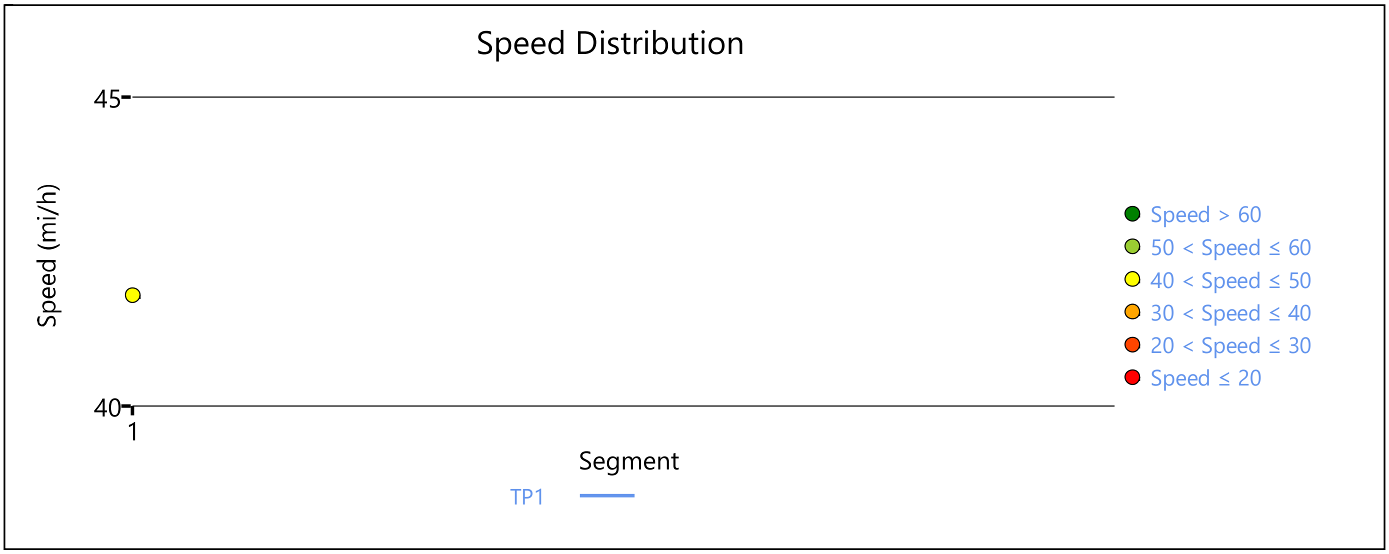
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	10.0
Average Travel Time, min	1.40	Density, pc/mi/ln	10.7

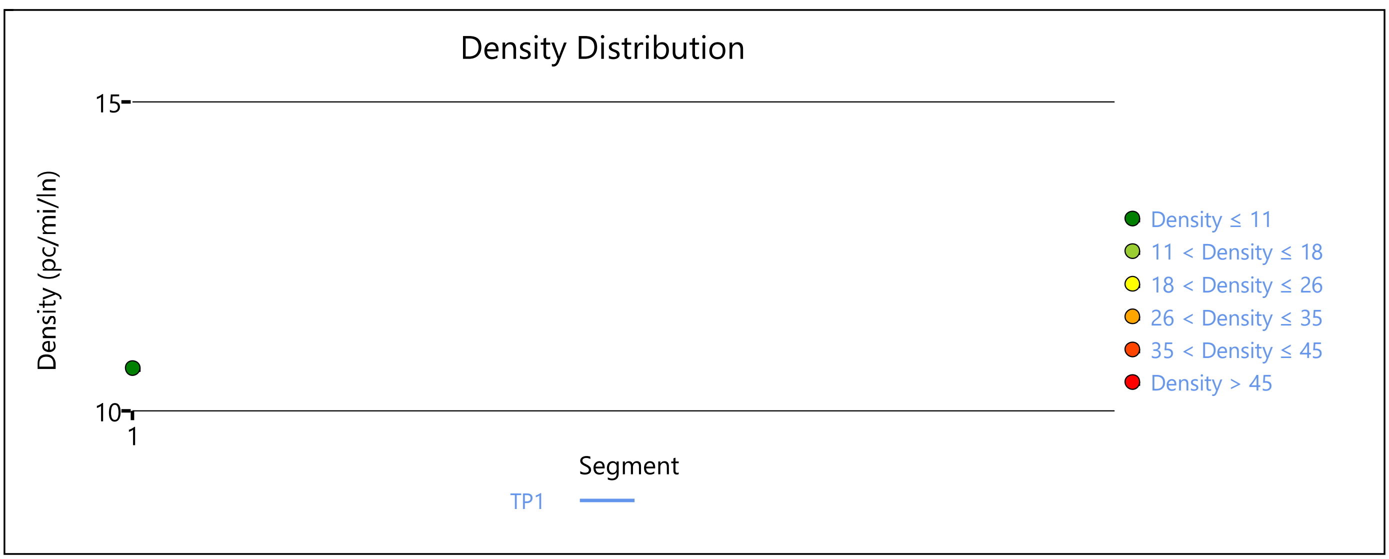
Messages

INFORMATION 1	Density for segment 1 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	1
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.00		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.865	280	4400	0.06	41.8	3.3	A

Facility Time Period Results

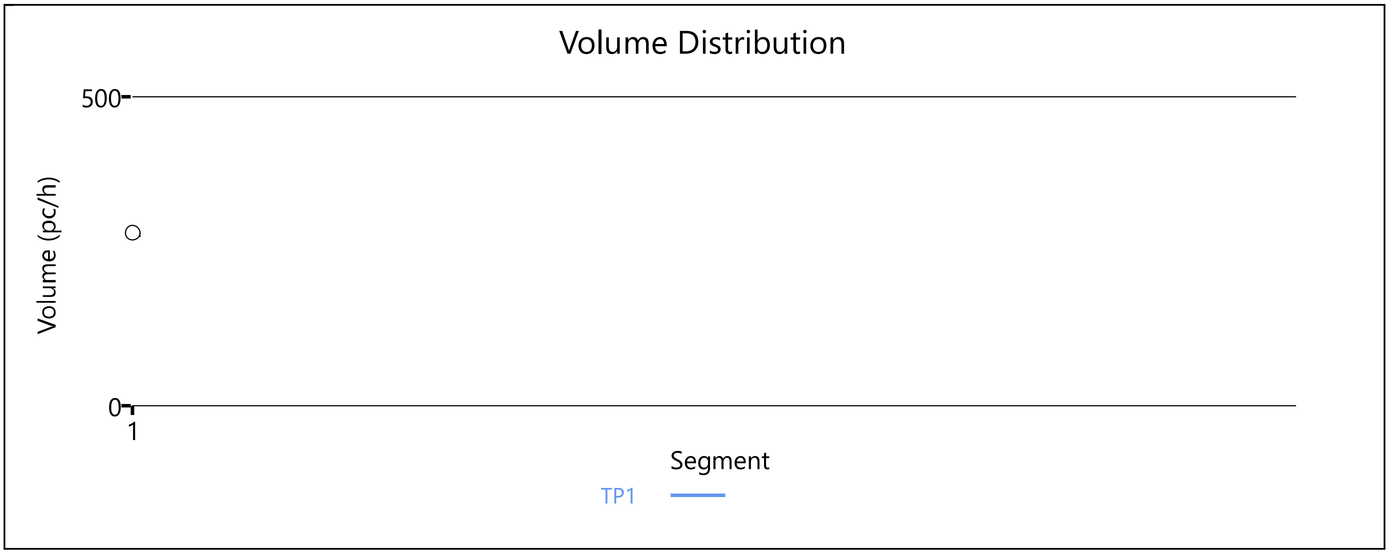
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	41.8	3.3	2.9	1.40	A

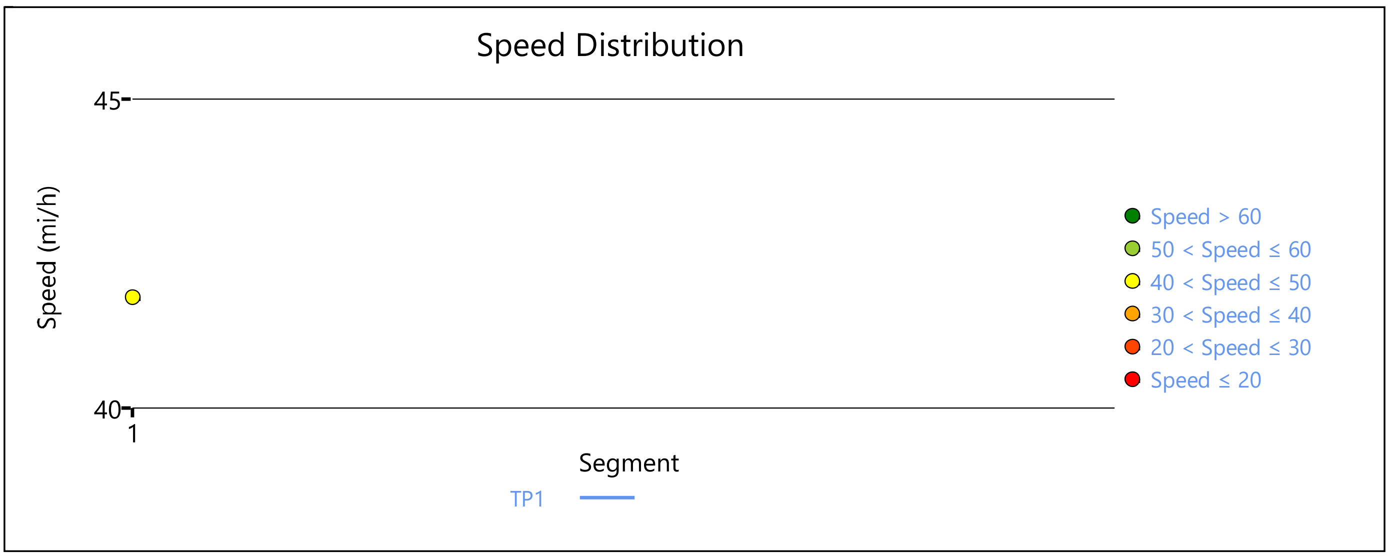
Facility Overall Results

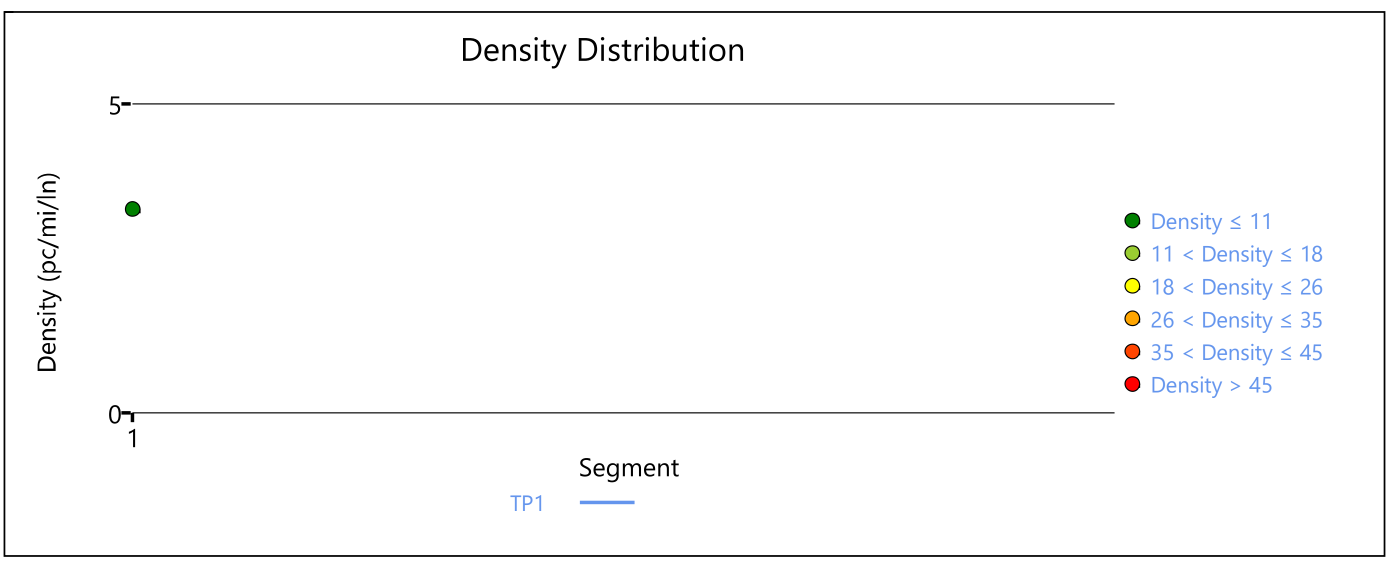
Space Mean Speed, mi/h	41.8	Density, veh/mi/ln	2.9
Average Travel Time, min	1.40	Density, pc/mi/ln	3.3

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.772	209	6654	0.03	51.8	1.4	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.772	0.849	1012	803	6750	4000	0.15	0.20	51.6	51.3	6.5	8.2	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.833	1013	6654	0.15	51.8	6.5	A

Facility Time Period Results

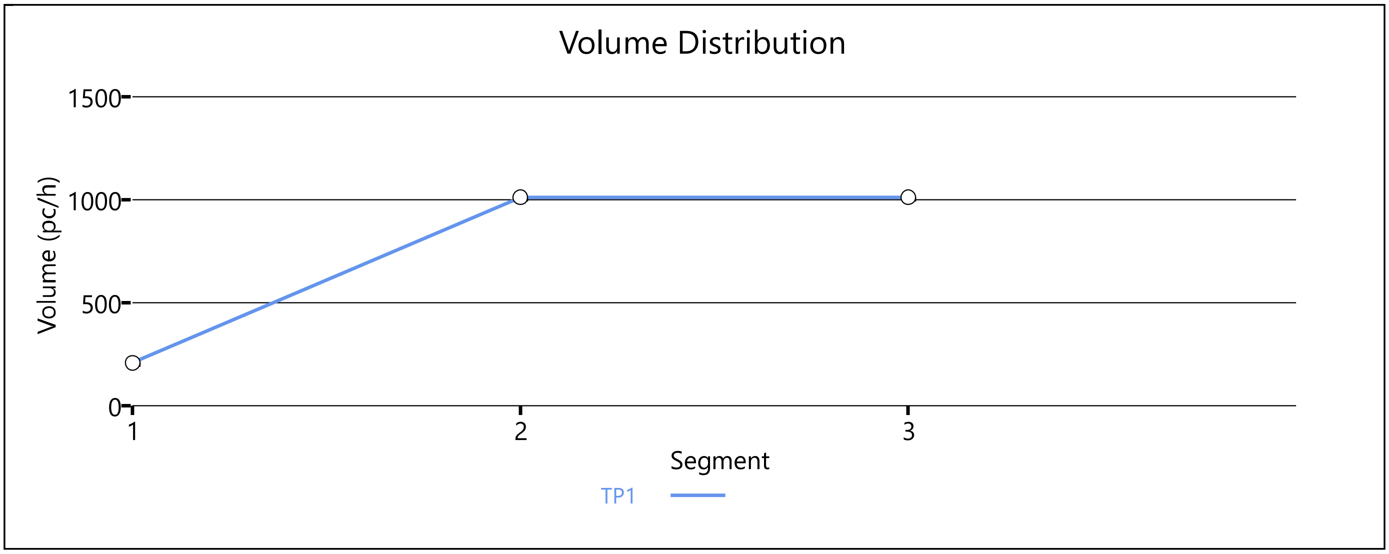
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	4.3	3.5	1.20	A

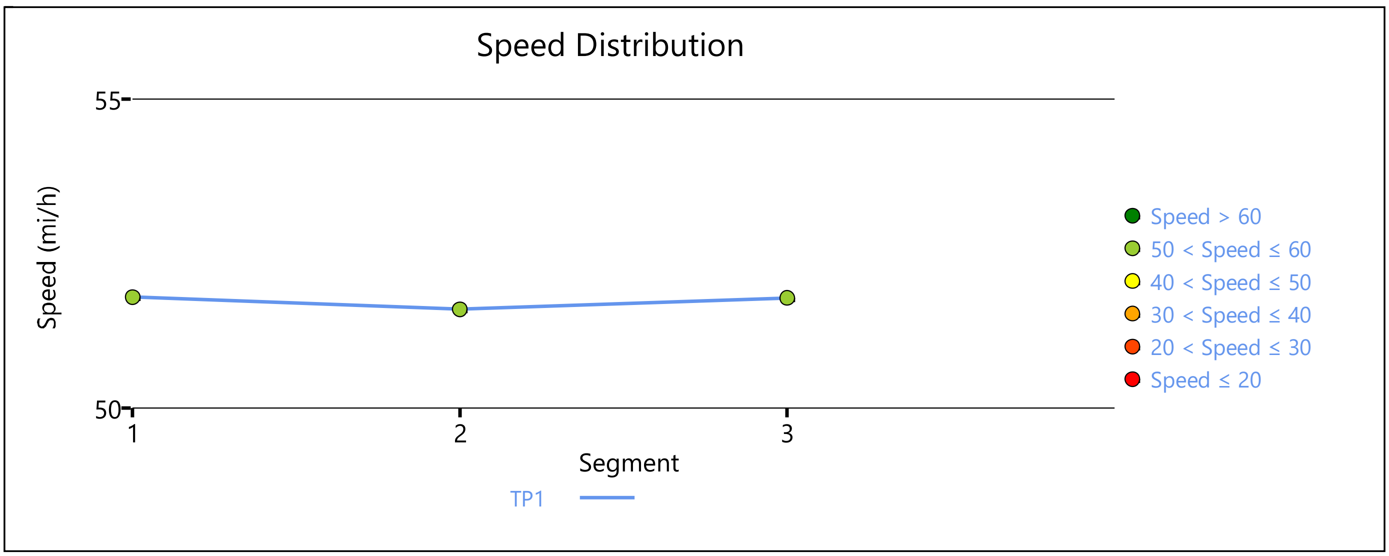
Facility Overall Results

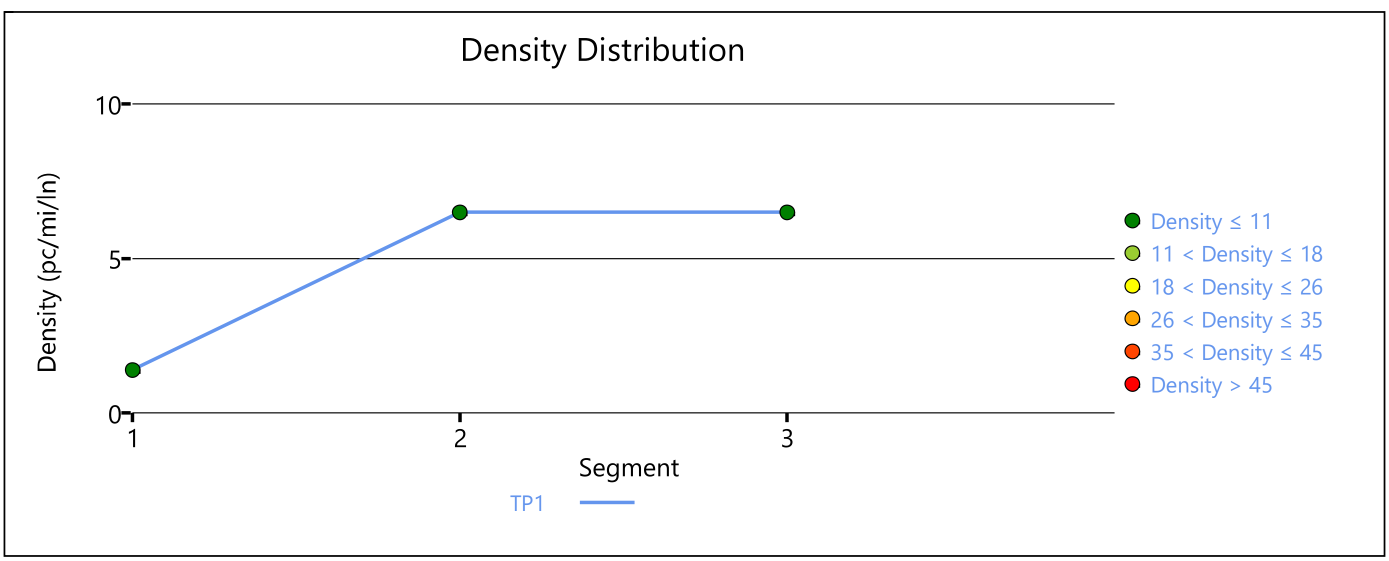
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	3.5
Average Travel Time, min	1.20	Density, pc/mi/ln	4.3

Messages

Comments







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NJ Turnpike - Eastern Spur NB AM v2 - Existing.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.797	300	6654	0.05	51.8	1.9	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.797	0.801	1060	760	6750	4000	0.16	0.19	51.7	51.3	6.8	8.3	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.800	1060	6654	0.16	51.8	6.8	A

Facility Time Period Results

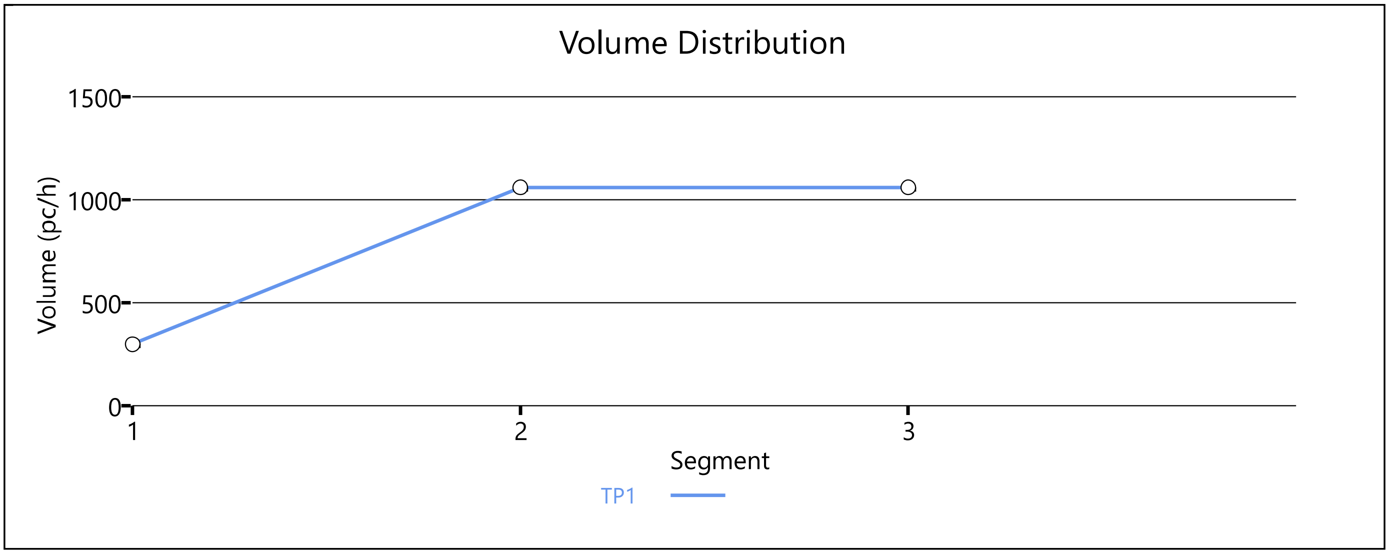
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	4.6	3.7	1.20	A

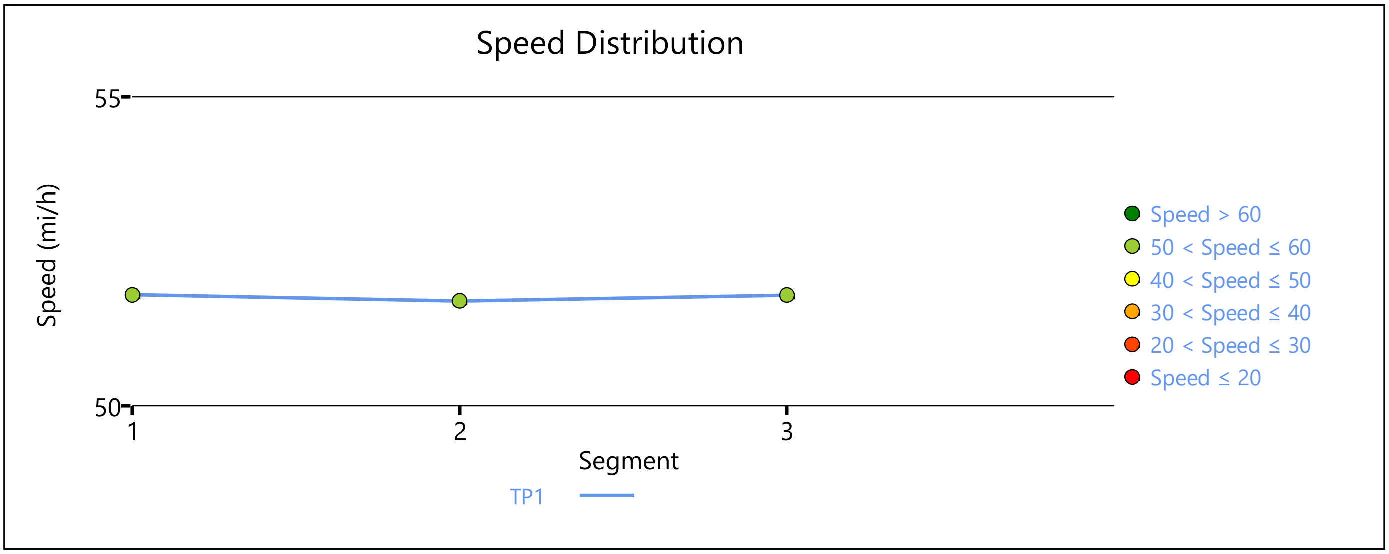
Facility Overall Results

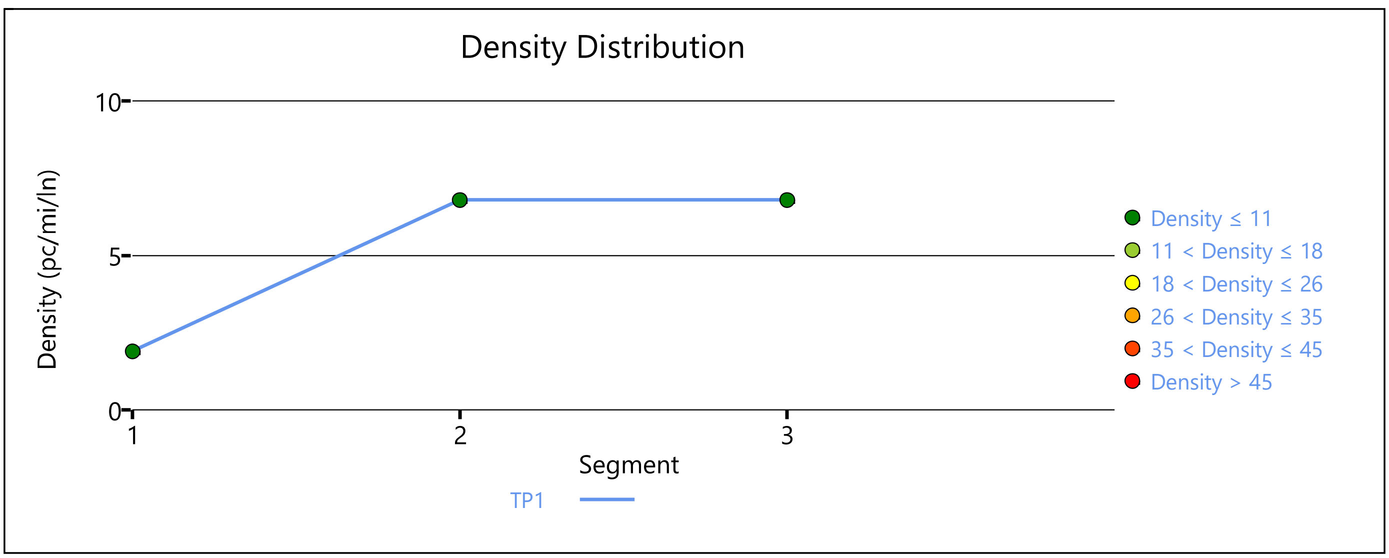
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	3.7
Average Travel Time, min	1.20	Density, pc/mi/ln	4.6

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.919	484	6654	0.07	51.8	3.1	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.919	0.923	1412	928	6750	4000	0.21	0.23	51.8	51.3	9.1	10.4	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.923	1410	6654	0.21	51.8	9.1	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	6.5	5.9	1.20	A

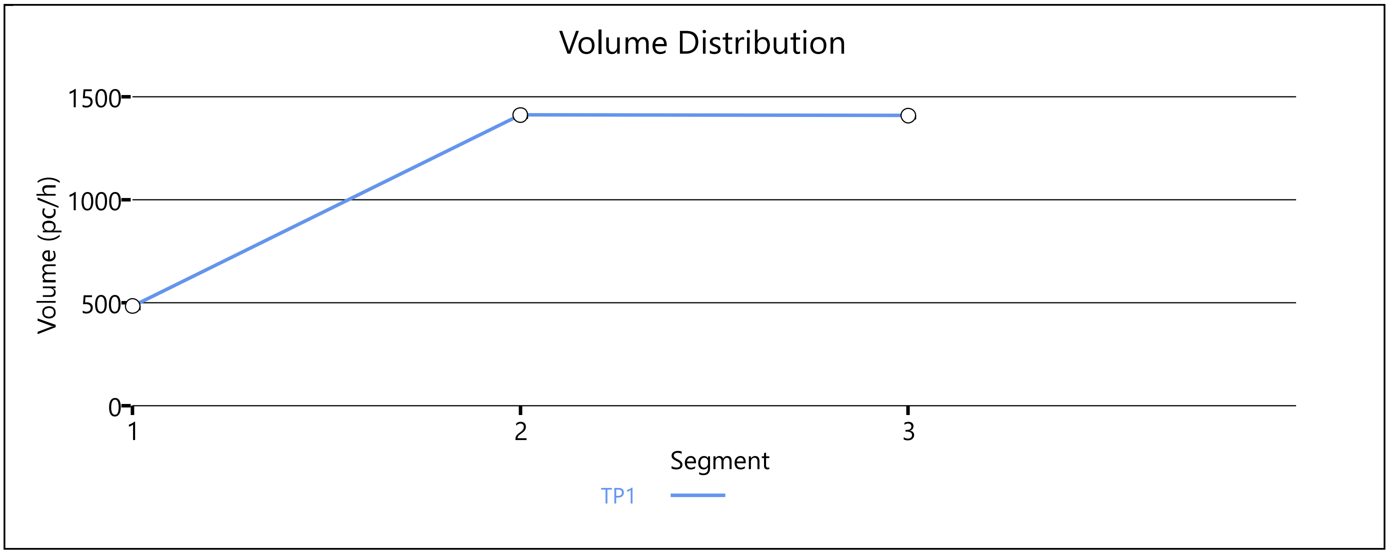
Facility Overall Results

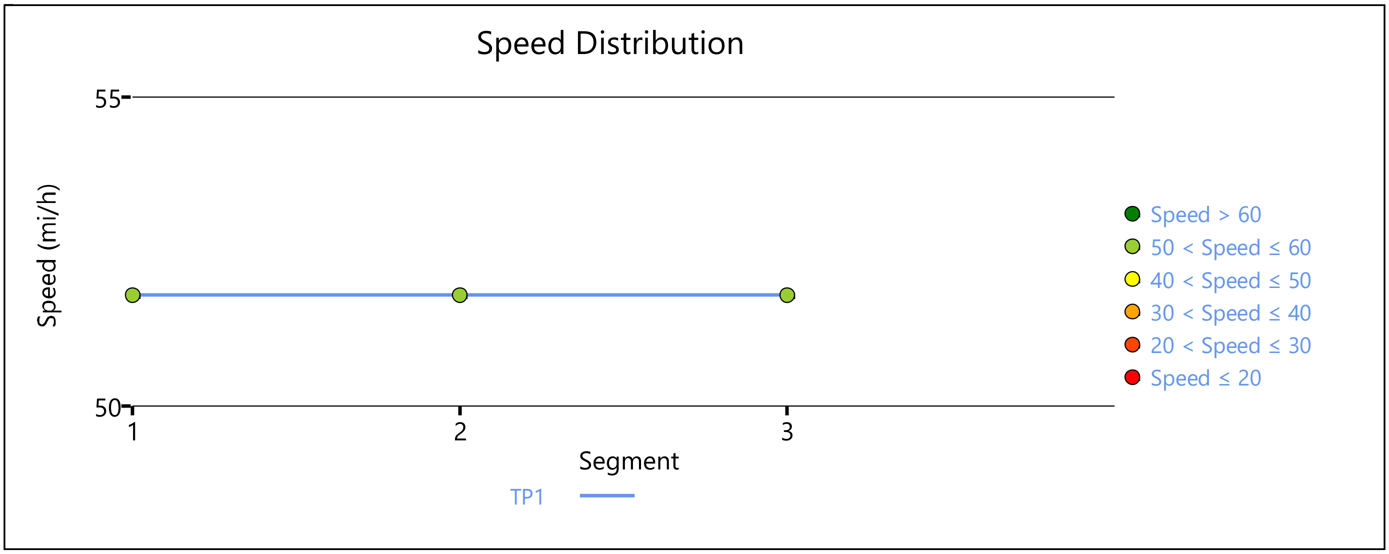
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	5.9
Average Travel Time, min	1.20	Density, pc/mi/ln	6.5

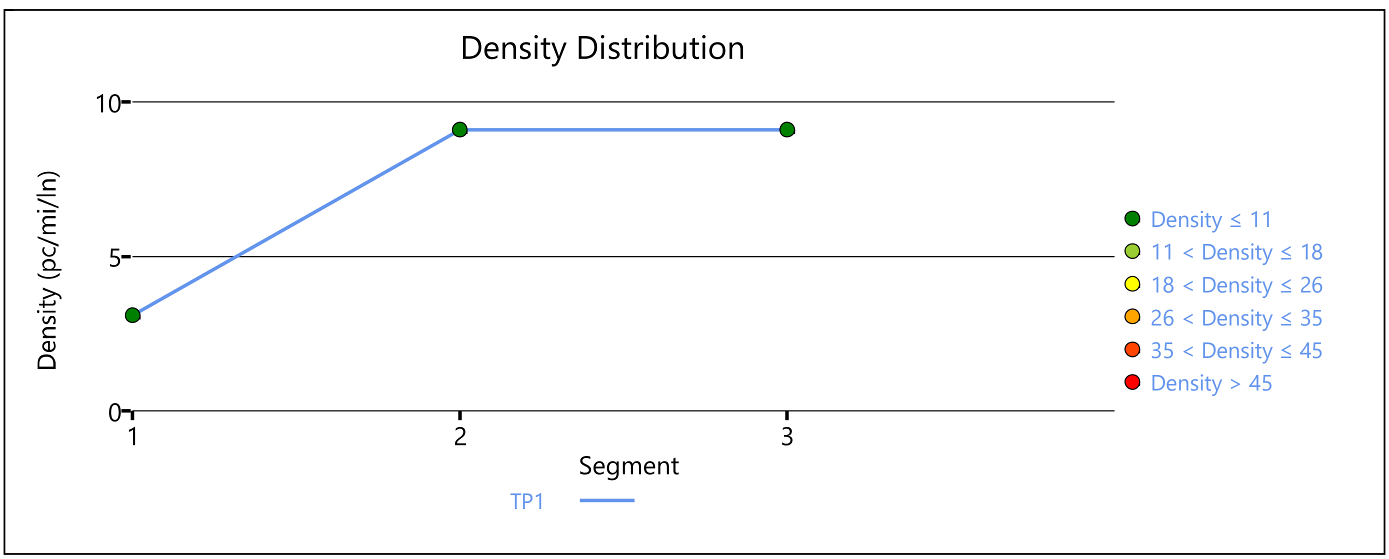
Messages

INFORMATION 1	Density for segment 2 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments







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NJ Turnpike - Eastern Spur NB PM - Existing.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.723	22	6654	0.00	51.8	0.1	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.723	0.888	431	409	6750	4000	0.06	0.10	51.4	51.3	2.8	4.5	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.880	430	6654	0.06	51.8	2.8	A

Facility Time Period Results

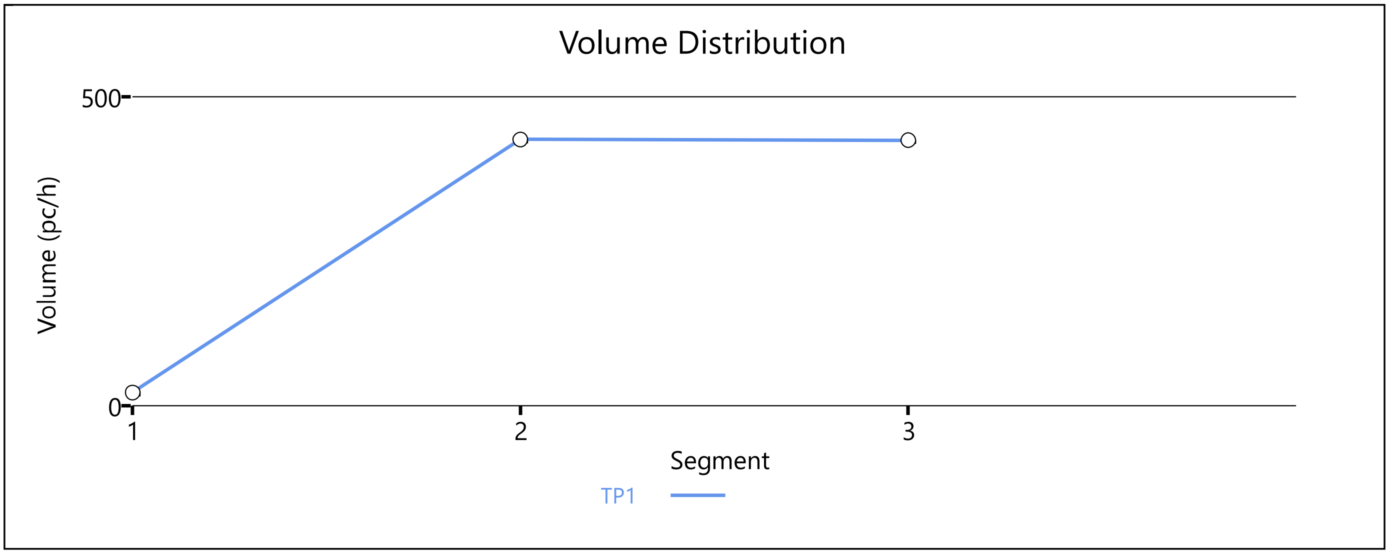
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.7	1.6	1.4	1.20	A

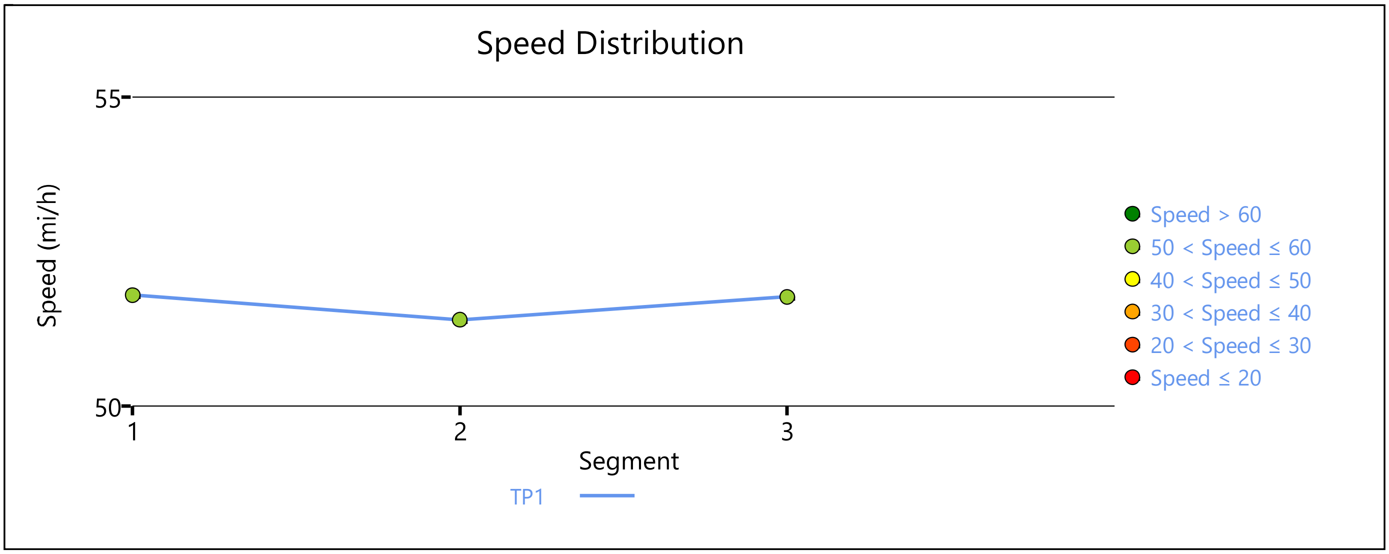
Facility Overall Results

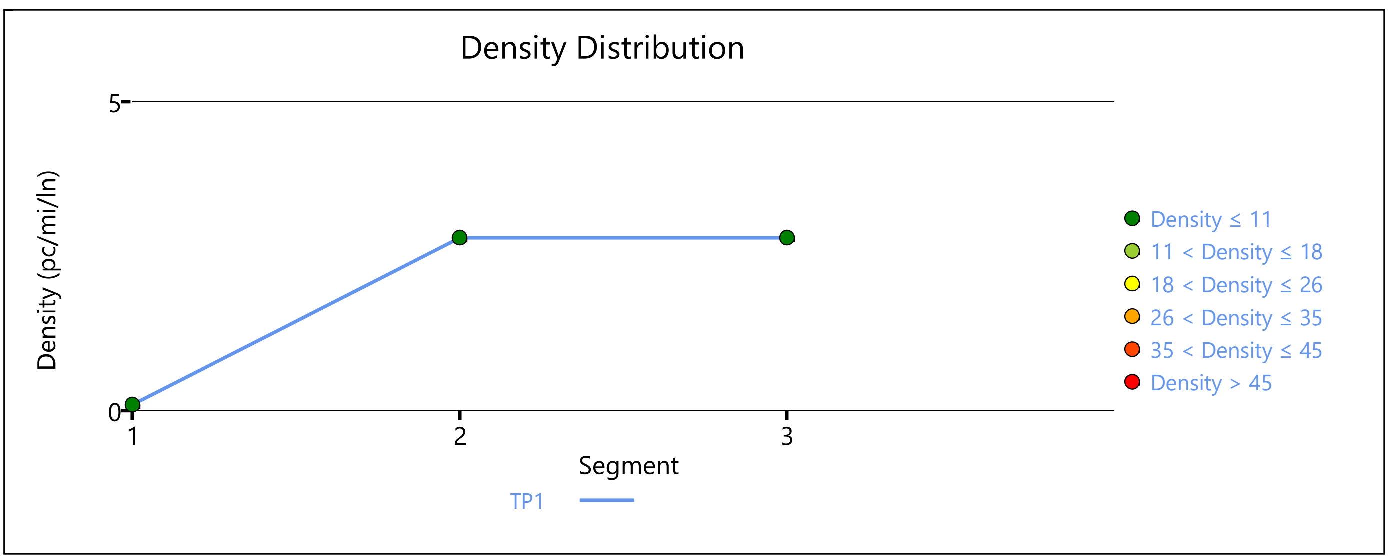
Space Mean Speed, mi/h	51.7	Density, veh/mi/ln	1.4
Average Travel Time, min	1.20	Density, pc/mi/ln	1.6

Messages

Comments







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NJ Turnpike - Eastern Spur NB LN - Existing.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Analyzed	AM
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.846	1337	6654	0.20	51.8	8.6	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.846	0.829	1337	808	6750	4200	0.20	0.19	54.9	55.0	8.1	8.1	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.873	528	6654	0.08	51.8	3.4	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	52.8	6.6	5.6	1.50	A

Facility Overall Results

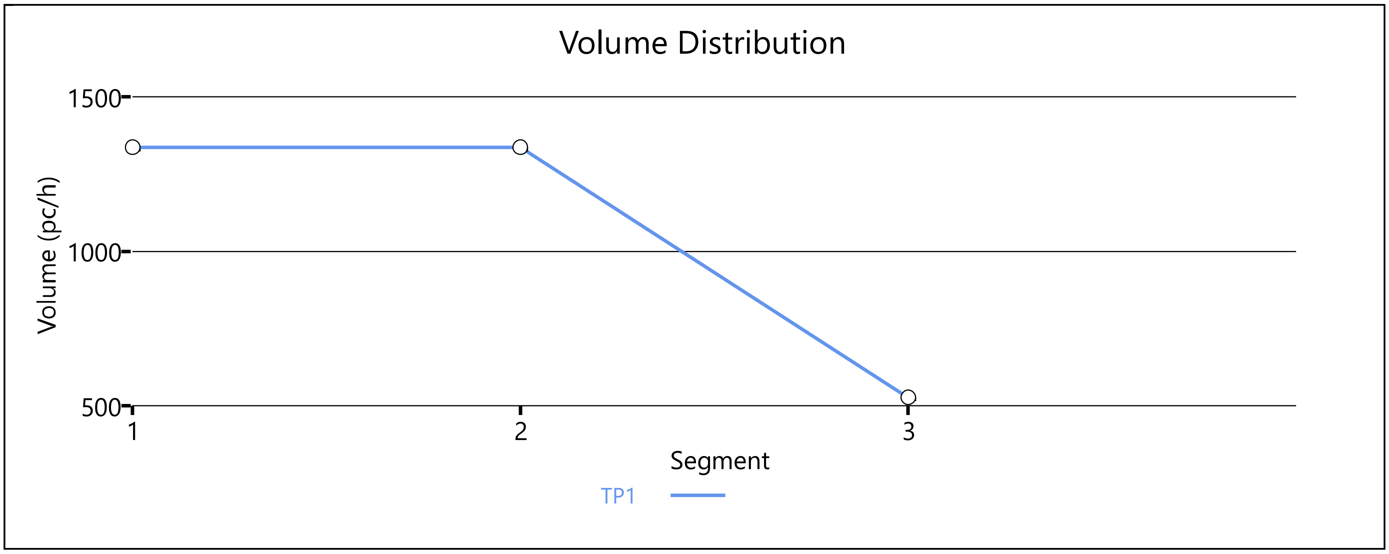
Space Mean Speed, mi/h	52.8	Density, veh/mi/ln	5.6
Average Travel Time, min	1.50	Density, pc/mi/ln	6.6

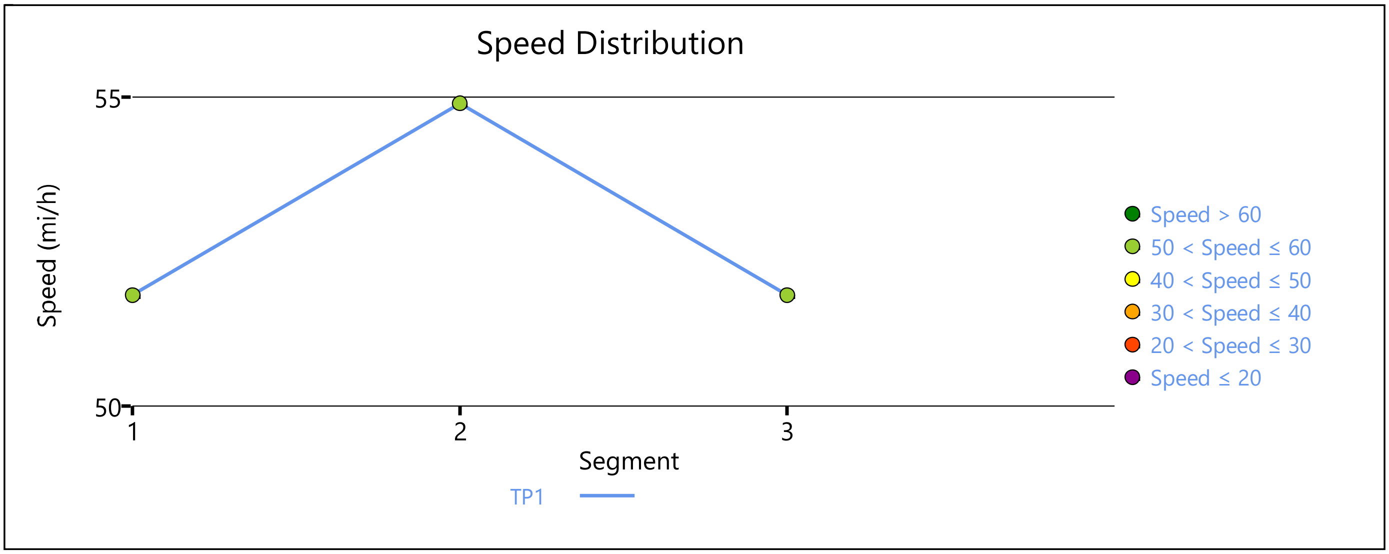
Messages

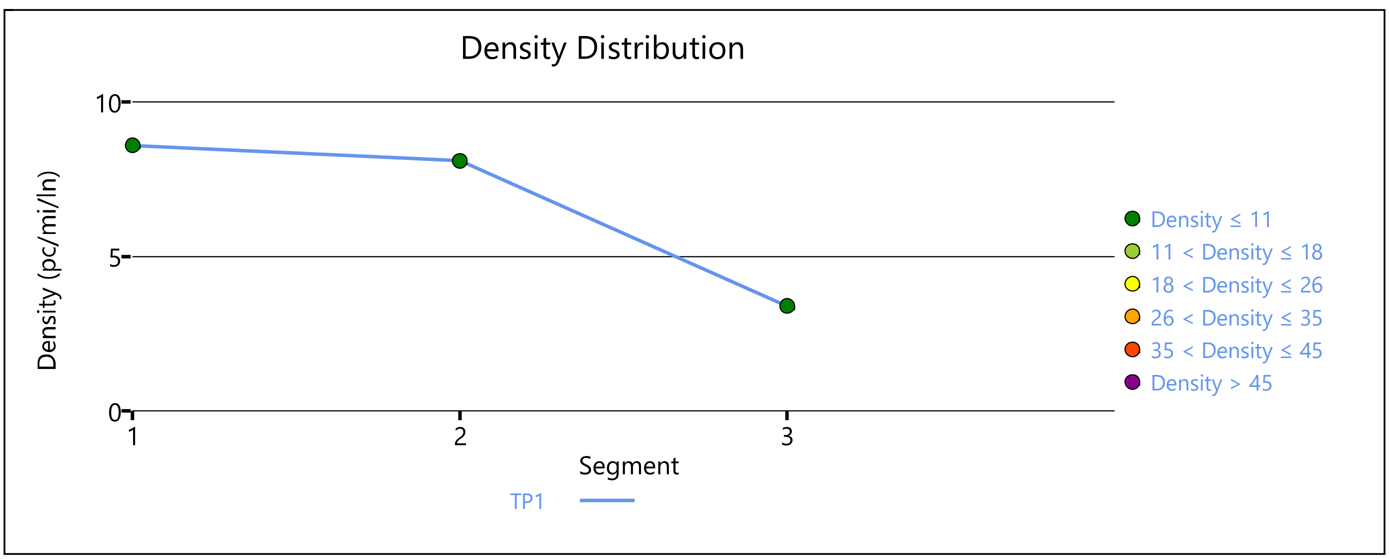
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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NJ Turnpike - Eastern Spur SB AM - Existing.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Analyzed	MD
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.810	835	6654	0.13	51.8	5.4	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.810	0.817	835	776	6750	4200	0.12	0.18	54.9	55.0	5.1	5.1	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.715	60	6654	0.01	51.8	0.4	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.0	3.5	2.8	1.50	A

Facility Overall Results

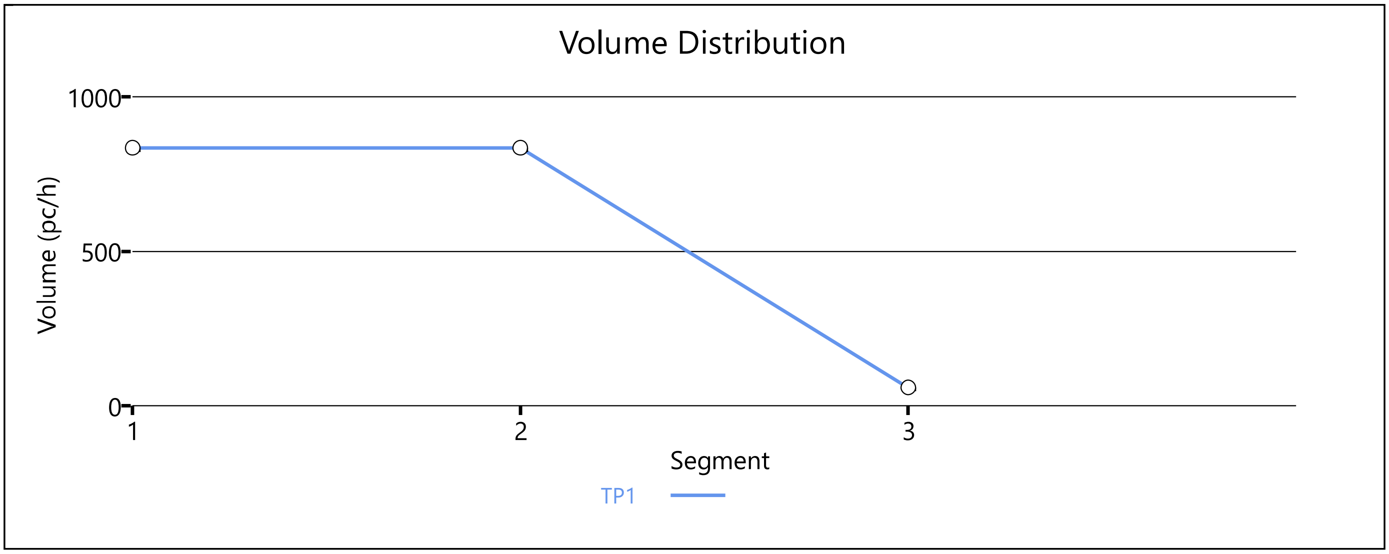
Space Mean Speed, mi/h	53.0	Density, veh/mi/ln	2.8
Average Travel Time, min	1.50	Density, pc/mi/ln	3.5

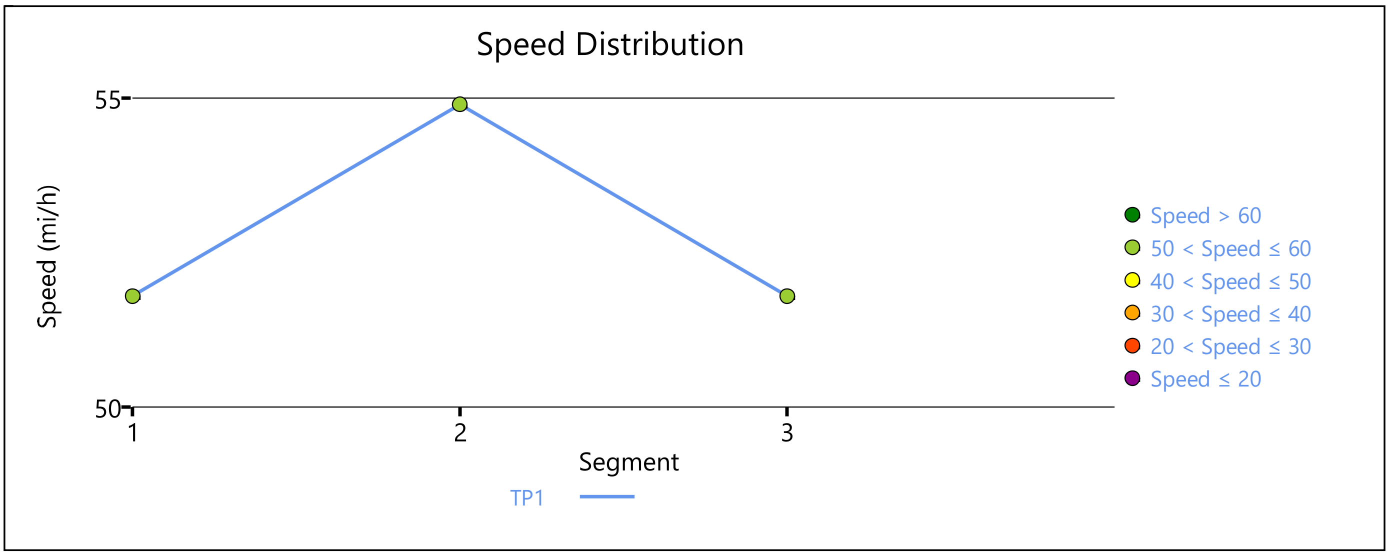
Messages

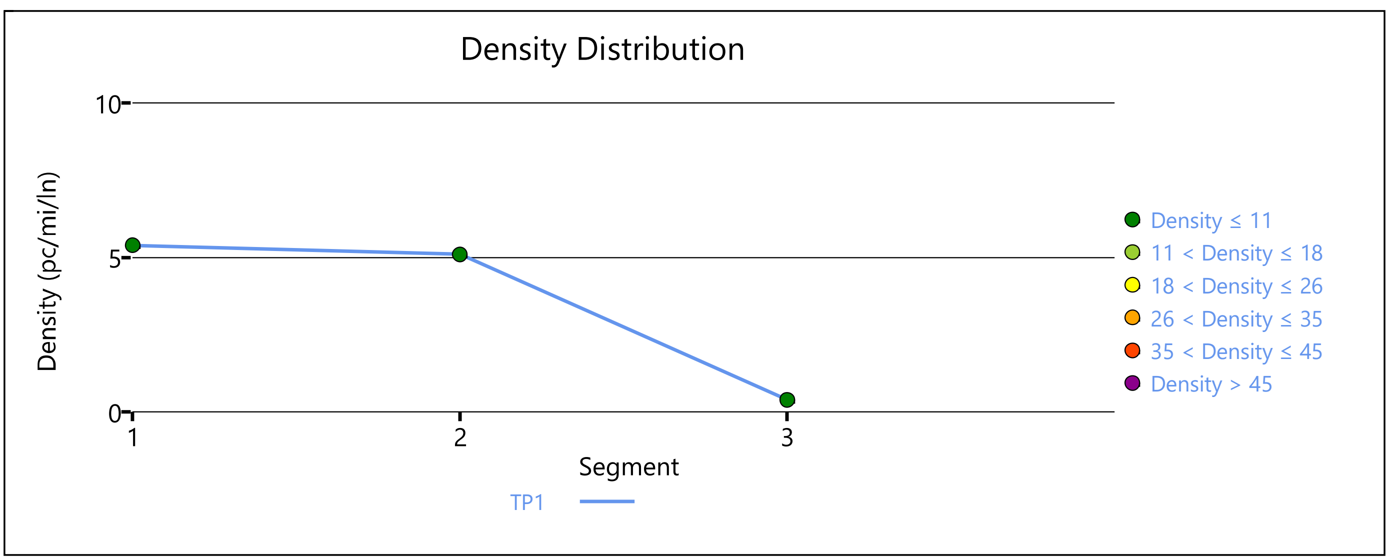
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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NJ Turnpike - Eastern Spur SB MD - Existing.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Analyzed	PM
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.921	925	6654	0.14	51.8	5.9	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.921	0.926	925	874	6750	4200	0.14	0.21	54.9	55.0	5.6	5.6	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.822	52	6654	0.01	51.8	0.3	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.0	3.8	3.4	1.50	A

Facility Overall Results

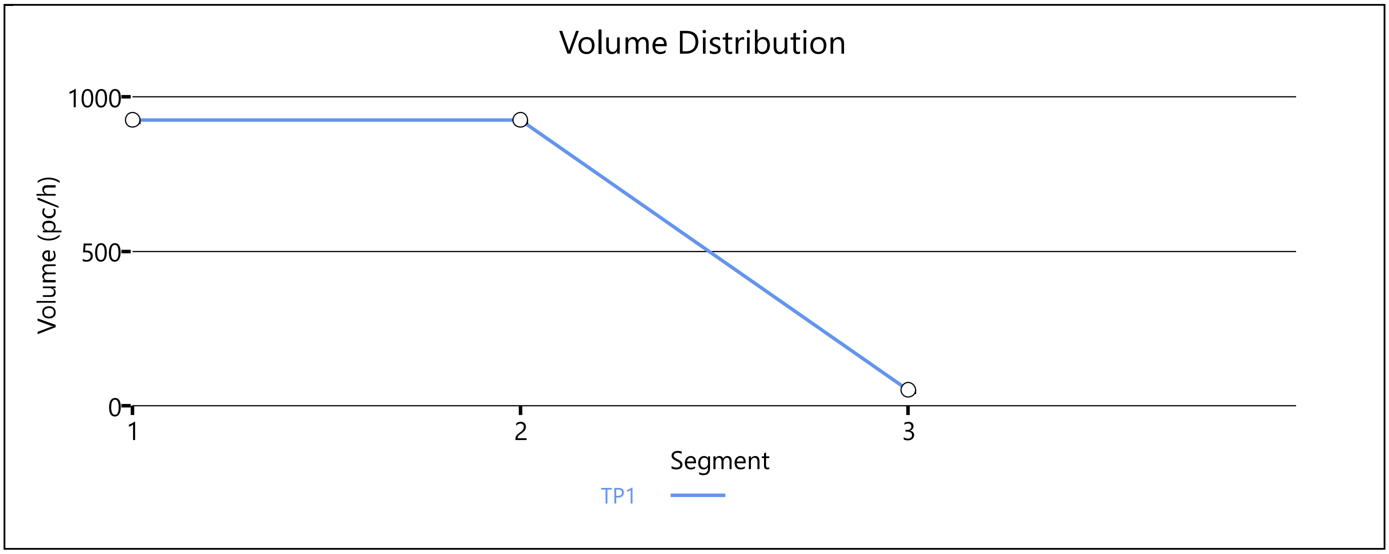
Space Mean Speed, mi/h	53.0	Density, veh/mi/ln	3.4
Average Travel Time, min	1.50	Density, pc/mi/ln	3.8

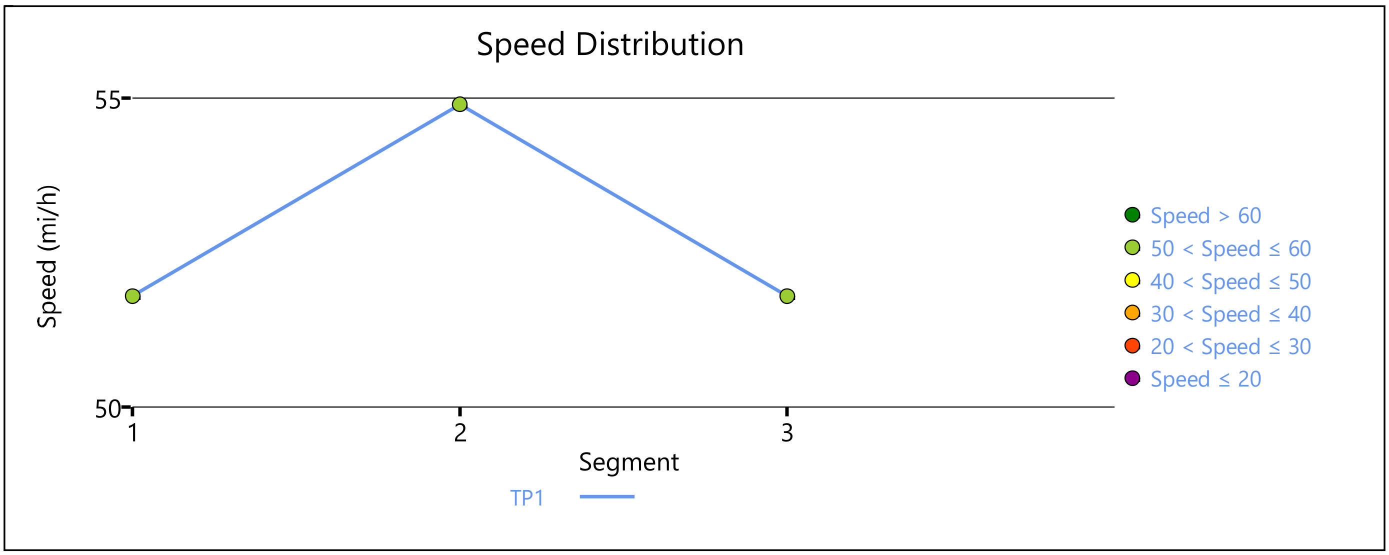
Messages

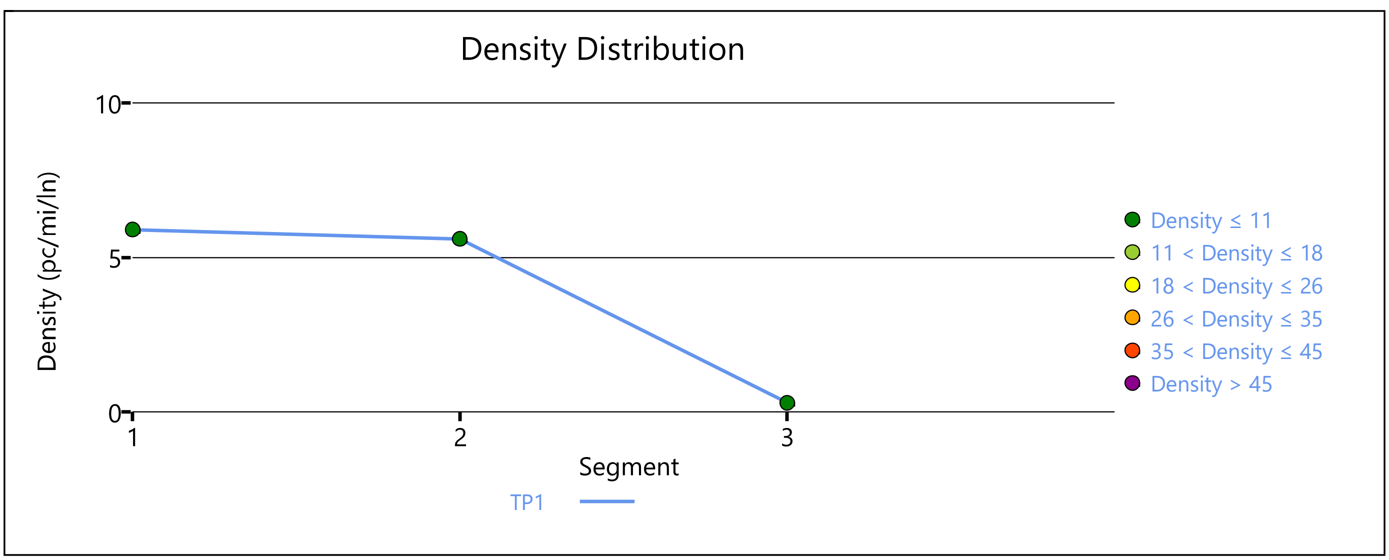
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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NJ Turnpike - Eastern Spur SB PM - Existing.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	Existing
Jurisdiction		Time Analyzed	LN
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.891	414	6654	0.06	51.8	2.7	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.891	0.899	414	395	6750	4200	0.06	0.09	54.9	55.0	2.5	2.5	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.734	19	6654	0.00	51.8	0.1	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.0	1.7	1.5	1.50	A

Facility Overall Results

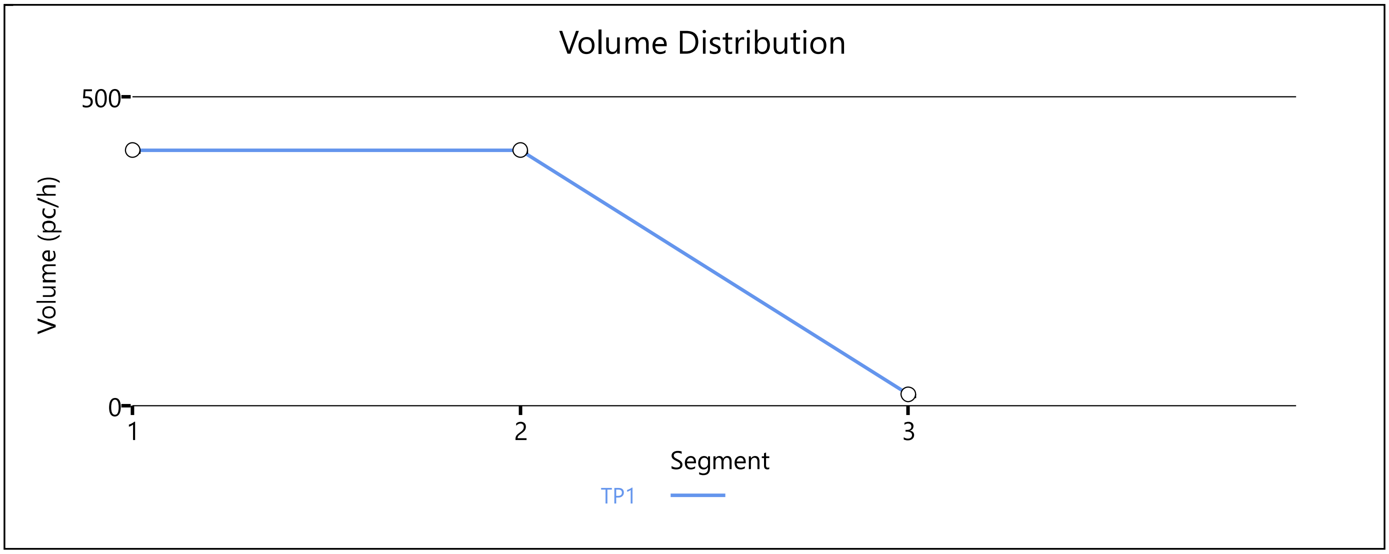
Space Mean Speed, mi/h	53.0	Density, veh/mi/ln	1.5
Average Travel Time, min	1.50	Density, pc/mi/ln	1.7

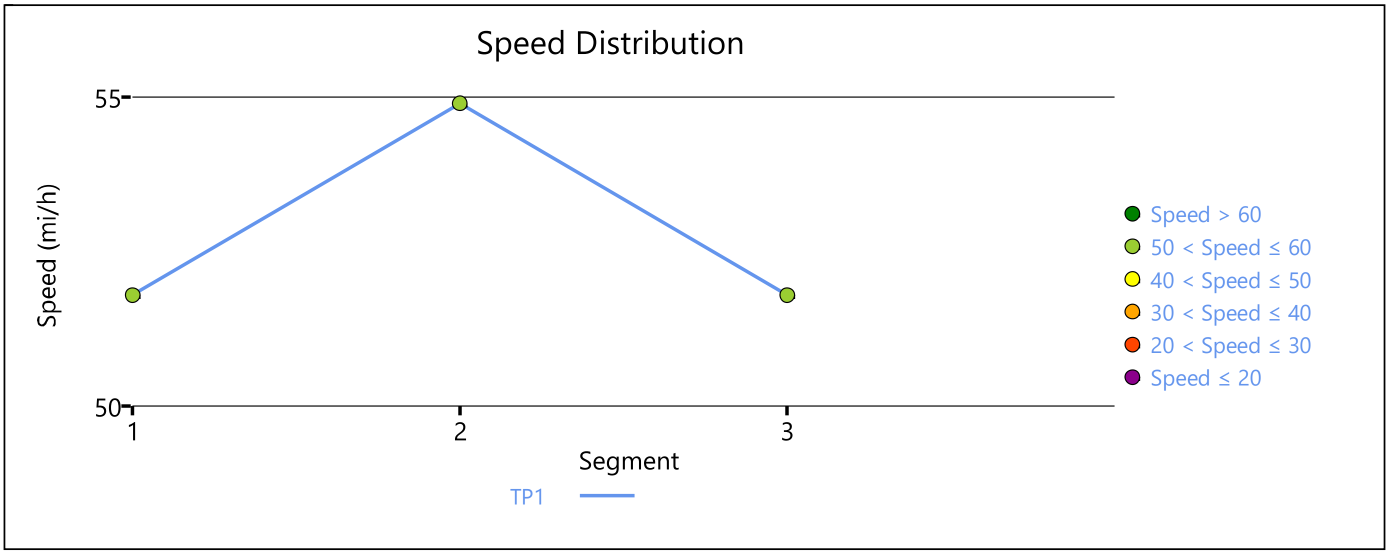
Messages

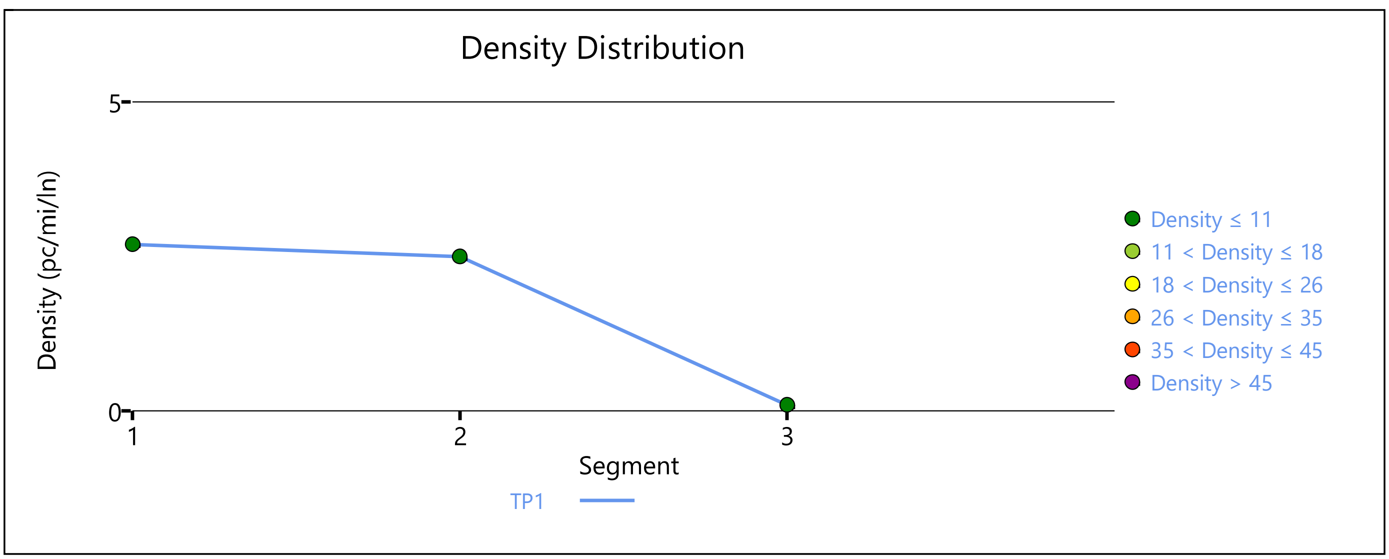
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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NJ Turnpike - Eastern Spur SB LN - Existing.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NoBuild
Jurisdiction		Time Analyzed	AM
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.846	1440	6654	0.22	51.8	9.3	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.846	0.829	1440	805	6750	4200	0.21	0.19	54.9	55.0	8.7	8.7	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.873	631	6654	0.09	51.8	4.1	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	52.8	7.2	6.2	1.50	A

Facility Overall Results

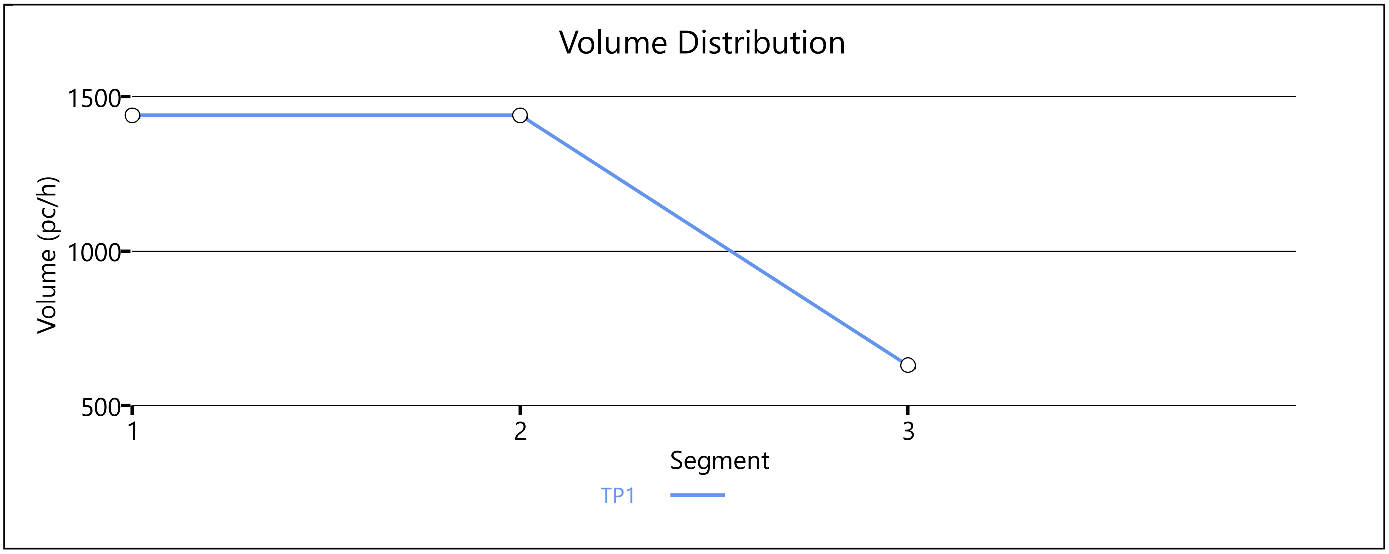
Space Mean Speed, mi/h	52.8	Density, veh/mi/ln	6.2
Average Travel Time, min	1.50	Density, pc/mi/ln	7.2

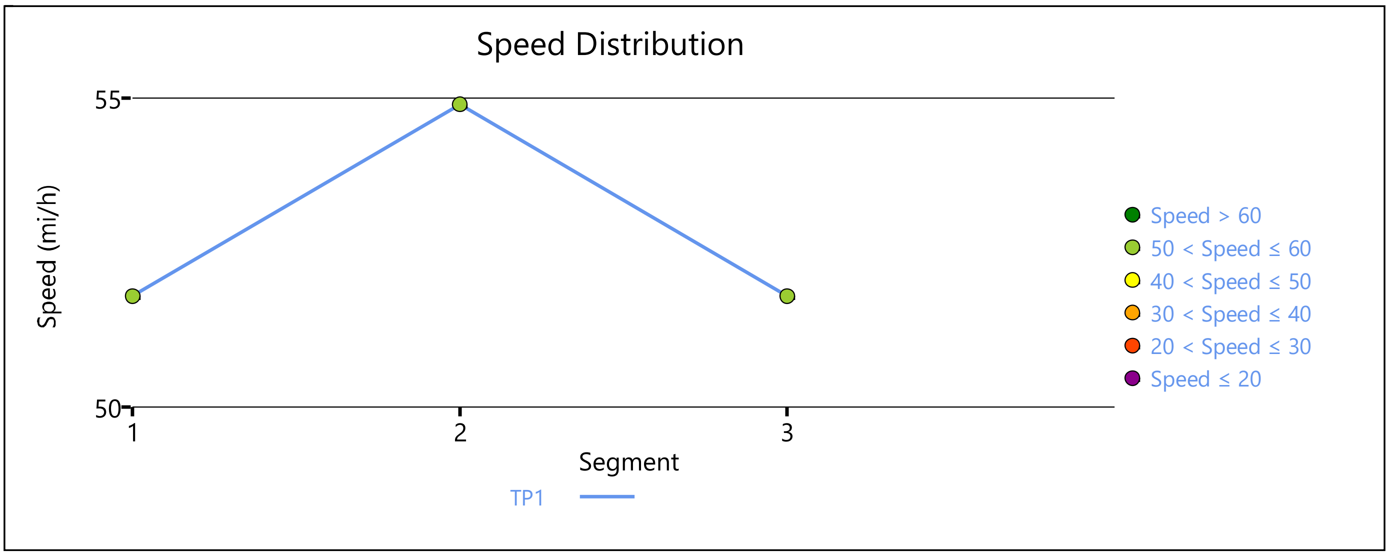
Messages

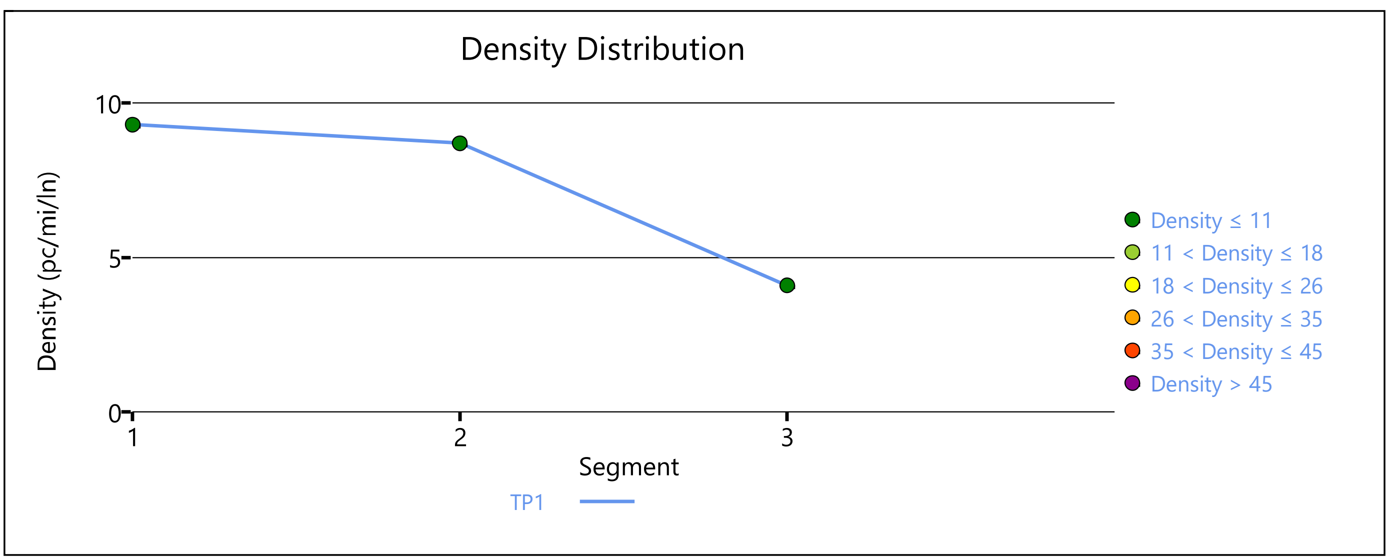
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	No Build
Jurisdiction		Time Analyzed	MD
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.810	826	6654	0.12	51.8	5.3	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.810	0.817	826	763	6750	4200	0.12	0.18	54.9	55.0	5.0	5.0	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.715	64	6654	0.01	51.8	0.4	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.0	3.4	2.8	1.50	A

Facility Overall Results

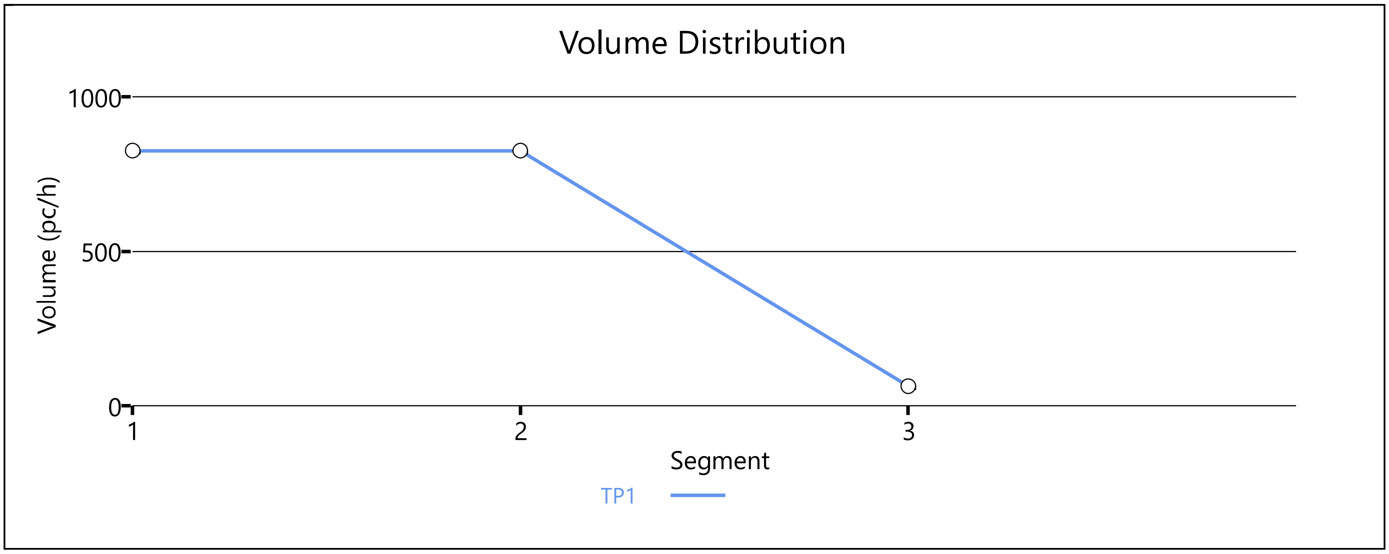
Space Mean Speed, mi/h	53.0	Density, veh/mi/ln	2.8
Average Travel Time, min	1.50	Density, pc/mi/ln	3.4

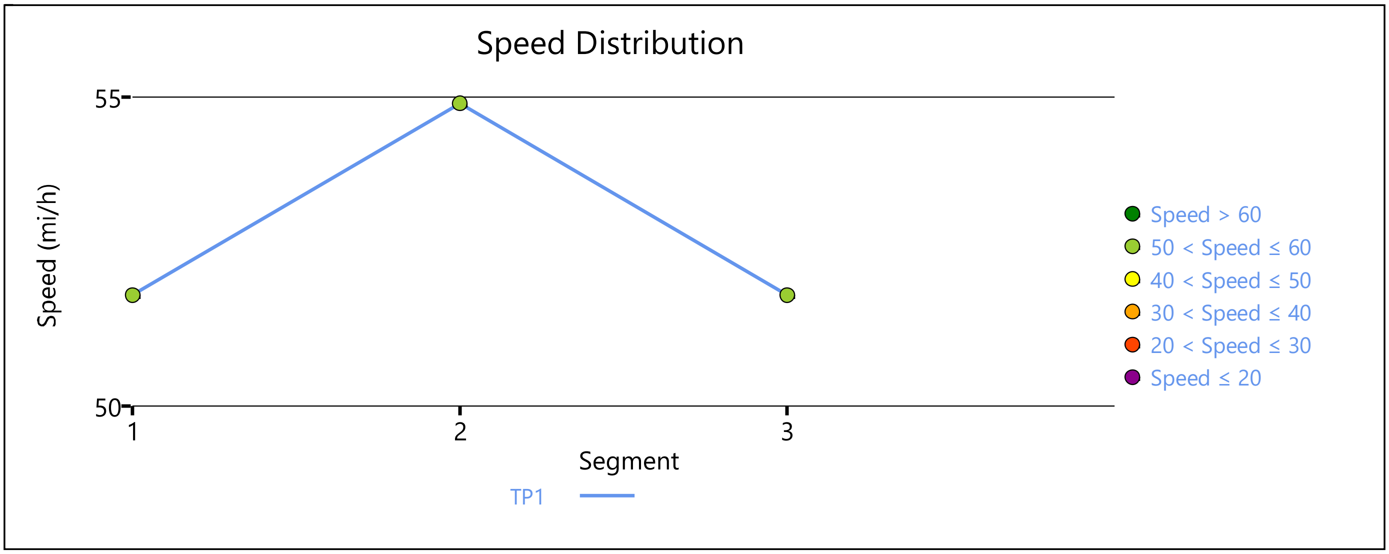
Messages

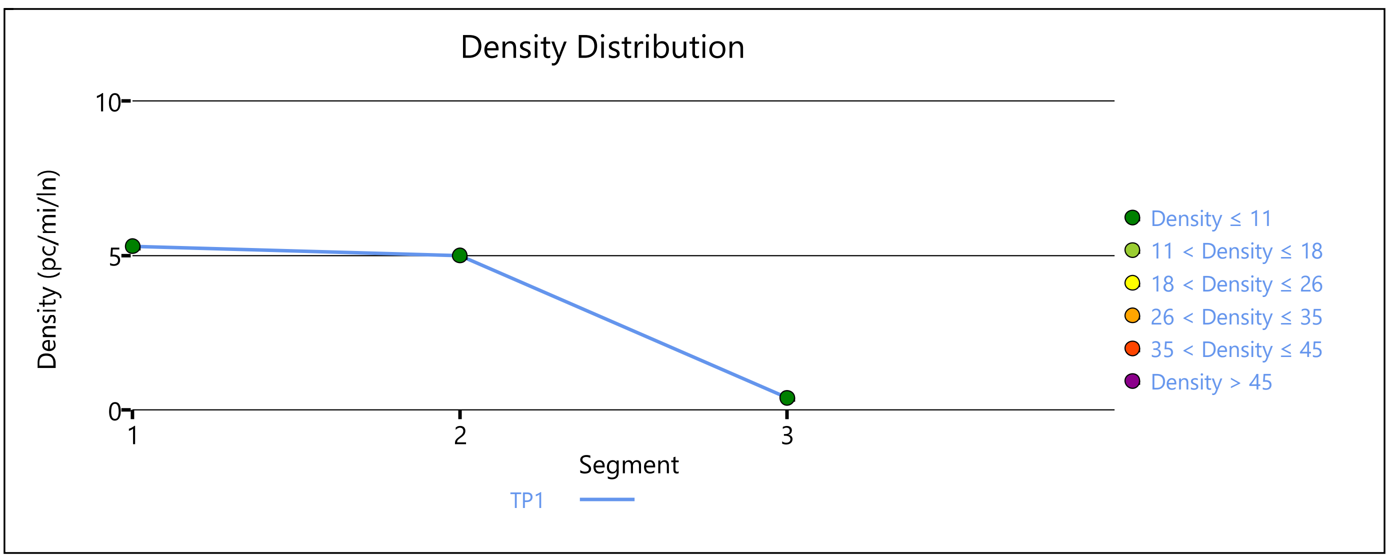
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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NJ Turnpike - Eastern Spur SB MD - NoBuild.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	No Build
Jurisdiction		Time Analyzed	PM
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.921	915	6654	0.14	51.8	5.9	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.921	0.926	915	867	6750	4200	0.14	0.21	54.9	55.0	5.5	5.5	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.822	48	6654	0.01	51.8	0.3	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.0	3.7	3.4	1.50	A

Facility Overall Results

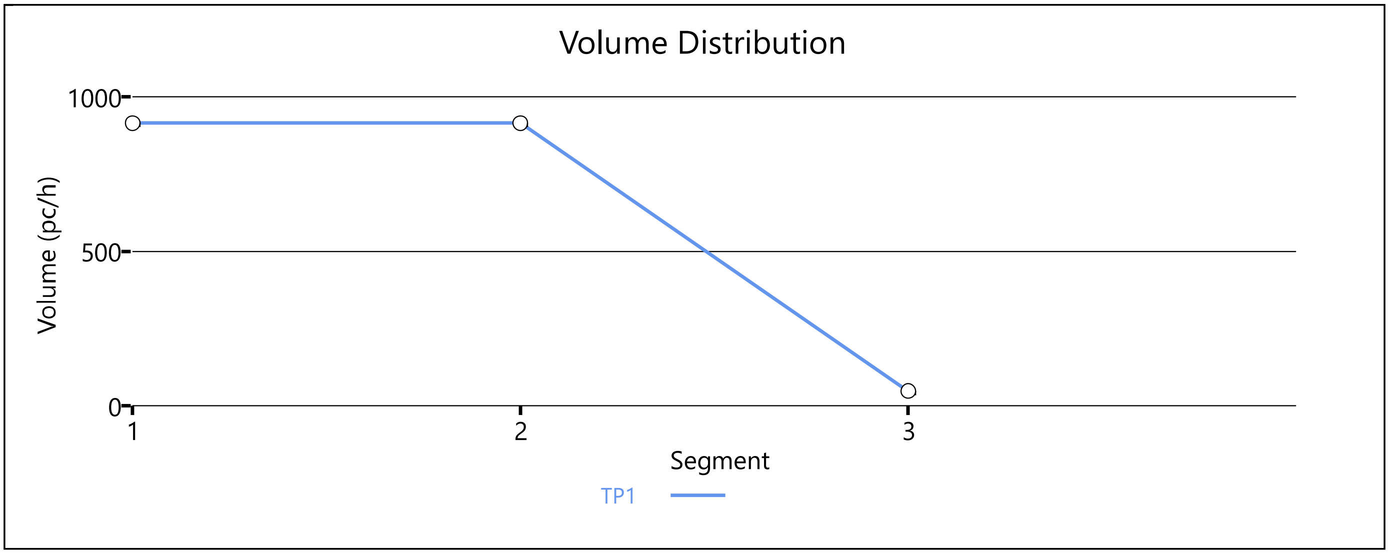
Space Mean Speed, mi/h	53.0	Density, veh/mi/ln	3.4
Average Travel Time, min	1.50	Density, pc/mi/ln	3.7

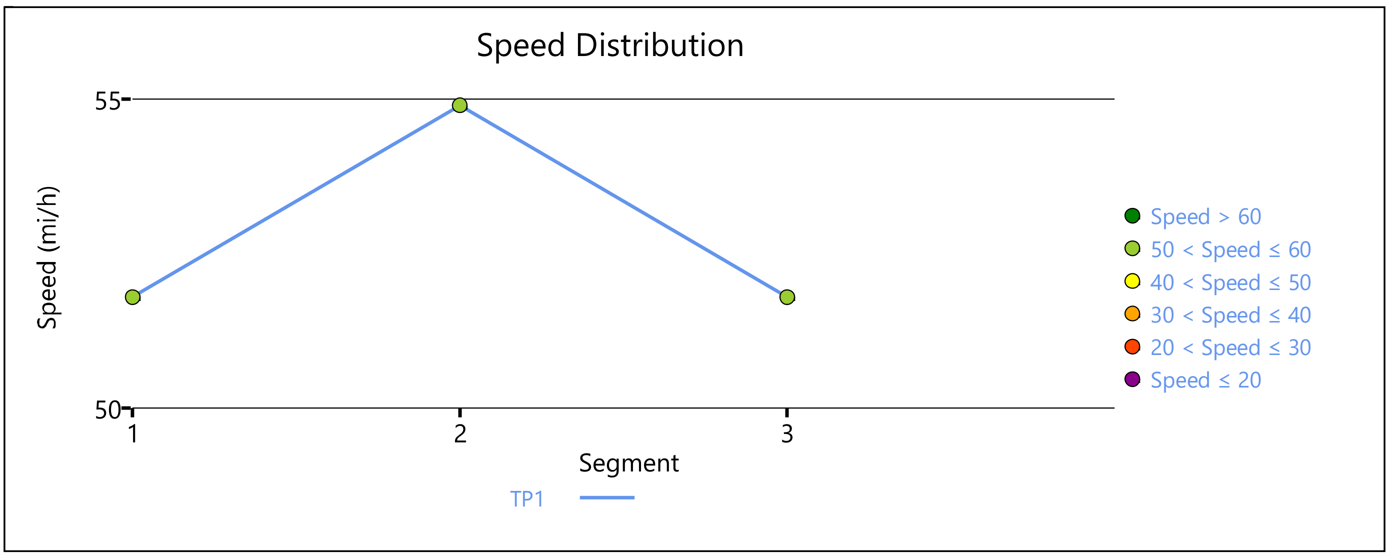
Messages

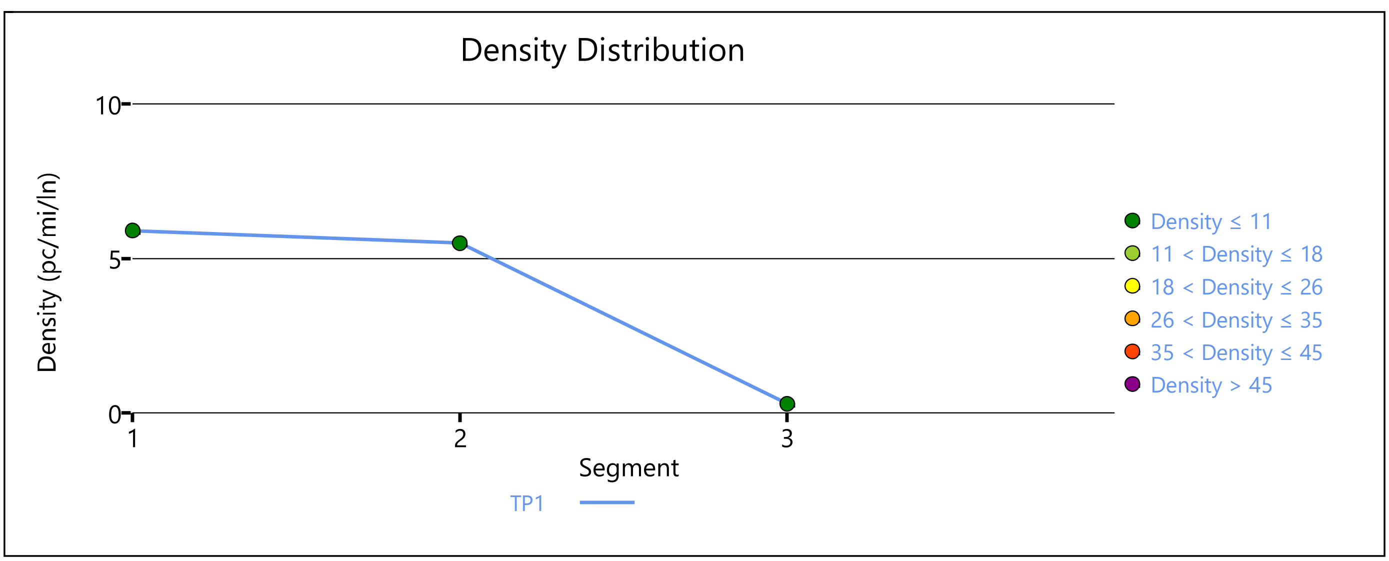
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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NJ Turnpike - Eastern Spur SB PM - NoBuild.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	No Build
Jurisdiction		Time Analyzed	LN
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.891	423	6654	0.06	51.8	2.7	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.891	0.899	423	402	6750	4200	0.06	0.10	54.9	55.0	2.6	2.6	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.734	20	6654	0.00	51.8	0.1	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.0	1.7	1.5	1.50	A

Facility Overall Results

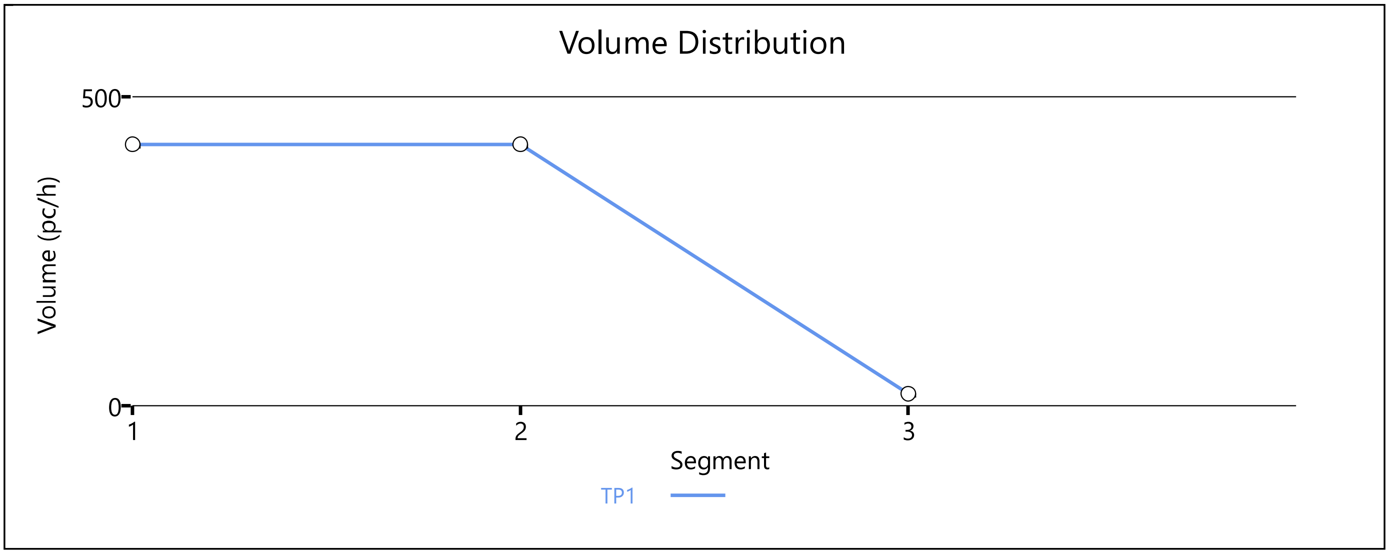
Space Mean Speed, mi/h	53.0	Density, veh/mi/ln	1.5
Average Travel Time, min	1.50	Density, pc/mi/ln	1.7

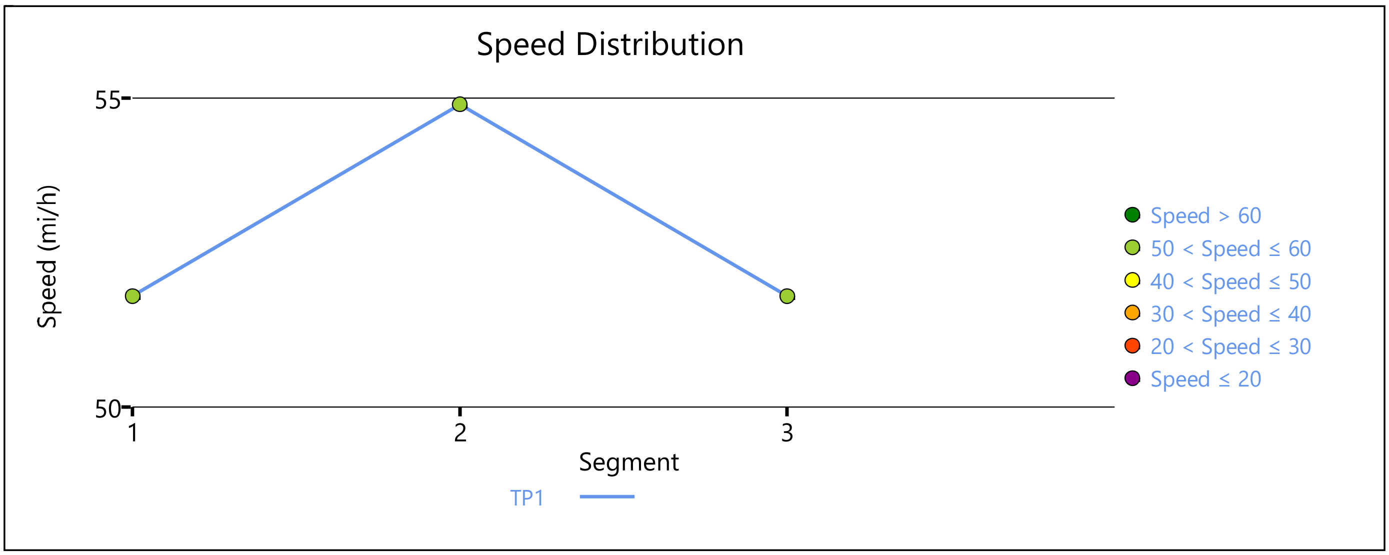
Messages

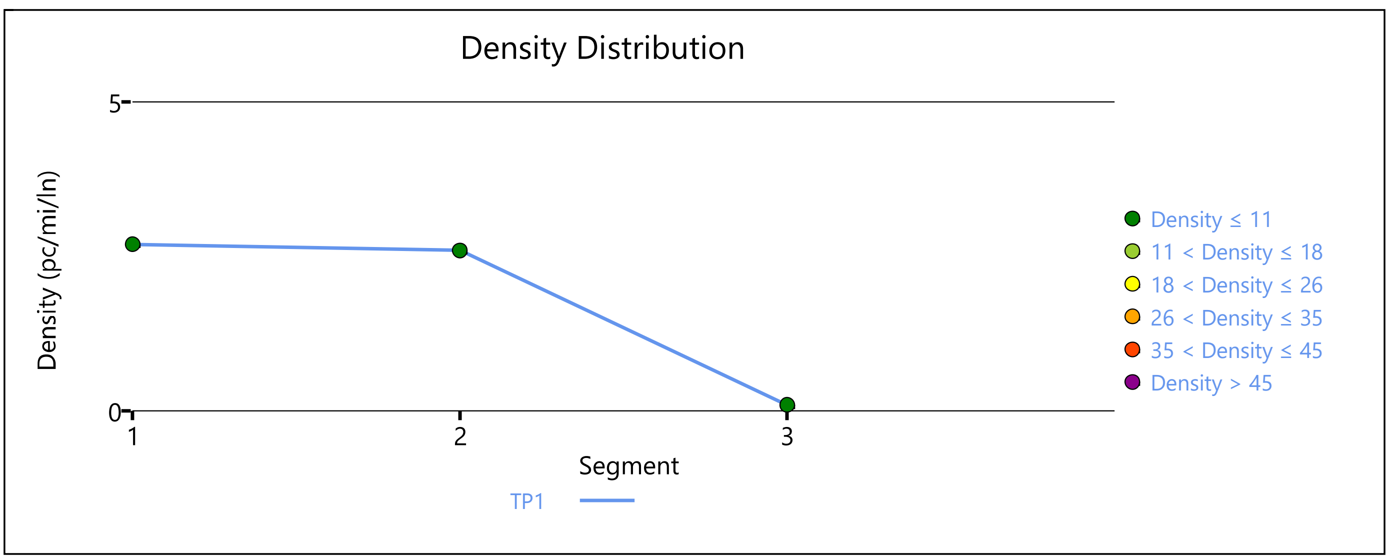
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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NJ Turnpike - Eastern Spur SB LN - NoBuild.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	No Build
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.772	209	6654	0.03	51.8	1.4	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.772	0.849	1036	827	6750	4000	0.15	0.21	51.6	51.3	6.7	8.4	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.833	1037	6654	0.16	51.8	6.7	A

Facility Time Period Results

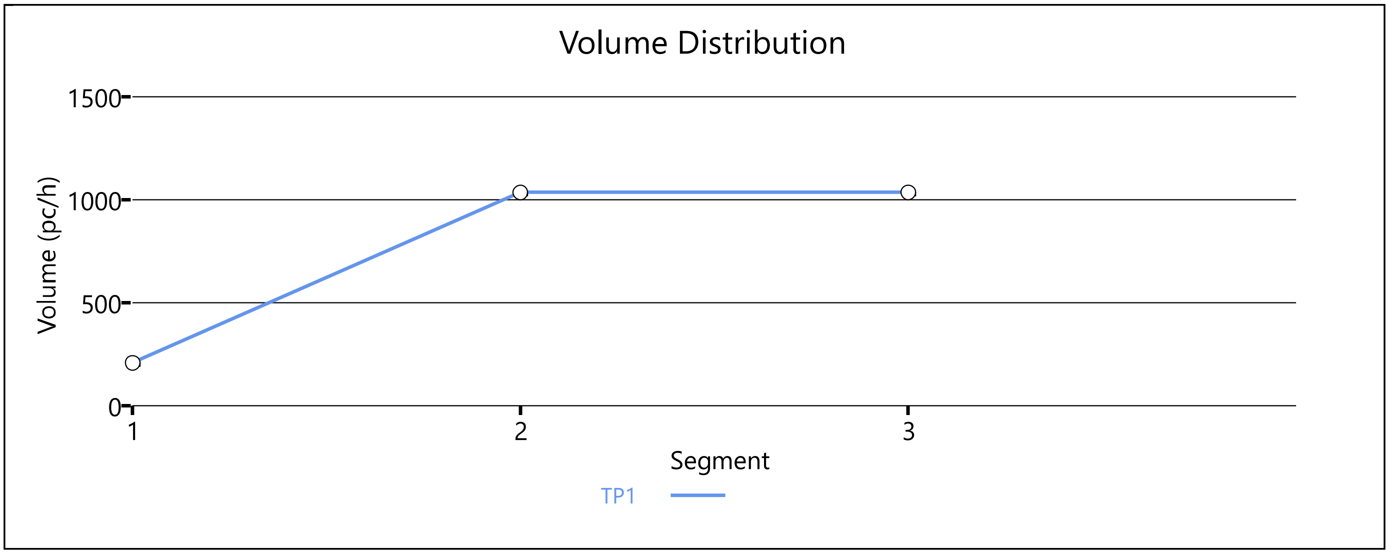
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	4.4	3.6	1.20	A

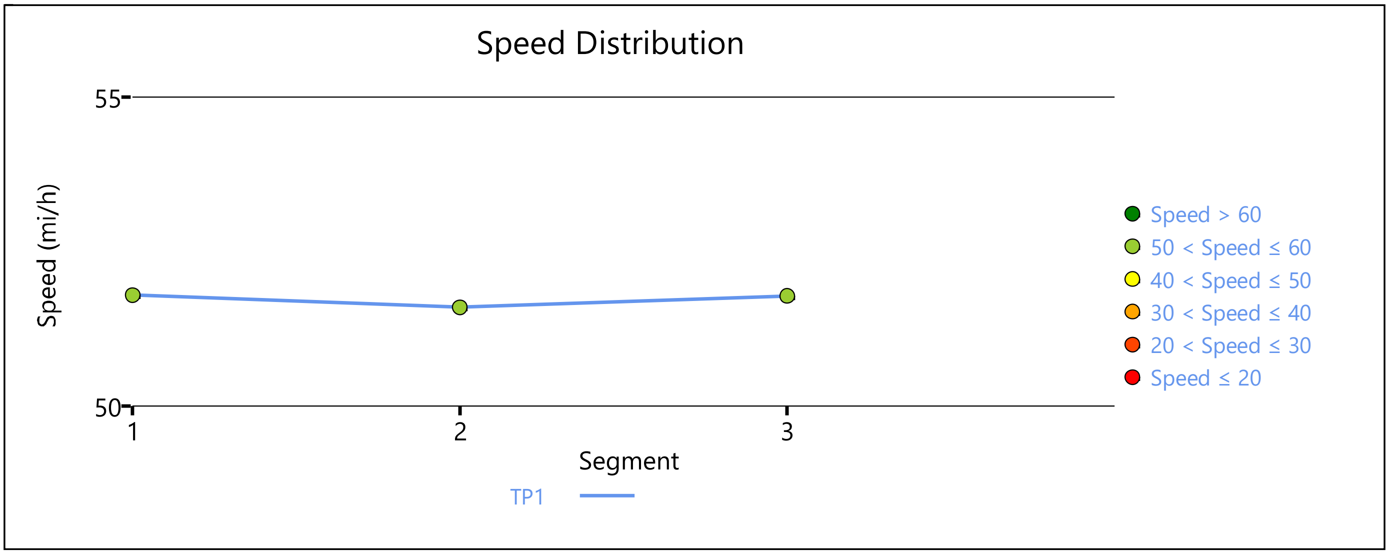
Facility Overall Results

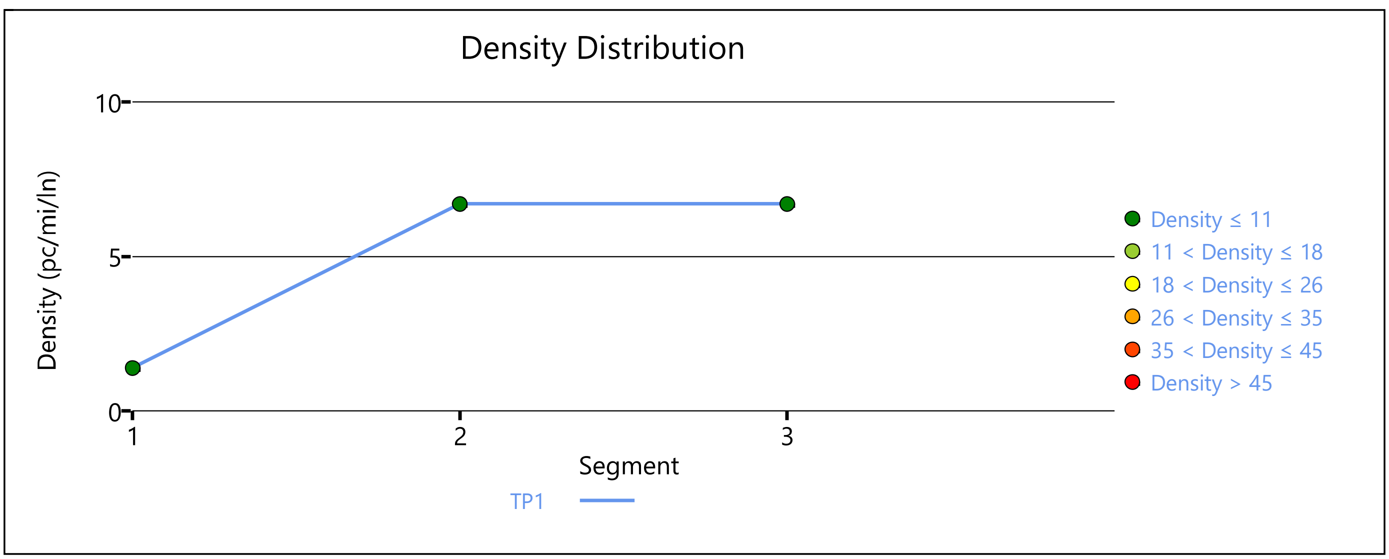
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	3.6
Average Travel Time, min	1.20	Density, pc/mi/ln	4.4

Messages

Comments







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NJ Turnpike - Eastern Spur NB AM v2 - NoBuild.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	No Build
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.797	260	6654	0.04	51.8	1.7	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.797	0.801	1016	756	6750	4000	0.15	0.19	51.7	51.3	6.6	8.1	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.800	1016	6654	0.15	51.8	6.5	A

Facility Time Period Results

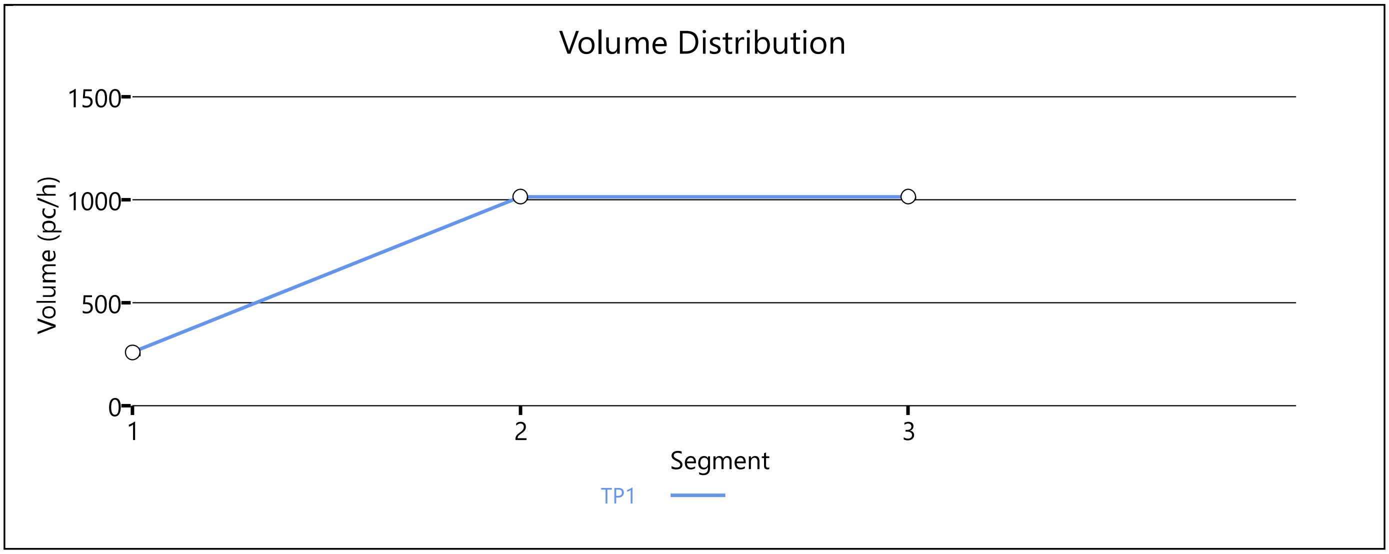
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	4.4	3.5	1.20	A

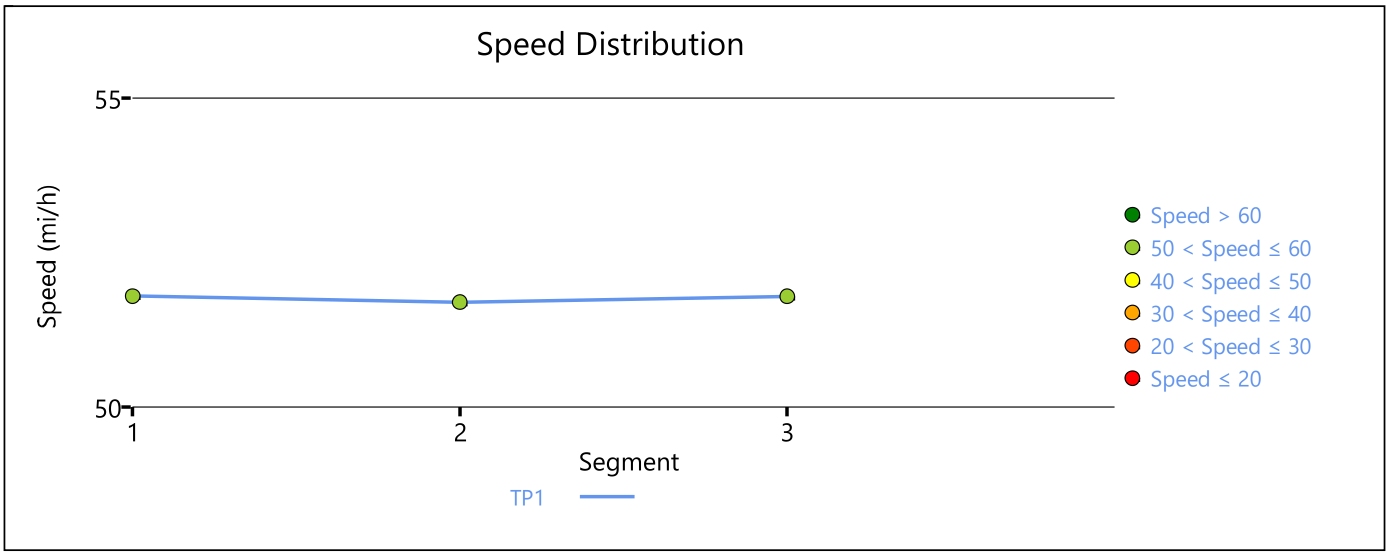
Facility Overall Results

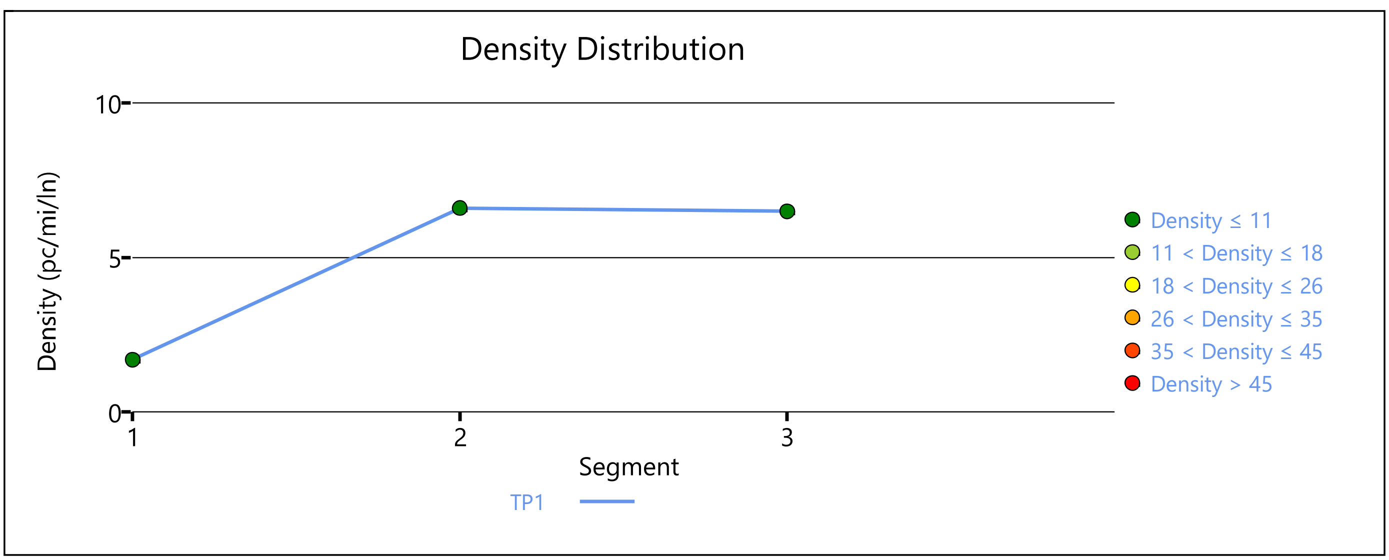
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	3.5
Average Travel Time, min	1.20	Density, pc/mi/ln	4.4

Messages

Comments







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NJ Turnpike - Eastern Spur NB MD - NoBuild.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	No Build
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.919	505	6654	0.08	51.8	3.2	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.919	0.923	1433	928	6750	4000	0.21	0.23	51.8	51.3	9.2	10.5	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.923	1430	6654	0.21	51.8	9.2	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	6.6	6.0	1.20	A

Facility Overall Results

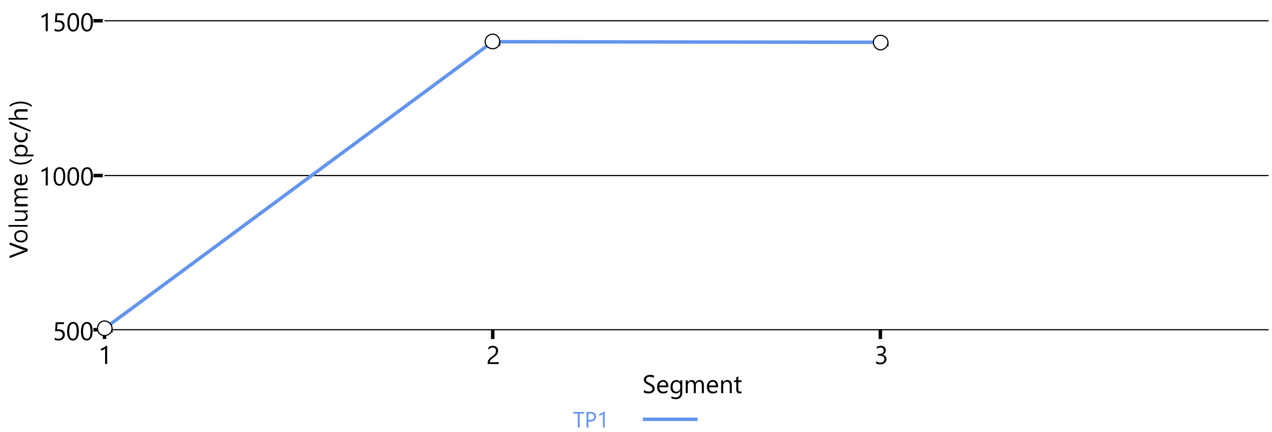
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	6.0
Average Travel Time, min	1.20	Density, pc/mi/ln	6.6

Messages

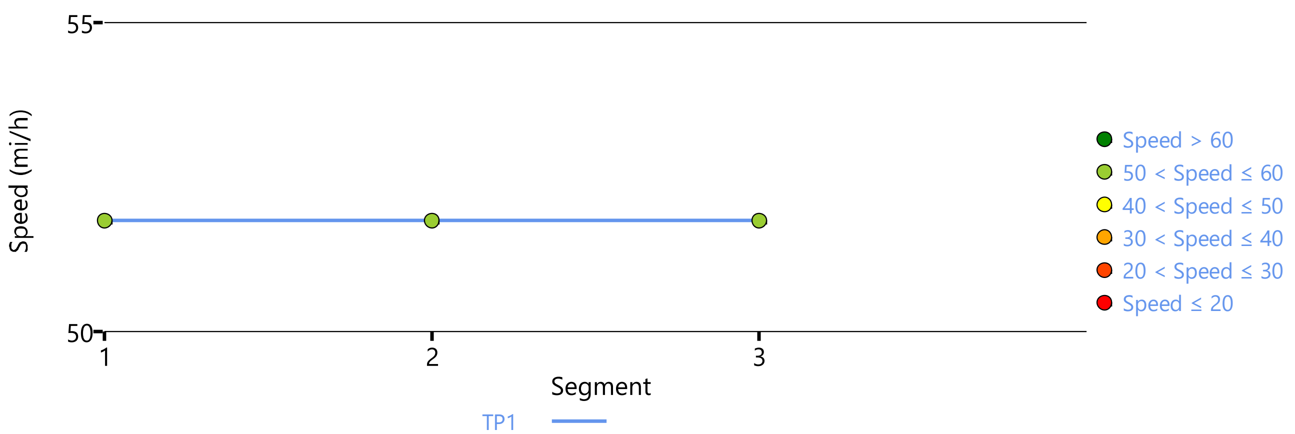
INFORMATION 1	Density for segment 2 in time period 1 is within 0.5 pc/mi/ln of LOS boundary. Be cautious when comparing LOS results.

Comments

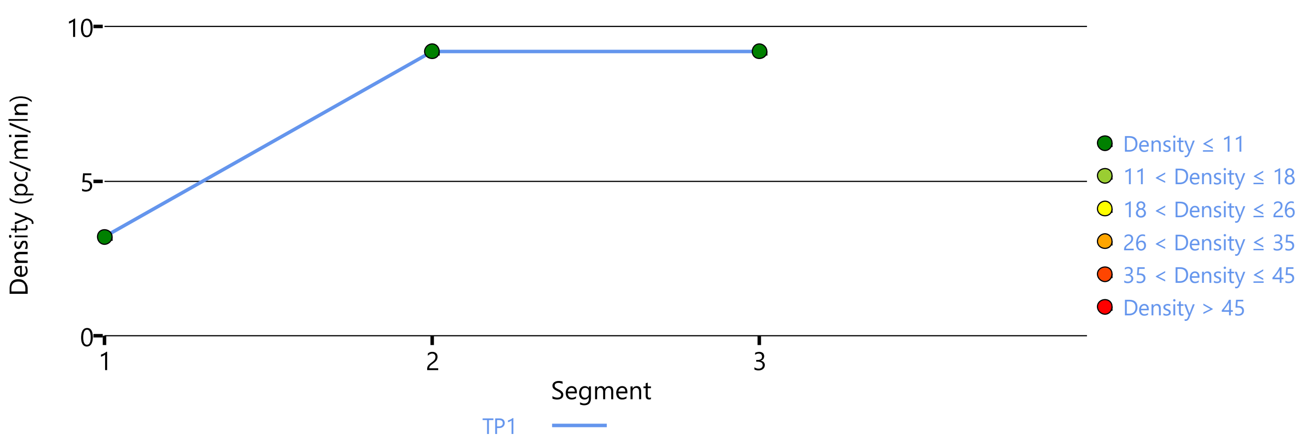
Volume Distribution



Speed Distribution



Density Distribution



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NJ Turnpike - Eastern Spur NB PM - NoBuild.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	No Build
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.723	24	6654	0.00	51.8	0.2	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.723	0.888	435	411	6750	4000	0.06	0.10	51.4	51.3	2.8	4.5	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.880	434	6654	0.07	51.8	2.8	A

Facility Time Period Results

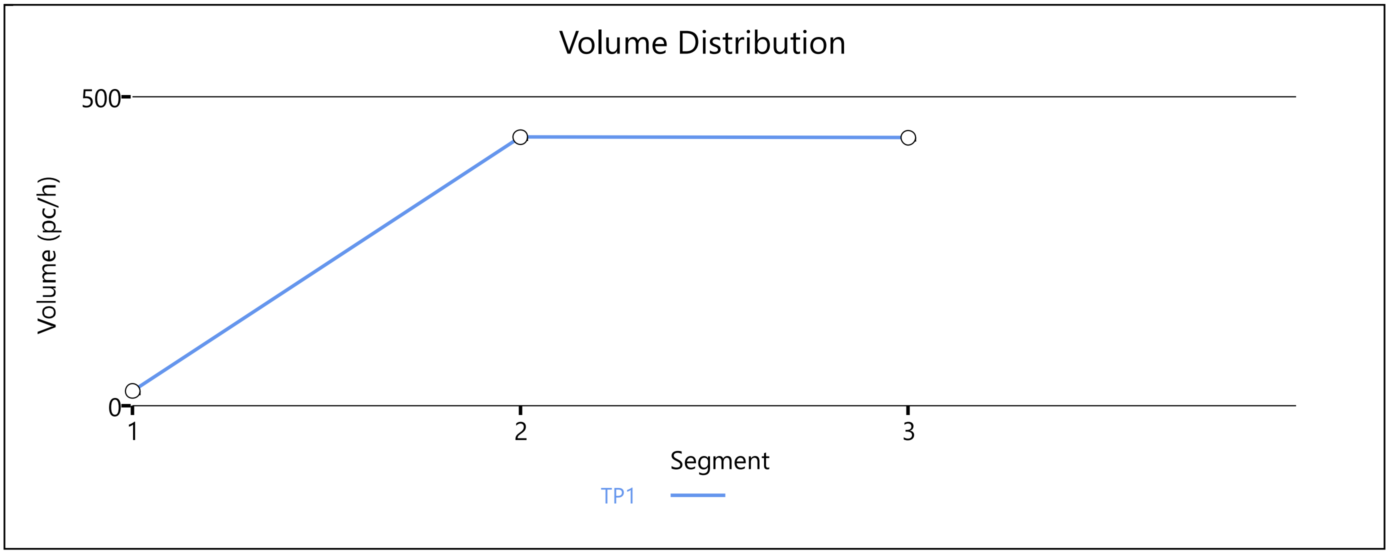
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.7	1.7	1.4	1.20	A

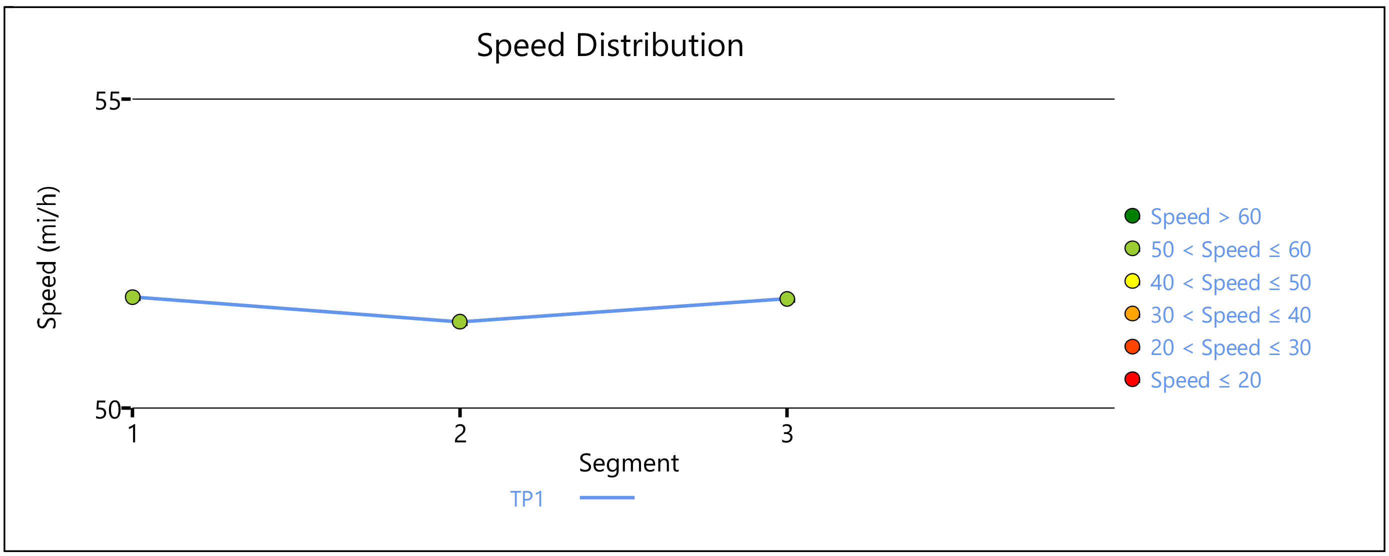
Facility Overall Results

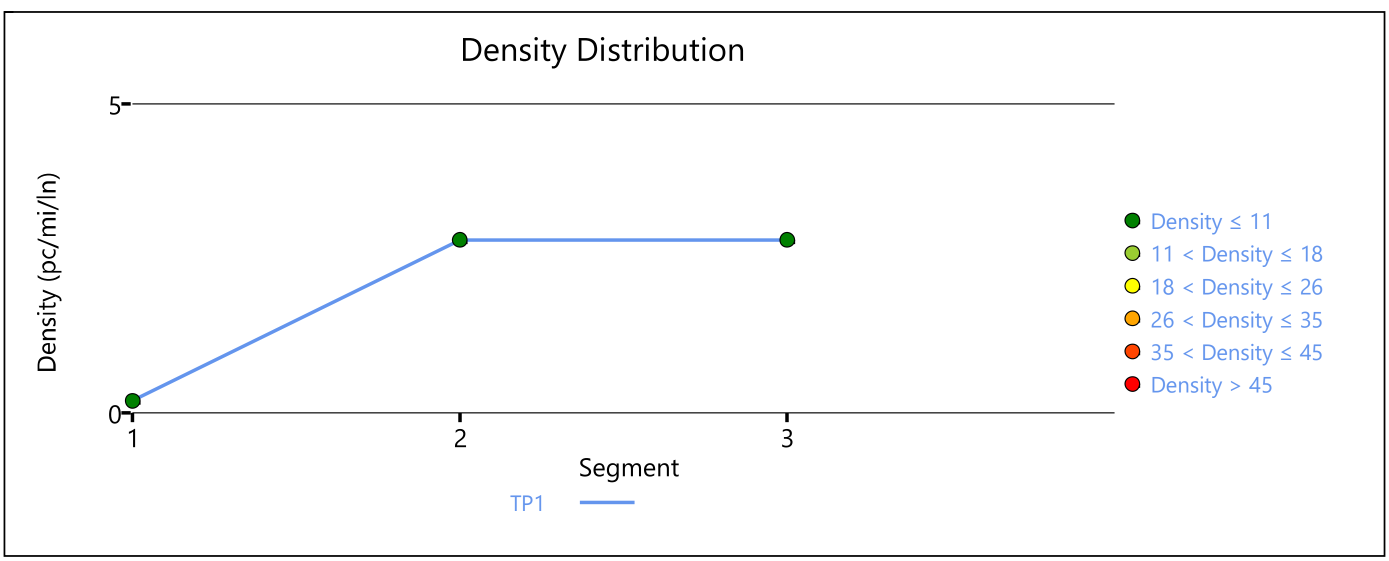
Space Mean Speed, mi/h	51.7	Density, veh/mi/ln	1.4
Average Travel Time, min	1.20	Density, pc/mi/ln	1.7

Messages

Comments







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NJ Turnpike - Eastern Spur NB LN - NoBuild.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	AM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.789	280	6654	0.04	51.8	1.8	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.789	0.855	1097	817	6750	4000	0.16	0.20	51.7	51.3	7.1	8.6	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.838	1098	6654	0.17	51.8	7.1	A

Facility Time Period Results

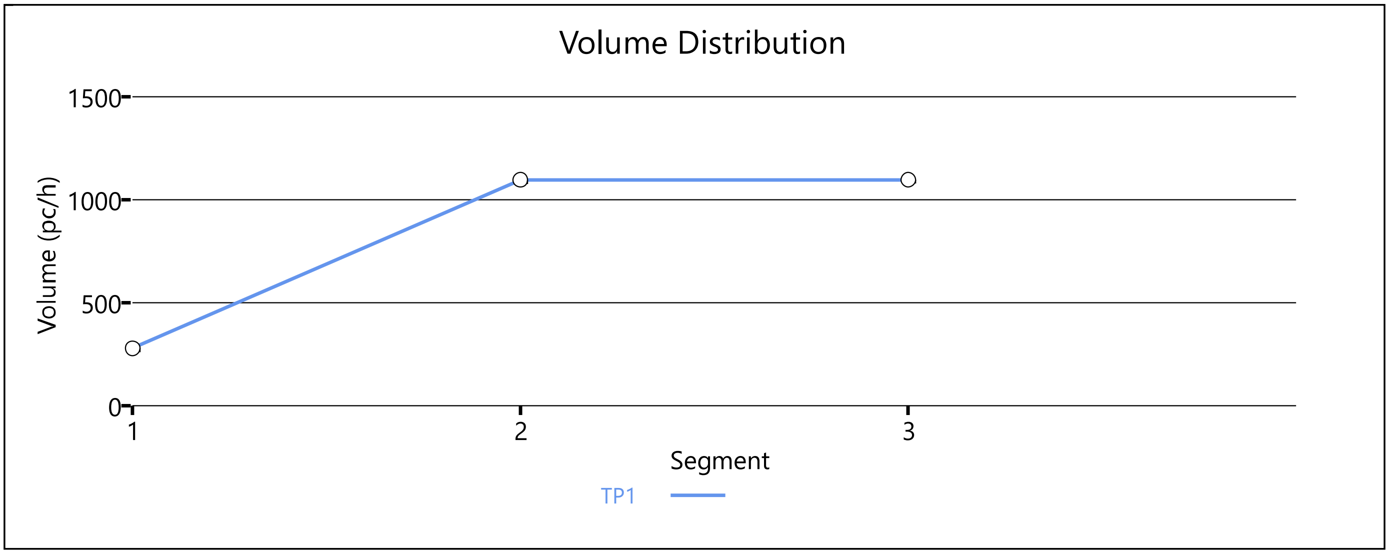
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	4.8	3.9	1.20	A

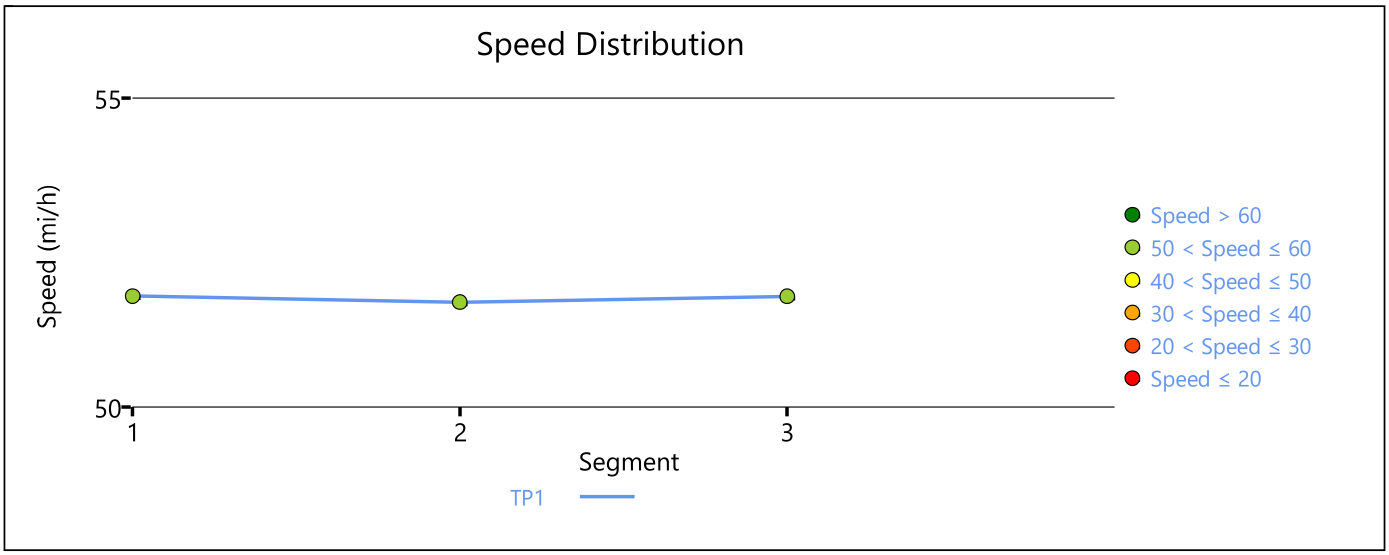
Facility Overall Results

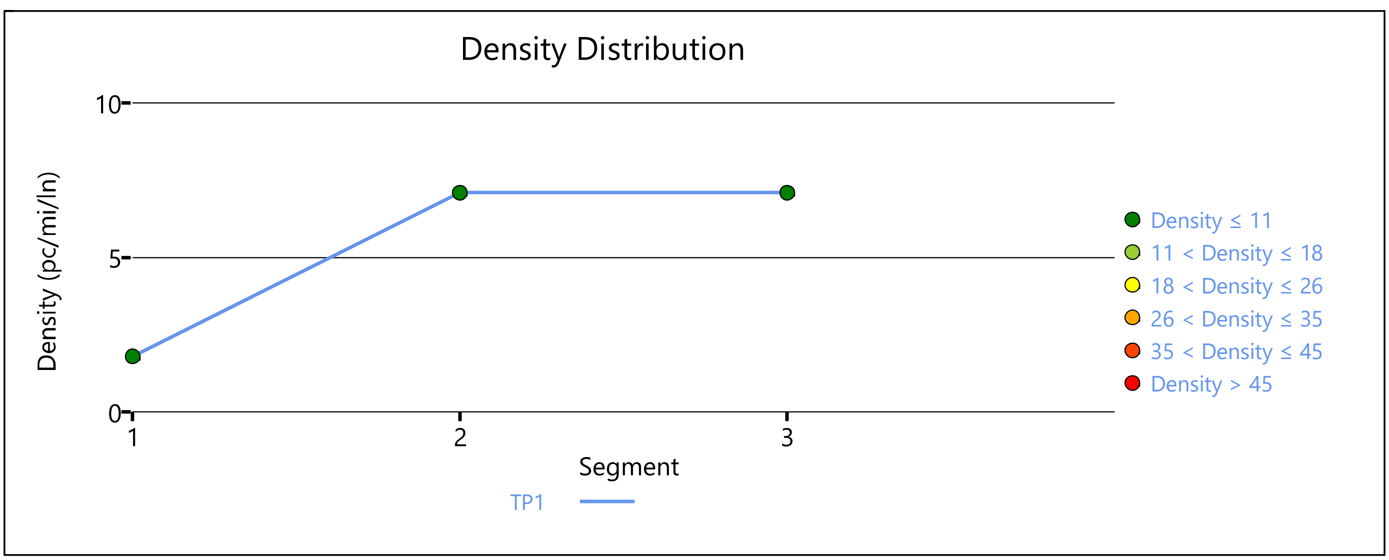
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	3.9
Average Travel Time, min	1.20	Density, pc/mi/ln	4.8

Messages

Comments







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NJ Turnpike - Eastern Spur NB AM v2 - Build.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	MD
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.795	317	6654	0.05	51.8	2.0	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.795	0.832	1071	754	6750	4000	0.16	0.19	51.7	51.3	6.9	8.3	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.821	1072	6654	0.16	51.8	6.9	A

Facility Time Period Results

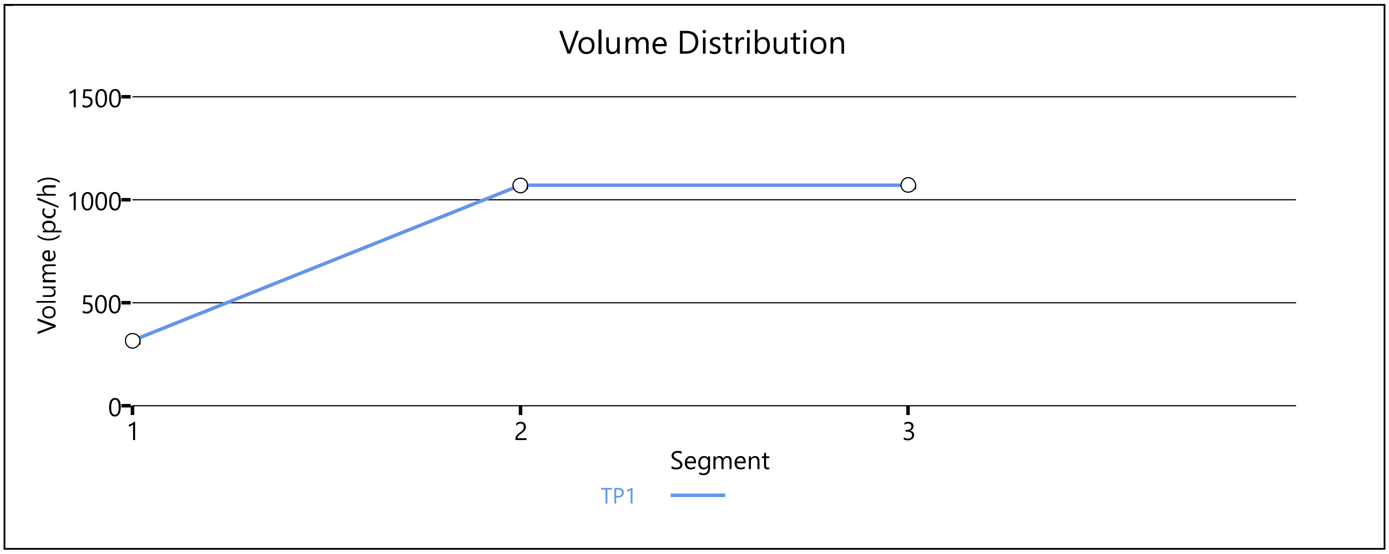
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	4.7	3.9	1.20	A

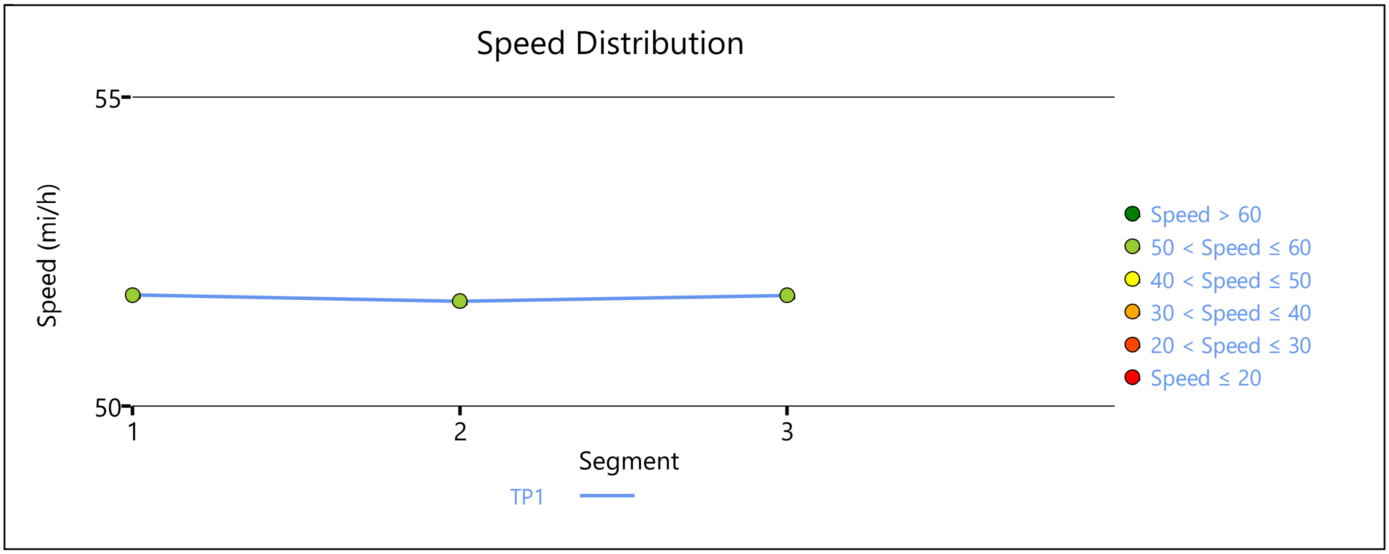
Facility Overall Results

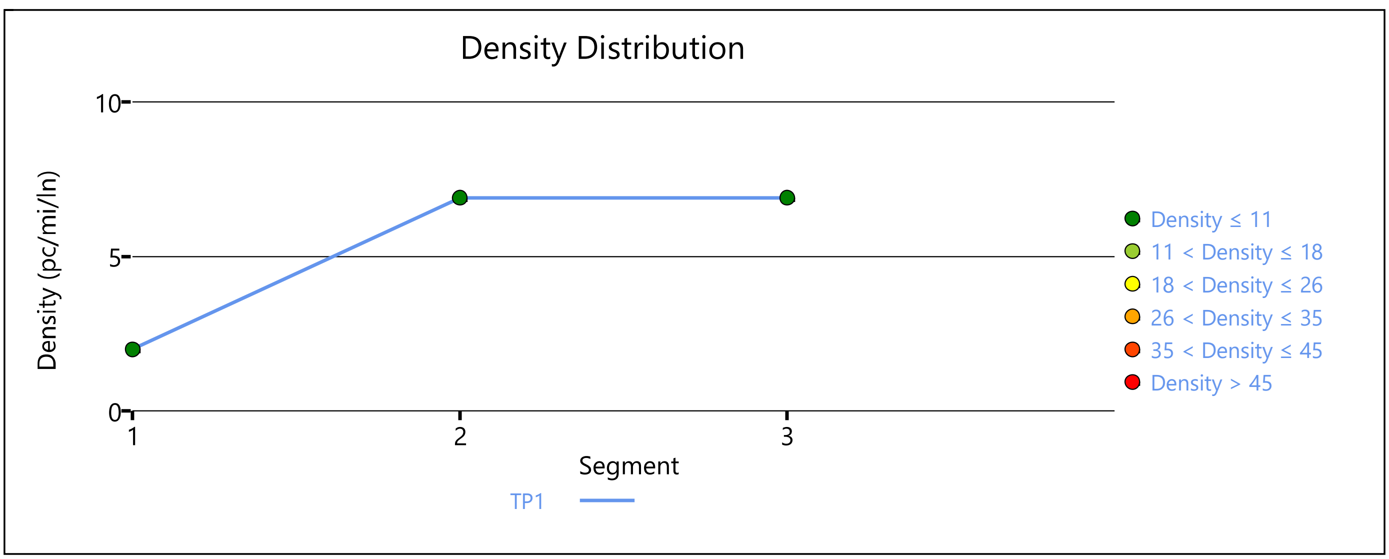
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	3.9
Average Travel Time, min	1.20	Density, pc/mi/ln	4.7

Messages

Comments







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NJ Turnpike - Eastern Spur NB MD - Build.xuf

HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	PM
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.917	545	6654	0.08	51.8	3.5	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.917	0.933	1515	970	6750	4000	0.22	0.24	51.8	51.2	9.7	10.9	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.928	1514	6654	0.23	51.8	9.7	A

Facility Time Period Results

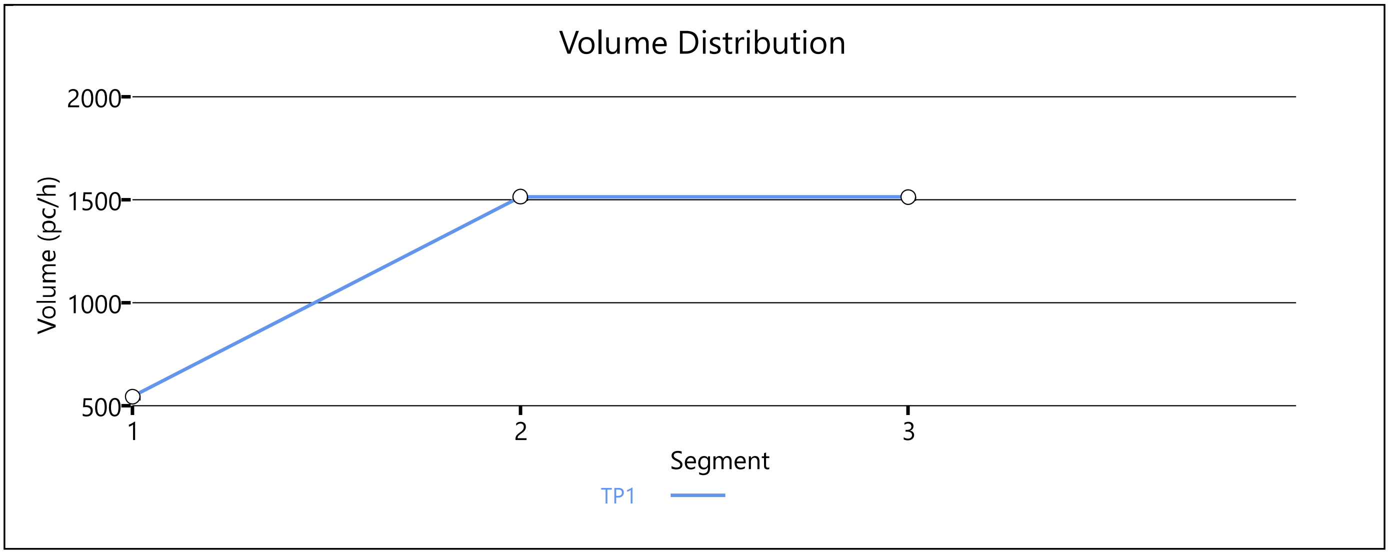
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.8	7.0	6.4	1.20	A

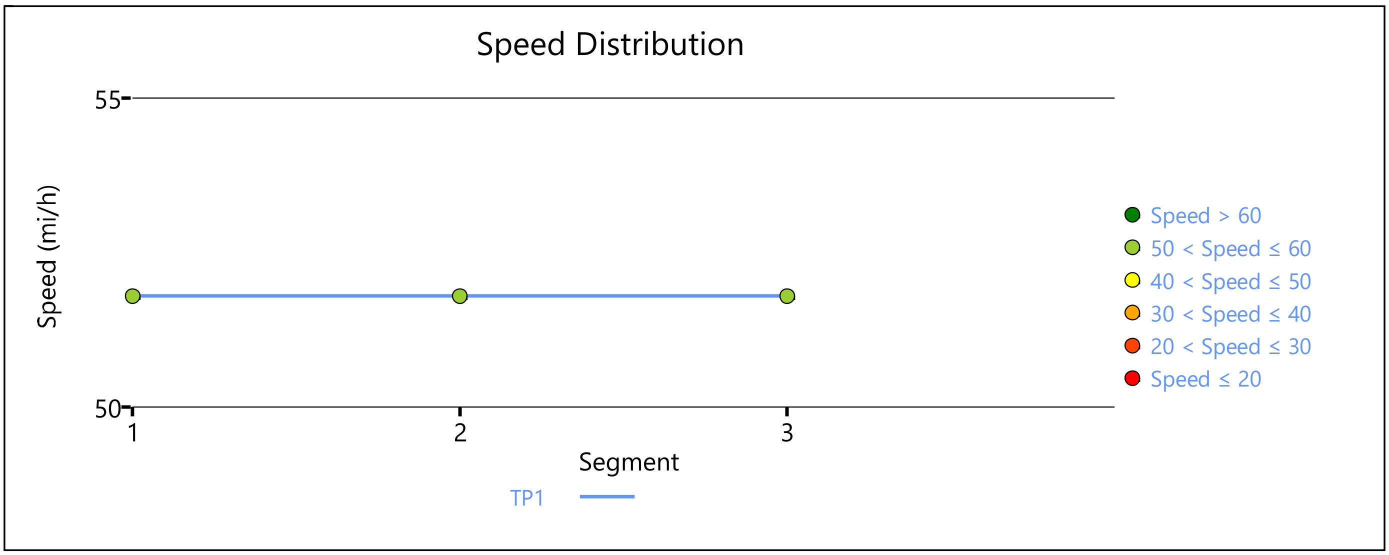
Facility Overall Results

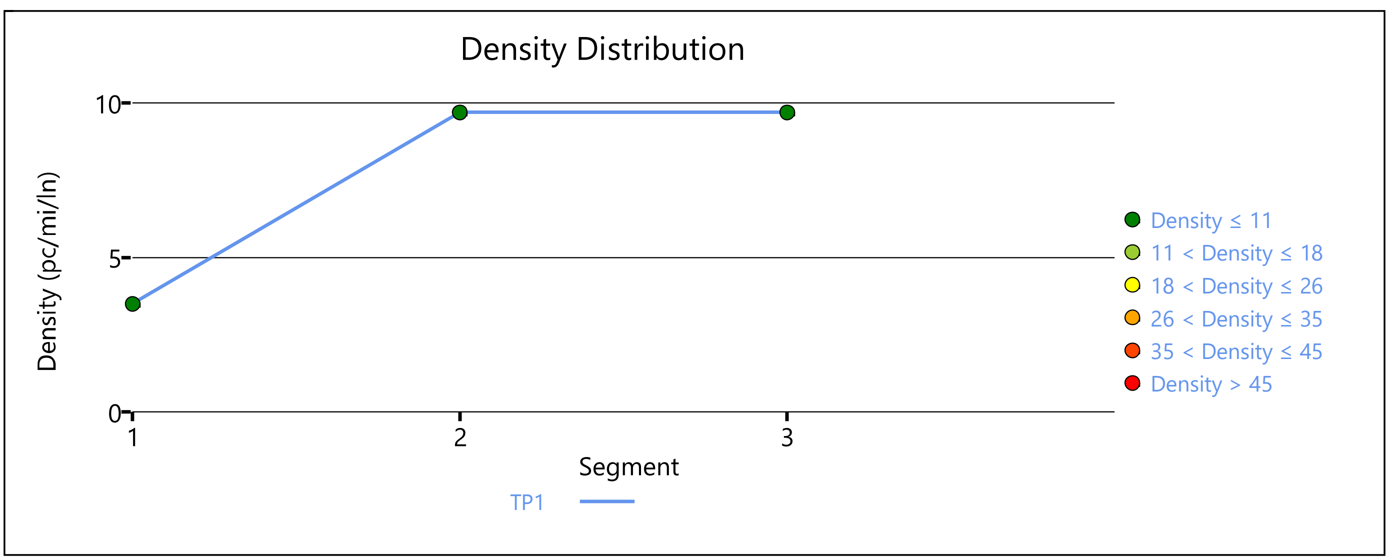
Space Mean Speed, mi/h	51.8	Density, veh/mi/ln	6.4
Average Travel Time, min	1.20	Density, pc/mi/ln	7.0

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Period Analyzed	LN
Project Description	CBD		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.07		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Merge	Merge	_	663	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.733	22	6654	0.00	51.8	0.1	A

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.733	0.904	409	387	6750	4000	0.06	0.10	51.5	51.4	2.6	4.3	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.896	408	6654	0.06	51.8	2.6	A

Facility Time Period Results

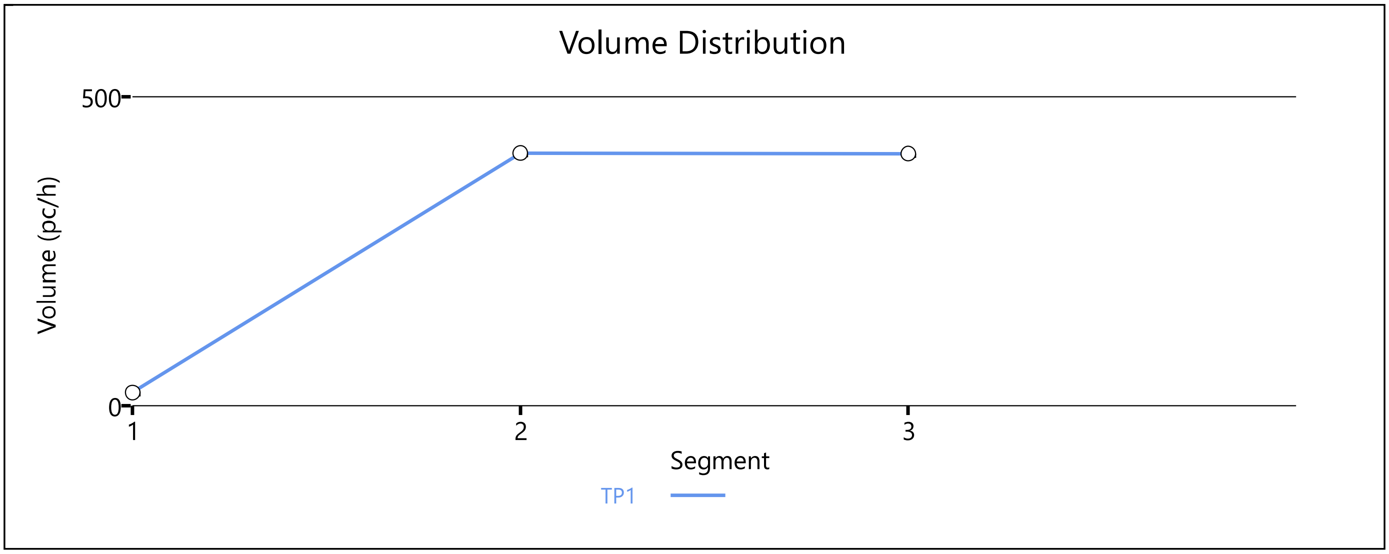
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.7	1.5	1.3	1.20	A

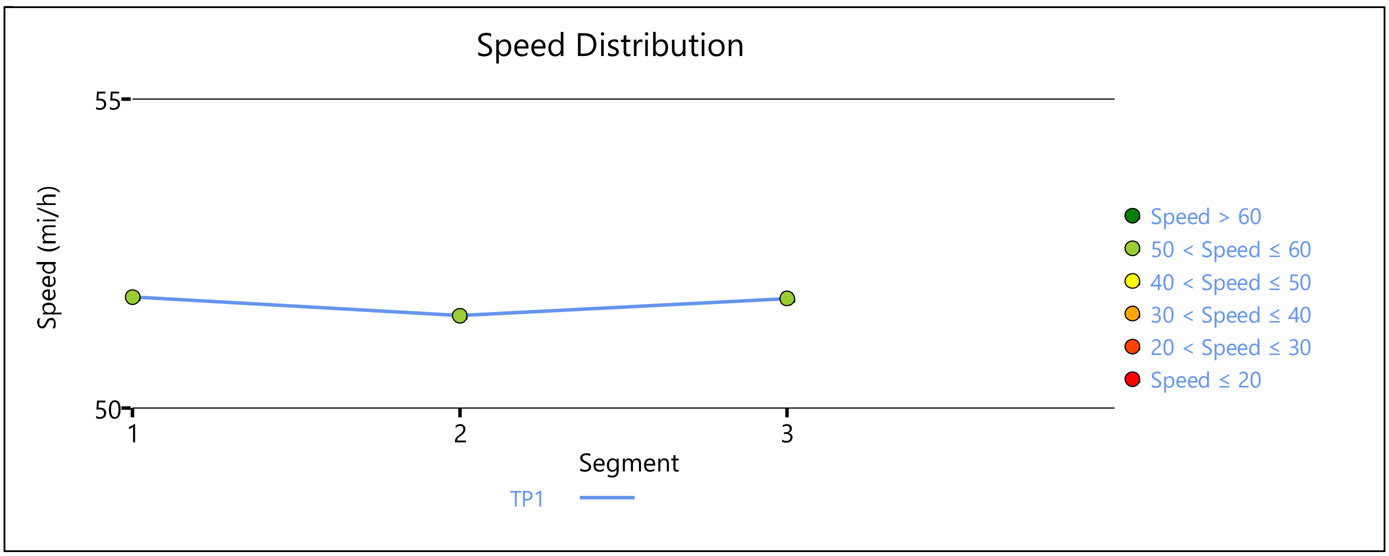
Facility Overall Results

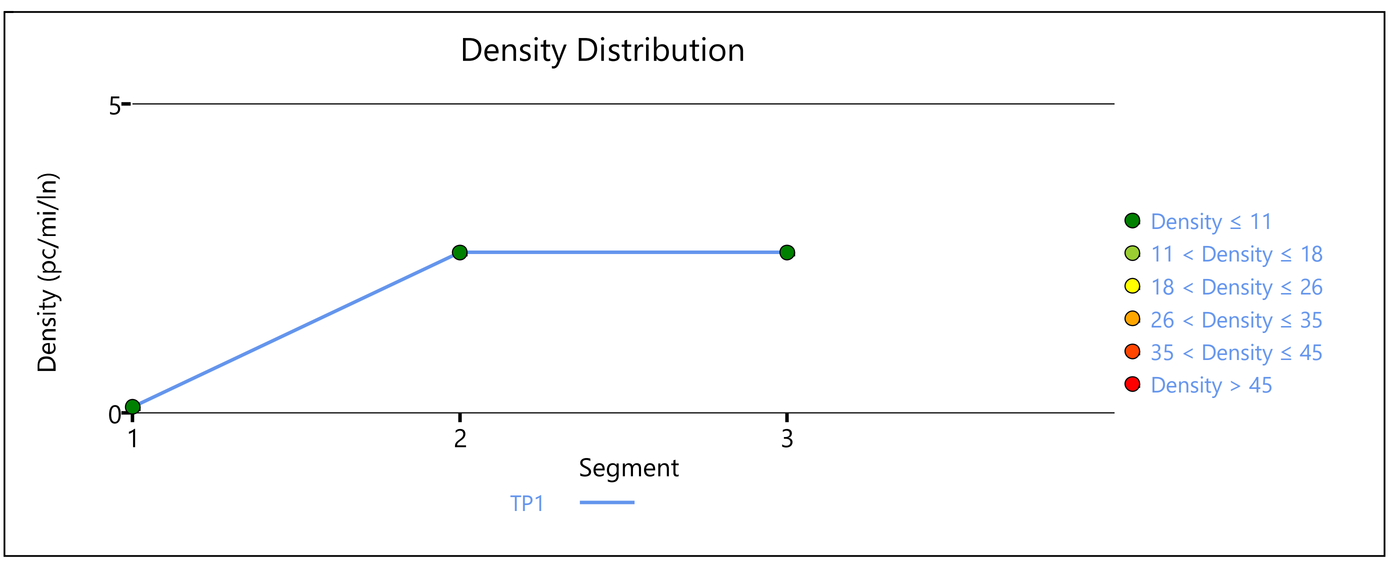
Space Mean Speed, mi/h	51.7	Density, veh/mi/ln	1.3
Average Travel Time, min	1.20	Density, pc/mi/ln	1.5

Messages

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Analyzed	AM
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Diverge	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.856	1546	6654	0.23	51.8	9.9	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.856	0.836	1546	873	6750	4200	0.23	0.21	52.9	50.9	9.7	0.9	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.880	675	6654	0.10	51.8	4.3	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	52.2	7.8	6.7	1.50	A

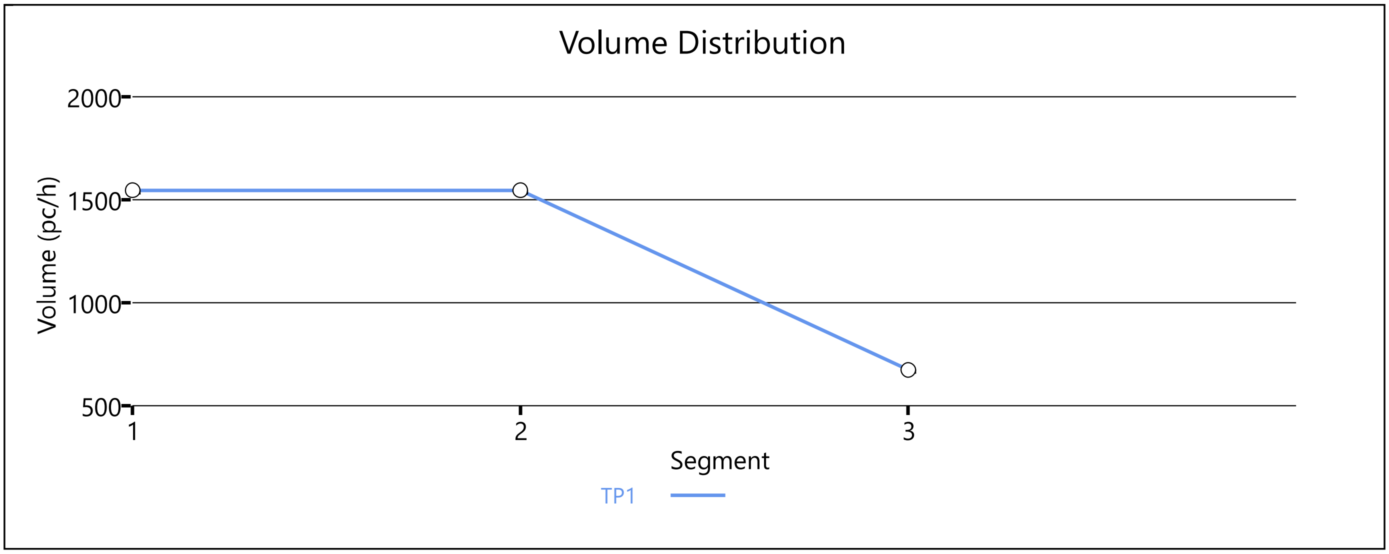
Facility Overall Results

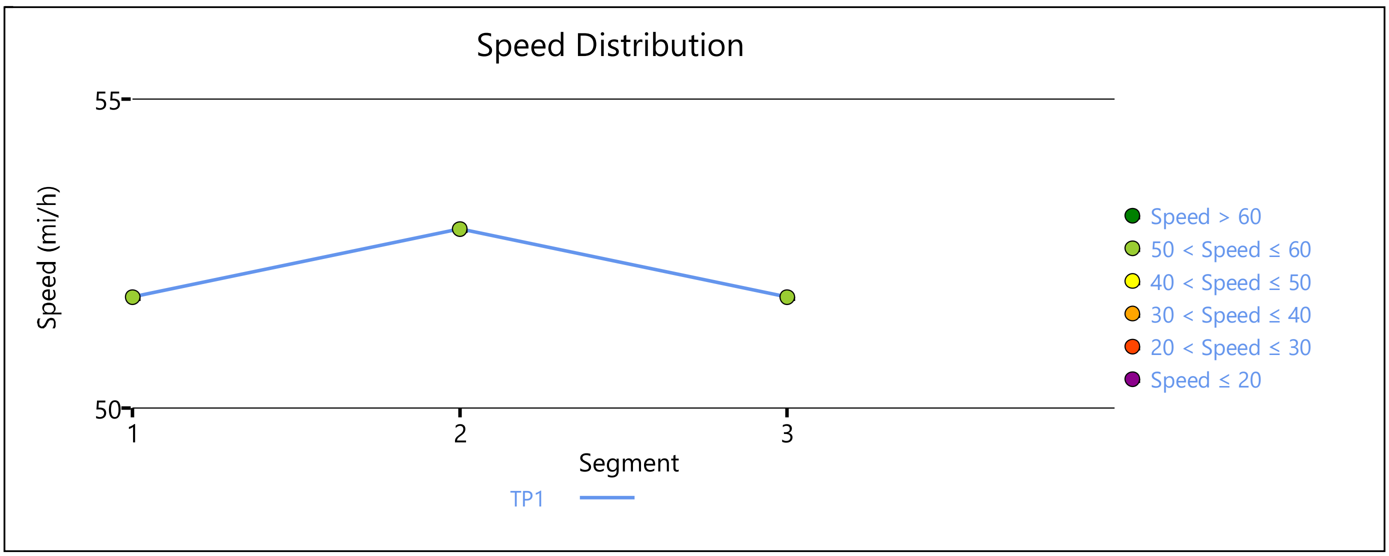
Space Mean Speed, mi/h	52.2	Density, veh/mi/ln	6.7
Average Travel Time, min	1.50	Density, pc/mi/ln	7.8

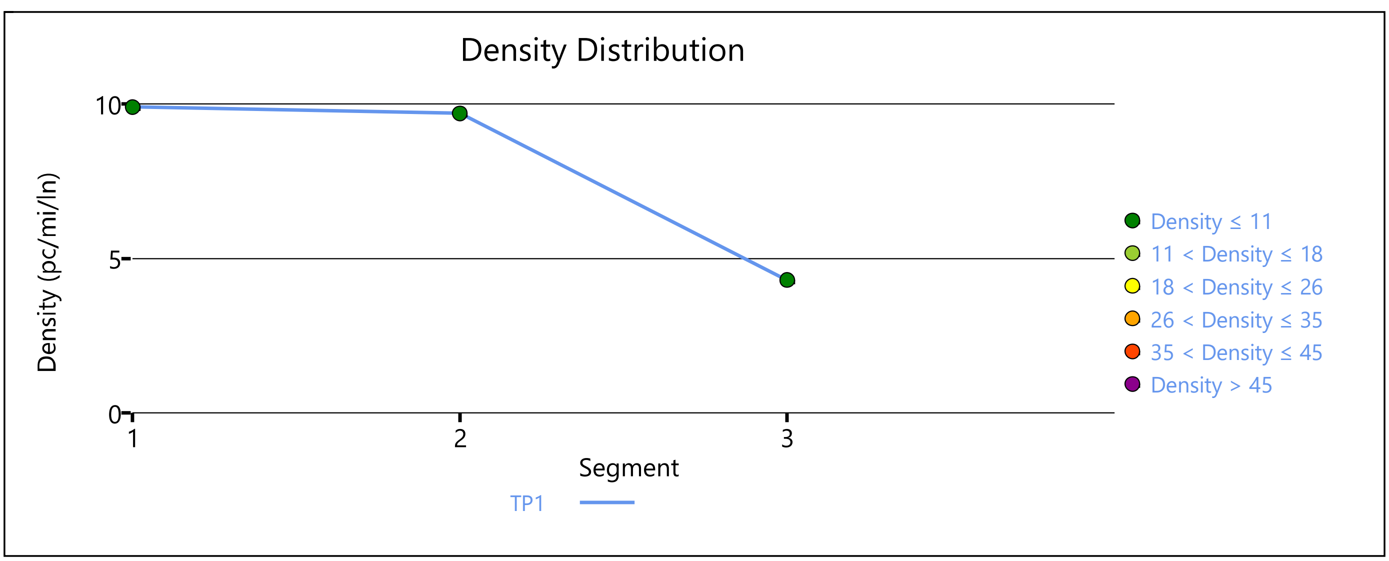
Messages

WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Analyzed	MD
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.831	1084	6654	0.16	51.8	7.0	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.831	0.806	1084	853	6750	4200	0.16	0.20	54.9	55.0	6.6	6.6	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.921	232	6654	0.03	51.8	1.5	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	52.9	4.9	4.1	1.50	A

Facility Overall Results

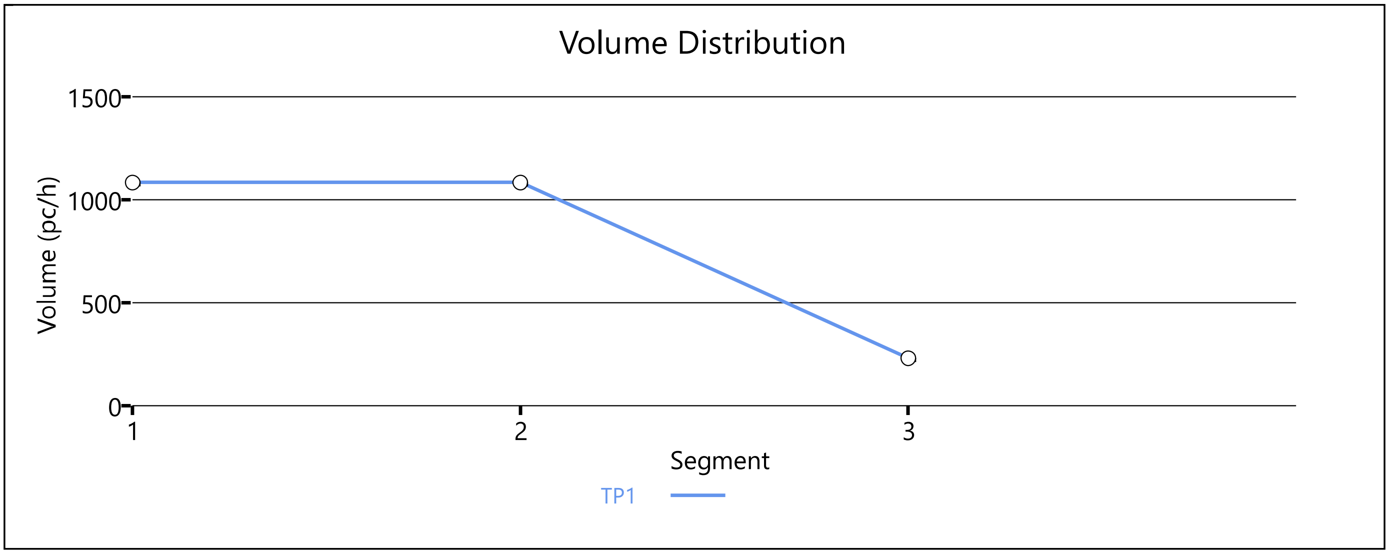
Space Mean Speed, mi/h	52.9	Density, veh/mi/ln	4.1
Average Travel Time, min	1.50	Density, pc/mi/ln	4.9

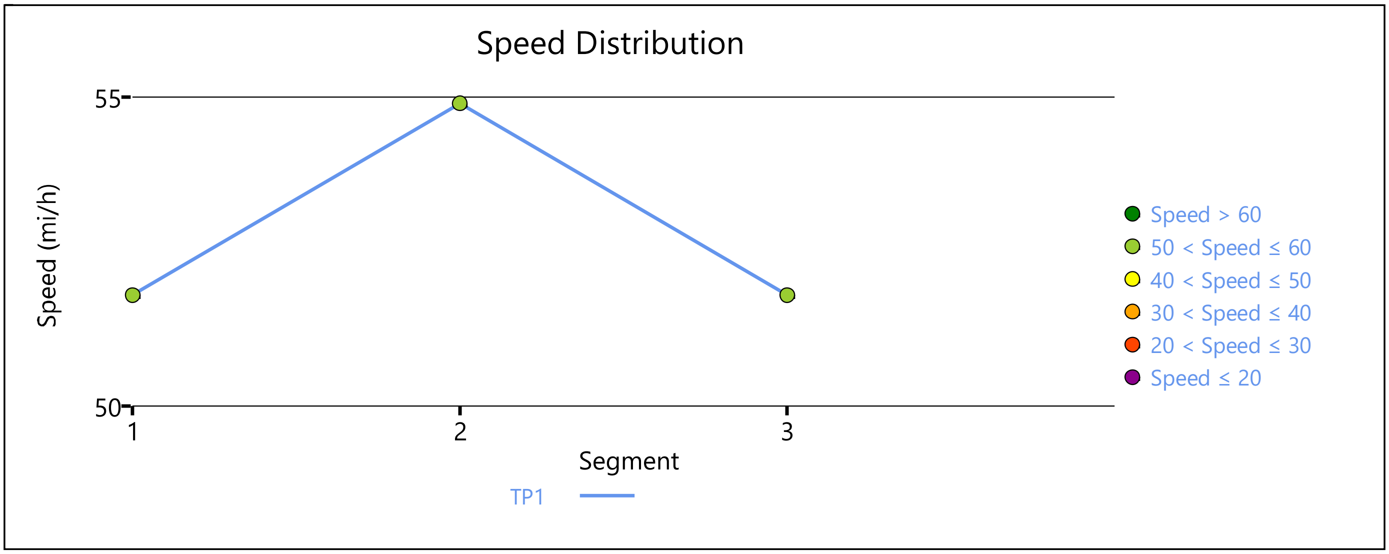
Messages

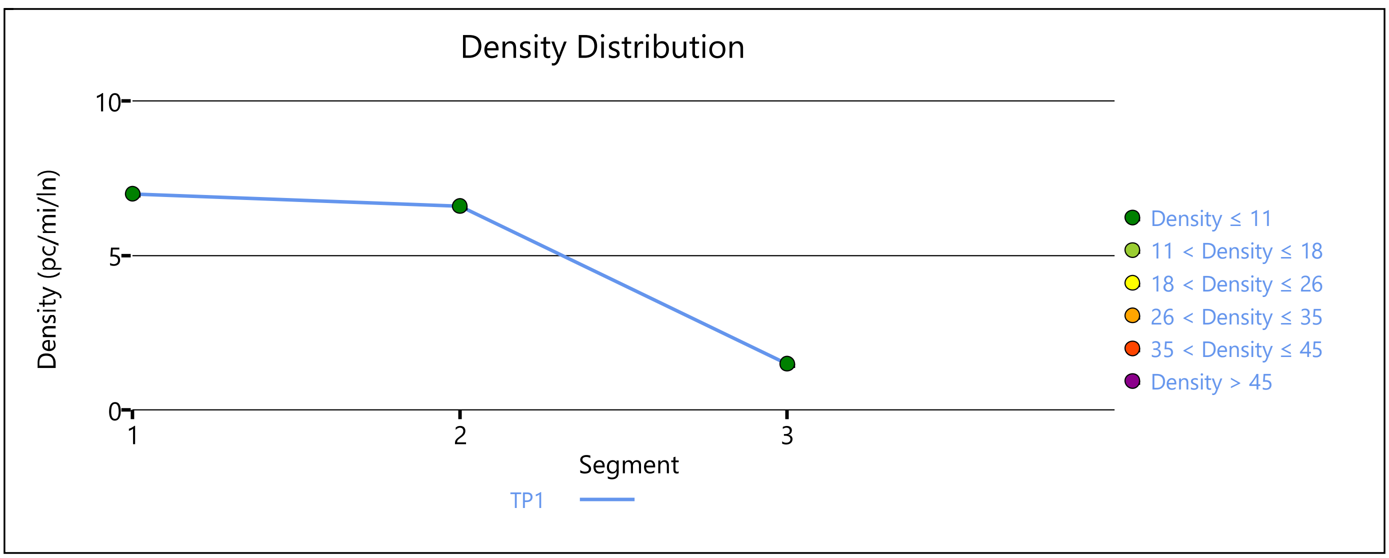
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Analyzed	PM
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.919	980	6654	0.15	51.8	6.3	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.919	0.926	980	928	6750	4200	0.15	0.22	54.9	55.0	5.9	5.9	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.808	51	6654	0.01	51.8	0.3	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.0	4.0	3.6	1.50	A

Facility Overall Results

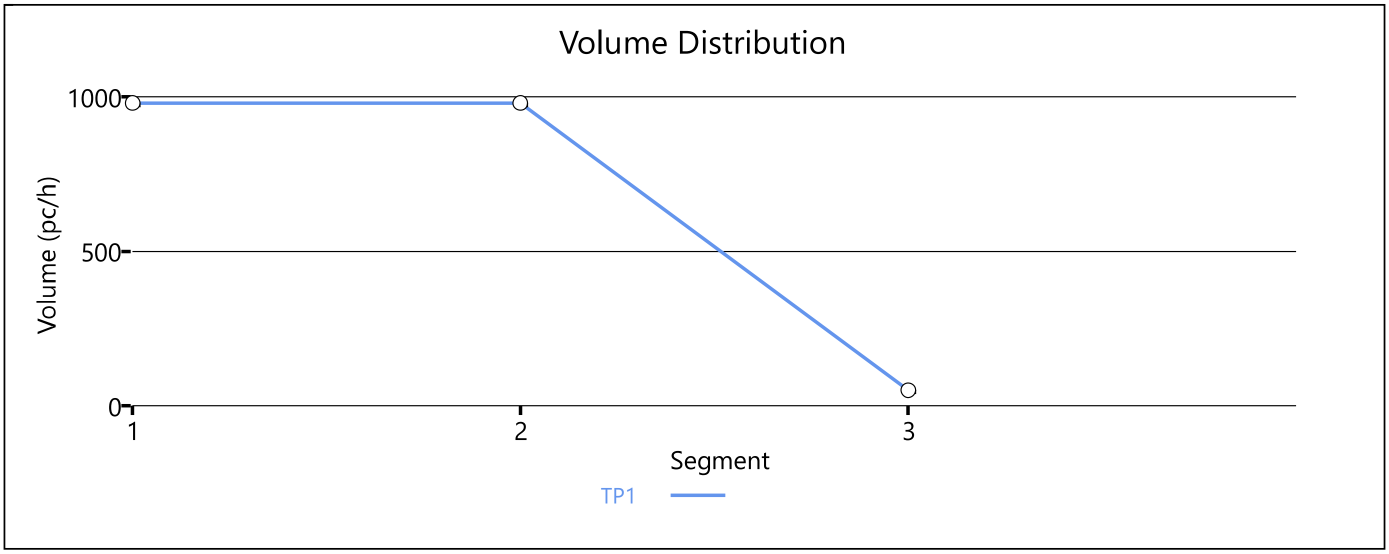
Space Mean Speed, mi/h	53.0	Density, veh/mi/ln	3.6
Average Travel Time, min	1.50	Density, pc/mi/ln	4.0

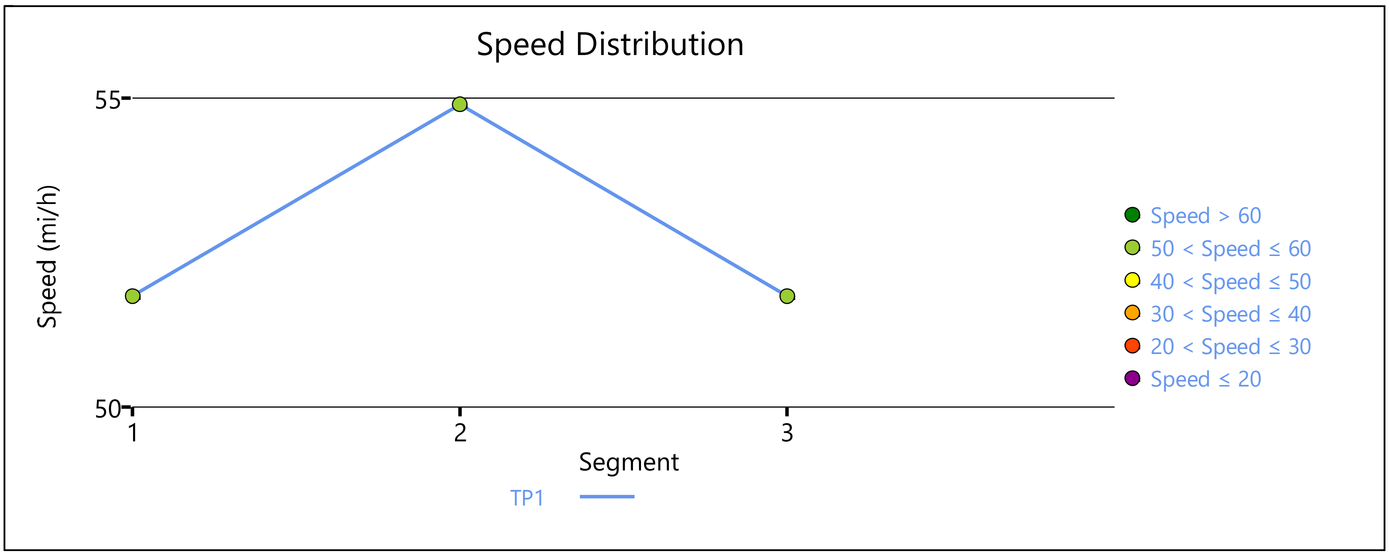
Messages

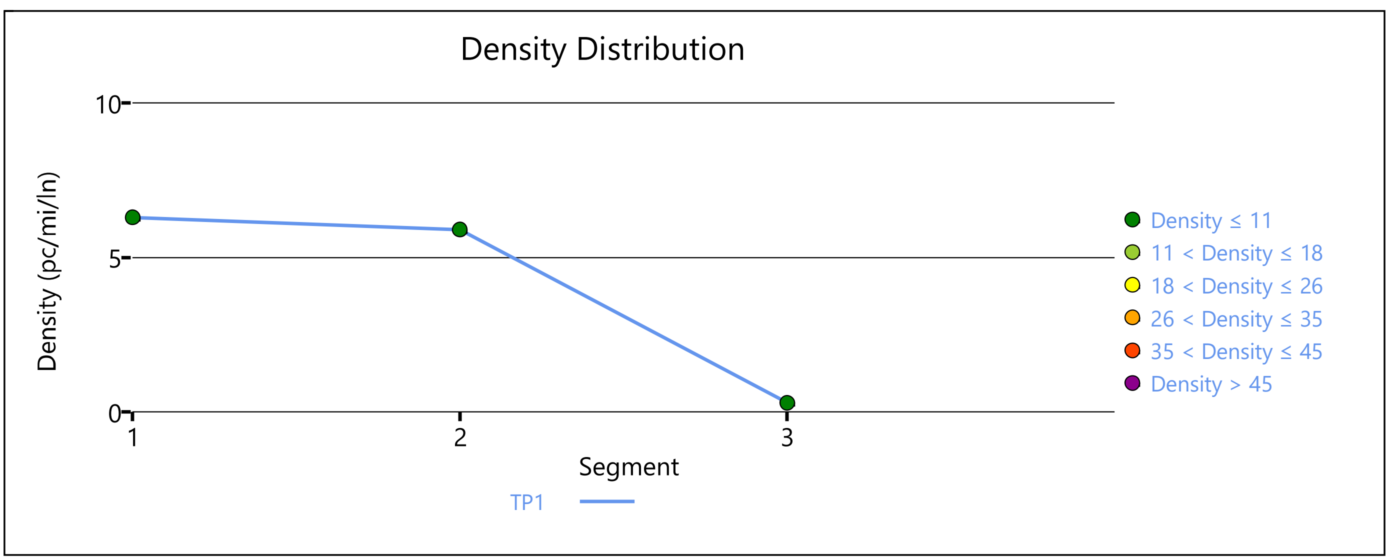
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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HCS7 Freeway Facilities Report

Project Information

Analyst	CJ	Date	4/21/2022
Agency	WSP	Analysis Year	NEPA 5
Jurisdiction		Time Analyzed	LN
Project Description	CBD	Units	U.S. Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	3
Total Analysis Periods	1	Analysis Period Duration, min	15
Facility Length, mi	1.29		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic		2500	3
2	Diverge	Basic	_	1800	3
3	Basic	Basic		2500	3

Facility Segment Data

Segment 1: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.899	542	6654	0.08	51.8	3.5	A

Segment 2: Diverge

AP	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.899	0.906	542	523	6750	4200	0.08	0.12	54.9	55.0	3.3	3.3	A

Segment 3: Basic

AP	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.706	20	6654	0.00	51.8	0.1	A

Facility Analysis Results

AP	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.0	2.2	2.0	1.50	A

Facility Overall Results

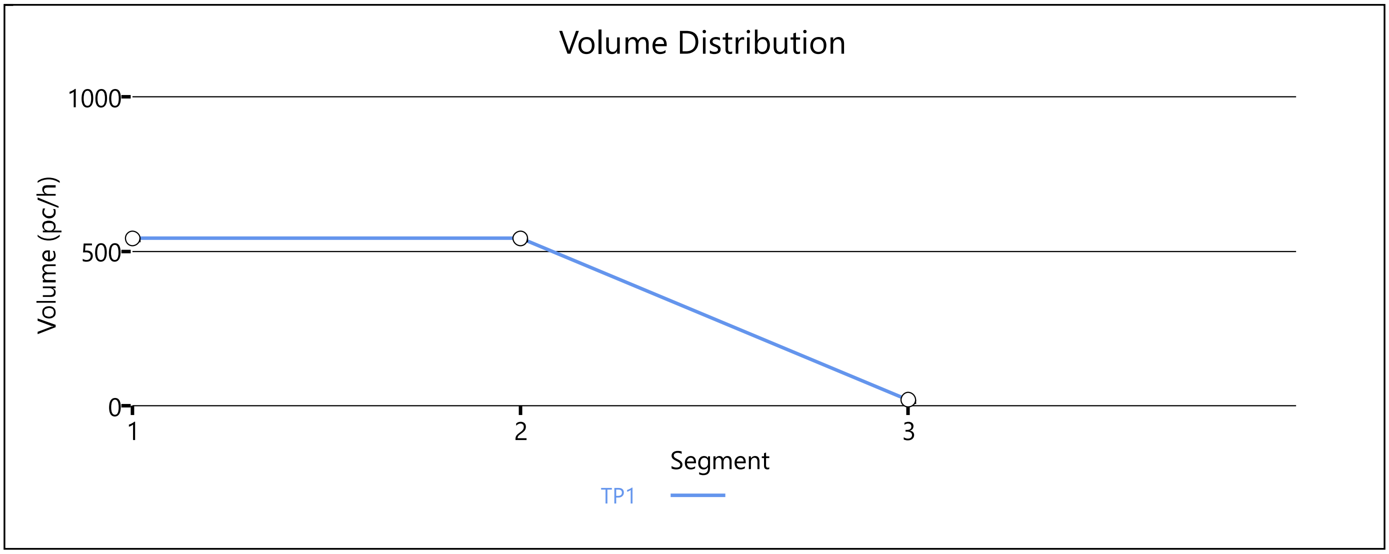
Space Mean Speed, mi/h	53.0	Density, veh/mi/ln	2.0
Average Travel Time, min	1.50	Density, pc/mi/ln	2.2

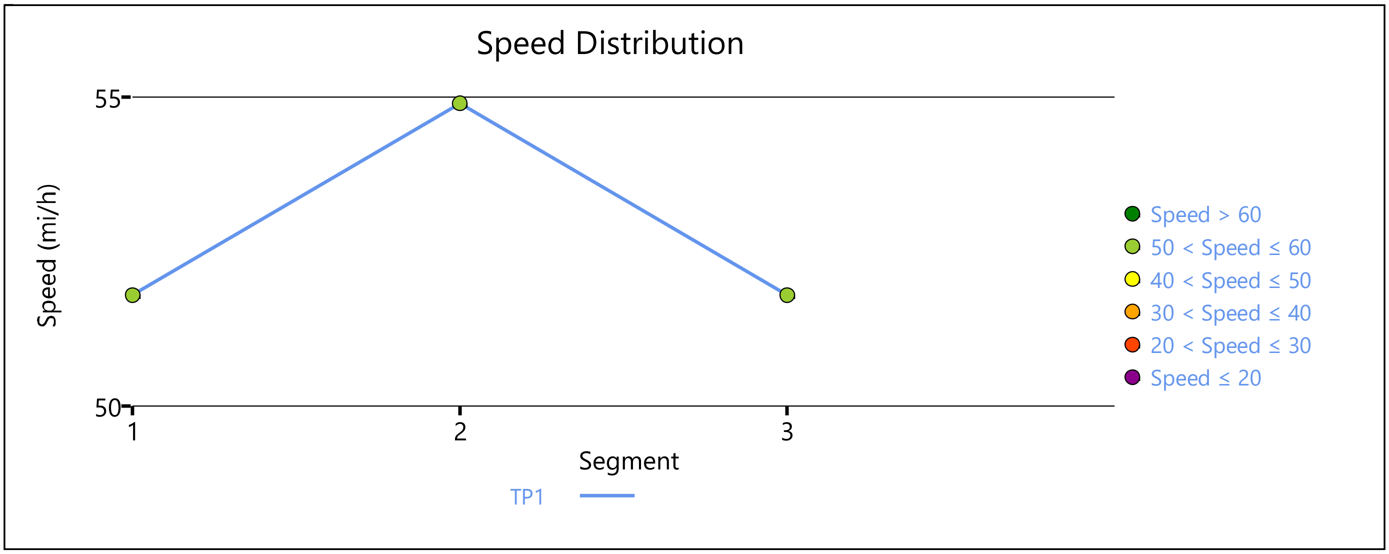
Messages

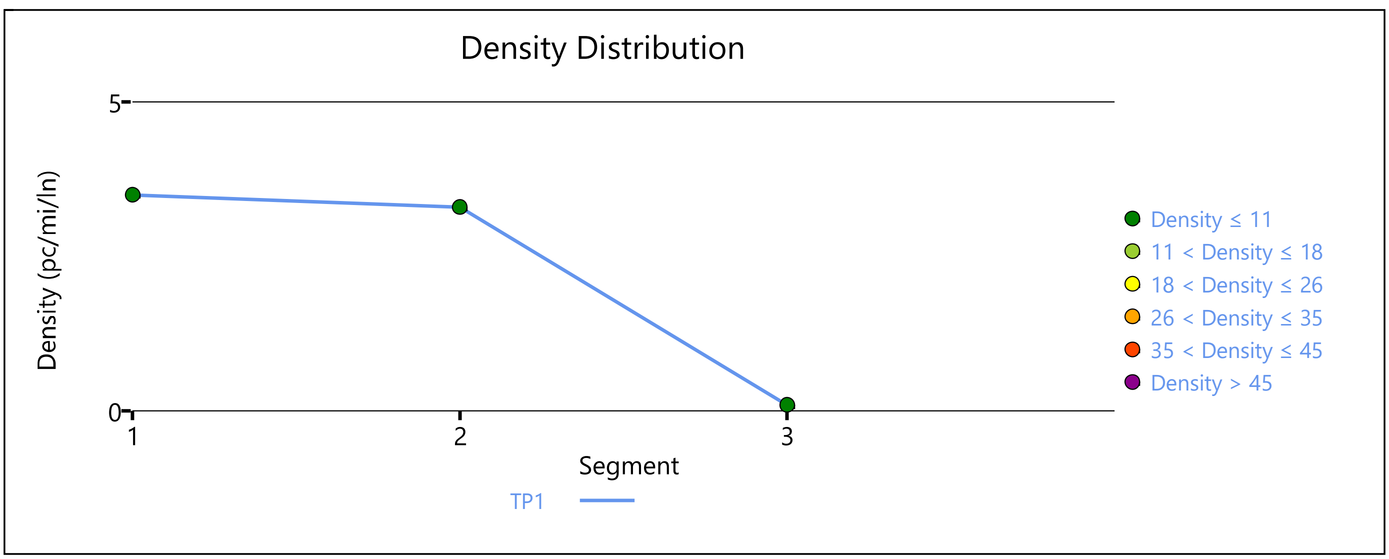
WARNING 1	Ramp segment length is longer than 1500 feet for segment 2.

WARNING 2	Length of accel/decel lane is longer than 1500 feet for segment 2.

Comments







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CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.7, Transportation: Average Weekday Travel Times to the Manhattan CBD

August 2022

Tables

Figures

Table 4B.7-1. Average Weekday Travel Time to the Manhattan CBD from the Bronx (minutes)

YEAR	MONTH	AM	MD	PM	ON
2019	October	48.4	43.4	47.1	29.2
	November	45.5	44.1	47.6	28.4
	December	42.7	42.9	49.4	28.7
2020	January	42.5	36.9	38.6	27.5
	February	46.8	39.8	40.5	27.9
	March	36.7	32.3	31.7	25.3
	April	24.5	25.0	24.6	23.3
	May	27.3	28.7	27.8	24.8
	June	31.6	32.5	30.7	26.4
	July	33.1	34.3	32.9	26.0
	August	34.0	36.4	35.0	26.6
	September	41.6	37.9	35.5	26.9
	October	42.6	37.4	37.2	26.6
	November	35.2	35.3	35.4	26.0
	December	33.3	35.7	36.7	26.7
2021	January	33.5	32.9	33.1	25.8
	February	35.9	37.2	34.9	25.9
	March	36.6	36.6	36.2	25.9
	April	38.4	40.1	36.8	26.2
	May	40.2	41.2	41.4	26.7
	June	40.8	43.3	44.5	28.1
	July	37.3	40.4	41.4	27.6
	August	36.4	39.3	38.6	27.9
	September	44.1	41.1	40.5	27.8
	October	47.3	42.0	43.2	27.2
	November	42.0	41.4	42.7	27.2
	December	39.0	38.9	39.8	26.9
2022	January	37.9	34.6	34.6	25.4
	February	43.6	41.3	39.6	26.5
	March	45.2	40.3	39.8	27.0
	April	45.0	43.0	43.3	27.2
	May	46.4	46.3	46.7	28.0
	June	43.7	44.3	45.1	28.5

Source: NYCDOT FHV VMT/VHT Data and WSP Analysis - July 2022
Notes:
1 AM 6:00 a.m. to 10:00 a.m. (Morning Peak Period0
2 MD 10:00 a.m. to 4:00 p.m. (Midday)
3 PM 4:00 p.m. to 8:00 p.m. (Afternoon Peak Period)
4 ON 8:00 p.m. to 6:00 a.m. (Overnight)

Table 4B.7-2. Average Weekday Travel Time to the Manhattan CBD from Brooklyn (minutes)

YEAR	MONTH	AM	MD	PM	ON
2019	October	31.3	30.1	29.1	22.1
	November	30.6	30.1	29.2	21.9
	December	28.5	30.0	29.9	22.5
2020	January	28.3	26.3	25.8	21.0
	February	30.8	28.2	27.2	21.4
	March	27.0	25.2	23.7	20.7
	April	21.4	21.9	20.3	21.0
	May	24.2	24.0	21.6	21.3
	June	26.3	26.4	24.3	21.6
	July	27.1	27.8	24.4	19.9
	August	28.2	29.3	26.1	20.3
	September	30.6	30.0	26.8	20.9
	October	31.0	30.0	26.5	20.7
	November	28.8	28.0	26.2	20.9
	December	27.1	28.3	27.0	21.5
2021	January	26.1	26.3	24.0	21.0
	February	28.5	28.9	25.5	21.5
	March	28.4	29.6	25.7	21.1
	April	29.4	30.3	27.1	21.2
	May	30.2	31.5	28.2	21.6
	June	30.7	31.9	30.2	22.3
	July	30.2	31.5	30.5	22.7
	August	30.5	31.0	29.6	22.5
	September	32.9	32.0	30.0	21.9
	October	35.0	32.6	32.1	22.6
	November	32.7	32.6	32.9	22.2
	December	30.0	30.9	32.5	21.8
2022	January	30.1	28.6	26.8	20.9
	February	34.0	32.4	31.6	22.0
	March	34.1	32.3	31.2	22.6
	April	34.5	33.9	33.0	22.5
	May	35.6	34.9	34.7	22.8
	June	34.2	35.1	34.4	22.9

Source: NYCDOT FHV VMT/VHT Data and WSP Analysis - July 2022
Notes:
1 AM 6:00 a.m. to 10:00 a.m. (Morning Peak Period0
2 MD 10:00 a.m. to 4:00 p.m. (Midday)
3 PM 4:00 p.m. to 8:00 p.m. (Afternoon Peak Period)
4 ON 8:00 p.m. to 6:00 a.m. (Overnight)

Table 4B.7-3. Average Weekday Travel Time to the Manhattan CBD from Queens (minutes)

YEAR	MONTH	AM	MD	PM	ON
2019	October	44.5	43.9	45.9	30.9
	November	43.4	43.8	45.2	29.5
	December	40.4	44.6	46.0	29.2
2020	January	38.4	34.4	35.6	27.6
	February	42.0	37.0	38.2	28.1
	March	31.3	28.1	27.7	24.5
	April	21.1	21.0	20.5	21.0
	May	23.3	23.4	23.0	21.8
	June	27.0	25.6	24.9	22.8
	July	29.5	27.6	25.5	22.4
	August	29.9	30.0	28.5	22.9
	September	34.2	31.1	28.8	23.7
	October	34.4	31.1	29.3	24.2
	November	30.9	28.6	28.5	23.8
	December	28.0	29.3	29.4	24.2
2021	January	27.7	27.0	27.3	24.5
	February	29.6	29.5	27.6	24.0
	March	30.7	30.2	28.1	23.8
	April	33.0	33.1	30.0	24.4
	May	35.9	36.9	33.9	26.0
	June	36.7	38.9	36.9	26.7
	July	34.8	36.8	35.3	26.8
	August	35.2	37.0	34.7	26.9
	September	40.1	39.2	37.4	27.7
	October	42.6	40.6	39.6	27.2
	November	41.2	41.9	41.4	27.4
	December	36.6	38.7	39.7	26.7
2022	January	33.9	31.2	30.3	24.9
	February	41.0	39.1	36.6	26.2
	March	42.0	39.9	38.4	27.4
	April	42.5	43.6	43.2	28.0
	May	46.6	47.8	46.4	28.5
	June	43.2	46.1	45.5	28.4

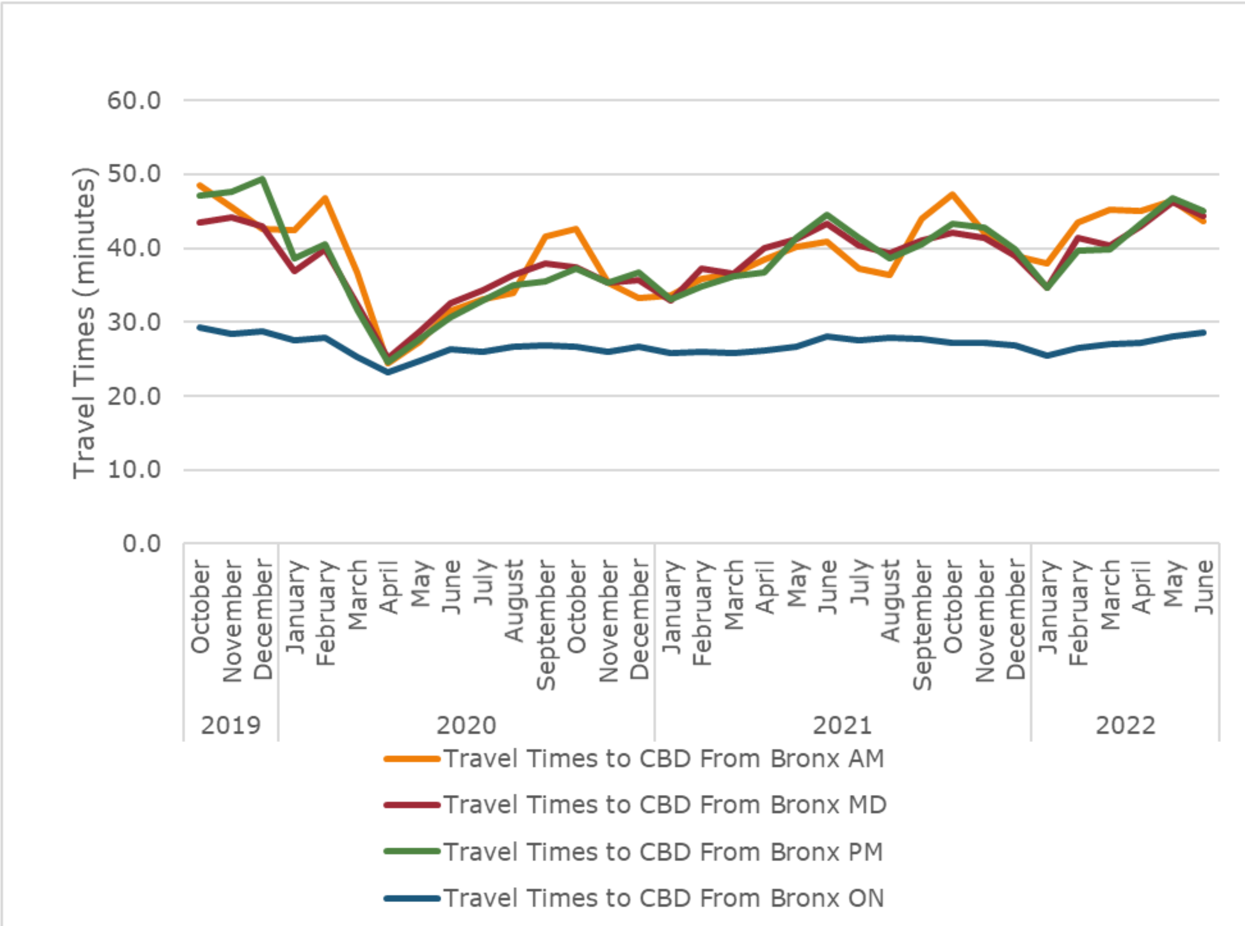
Source: NYCDOT FHV VMT/VHT Data and WSP Analysis - July 2022
Notes:
1 AM 6:00 a.m. to 10:00 a.m. (Morning Peak Period0
2 MD 10:00 a.m. to 4:00 p.m. (Midday)
3 PM 4:00 p.m. to 8:00 p.m. (Afternoon Peak Period)
4 ON 8:00 p.m. to 6:00 a.m. (Overnight)

Table 4B.7-4. Average Weekday Travel Times to the Manhattan CBD from Staten Island (minutes)

YEAR	MONTH	AM	MD	PM	ON
2019	October	54.9	51.7	53.4	40.3
	November	55.6	51.4	59.3	38.4
	December	55.1	55.5	62.3	39.8
2020	January	50.0	44.7	50.5	35.9
	February	54.3	45.5	50.8	35.7
	March	44.8	40.5	43.0	33.2
	April	33.2	36.3	38.1	34.2
	May	37.1	39.7	37.5	34.3
	June	38.7	41.9	39.8	33.4
	July	38.8	42.0	40.8	36.2
	August	39.9	45.8	39.8	33.3
	September	44.4	46.6	42.6	35.9
	October	44.9	45.7	43.1	35.4
	November	42.8	43.2	44.2	33.9
	December	39.7	45.1	45.2	34.0
2021	January	39.8	42.3	40.2	34.4
	February	43.9	43.8	42.0	34.6
	March	43.9	47.0	43.3	33.1
	April	43.4	46.8	46.0	34.5
	May	45.2	48.3	47.7	37.7
	June	46.3	49.2	52.3	36.8
	July	44.3	45.9	51.6	36.3
	August	42.8	46.1	51.0	36.6
	September	51.8	49.7	51.7	39.2
	October	65.0	53.4	58.1	40.6
	November	54.9	50.7	61.1	39.9
	December	47.1	49.0	60.6	37.5
2022	January	45.7	44.0	46.6	35.7
	February	53.8	47.7	52.8	36.7
	March	57.4	48.3	54.2	37.0
	April	57.6	50.0	56.7	37.2
	May	60.4	53.2	58.5	36.6
	June	55.7	56.1	63.1	38.1

Source: NYCDOT FHV VMT/VHT Data and WSP Analysis - July 2022
Notes:
1 AM 6:00 a.m. to 10:00 a.m. (Morning Peak Period0
2 MD 10:00 a.m. to 4:00 p.m. (Midday)
3 PM 4:00 p.m. to 8:00 p.m. (Afternoon Peak Period)
4 ON 8:00 p.m. to 6:00 a.m. (Overnight)

Figure 4B.7-1. Average Weekday Travel Times to the Manhattan CBD from the Bronx—AM, MD, PM, ON (minutes)



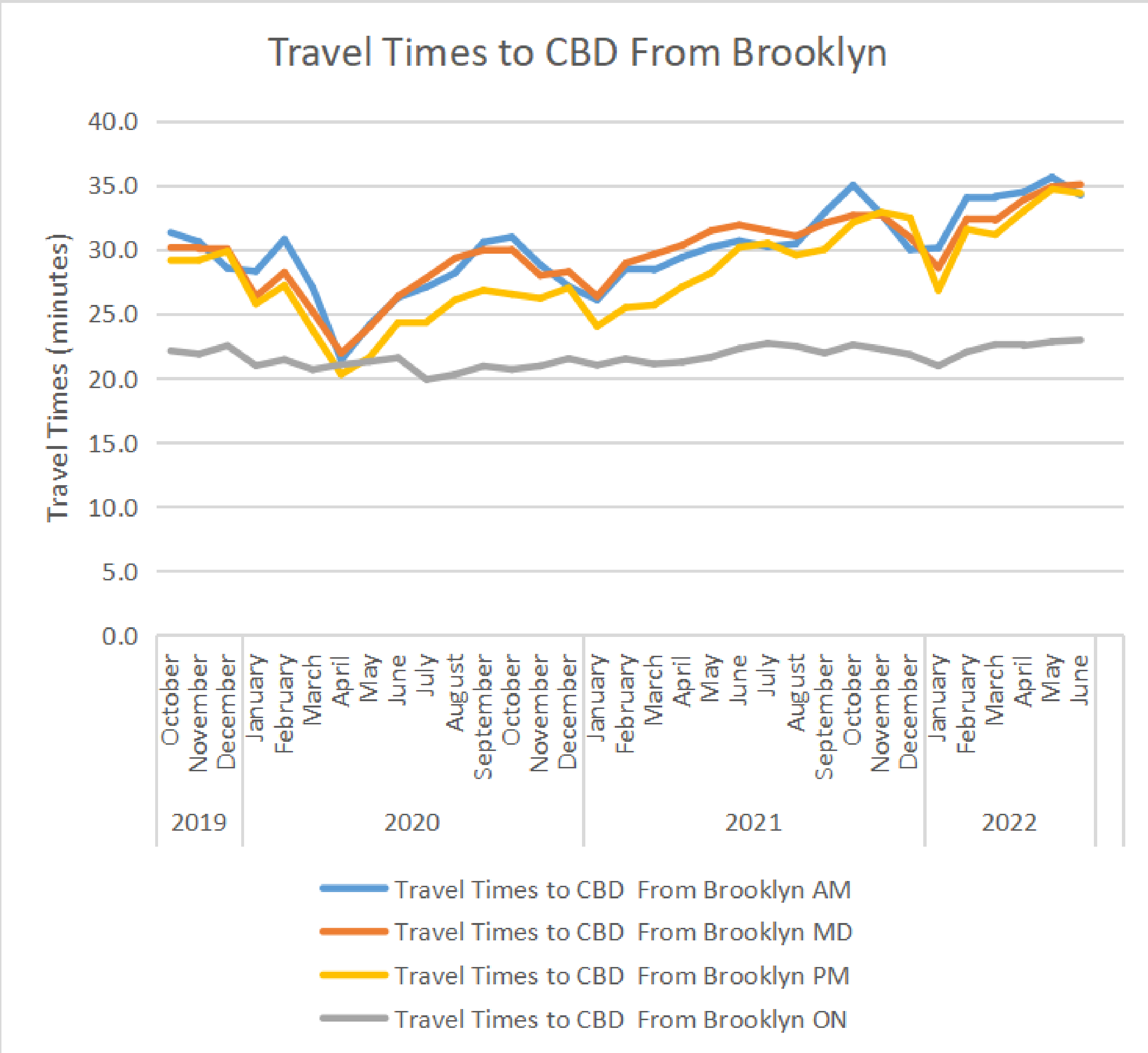
Source: NYCDOT FHV VMT/VMT Data and WSP Analysis—July 2022

Table 4B.7-5. Average Weekday Travel Times to the Manhattan CBD Before/After Peak of Pandemic—The Bronx (minutes)

PERIOD	MONTH	AM	MD	PM	ON
Pre-Pandemic	October–December 2019	45.5	43.5	48.0	28.8
Post-Pandemic	April–June 2022	45.0	44.5	45.0	27.9
	Change	-0.5	1.1	-3.0	-0.9

Source: NYCDOT FHV VMT/VMT Data and WSP Analysis—July 2022

Figure 4B.7-2. Average Weekday Travel Times to the Manhattan CBD from Brooklyn—AM, MD, PM, ON (minutes)



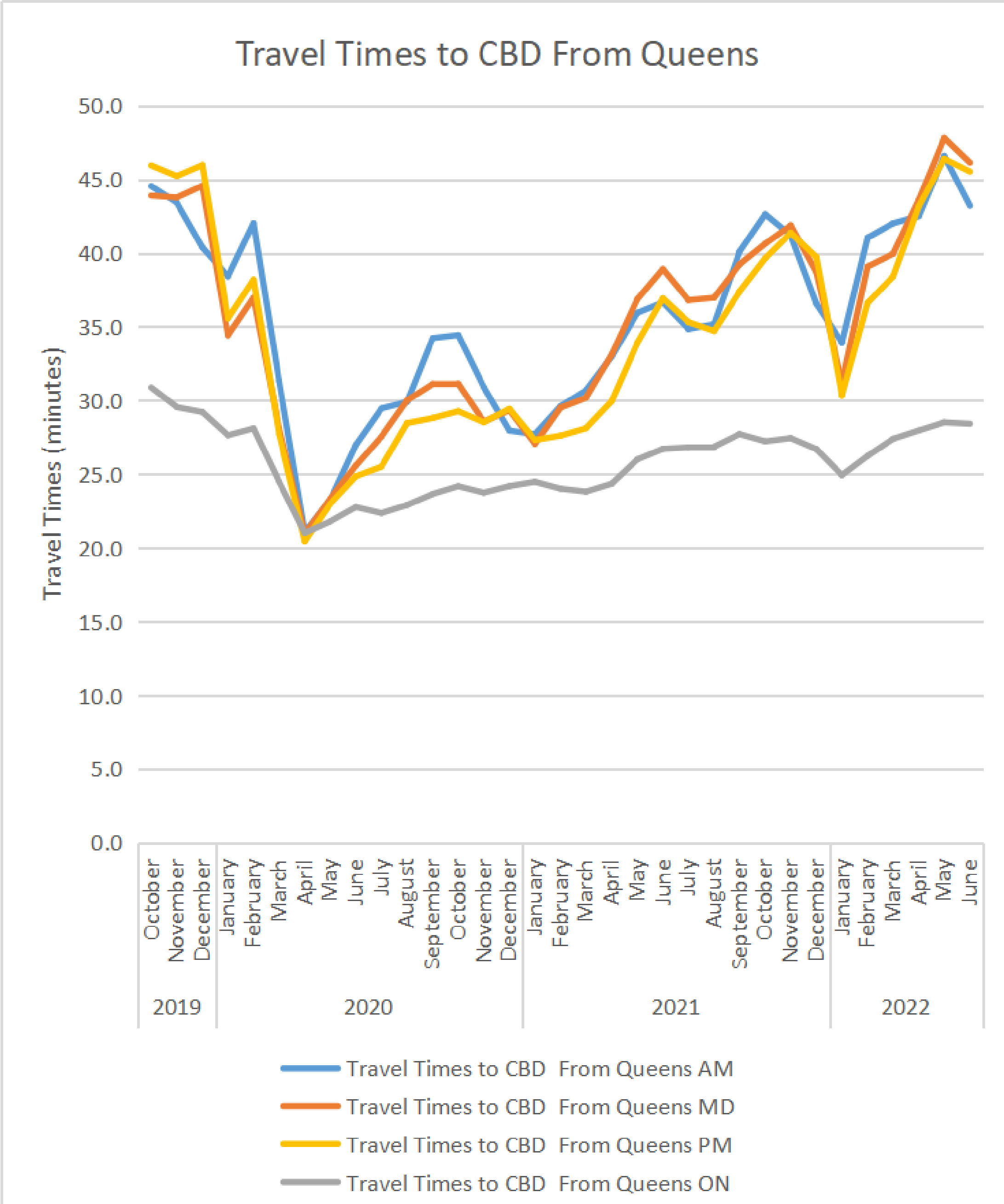
Source: NYCDOT FHV VMT/VMT Data and WSP Analysis—July 2022

Table 4B.7-6. Average Weekday Travel Time to the Manhattan CBD Before/After Peak of the Pandemic—Brooklyn (minutes)

PERIOD	MONTH	AM	MD	PM	ON
Pre-Pandemic	October–December 2019	30.1	30.1	29.4	22.2
Post-Pandemic	April–June 2022	34.8	34.6	34.0	22.8
	Change	4.6	4.5	4.6	0.6

Source: NYCDOT FHV VMT/VMT Data and WSP Analysis—July 2022

Figure 4B.7-3. Average Weekday Travel Times to the Manhattan CBD from Queens—AM, MD, PM, ON



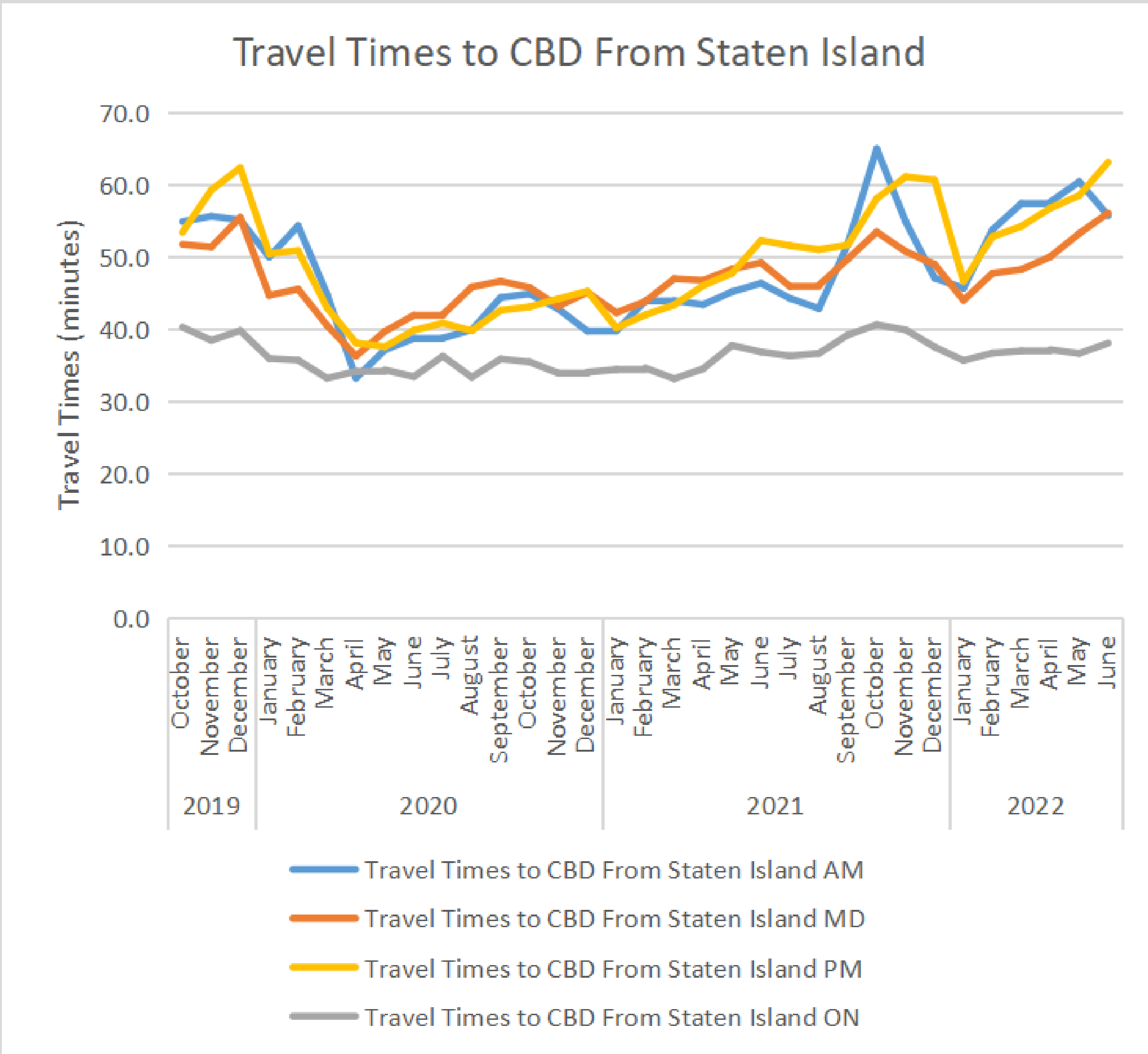
Source: NYCDOT FHV VMT/VMT Data and WSP Analysis—July 2022

Table 4B.7-7. Average Weekday Travel Times to the Manhattan CBD Before/After Peak of Pandemic—Queens (minutes)

PERIOD	MONTH	AM	MD	PM	ON
Pre-Pandemic	October–December 2019	42.8	44.1	45.7	29.9
Post-Pandemic	April–June 2022	44.1	45.8	45.0	28.3
	Change	1.3	1.8	-0.7	-1.6

Source: NYCDOT FHV VMT/VMT Data and WSP Analysis—July 2022

Figure 4B.7-4. Average Weekday Travel Times to the Manhattan CBD from Staten Island—AM, MD, PM, ON



Source: NYCDOT FHV VMT/VMT Data and WSP Analysis—July 2022

Table 4B.7-8. Average Weekday Travel Times to the Manhattan CBD Before/After Peak of Pandemic—Staten Island (minutes)

PERIOD	MONTH	AM	MD	PM	ON
Pre-Pandemic	October–December 2019	55.2	52.9	58.3	39.5
Post-Pandemic	April–June 2022	57.9	53.1	59.5	37.3
	Change	2.7	0.3	1.1	-2.2

Source: NYCDOT FHV VMT/VMT Data and WSP Analysis—July 2022

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.8, Transportation: Overview of Highways Throughout the Study Area

August 2022

Contents

Figures

Figure 4B.8-1, Figure 4B.8-2, and Figure 4B.8-3 show the principal highways in the regional study area. The following describes this highway network and is organized by geographic regions relative to the Manhattan CBD.

4B.8-1 NORTH OF THE MANHATTAN CBD: HIGHWAYS IN THE BRONX, NEW YORK COUNTIES NORTH OF NEW YORK CITY, AND SOUTHWESTERN CONNECTICUT

The Major Deegan Expressway (I-87) extends from the Robert F. Kennedy (RFK) Bridge through the western Bronx to the New York City-Westchester County border where it becomes the **New York State Thruway (I-87)** (Governor Thomas E. Dewey Thruway). From the RFK Bridge, I-87 has three lanes in each direction for most of the highway north until it merges with I-287 at the approach to the Governor Mario M. Cuomo Bridge.

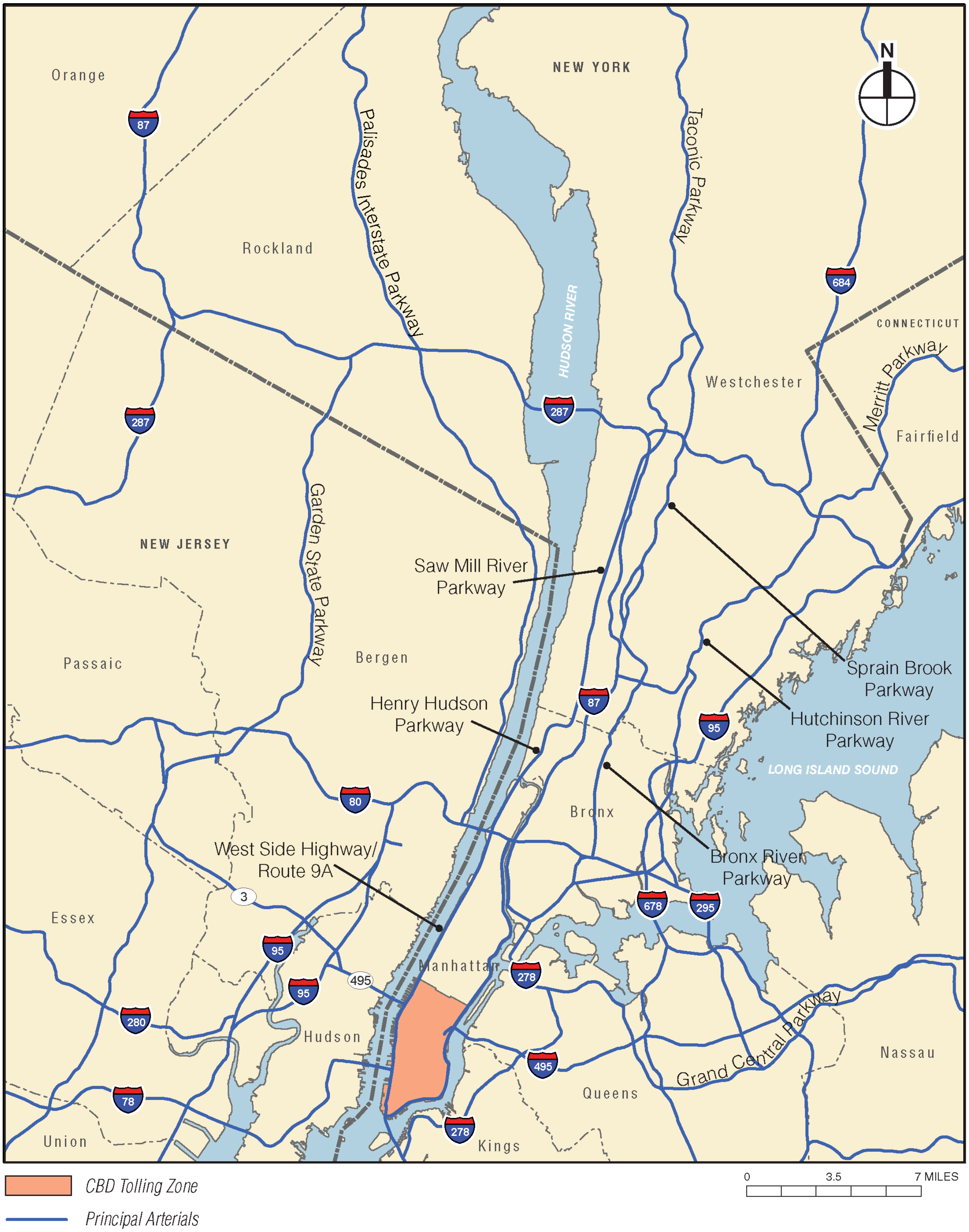
Between the Bronx and Westchester County border to Albany, I-87 is commonly known as the New York State Thruway. This portion of the New York State Thruway passes through Yonkers, New York, and continues through southwestern Westchester County until it converges with I-287 and crosses the Hudson River via the Governor Mario M. Cuomo Bridge. The New York State Thruway then diverges from I-287 and continues north through Rockland and Orange Counties, and points north to Albany.

Tolls are collected by the New York State Thruway Authority in both directions at the Yonkers tolling point, eastbound only at the Governor Mario M. Cuomo Bridge, and westbound only at Spring Valley (for trucks only) in Rockland County. From Woodbury, in Orange County to the north, tolls are based upon entrance and exit location, distance traveled and type of vehicle. New York State Thruway system tolls can be paid by E-ZPass and more recently Tolls by Mail.

The **Trans-Manhattan/Cross Bronx Expressway (part of I-95)** extends east–west from the George Washington Bridge, with the Trans-Manhattan Expressway consisting of the portion located in Manhattan, and the Cross Bronx Expressway consisting of the portion in the Bronx. It continues to run across the Bronx to multiple interchanges in the eastern Bronx and joins with the New England Thruway (I-95), the Bruckner Expressway (I-278), the Hutchinson River Parkway, the Bronx-Whitestone Bridge via the Hutchinson Expressway (I-678), and the Throgs Neck Bridge via the Throgs Neck Expressway (I-695).

The **New England Thruway (part of I-95)** extends north–south from the Cross Bronx Expressway (I-95) and Bruckner Expressway (I-278) in the eastern Bronx through Westchester County to the New York and Connecticut state line where I-95 continues as the Connecticut Turnpike, serving cities and towns along Long Island Sound. A toll is collected for I-95 in New York by the New York State Thruway Authority in the northbound direction only, at New Rochelle, New York. The **Bruckner Expressway (I-278)** connects the RFK Bridge and the southern end of the Major Deegan Expressway (I-87) to the New England Thruway (I-95), Cross Bronx Expressway (I-95) and Hutchinson River Parkway.

Figure 4B.8-1. Highways in The Bronx, New York Counties North of New York City, and Southwestern Connecticut



Source: ESRI, New York City Open Data, NYMTC 2020 TransCAD Highway Network.

Figure 4B.8-2. Highways in Brooklyn, Queens, and Long Island

Source: ESRI, New York City Open Data, NYMTC 2020 TransCAD Highway Network.

Figure 4B.8-3. Highways in Northern New Jersey

Source: ESRI, New York City Open Data, NYMTC 2020 TransCAD Highway Network.

The **Cross-Westchester Expressway (I-287)** runs east–west across Westchester County, connecting the Governor Mario M. Cuomo Bridge and the New York State Thruway (I-87) to the New England Thruway (I-95). Along the way, it connects to several north–south parkways in Westchester County and the southern end of I-684.

I-684 extends north–south from the Cross-Westchester Expressway (I-287) north to I-84, east of Brewster, New York. Along the way it traverses a small corner of Connecticut. The northern end of the Saw Mill River Parkway terminates at I-684, in Katonah, New York.

I-84 extends east–west from Scranton, Pennsylvania, to the Massachusetts Turnpike. Within the study area, I-84 enters New York at Port Jervis, crosses the Hudson River from Orange County to Dutchess County on the Newburgh-Beacon Bridge and enters Connecticut at Danbury in Fairfield County.

A group of interconnected parkways pass through Putnam County, Dutchess County, Westchester County, or the Bronx in New York as well as Fairfield County in Connecticut. These parkways provide north–south connections with Manhattan via the Henry Hudson Bridge, RFK Bridge, I-95, and local streets that span the Harlem River. Only passenger cars are permitted on these parkways. Parkways generally prohibit heavy trucks, most buses, and other commercial vehicles and impose height restrictions for bridges and overpasses along the roadway.

These parkways include the following:

- **Henry Hudson Parkway** is a north–south parkway that extends from West 72nd Street in Manhattan to the Bronx–Westchester County boundary.
- **Saw Mill River Parkway** is a north–south parkway that runs along the westernmost side of New York extending from the Bronx–Westchester County boundary as the continuation of the Henry Hudson Parkway. The Parkway heads northeastward to an interchange with I-684 and New York State Route 35 (NY 35).
- **Sprain Brook Parkway** is a north–south parkway that extends up the middle of New York from an interchange with the Bronx River Parkway in Yonkers, New York, to Hawthorne, New York, where it ends as a merge into the Taconic State Parkway.
- **Bronx River Parkway** is a north–south parkway that extends between Story Avenue near Bruckner Expressway in the Bronx to the southern end of the Taconic State Parkway at Kensico Circle in Westchester County.
- **Taconic State Parkway** is a north–south divided highway that passes through Putnam and Dutchess Counties from the Kensico Dam in Valhalla, New York, in the south, to Chatham, New York, in the north. This alignment extends roughly midway between the Hudson River and the Connecticut and Massachusetts state lines, along the Taconic Mountains.
- **Hutchinson River Parkway** is a north–south parkway that extends from the Bruckner Expressway in the Throgs Neck section of the Bronx to the New York–Connecticut state line at Rye Brook, New York, where the highway continues into Connecticut as the Merritt Parkway.

- **Merritt Parkway** is a limited-access parkway in Fairfield County, Connecticut, that extends from the New York State line in Westchester—where it serves as the continuation of the Hutchinson River Parkway—to Exit 54 in Milford, where the Wilbur Cross Parkway begins.

4B.8-2 HIGHWAYS IN BROOKLYN, QUEENS, AND LONG ISLAND

The **Long Island Expressway (I-495, NY-495)** extends most of the length of Long Island, 71 miles east from the western end at the Queens-Midtown Tunnel in Queens, through Nassau, to Riverhead in Suffolk County. The Long Island Expressway (I-495) is the primary east–west highway through Long Island and serves car, bus, and truck traffic. The Long Island Expressway (I-495) has three general-use lanes in each direction in most areas and there is a high-occupancy vehicle (HOV) lane in each direction between Exit 32 (Nassau/Queens Border) and Exit 64 (Medford, Suffolk County). In addition, during weekdays, there is an HOV-3+ (and Clean Pass) lane in effect in the Manhattan-bound direction from the Calvary Cemetery to the entrance of the Queens-Midtown Tunnel.

The **Grand Central Parkway and Northern State Parkway** follow a curving 43-mile route, starting from the RFK Bridge in the west to Hauppauge, New York, in the east. The route begins at the RFK Bridge on an overlapping route with I-278 to the Brooklyn-Queens Expressway (BQE) interchange in the Astoria and Jackson Heights neighborhoods of Queens. It continues as the Grand Central Parkway through Queens and becomes the Northern State Parkway at the Queens-Nassau County border. The Grand Central Parkway and Northern State Parkway carry only passenger cars. West of the Wantagh State Parkway, the Northern State Parkway generally has three lanes in each direction while east of the Wantagh State Parkway, it has two lanes in each direction.

The **Belt Parkway** extends 25 miles around southern Brooklyn and Queens from Bay Ridge, Brooklyn, to the Queens-Nassau County border. At its western end, the Belt Parkway connects to both the Gowanus Expressway and the Verrazzano-Narrows Bridge. At its eastern end, the Belt Parkway connects to the Southern State Parkway and the Cross Island Parkway. Along the way, it provides connections to the Van Wyck Expressway, John F. Kennedy (JFK) Expressway, and Nassau Expressway. Both the Van Wyck Expressway and JFK Expressway provide access to/from JFK International Airport. The Belt Parkway carries only passenger cars.

The **Southern State Parkway and Heckscher State Parkway** extend 34 miles from the Belt Parkway at the Queens-Nassau County border east to Heckscher State Park on the south shore of Long Island in East Islip. The Southern State has three lanes in each direction in most areas—except the western portion where it has four lanes in each direction. The Southern State Parkway and Heckscher State Parkway carry only passenger cars.

The **BQE and Gowanus Expressway (both I-278)** follow a winding north–south path in western Brooklyn and Queens. They comprise the circumferential link between the Bruckner Expressway via the RFK Bridge and the Staten Island Expressway via the Verrazzano-Narrows Bridge. This limited-access highway provides connections to all the Brooklyn and Queens bridges and tunnels to Manhattan (e.g., Hugh L. Carey Tunnel, Brooklyn Bridge, Manhattan Bridge, Williamsburg Bridge, Long Island Expressway/Queens-Midtown

Tunnel, and Ed Koch Queensboro Bridge[1]). The highway generally has three lanes in each direction; however, the section between Atlantic Avenue and Sands Street has been reduced to two lanes in each direction due to the advanced age and condition of this cantilever structure. There is a reversible 3+ HOV lane from the Verrazzano-Narrows Bridge to the Hugh L. Carey Tunnel via the Gowanus Expressway in Brooklyn.

A set of relatively short expressways and parkways provide north–south connections in Queens and Long Island. Parkways generally prohibit heavy trucks, most buses, and other commercial vehicles and impose height restrictions for bridges and overpasses along the roadway. From west to east, these expressways and parkways include the following:

- **Van Wyck Expressway (I-678)** is a north–south auxiliary interstate highway that extends for approximately 9 miles through Queens. The route begins at JFK International Airport and ends at Northern Boulevard, with I-678 continuing under other highway names across the Bronx-Whitestone Bridge to the Bruckner Interchange in the Bronx. The Van Wyck Expressway has three to four lanes in each direction, with an additional managed-use lane[2] proposed in each direction from the airport to the Kew Gardens Interchange as part of the Van Wyck Expressway Capacity and Access Improvements to JFK Airport Project.
- The **Cross Island Parkway** originates near the JFK International Airport and the Southern State Parkway in the south and ends at the Whitestone Expressway (I-678) in Whitestone, Queens, in the north—a distance of approximately 11 miles.
- **Meadowbrook State Parkway** is a 12.5-mile parkway in Nassau County. Its southern terminus is at a full cloverleaf interchange with the Bay and Ocean Parkways in Jones Beach State Park. The parkway heads north, provides an interchange with the Loop Parkway, crosses South Oyster Bay, enters the mainland, and connects to the Southern State Parkway in North Merrick before merging into the Northern State Parkway at Exit 31A in the hamlet of Carle Place.
- **Wantagh State Parkway** is a 13.3-mile parkway in Nassau County that extends from Jones Beach State Park at the southern end to an interchange with the Northern State Parkway at the northern end.
- **Robert Moses Causeway, Sagtikos State Parkway, and Sunken Meadow State Parkway** together form a continuous north–south route across the entire width of Long Island for 19.4 miles. At the south end, the Robert Moses Causeway extends from its interchange with the Southern State Parkway south to Robert Moses State Park. From this interchange, the roadway is branded as Sagtikos State Parkway, which continues northward to the Long Island Expressway (I-495) and Northern State Parkway. At this interchange and continuing northward, the roadway is known as the Sunken Meadow Parkway and extends to the north shore, terminating at Sunken Meadow State Park.

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[1] The connection to the Ed Koch Queensboro Bridge is not direct because vehicles must traverse local streets to reach the bridge.

[2] Managed use lane is defined by the Federal Highway Administration as highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions. Strategies may include pricing, vehicle eligibility, and access control.

4B.8-3 HIGHWAYS IN NORTHERN NEW JERSEY

The **New Jersey Turnpike (I-95)** runs north–south for 117 miles through New Jersey from the George Washington Bridge to the Delaware Memorial Bridge. The turnpike enters the south end of the BPM catchment area east of Trenton and intersects with several limited-access or major highways in northeastern New Jersey, including I-195, I-287, the Garden State Parkway, I-278, I-78, US-1/9, I-280, NJ Route 3, US-46, and I-80.

From the southern end of the regional study area to the Garden State Parkway interchange, the turnpike has six lanes split between two adjacent roadways in each direction, for a total of 12 lanes. From the Garden State Parkway to the Route 9 interchange, the turnpike has seven lanes in each direction for a total of 14 lanes. From the Route 9 interchange to the Vince Lombardi Park & Ride facility, the turnpike splits into eastern and western spurs with three lanes in each direction on each spur, for a total of 12 lanes. From the junction with I-80 to the George Washington Bridge, the turnpike has five lanes on two roadways in each direction for a total of 10 lanes.

Tolls are paid in cash or by E-ZPass using a system to record the entry and exit of each vehicle along the entire length of the turnpike up to the Route 46 interchange. A toll is collected by the Port Authority of New York and New Jersey on the George Washington Bridge for vehicles entering New York.

I-80 begins at a junction with the New Jersey Turnpike (I-95) in Teaneck, New Jersey, west of the George Washington Bridge and continues west through the Delaware Water Gap, where it enters Pennsylvania. I-80 intersects the Garden State Parkway, I-280, and I-287. Between the Garden State Parkway in Saddle Brook and the junction with I-95, I-80 is divided into an express and local roadway pair with three local and two express lanes in each direction. This separation continues after the merge onto I-95 to the Fort Lee, New Jersey side of the George Washington Bridge in Bergen County. West of Saddle Brook, the interstate initially has four lanes in each direction, narrowing to three lanes, and then two lanes just before the Delaware Water Gap in Warren County.

I-78 comprises the New Jersey Turnpike Extension and the Phillipsburg-Newark Expressway. The New Jersey Turnpike Extension begins just west of the Holland Tunnel and extends to the New Jersey Turnpike after crossing Newark Bay. From that point, the Phillipsburg-Newark Expressway continues west-southwest past Phillipsburg, New Jersey, into Pennsylvania. In addition to the New Jersey Turnpike, the highway intersects the Garden State Parkway and I-287. From the New Jersey Turnpike west to a junction with NJ Route 24, I-78 is divided into a local roadway and an express roadway in each direction.

The New Jersey Turnpike Extension (the portion of I-78 between the New Jersey Turnpike and the Holland Tunnel) has two lanes in each direction and is integrated into the New Jersey Turnpike toll system, which accepts cash and E-ZPass payments. At Jersey Avenue in Jersey City, New Jersey, I-78 transitions to a pair of one-way, east–west, local streets with traffic signals to the Holland Tunnel.

The **Essex Freeway (I-280)** runs southeast to northwest for 17.9 miles connecting I-80 at the western end to the New Jersey Turnpike (I-95) at the eastern end, passing just north of downtown Newark. The highway varies between two to three lanes in each direction, depending upon the segment.

I-287 is a circumferential or belt freeway that loops around the southern, western, and northern portions of the New York/Northern New Jersey metropolitan area. To the south, I-287 heads westward from an interchange with the New Jersey Turnpike (I-95) and NJ Route 440 (connecting to the Outerbridge Crossing to Staten Island, New York). From this interchange, the highway heads west and north through Middlesex, Somerset, Morris, and Bergen Counties in New Jersey and then connects with the New York State Thruway (I-87) in Suffern, New York.

Garden State Parkway is a 172-mile parkway that parallels the New Jersey Coast and northeastern New Jersey with its southern terminus is in Cape May and its northern terminus as a short section in Rockland County, New York, where it connects with the New York State Thruway (I-87 and I-287). From south to north, the Garden State Parkway intersects I-195, the NJ Turnpike (I-95), I-78, I-280, NJ Route 3, I-80, NJ Route 4, and I-87/I-287. The Garden State Parkway has large truck restrictions from Exit 105 (Tinton, New Jersey) north to its terminus in New York State.

The **Palisades Interstate Parkway** links I-95, the George Washington Bridge, and US Route 9W from its southern terminus in Fort Lee, New Jersey, and extends north along the Hudson River and into New York State.

The **Pulaski Skyway (US 1/9) and NJ 139** form a key connection to the Holland Tunnel. The 3.5-mile four-lane highway opened in 1932 as one of the first limited-access highways in the United States. The east end of the highway connects to the Holland Tunnel, and the west end has interchanges with the New Jersey Turnpike and I-78.

NJ Route 3 is a limited-access highway connecting US Route 46 to the Lincoln Tunnel via NJ Route 495. NJ Route 3 also serves the Meadowlands Sports Complex and has three to four lanes, depending on the segment, with separate express and local roadways in Secaucus, New Jersey.

NJ Route 495 extends east–west, connecting the Lincoln Tunnel to both NJ Route 3 and the New Jersey Turnpike. NJ Route 495 has three lanes in each direction, with an eight-lane section along the NJ Route 495 Viaduct to Union City, New Jersey. The Port Authority of New York and New Jersey operates one westbound (outbound from the Manhattan CBD) lane of the highway as a contra-flow Exclusive Bus Lane during the AM peak hours.

NJ Route 4 extends east–west connecting Paterson, New Jersey, to an interchange with I-95, US Route 1/9 (US 1/9), and US 9W at the George Washington Bridge approach in Fort Lee, New Jersey. The route is a divided highway with four to six lanes depending on the segment.

CENTRAL BUSINESS DISTRICT (CBD) TOLLING PROGRAM

Appendix 4B.9, Transportation:
Traffic Data Collection Program

August 2022

From June 15–25, 2019, an extensive traffic data collection effort was undertaken at intersections within the 15 intersection study areas. Additional data collection occurred in fall 2019, and NYCDOT provided available traffic count data from recent traffic studies (all pre-COVID-19 pandemic). The data collection calibration and balancing of intersection traffic and pedestrian volumes included the following and were done in coordination with NYCDOT.

- **Turning-movement counts** at 40 locations
  - 16 locations on the West Side
  - 12 locations on the East Side
  - 12 locations in the Lower Manhattan and Queens-Midtown Tunnel areas
- **Automatic Traffic Recorder (ATR) counts** at 118 locations within the study areas
  - 42 locations on the West Side at 60th Street area
  - 42 locations on the East Side at 60th Street area
  - 34 locations in the Lower Manhattan and Queens-Midtown Tunnel areas
- **Vehicle classification** counts at each of the 40 intersections and eight ATR locations.

The following data collection times were used.

- AM count period: 7:00 a.m. to 10:00 a.m.
- Midday (MD) count period: 11:00 a.m. to 2:00 p.m.
- PM count period: 4:00 p.m. to 7:00 p.m.
- Late night (LN) count period: 8:00 p.m. to 12:00 a.m.

Field data relating to traffic operations were collected in June 2019 at key intersections in the 15 study areas:

- **Physical inventory**, including intersection geometry, number of lanes, lane markings, lane widths, permitted movements, turning bay lengths, signage, traffic controls, signal-timing, and all other applicable dimensions.
- **Signal-timing** data was provided by NYCDOT.
- **Operating characteristics**, including lane designations, parking regulations, bus stop locations, bus lane locations, turning restrictions, and all other applicable characteristics.
- **Traffic and pedestrian counts**, including 7-day ATR counts, video turning-movement counts with vehicle classifications, and video pedestrian counts.
- **Field observations of roadway and intersection performance characteristics**, including floating vehicle-speed and delay measurements, queue lengths, and intersection processing rates.
- **Vehicle speeds, travel time, and travel pattern data** were purchased from StreetLight Data, Inc.