bike+ride

Bicycle Access and Parking for Subway and Commuter Rail Users

NYC Dept City Planning
Transportation Division
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Table of Contents

Executive Summary

Bike & Ride: Bicycle Access and Parking for Subway and Commuter Rail Users is a project that seeks to increase the amount of secure bicycle parking at transit locations to allow people to ride their bicycles to a transit station, securely park their bicycles and continue their commute on the subway or commuter rail. Many people do not live within a reasonable biking distance to work, but are within a reasonable biking distance to transit. This bikable distance to transit provides an opportunity for the use of cycling as a viable form of virtually carbon-free commuting. This plan for bike parking near transit in New York City, includes an inventory of citywide subway stations and commuter rail stations that can accommodate site specific bicycle parking. Cycling as a form of commuting has the potential to reduce congestion on the roadways by lowering the number of vehicles on the street. The objective is not only to provide bicycle parking to meet current demand but to encourage potential riders to include cycling as a link in their multi-modal commuting chain. This project identifies transit stations within the five boroughs and recommends bicycle parking solutions to meet documented bicycle activity. The data collected in this study will be used by the NYC Dept of Transportation (CDOT) *CityRacks* program for immediate installation of bicycle racks along the (7) subway line in Queens as well as future bicycle rack installations at other stations. The study will also explore the feasibility of long-term indoor bicycle parking at transit stations with underutilized space and high demand for bicycle parking.

During the course of this study, 239 transit stations were analyzed to determine the current demand for bicycle parking, and the appropriate types of bicycle parking to meet each location's needs. A list of transit stations were compiled using data provided by CDOT, the Metropolitan Transportation Authority (MTA), the NYC Department of City Planning-Transportation Division (NYCDCP-TD), and the *New York City Bike Parking Survey*. Locations were also added to the list based upon connectivity to other modes of transportation and terminal stations. The list of stations were then divided by borough, and each station was surveyed using the specifications provided in the CDOT Bicycle Parking Clearance Standards. *See Appendix D.* Among the 239 stations that were studied, over 28 percent of the stations did not provide any bicycle parking. Eight bicycle parking designs were selected to be used in this project based upon their provided level of bicycle parking security, and its ability to get the maximum use of the rack within the available space. Each design was also chosen based upon its ability to function within areas that include limited sidewalk space and inside of a train station. The stations and bicycle parking were organized into a matrix to identify potential locations to be used as case studies. Nine stations were selected as case studies to demonstrate the benefits and functionality of each chosen bicycle parking design within a specific environment.

Borough Summaries

The Bronx

In the borough of the Bronx, 44 stations were surveyed including 12 Metro North stations. Of the stations surveyed, five percent of them provided bicycle parking and 17 stations exhibited a need for bicycle parking based on the bicycles found chained to nearby street furniture. The limitations of the survey makes it difficult to determine the cause for such low demand for bicycle parking. The findings of this project indicate that basic secure bicycle parking should be provided at most transit and Metro North stations throughout the borough of the Bronx. By providing basic bicycle parking, potential users may be drawn to incorporate cycling into their daily commute.

Brooklyn

In the borough of Brooklyn, there were 60 stations surveyed. Among the stations surveyed, 12 were considered high priority stations with more than 11 bicycles parked at each location. 47 percent of the stations surveyed provided some form of bicycle parking. In some cases, while bicycle parking was provided, it was observed that the available parking was either not sufficient for the current demand or the available parking provided was not the best fit for the space. In areas with very high bicycle activity, it was concluded that alternate methods of bicycle parking may be needed to minimize clutter and maximize the use of available space on sidewalks and inside of subway stations. It was also observed that bicycle activity in Brooklyn is concentrated into several small areas. Expanded infrastructure and an increase in available bicycle parking at transit stations would cast a wider net for potential users and possibly increase ridership borough-wide.

Staten Island

Of the 14 stations surveyed along the Staten Island Rail Road, the greatest number of bicycles (8) were found at the St. George Ferry terminal station. 50 percent of the stations observed displayed signs of bicycle activity. The existing bicycle network in Staten Island is disconnected and does not foster cycling as a practical mode of transportation. In order to increase the overall number of commuter cyclists borough wide, the proper bicycle infrastructure must be in place to allow people to feel safe while riding their bicycle on the roadway. Secure bicycle parking must also be made available to cyclists once they arrive at the rail stations.

Queens

Of the 60 stations surveyed in the borough of Queens, 37 percent of them provided bicycle parking. The stations with the highest number of parked bicycles were located along the (7) subway line. This high level of bicycle activity may be attributed to the large immigrant population whose primary mode of transportation may have been the bicycle in their home country. The existing racks at many of the stations are not meeting the current demand for bicycle parking. Collaboration between the MTA and CDOT is needed to analyze each individual station to evaluate the available space above and below ground and consider non-traditional methods of bicycle parking to meet existing and future demand.

Manhattan

Almost 50 percent of the 60 stations surveyed in Manhattan did not have bicycle parking. Bicycles were found locked to the nearest available street furniture. This lack of bicycle parking produces a safety concern for both pedestrians and passengers entering and exiting transit stations. Bicycle parking should be installed at all stations in Manhattan.

Bicycle Parking Systems

There are a large number of bicycle parking designs and systems on the market today. The following bicycle parking designs were selected for this project because they meet the basic safety standards documented by CDOT and were determined to be implementable under various site conditons throughout New York City. All of these designs are constructed of durable, high quality materials and can withstand the variable weather conditions in New York City.

The following Bicycle Parking Systems were evaluated for this study *(descriptions and images available starting on pg 46)*:

1)Inverted "U" Rack
2)Wave Rack
3)Multiple "U" Rack
4)X-Type Tree Guard
5)Vertical Bicycle Racks
6)Parking Meter Retrofitted Bicycle Racks
7)2-Tier Racks
8)Bicycle Lockers
9)Curb Extensions & On-Street Bicycle Racks

Case Studies

In order to convey the benefits of using site specific bicycle parking to meet the needs of users within variable conditions, this report includes nine case studies to help visualize the existing conditions and see how the space would look and function with the newly installed recommended bicycle parking. The case study locations include:

Fordham station on the Metro North in the Bronx and Astoria Ditmars Blvd in Queens: **Multiple "U" Rack**
Grant City station in Staten Island: **Inverted "U" Rack**
Graham Ave station in Brooklyn: **Parking Meter Retrofitted Bicycle Rack**
23rd St station in Manhattan: **X-Type Tree Guard Rack**
DeKalb Ave station in Brooklyn: **Vertical Bicycle Rack**
Spuyten Duyvil station on the Metro North in the Bronx: **Bicycle Lockers**
Brooklyn Bridge/City Hall station in Manhattan: **2-Tier racks**
Metropolitan Ave in Brooklyn: **Indoor installation of Multiple "U" Racks**

Recommended Next Steps

This study lays the groundwork for developing a bicycle parking network at transit stations. The 239 stations surveyed for this study represent approximately 50% of the total number of transit stations citywide. There are many agencies involved in the implementation process of bicycle parking at transit stations CDOT, NYCT and NYCDCP. With improved coordination between agencies, data collection and implementation can be processed quickly and efficiently, producing a high quality bicycle parking network. Another key component necessary to move forward in the development of a bicycle parking network is to educate the public on how to properly use the provided bicycle racks. This education would emphasize the importance of bicycle parking security and help to reduce the occurrence of bicycle theft citywide.

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Introduction

Bicycle ridership in New York City has increased significantly in the last decade as more miles of bicycle lanes and greenway trails are built. However, due to the absence of secure bicycle parking near transit stations, cyclists are not able to effectively combine transit and cycling as a means of daily travel. The purpose of this project is to recommend locations for secure bicycle parking at transit stations and encourage potential cyclists to ride their bicycle to a transit station, park their bicycle and continue their commute to work on the subway or commuter rail. A multi-modal commute that incorporates the bicycle not only improves the overall health of the individual, it has the potential to reduce congestion on roadways.

According to the *New York City Bicycle Survey* conducted by the New York City Department of City Planning's Transportation Division (NYCDCP/TD) in 2007, 29 percent of commuting cyclists connect to other modes of transportation to reach their destination. When asked where they would like to see more bike racks, 67 percent of the responses noted that subway stations needed more bicycle parking. There were over 4.5 million riders using New York City's transit system daily in 2007. Although bicycles are allowed onboard subways and commuter rail, most subway cars are so crowded during rush hour that to do so is virtually impossible. The alternative is to provide adequate bicycle parking at the stations where cyclists can safely lock their bicycle and board transit.

This report consists of five parts: 1)Existing conditions for bike parking near transit; 2)a survey of 239 transit station locations for bike parking, including an analysis of demand and the best type of bicycle parking at each location; 3) A review of bicycle parking systems in use in New York City and other cities; 4)case studies for bicycle parking installation at 9 locations; 5)and next steps for a bicycle parking at transit program.

This study includes a preliminary plan for bike parking near transit in New York City with an inventory of citywide subway stations and commuter rail stations that can accommodate site specific bicycle parking. Implementation of this plan will meet the needs of existing cyclists while at the same time encouraging potential bicycle commuters.

Existing Conditions

Current Bicycle Parking Conditions

Bicycling and bicycle parking are in a state of evolution throughout New York City. According to the annual New York City Bicycle Screenline Counts (12 hour count of cyclists entering and existing the city center) conducted by CDOT, it is estimated that the number of commuting cyclists has increased 39 percent between 2007 and 2008. This is an indication that more people are accepting bicycling as a viable mode of transportation and nolonger view cycling only as a recreational activity.

Unfortunately, bicycle parking has not evolved at the same rate as bicycling. The amount of available bicycle parking has not increased at the same rate as the number of cyclists, particularly bicycle parking at transit. The lack of sufficient bicycle parking at transit is made evident by the number of bicycles found locked to street furniture nearby transit stations throughout New York City.

Currently, the most commonly used bicycle racks in New York City are the standard inverted "U" and the wave racks. Designed as a secure method of bicycle parking, the inverted "U" can accommodate two bicycles and allows each bicycle to be locked at two points on the bicycle using either a U-lock or a chain.

The wave rack is designed to accommodate at least four bicycles but in most cases does not allow the user to lock the bicycle at more than one point on the bicycle. Thus, the wave rack is a less secure rack when compared to the inverted "U" rack. The number of points a bicycle is able to be locked to a rack is a major factor in determining its level of security. When a bicycle is locked to a rack at two points, not only is the frame of the bicycle more stable, it also creates a greater obstacle for bicycle thieves to steal the bicycle.

Bicycle locked to a parking meter near subway station indicates a need for bicycle parking

The initial model of bicycle racks installed by the CDOT were made of round steel tubing. It was then discovered that bicycle thieves were using pipe cutters to cut through the round pipe and steal bicycles. Designed to cut copper pipes in plumbing, when revolved and tightened around the round metal tubing, the cutting edge of the pipe cutter cuts though the steel in seconds. As a result, the old model has been replaced by square tubing. The square tubing does not conform to the shape of the pipe cutting tool, therefore eliminating the opportunity for thieves to steal a bicycle using this method.

Round tube bicycle rack with stripped bicycle frames attached. Bicycle thieves may store the stolen bicycles at a central location and sell the bike parts.

Square tube wave rack. Improperly locked bicycle at only one point of the bicycle is an opportunity for a bike thief.

Despite the alterations to the racks, according to the annual informal survey conducted by Kryptonite, the industry leader in bicycle security, New York City ranked number three in 2007 on the list of the Top Ten Cites for Bike Theft; an improvement from number one in 2005 and 2006.

This high rate of bicycle theft in New York City is influenced by many factors. This study will address the most obvious and easily resolved factor: proper education for users on how to correctly lock a bicycle no matter the type of rack. While conducting this study many people were observed using the CDOT standard issue *CityRacks,* but were not locking their bicycles to the rack properly. Regardless of the number of security features a bicycle rack is designed with, if the bicycle is not correctly locked to the rack, the security features are for naught. The solution to this problem is to educate all cyclists on the proper methods of securing their bicycle to the standard *CityRacks* bicycle rack. This will ensure that each bicycle is properly secured and will help to reduce bicycle theft.

Cyclist upset because her bicycle seat was stolen while parked at the Marcy Ave (J, M, Z) subway station.

Metropolitan Transportation Authority (MTA)

The Metropolitan Transportation Authority is the primary governing body of the seven transportation agencies within the New York Region. The seven agencies are: New York City Transit, the MTA Bus Company, Metro North Rail Road, the Long Island Rail Road, Long Island Bus, Bridges and Tunnels, and MTA Capital Construction. Of these seven agencies, this study will focus on New York City Transit, Metro North Rail Road, and the Long Island Rail Road to determine how to improve existing and potential bicycle parking at these stations as well as increase the number of cycling-to-transit commuters.

New York City Transit Bicycle Policies

New York City Transit encompasses the subway, buses, para-transit and the Staten Island Rail Road. Currently, the MTA allows bicycles on board subway trains at all times. However, they "strongly recommend" that cyclists avoid boarding trains during rush hour. Among some of the rules to maintain bicycle safety, the MTA suggests that riders:

- Use the lettered express trains because they have larger stations, the subway cars are roomier, and the express trains make fewer stops.
- Enter and exit through the service gate and avoid trying to lift a bicycle over the turnstile.
- Wait until the stairs are cleared and carry a bicycle down the stairs rather than bumping it up/down stairs to avoid injury to fellow passengers.
- Do not lock bicycles to NYCT property (i.e. stairway railings)

Metro-North Rail Road Bicycle Policies

The Metro North commuter rail connects passengers from Westchester, Putnam, Dutchess, Orange, Rockland counties, and Connecticut to the New York City area. Unlike the policies regarding bicycles onboard the subway, the policies for bicycles onboard a commuter train are time-specific and strictly enforced. This difference in policy is due to the difference in the type of passenger cars used for commuter trains and the adherence to stricter scheduling. Before boarding a commuter train with a bicycle, cyclists must obtain a bicycle access permit. Each bicycle requires a permit and an individual is only allowed to take one bicycle onboard the train. These permits can be purchased at designated stations or by mail and must be presented at the request of an MTA employee.

Bicycles are allowed onto commuter rail cars, but cyclists must adhere to very stringent rules for the safety of all passengers. The rules are as follows:

- Bicycles will not be permitted on trains scheduled to depart from Grand Central Terminal between 7am & 9am, 3:01pm and 8:15pm and all connecting trains.
- Bicycles will not be permitted on trains scheduled to arrive in Grand Central Terminal between 5am & 10am, 4pm & 8pm and all connecting trains.
- On weekdays two bicycles will be permitted per car with a maximum of four bicycles per train.
- On weekends the maximum number of bicycles permitted on trains is eight. Only trains designated as “Bicycle Trains” and noted in the timetable may carry more than the permitted number of bicycles.

According to the MTA website, bike racks are available at many Metro-North stations and bike lockers (which are managed by a private company) are available at six stations. Of the 12 stations within the New York City boundary evaluated for this study, bicycle parking was not provided at any of them.

Long Island Rail Road (LIRR) Bicycle Policies

The Long Island Rail Road is the commuter rail service that connects passengers from Nassau and Suffolk counties to Penn Station, Flatbush Avenue Station and Jamaica Station in New York City. Similar to Metro North, the rules regarding bicycles on LIRR commuter rail cars are based on peak and off-peak travel times and are in place to minimize bicycle and passenger conflicts.

- Bicycles are not allowed on trains on weekdays between the hours of 6am & 10am (westbound arrivals)
- Bicycles are not allowed on trains on weekdays between the hours of 3pm & 8pm (eastbound departures)
- On weekdays, four bicycles are permitted on the train (two in the east car and two in the west car).
- On weekends, one bicycle is permitted per car with a maximum of 8 bicycles per train. Only trains designated as "Bicycle Trains" on specific branches and noted in the timetable may carry more than the permitted number of bicycles.

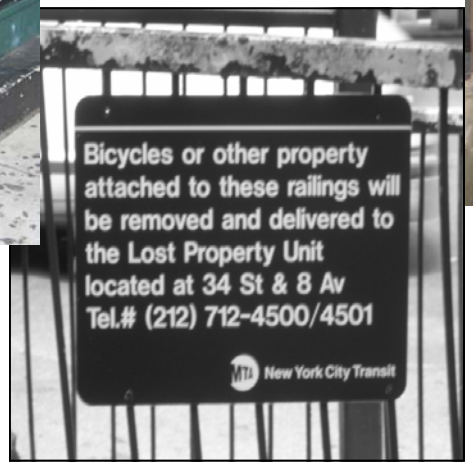
As mentioned on the MTA website, bike racks are available at many LIRR stations and bike lockers (which are managed by a private company) are available at 18 stations. Of the 17 stations within the New York City boundary evaluated for this study, bicycle parking was provided at seven stations. (*See Appendix C)*

Bicycle Parking Concerns for MTA Customers

The policies instituted by the MTA are intended to protect all passengers riding the subway and commuter rail systems and to ensure a safe and comfortable journey for all users. However, suggesting that a cyclist commuting to work by subway with a bicycle should wait for an un-crowded train is inconvenient and impractical. If a commuter with a bicycle needs to wait until the tail end of rush hour to board the subway, this will extend the time of the cyclist's commute and discourage the person from using a bicycle as a part of the commute. The MTA is promoting the multi-modal use of cycling and taking transit as a healthy, environmentally friendly and inexpensive form of commuting. Unfortunately, the existing rules make it very difficult for commuting cyclists and should be re-evaluated with the convenience of the cyclists in mind.

With so many obstacles involved with taking one's bicycle on board the subway or commuter rail, many cyclists have opted to lock their bicycles outside of the stations. Among the 239 stations that were observed for this study, over 28 percent of the stations did not provide any bicycle parking. Without bicycle parking at transit stations, commuters have improvised by locking bicycles to any available railing or pole. Cyclists who lock their bicycles to the entrances of the subway create a trip hazard for passengers exiting and entering the
station. As a result, the MTA has posted signs at all subway stations notifying users that bicycles found attached to the railings will be removed and taken to the MTA's Lost & Found.

A bicycle found chained to subway entrance



MTA Bicycle Lost Property Sign

A bicycle chained to the elevated train structure

Moving towards a more bicycle friendly environment, as part of their citywide flood prevention plan, the MTA hired Grimshaw Architects to design elevated subway ventilation grates that double as bicycle parking and seating. The primary function of the elevated ventilation grate is to prevent rainwater run-off from flooding the subway stations. The atypical design of the bicycle racks and the strategic placement of the benches help to minimize the potential for pedestrians walking on the sidewalk to injure themselves. Made of steel, both the grates and bicycle racks are durable and can withstand inclement weather. This re-design of the subway grate meets the needs of the MTA by reducing subway flooding, while providing much needed bicycle parking and seating with a unique urban design. The prototype was released in the Fall of 2008 and the installation of 15 ventilation grates in Lower Manhattan was completed during the Spring of 2009.

Elevated subway ventilation grates with built-in bicycle parking and sitting at West Broadway and Chambers Street

This location provides up to 16 bicycle parking spaces.

New York City Department of Transportation

CityRacks Program

CityRacks is a program managed by the New York City Department of Transportation (CDOT) to provide free bicycle racks throughout New York City to encourage cycling for commuting and short trips. As mentioned in their Strategic Plan, CDOT has installed over 6000 CityRacks and anticipates the installation of an additional 5,000 CityRacks and 37 Cemusa bicycle shelters by the year 2011. Through an increase in bicycle parking and bicycle lanes, CDOT expects to double the number of bicycle commuters by 2015 from 19,900* commuters in 2007.

Currently the *CityRacks* program uses the standard inverted "U" and wave racks both made of square steel tube pipe coated with a black polyester finish. *CityRacks* are installed based on public request as well as locations proposed by CDOT. This process allows community organizations, businesses and local residents to request bicycle racks for their neighborhood. An application for the bike parking installation goes through a pre-evaluation process to determine if the site meets CDOT's criteria. If the site is approved, a CDOT inspector is dispatched to the location to verify that the location meets the siting criteria which requires that the location be:

- City-owned property;
- Wide sidewalk (minimum sidewalk width 12 feet)
- Removed from the natural flow of pedestrians usually at the curb and always away from crosswalks;
- Usually a minimum of 6 feet from other street furniture (e.g., street signs, mailboxes, benches, and telephones)
- Greater distances from certain features (e.g., up to 13 feet from fire hydrants, and 15 feet from bus stop shelters and newsstands);
- *CityRacks* can not be installed on pavers, cobblestone, brick, stone/slate slabs, custom/patterned concrete or metal grating.

If the site meets the above-listed criteria, a CDOT inspector, using the *CityRacks* Bicycle Rack Clearance Standards as a guide, marks the site with spray paint to indicate to the contractor the proper placement of the rack. The location is then added to the contractor's list for future installation.

**The average of counts taken in the Spring, Summer & Fall over a 12 hour period*

In March 2008, CDOT commenced a search for a new citywide bicycle rack design with the *CityRacks Design Competition*. Sponsored by CDOT, in partnership with the Cooper-Hewitt National Design Museum and the support of Google, Inc. and Transportation Alternatives, the objective of the competition was to find a new on-street bicycle rack that would be more noticeable and able to blend in with the character of any neighborhood while remaining functional. After several months of reviewing over 200 designs, the "Hoop" design of Ian Mahaffy and Maarten DeGreeve was selected. The winning design is round with a horizontal bar that allows users to lock both the wheel and the frame of the bicycle. Made of cast-metal, this new rack is designed to withstand the outdoor elements. The first "Hoop" racks were installed along Broadway between 43rd and 44th streets in conjunction with the unveiling of the new pedestrian plaza in Times Square. CDOT will continue to install the new CityRacks throughout the five boroughs.

CityRacks Design Competition winner "Hoop" on display at Astor Place subway station

Newly installed CityRacks "Hoop" design at Hanover Square in Lower Manhattan

Cemusa Bike Shelter – Coordinated Street Furniture

In July 2005, Cemusa, a Spanish street furniture company was granted a franchise by the city to design, manufacture, install and maintain street furniture in New York City. As a part of the franchise, Cemusa designed sleek metal Bus Shelters, Newsstands, Automated Public Toilets and Sheltered Bicycle Parking. The bicycle shelters are equipped with stainless steel racks to accommodate eight bicycles and a full size bicycle map. The shelter is designed to provide covered bicycle parking to protect bicycles from inclement weather and is well lit to provide a safe environment for cyclists parking and retrieving their bicycles. With 20 shelters already in place, Cemusa will be installing a total of 36 bicycle shelters throughout the five boroughs.

Similar to the *CityRacks*, the Cemusa bicycle shelter has minimum clearance requirements that have to be met prior to installation. These requirements include:

- A 7 foot path for pedestrian circulation
- 3 feet setback from the curb
- 10 feet from the fire hydrants and standpipes
- 7 feet from tree trunks and tree canopies
- 5 feet from tree pits and cellar doors
- 3 feet from streetlights and traffic signal poles
- Permission from property owners if the shelter is blocking an entrance

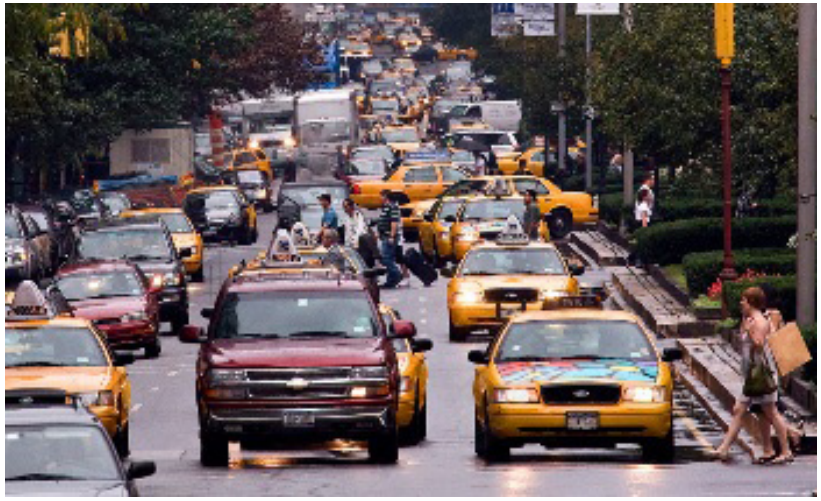
The siting requirements for sheltered bicycle parking are more stringent in comparison to those of the *CityRacks*. Because the shelter occupies a larger amount of space on the sidewalk, the siting requirements must ensure that pedestrian circulation is safely maintained .

Cemusa bicycle shelter at Union Square

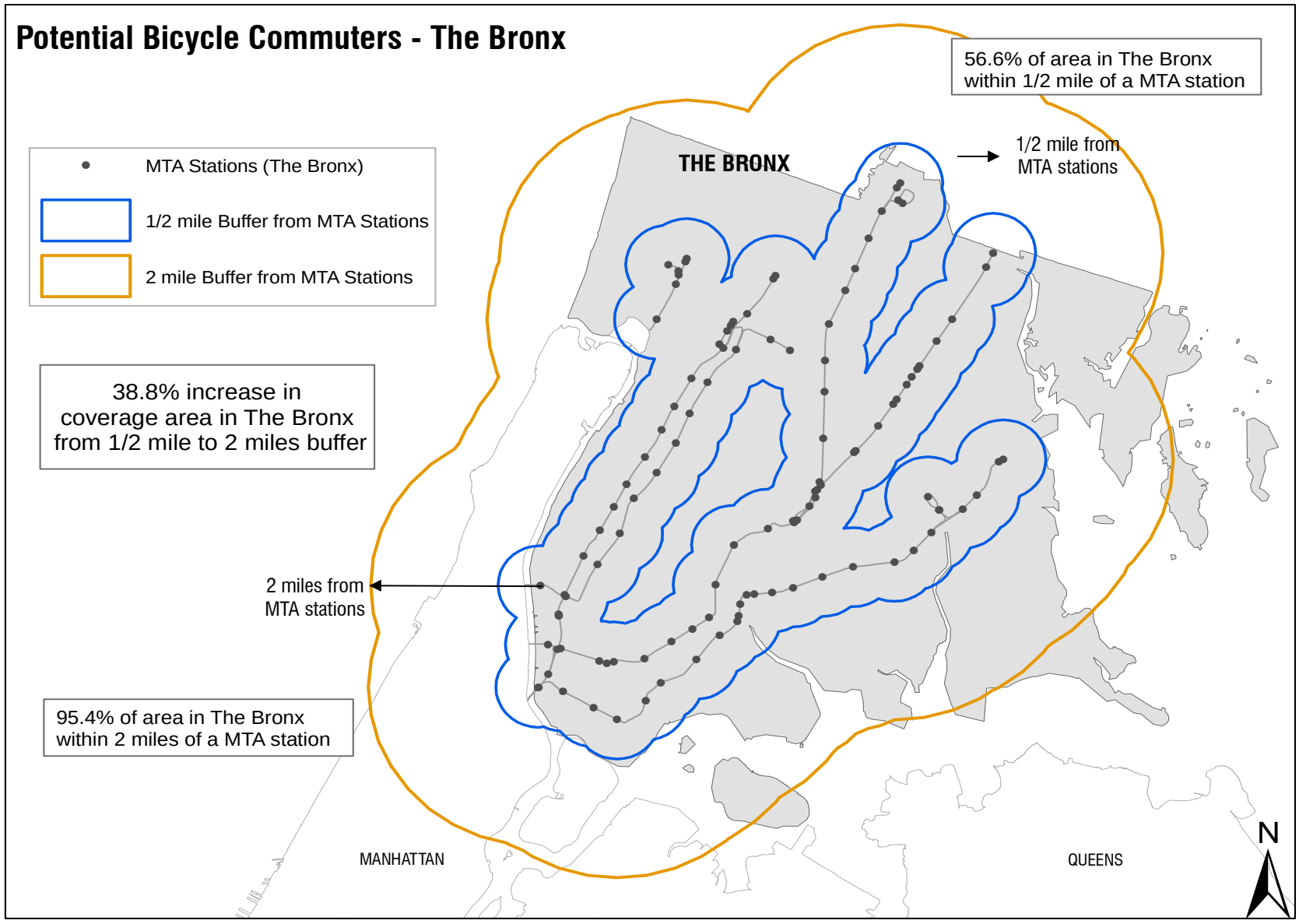
Potential Bicycle Commuters

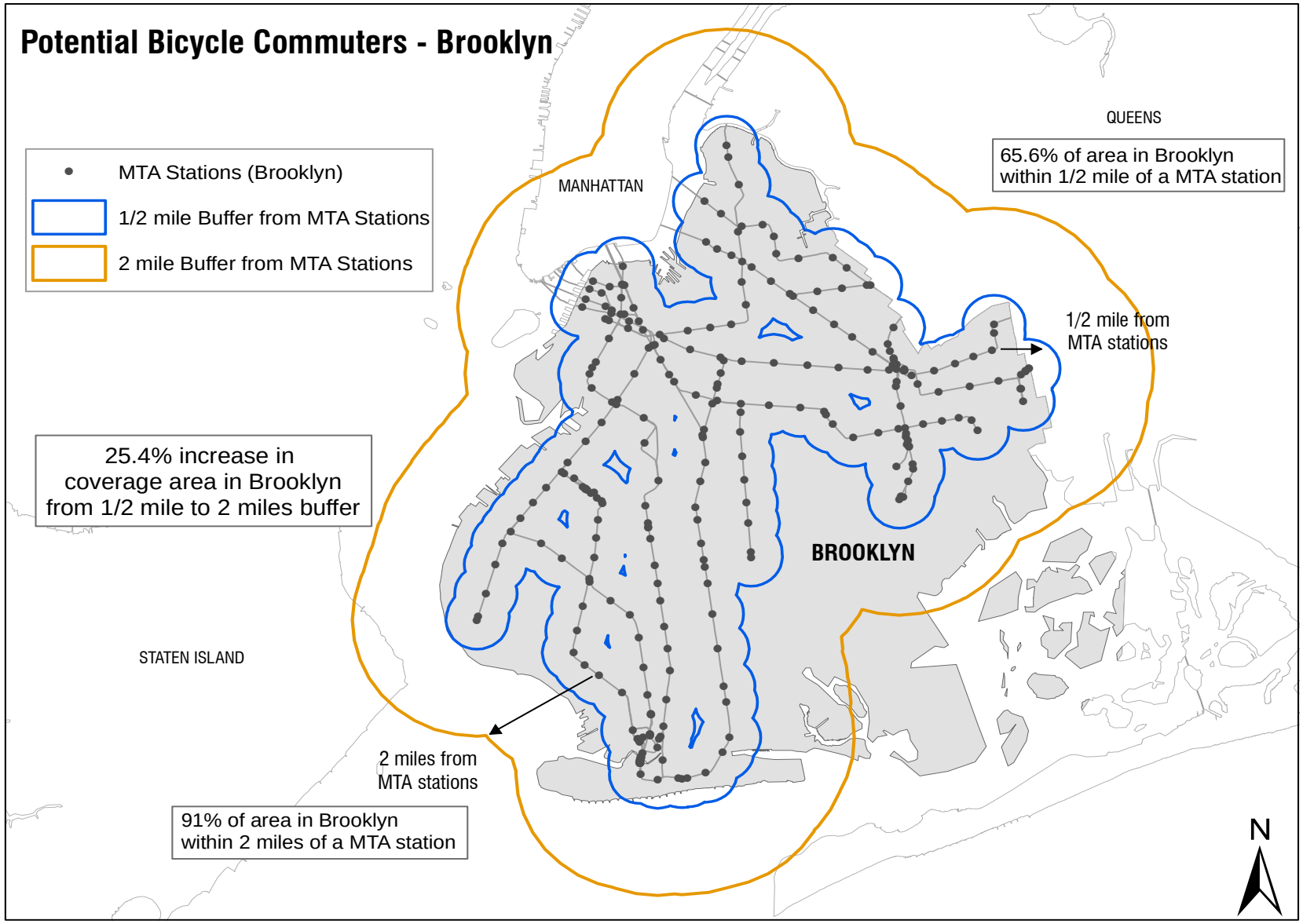
The purpose of this project is to recommend secure bicycle parking at transit locations to encourage potential bicycle commuters to ride their bicycles to a transit station, park their bicycles and continue their commute to work on the subway or commuter rail.

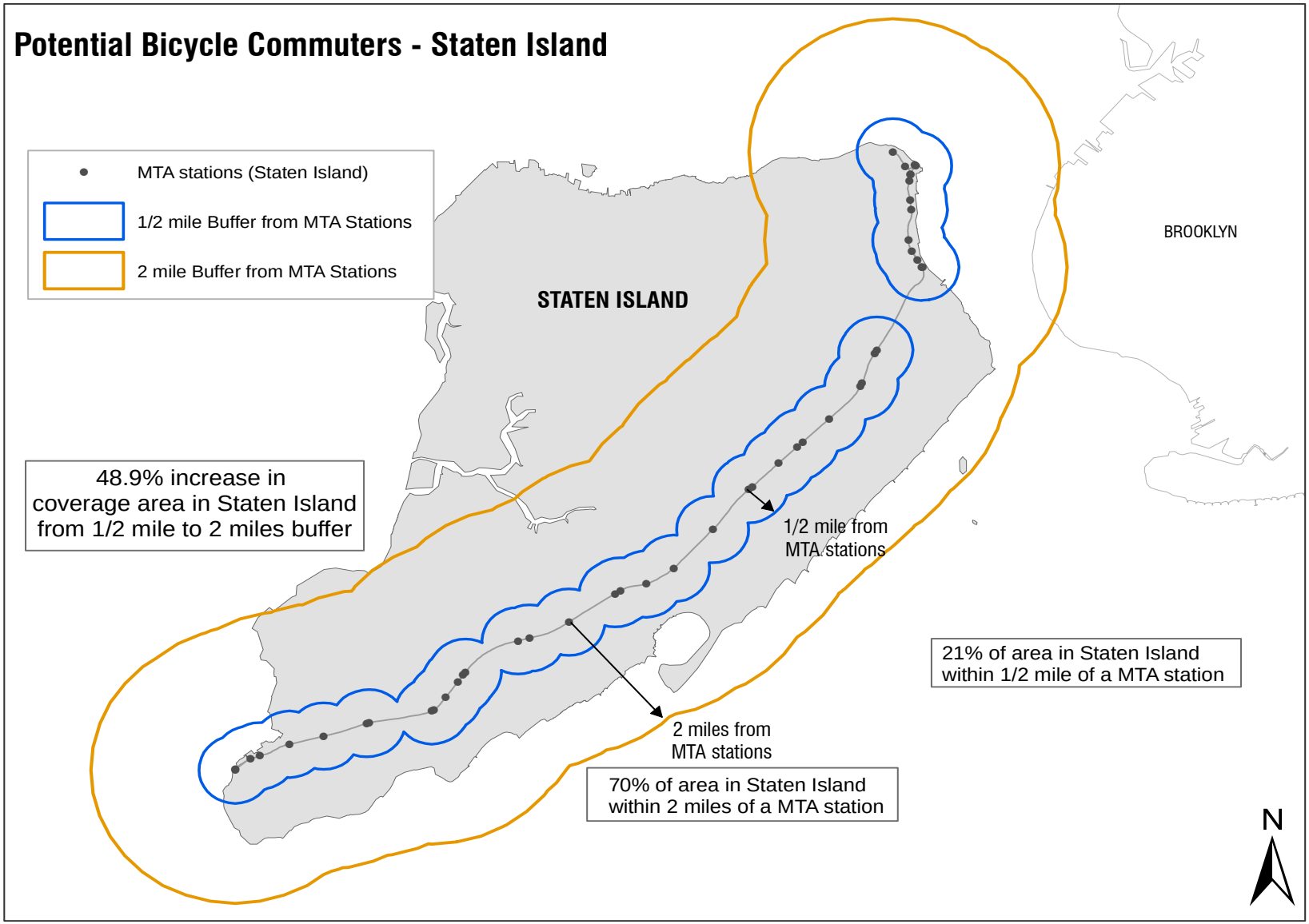
The following maps show how the catchment area for transit users can be increased if the appropriate bicycle parking and infrastructure are in place to safely allow people to travel to and from transit via bicycle. The borough of Manhattan was excluded from this section because most of the transit stations are within a ten minute walking distance. The "inner ring" represents a half-mile radius that people are willing to walk in any direction to transit. This distance is approximately a ten minute walk and is considered an acceptable length of time at the average walking speed. Any distance outside of this half-mile radius will require transit users to either use the bus, a commuter van or drive their personal vehicle to transit. With the integration of bicycles and transit, the standard half mile walkable distance increases to a two-mile bikeable distance represented by the "outer ring". The two-mile radius increases the percentage of people that have access to transit by way of bicycle. This increase in catchment area provides commuters with another viable mode of transportation other than a personal vehicle. Removing even a small number of vehicles from the road will reduce the negative impact automobiles have on the environment and ease traffic congestion.

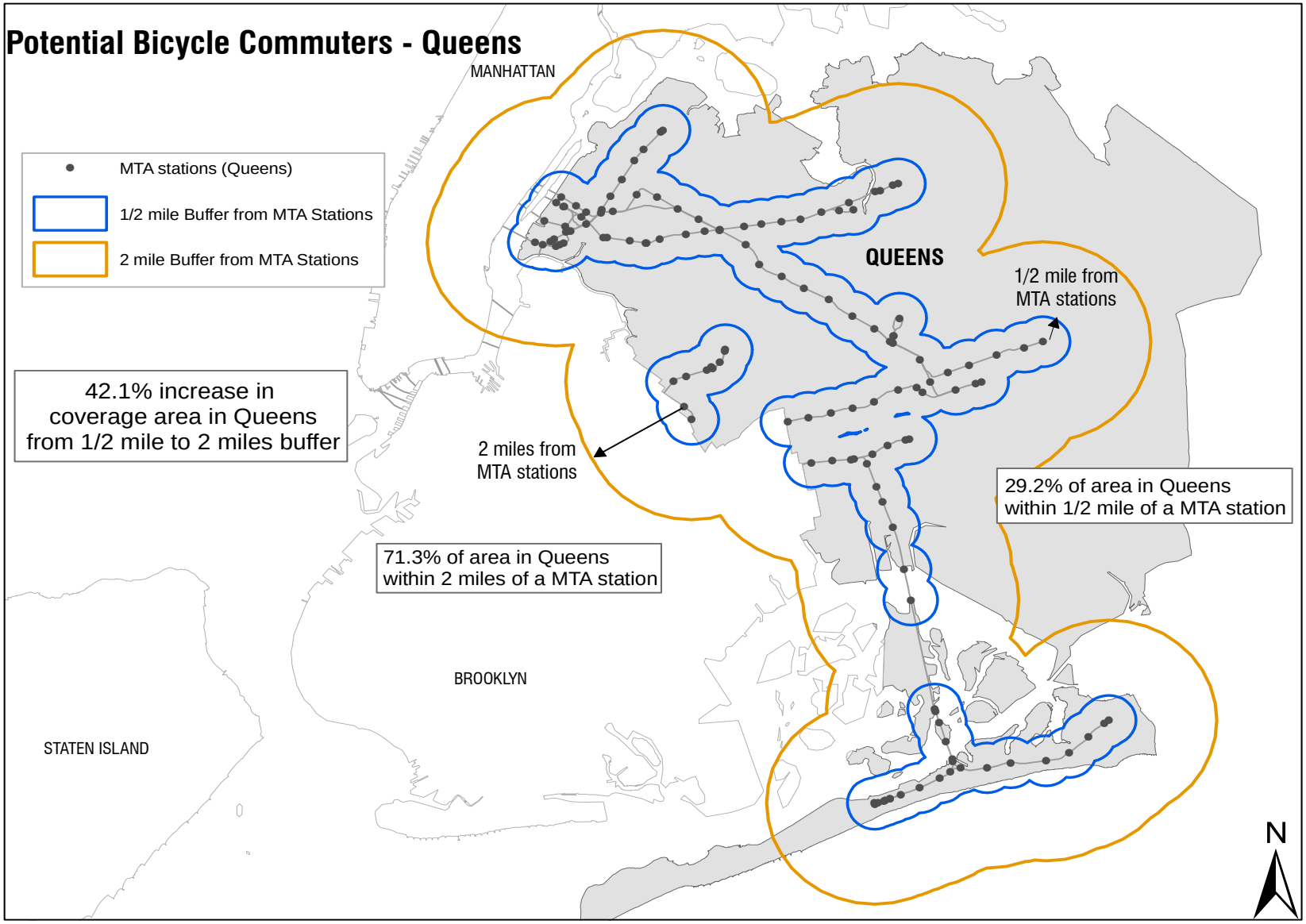


Courtesy of www.metroscenes.com


Potential Bicycle Commuters - The Bronx
56.6% of area in The Bronx within 1/2 mile of a MTA station
MTA Stations (The Bronx)
1/2 mile Buffer from MTA Stations
2 mile Buffer from MTA Stations
THE BRONX
1/2 mile from MTA stations
38.8% increase in coverage area in The Bronx from 1/2 mile to 2 miles buffer
2 miles from MTA stations
95.4% of area in The Bronx within 2 miles of a MTA station
MANHATTAN
QUEENS
N


Potential Bicycle Commuters - Brooklyn
MTA Stations (Brooklyn)
1/2 mile Buffer from MTA Stations
2 mile Buffer from MTA Stations
MANHATTAN
QUEENS
65.6% of area in Brooklyn within 1/2 mile of a MTA station
1/2 mile from MTA stations
25.4% increase in coverage area in Brooklyn from 1/2 mile to 2 miles buffer
BROOKLYN
STATEN ISLAND
2 miles from MTA stations
91% of area in Brooklyn within 2 miles of a MTA station
N


Potential Bicycle Commuters - Staten Island
MTA stations (Staten Island)
1/2 mile Buffer from MTA Stations
2 mile Buffer from MTA Stations
STATEN ISLAND
BROOKLYN
48.9% increase in coverage area in Staten Island from 1/2 mile to 2 miles buffer
1/2 mile from MTA stations
21% of area in Staten Island within 1/2 mile of a MTA station
2 miles from MTA stations
70% of area in Staten Island within 2 miles of a MTA station
N


Potential Bicycle Commuters - Queens
MANHATTAN
MTA stations (Queens)
1/2 mile Buffer from MTA Stations
2 mile Buffer from MTA Stations
QUEENS
1/2 mile from MTA stations
42.1% increase in coverage area in Queens from 1/2 mile to 2 miles buffer
2 miles from MTA stations
29.2% of area in Queens within 1/2 mile of a MTA station
71.3% of area in Queens within 2 miles of a MTA station
BROOKLYN
STATEN ISLAND
N

Station Evaluation Process

Methodology

There were 239 transit stations analyzed for this report to determine the demand for bicycle parking. Potential locations were compiled from several sources including CDOT, the Metropolitan Transportation Authority, the staff of the NYC Department of City Planning-Transportation Division, and the *New York City Bike Parking Survey*. After discussing the scope of the study with the CDOT Bicycle Program, a list of transit stations were provided to DCP; all of which CDOT staff were interested in having surveyed as a part of this study to establish the level of demand for bicycle parking at each listed station. The Strategic Initiatives Division of the MTA expressed an interest in the study and were interested in finding out what the actual demand for bicycle parking was along the (7) subway line in the borough of Queens. As a result, all of the stations along the (7) line were added to the list of locations to be surveyed. A meeting was also held with staff members of DCP-Transportation Division to get a sense of possible demand for bicycle parking at transit stations in the outer boroughs where cycling may be a primary means of transportation for many people. In addition, terminal stations at the end of the subway lines and stations with connectivity to other modes of transportation were added to the list. The land-use for each station varied and included schools, residential areas and commercial areas.

The New York City Bike Parking Survey was a survey conducted via the internet by two Hunter College students as a part of a graduate school project to find out where New Yorkers would like to have bicycle parking placed to meet their needs. The *New York City Bike Parking Survey* was approaching its final stages of data collection concurrently with the assembly of the preliminary list of transit stations for this study. Because the locations provided by the respondents were located throughout the city, it was determined that the information from the survey would be valuable for use in this study. The locations that were in close proximity to train stations were extracted from the survey data and added to the list of locations. (*See Appendix C for complete list)*

Prior to surveying each station, DCP staff were trained by a CDOT *CityRacks* inspector on the correct method of siting a location for *CityRacks* installation. Upon the completion of training, each station was surveyed using the specifications provided in the CDOT Bicycle Parking Clearance Standards. (*See Appendix D)* The stations were visited between the hours of 9am and 5pm throughout the summer months between June and August 2008 during suitable bicycle riding conditions. The existing conditions of each subway station was documented and included a general description of the sidewalk widths, the number of bicycles found at the station, the available bicycle parking and recommended locations for potential bicycle parking placement. Unable to determine whether all of the bicycles noted during this study belong to commuting cyclists or those simply running errands in the area, recommending bicycle parking regardless of the user, ensures the need for bicycle parking is being met. After all of the stations were surveyed, the data was entered into a spreadsheet and analyzed to establish stations that exhibited a demand for bicycle parking, the type of racks that were at each station and whether the existing bicycle parking demand was being met by the available bicycle parking.

While the stations were being surveyed, research was conducted to establish a list of bicycle parking designs that are secure and able to get the maximum use of the rack within the available space. After extensive research, eight bicycle parking designs were chosen that were not only secure but implementable in New York City. Each design was also chosen based upon its ability to function under specific conditions. Each station has it own conditions and level of demand. In an attempt to satisfy the demand for bicycle parking without making adjustments to the space, the selected designs were adjusted to meet each station's needs fulfilling the site specific criteria of the study. With security as a main concern for many New York City cyclists, all of the bicycle parking options that were selected had to meet basic security standards, which included resistance to pipe cutters and the users ability to lock their bicycle to more than one point on the rack. It is important to note that while site specific bicycle parking designs were chosen for this study, each station can benefit from the installation of *CityRacks bicycle rack.* In addition, a complete list of the stations surveyed for this study has been made available to the *CityRacks* Division at CDOT for *CityRacks* installation according to their to be determined schedule.

Once the data was collected, the demand for each station was determined and the bicycle parking designs were selected. The data was sorted a second time to include an installation priority rating and a site specific bicycle parking treatment. The installation priority system from highest to lowest (1^{+} - 3) is based upon the number of bicycles found at each station and whether the demand is being met with the provided bicycle parking. At stations where many bicycles were found parked but there were only two inverted "U" *CityRack,* those stations were assigned a priority level 1. A station under the previously described circumstances could have several bicycles parked along the sidewalk and station entrances, posing a hazard to transit users and pedestrians. With a high rating, it is understood the that immediate bicycle parking is needed to meet the existing demand and minimize the possible risks posed to the public. On the other hand there were stations that had a low existing demand for bicycle parking that may or may not be met with available bicycle parking. In this case the station receives a rating of 3 indicating that while bicycle parking is needed, the impact of not having immediate installation will have a minimal effect on the station and the cyclists in the area.

Upon closer review of the stations sorted by borough, it was determined that under the existing priority system the boroughs of Staten Island and the Bronx were at a great disadvantage in comparison to the other boroughs because borough-wide there were very few bicycles at the observed transit stations. The results under the established system generated a borough-wide low priority rating. If these results correlated with an actual implementation phasing system, both the Bronx and Staten Island would be the last boroughs to receive services. It was determined that in order to maintain equity, the boroughs with the lowest demand should not be measured at the same scale as the other boroughs with a higher bicycle parking demand. A new installation priority system was developed from highest to lowest (1* - 3*) to be used only for the Bronx and Staten Island. *(See Appendix D for complete priority rating list)*

Priority Table used for stations in Brooklyn, Manhattan & Queens

# of Bicycles	Priority Level
>50	*1+*
11-49	*1*
6-10	*2*
0-5	3

Priority Table used for the Bronx and Staten Island

# of Bicycles	Priority Level
1-4	1*
0	3*

After each station was assigned a priority rating and all possible site specific bicycle parking designs were examined, a case study recommendation matrix was created to assist in selecting the station that could best demonstrate the benefits and functionality of each chosen bicycle parking system within a specific environment. To create the matrix, all of the stations with a priority rating less than (1 or 1*) were extracted from the total data set. Those stations that required additional evaluation from CDOT or whose supply of existing racks met the current demand were also extracted from the data set. The remaining stations were sorted by borough and were added to the case study recommendation matrix. With the matrix complete, the field notes and pictures for the corresponding stations were reviewed to determine which station was best suited as a case study for each bicycle parking design. It was also important when choosing the stations for case studies that each borough was represented. From this process the nine stations for selected for case studies.

(See matrix on next page.)

Case Study Recommendation Matrix

Brooklyn	*CityRack*	*Retrofitted Parking Meter*	*Tree Guard*	*Vertical Bicycle Rack*	*Bike Lockers*	*Curb Extension*	*2-Tiered Bicycle Parking*	*Cemusa*	*Multiple "U"*	*Indoor Parking*
Lafayette (C)		X								
Carroll St. (F,G)		X								
7th Avenue (B,Q)		X	X	X						
DeKalb Ave* (B,Q,R,M)				X						
Graham (L)		X							X	
Metropolitan Avenue (G)										X
Court St. Borough Hall (M,R,2,3,4,5)								X	X	
Bronx										
Spuyten Duyvil (Metro North)					X					
Fordham (Metro North)	X									
Kingsbridge Road (4)									X	
Bedford Park Blvd (D)	X									
Manhattan										
Astor Place (6)									X	
Delancey St-Essex St (F,J,M,Z)		X								
2nd Ave/LES (F,V)		X								
116th St-Columbia University (1)			X							
23rd St (F,V)			X						X	
Brooklyn Bridge/City Hall (4,5,6)							X		X	
1st Ave (L)		X								
6th Ave (L)		X								
14th St-6th Avenue (F,V)									X	
14th St-Union Square (L,N,R,W,Q,4,5,6)							X			
Queens										
Flushing (LIRR)		X								
74th St-Broadway (7,E,F,V,R,G)		X				X				
46th St (7)			X						X	
Jackson Heights-Roosevelt Ave (E,F,G,R,V)				X					X	
Vernon Blvd/Jackson Ave (7)						X			X	
90th St/Elmhurst Ave (7)		X				X				
Astoria/Ditmars Blvd (N,W)	X								X	
Staten Island										
Eltingville (SIR)		X								
St. George (SIR)								X		
Grant City (SIR)	X									

X — Station has met criteria for specific parking system

X — Station chosen as a Case Study

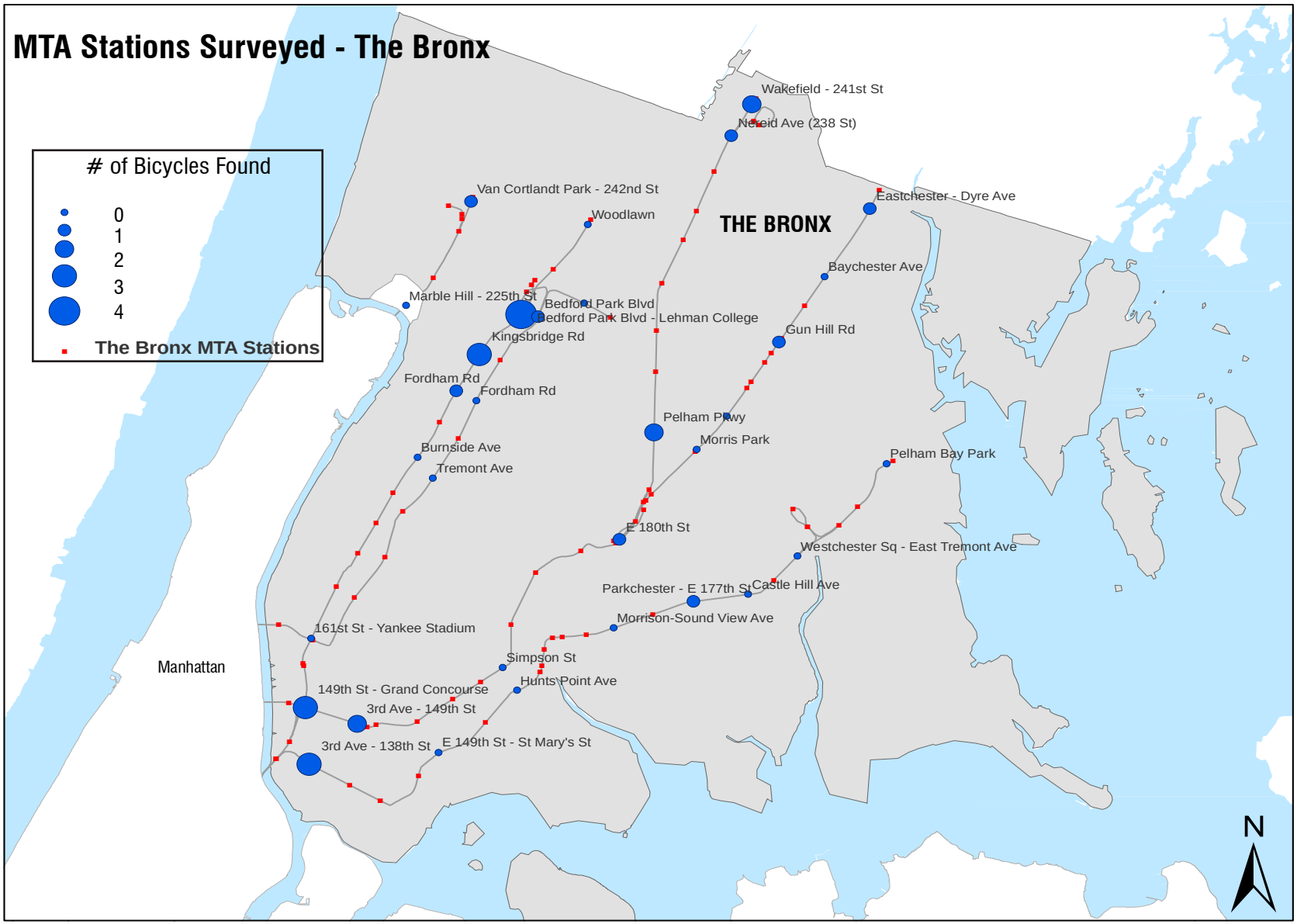
Data Analysis by Borough

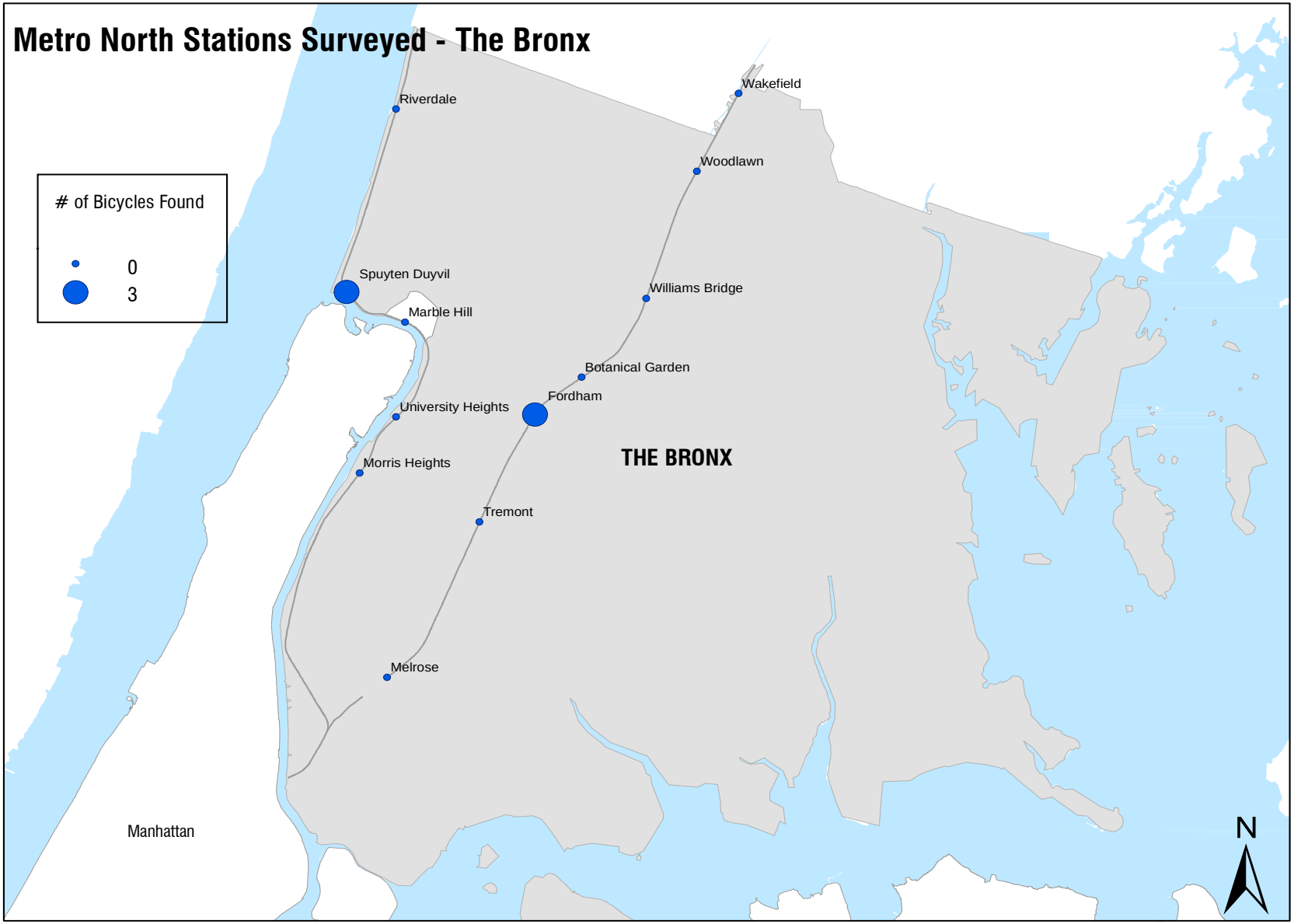
After surveying the 239 transit stations throughout the five boroughs, it was discovered that there were many more cyclists in the outer boroughs than previously expected. This study uses the number of bicycle found at each station as the determining factor for bicycle parking demand. The method of analysis used in this study does not distinguish the difference between commuter cyclists and cyclists using the available bicycle parking while conducting errands or for everyday bicycle storage. While this survey does not accurately indicate the total number of cyclists that ride to and from transit on a daily basis, it is a starting point to determine whether or not the demand for bicycle parking regardless of its user exists at the observed stations and whether this demand is being met. This chapter summarizes the data for each borough, and includes maps of each borough depicting the stations that were surveyed and the number of bicycles found at each one. These maps show some significant patterns pertaining to bicycles parked near transit, such as higher concentrations of parked bicycles in certain neighborhoods (e.g., Manhattan below 23rd Street); or along certain subway lines (#7 train in Queens). Priority maps have also been included to depict the distribution of stations throughout each borough based upon the priority rating system included in the methodology.

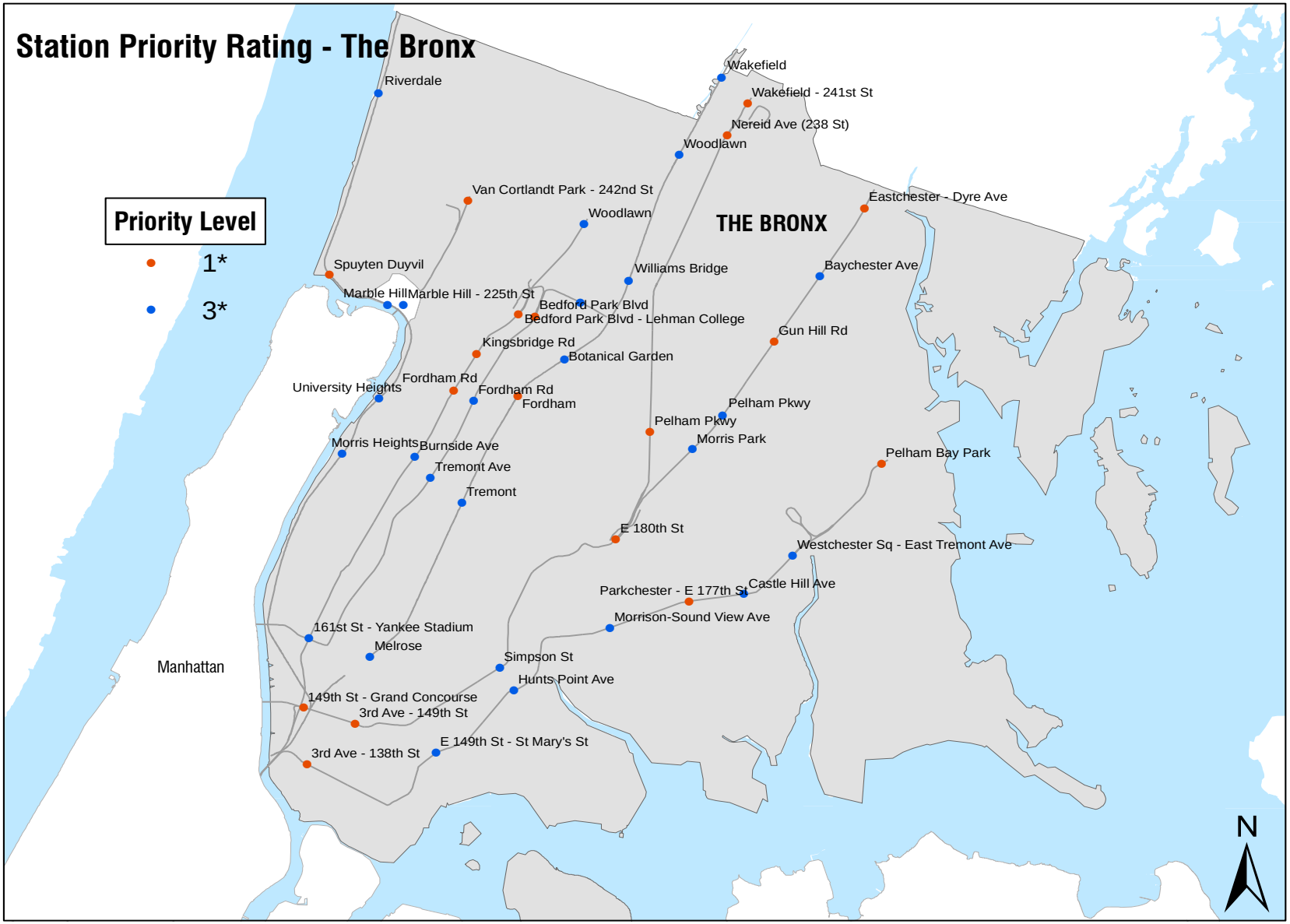
The Bronx

In the Bronx, 44 stations were surveyed including 12 Metro North stations. Of the stations surveyed, 17 stations exhibited bicycle activity with a maximum of three bicycles found parked at a station. Five percent of the stations surveyed provided bicycle parking. Based upon this limited survey, it is very difficult to determine the reason for such a low demand for bicycle parking at transit stations throughout the borough. It appears that such low bicycle activity could be attributed to the suspicion of bicycle theft and/or the absence of secure bicycle parking at the transit stations. If there is no secure bicycle parking available at the surveyed transit stations in the Bronx, it is fair to assume that the cyclists in the area will not bring their bicycle to the stations. Another factor may be the lack of existing bicycle infrastructure that leads to and from the transit stations. When compared to a map of existing Class I, II, & III bicycle lanes throughout the borough, the western end of the borough with the greater number of bicycle lanes was the same area found during this study to have the greater number of bicycles at the transit stations. If there is no safe route to and from the stations, cyclists, particularly novice cyclists will not feel comfortable riding to transit as a link in their daily commuting chain.

Based upon the findings of this bicycle parking study, it is recommended that basic secure bicycle parking be provided at most transit and Metro North stations throughout the borough. Increasing the amount of bicycle lanes borough-wide may also encourage potential users to bike to transit.


MTA Stations Surveyed - The Bronx
# of Bicycles Found
0
1
2
3
4
The Bronx MTA Stations
THE BRONX
Manhattan
Wakefield - 241st St
Nereid Ave (238 St)
Van Cortlandt Park - 242nd St
Woodlawn
Eastchester - Dyre Ave
Baychester Ave
Marble Hill - 225th St
Bedford Park Blvd
Bedford Park Blvd - Lehman College
Gun Hill Rd
Kingsbridge Rd
Fordham Rd
Fordham Rd
Pelham Pkwy
Morris Park
Burnside Ave
Tremont Ave
Pelham Bay Park
E 180th St
Westchester Sq - East Tremont Ave
Parkchester - E 177th St
Castle Hill Ave
Morrison-Sound View Ave
161st St - Yankee Stadium
Simpson St
Hunts Point Ave
149th St - Grand Concourse
3rd Ave - 149th St
3rd Ave - 138th St
E 149th St - St Mary's St
N

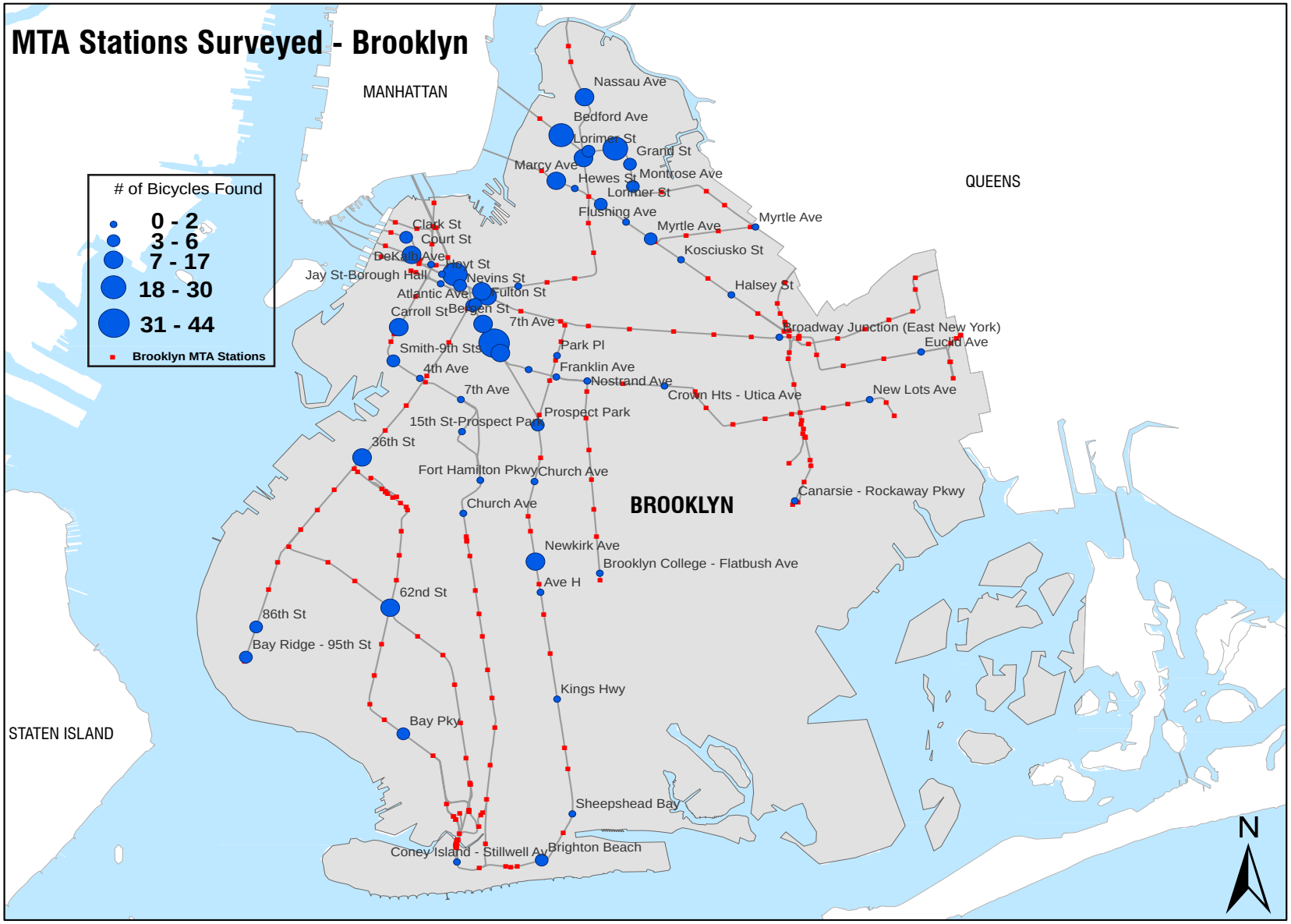

Metro North Stations Surveyed - The Bronx
# of Bicycles Found
0
3
Wakefield
Riverdale
Woodlawn
Spuyten Duyvil
Williams Bridge
Marble Hill
Botanical Garden
Fordham
University Heights
THE BRONX
Morris Heights
Tremont
Melrose
Manhattan
N

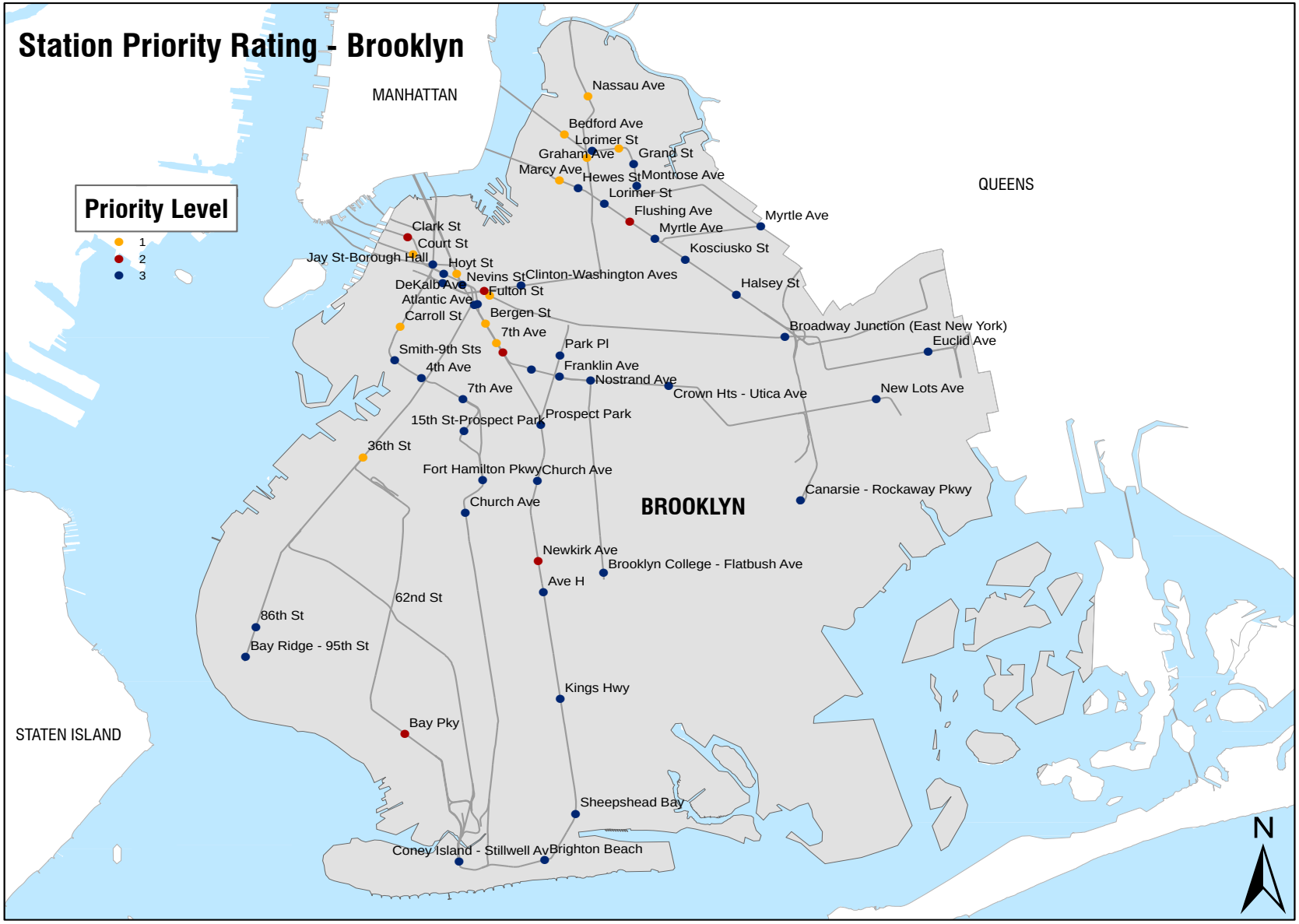

Station Priority Rating - The Bronx
Priority Level
1*
3*
THE BRONX
Manhattan
Wakefield
Riverdale
Wakefield - 241st St
Nereid Ave (238 St)
Woodlawn
Van Cortlandt Park - 242nd St
Eastchester - Dyre Ave
Woodlawn
Spuyten Duyvil
Williams Bridge
Baychester Ave
Marble Hill
Marble Hill - 225th St
Bedford Park Blvd
Bedford Park Blvd - Lehman College
Gun Hill Rd
Kingsbridge Rd
Botanical Garden
University Heights
Fordham Rd
Fordham Rd
Fordham
Pelham Pkwy
Pelham Pkwy
Morris Park
Morris Heights
Burnside Ave
Tremont Ave
Pelham Bay Park
Tremont
E 180th St
Westchester Sq - East Tremont Ave
Castle Hill Ave
Parkchester - E 177th St
Morrison-Sound View Ave
161st St - Yankee Stadium
Melrose
Simpson St
Hunts Point Ave
149th St - Grand Concourse
3rd Ave - 149th St
E 149th St - St Mary's St
3rd Ave - 138th St
N

Brooklyn

In the borough of Brooklyn, there were 60 stations surveyed. Among the stations surveyed, those with 11 or more bicycles found were considered high priority stations. 47 percent of the stations surveyed provided some form of bicycle parking. However, it was observed that the available parking was either not sufficient for the current demand, or the available parking provided was not the best fit for the space. In the northern section of Brooklyn, there are more bicycles than there is space to park them. In areas with such high demand for bicycle parking, alternate methods of bicycle parking are needed to minimize clutter and maximize the use of available space on sidewalks and inside subway stations.

Overall, there is a large amount of bicycle activity within the borough of Brooklyn, unfortunately this activity is concentrated in small areas, such as the Williamsburg neighborhood. Through expanded bicycle infrastructure, potential users can be encouraged to include cycling in their commute which will increase the demand for bicycle parking at transit stations in other neighborhoods in the borough.

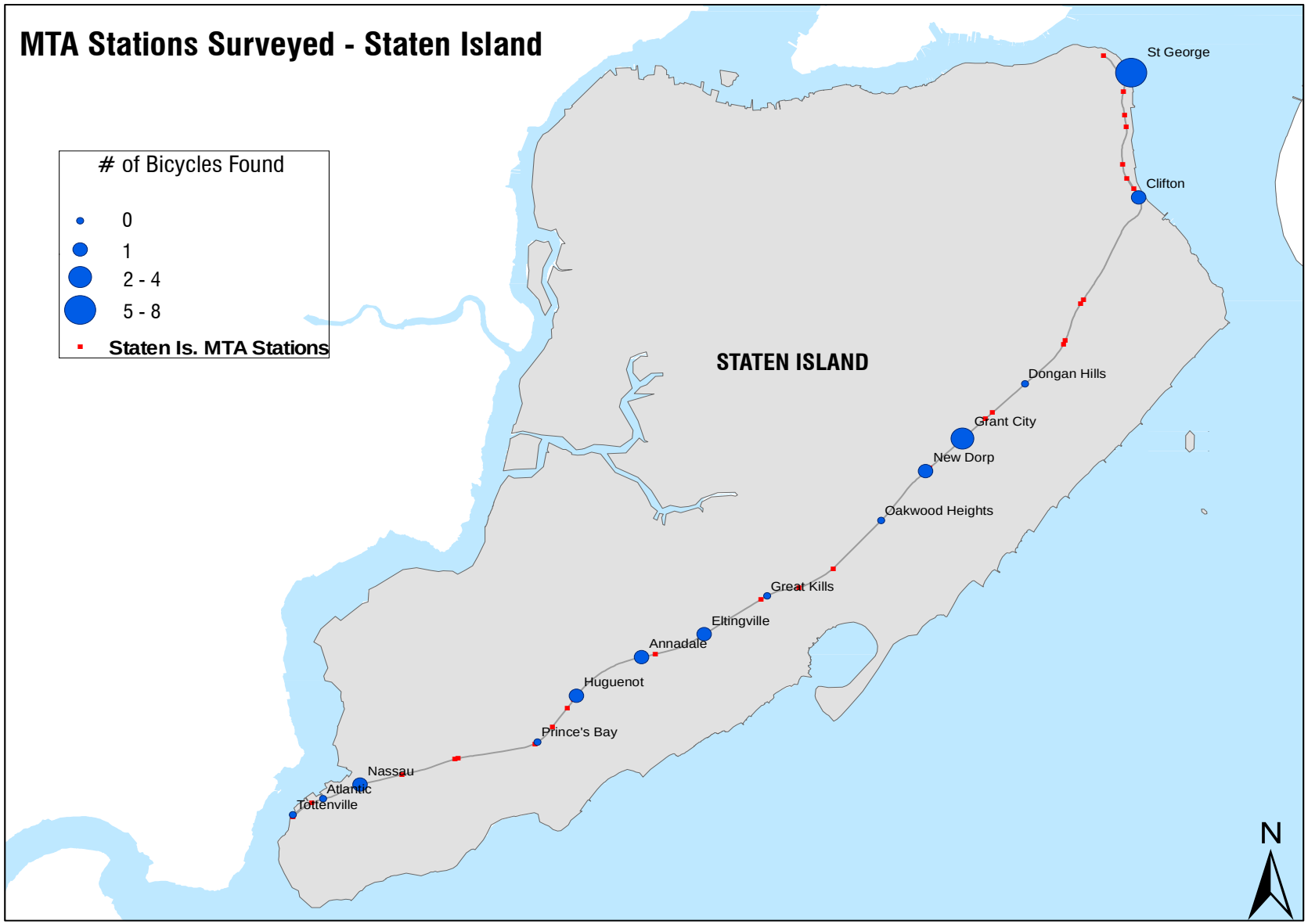

MTA Stations Surveyed - Brooklyn
# of Bicycles Found
0 - 2
3 - 6
7 - 17
18 - 30
31 - 44
Brooklyn MTA Stations
MANHATTAN
QUEENS
BROOKLYN
STATEN ISLAND
Nassau Ave
Bedford Ave
Lorimer St
Grand St
Marcy Ave
Hewes St
Montrose Ave
Lorimer St
Flushing Ave
Myrtle Ave
Myrtle Ave
Kosciusko St
Halsey St
Broadway Junction (East New York)
Euclid Ave
New Lots Ave
Crown Hts - Utica Ave
Clark St
Court St
DeKalb Ave
Hoyt St
Jay St-Borough Hall
Nevins St
Atlantic Ave
Fulton St
Carroll St
Bergen St
7th Ave
Park Pl
Franklin Ave
Nostrand Ave
Smith-9th Sts
4th Ave
7th Ave
15th St-Prospect Park
Prospect Park
36th St
Fort Hamilton Pkwy
Church Ave
Church Ave
Canarsie - Rockaway Pkwy
Newkirk Ave
Brooklyn College - Flatbush Ave
Ave H
62nd St
86th St
Bay Ridge - 95th St
Kings Hwy
Bay Pky
Sheepshead Bay
Coney Island - Stillwell Av
Brighton Beach
N

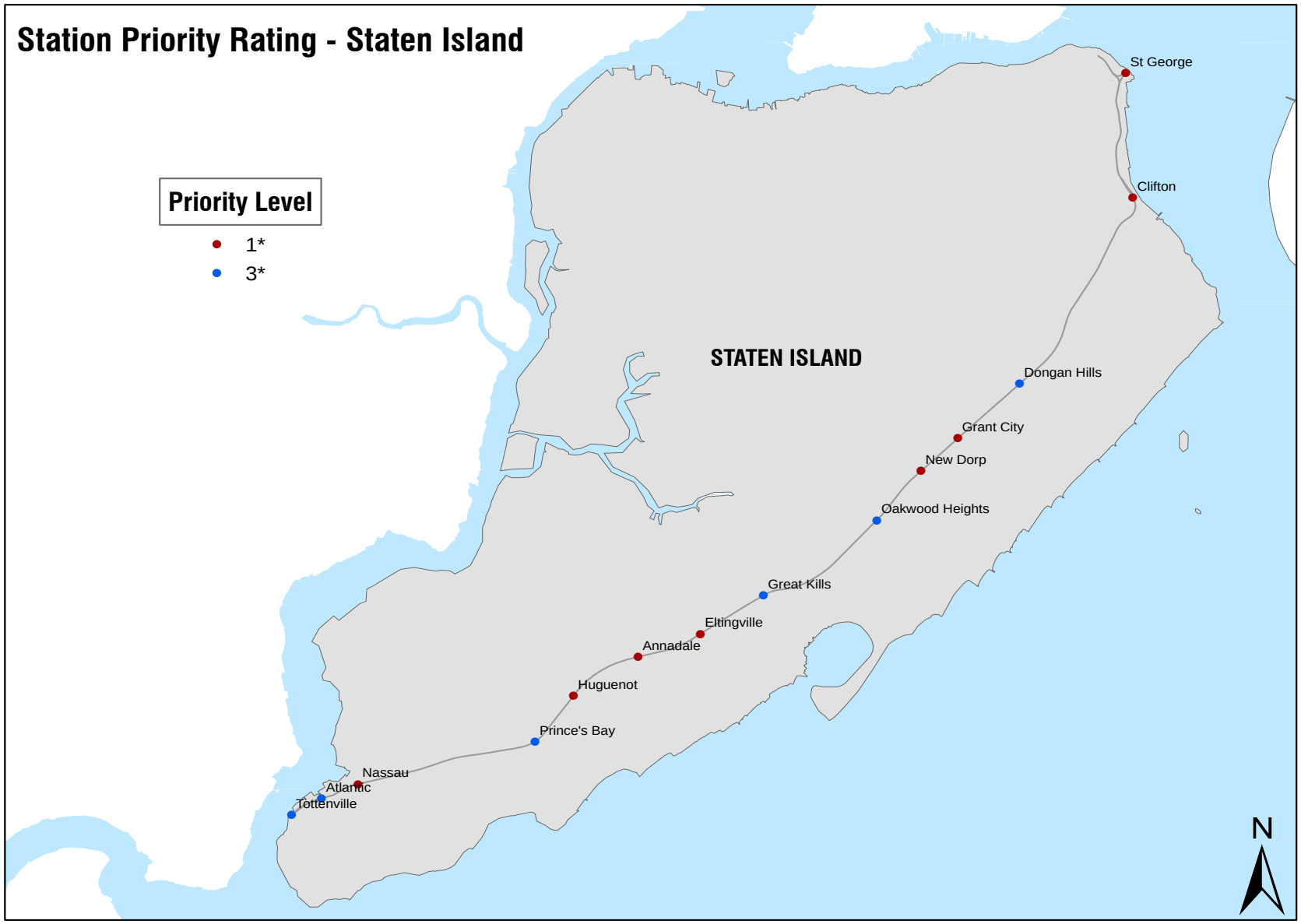

Station Priority Rating - Brooklyn
Priority Level
1
2
3
MANHATTAN
QUEENS
BROOKLYN
STATEN ISLAND
Nassau Ave
Bedford Ave
Lorimer St
Graham Ave
Grand St
Marcy Ave
Hewes St
Montrose Ave
Lorimer St
Flushing Ave
Myrtle Ave
Myrtle Ave
Kosciusko St
Clark St
Court St
Jay St-Borough Hall
Hoyt St
Nevins St
Clinton-Washington Aves
DeKalb Ave
Fulton St
Halsey St
Atlantic Ave
Carroll St
Bergen St
7th Ave
Broadway Junction (East New York)
Euclid Ave
Park Pl
Smith-9th Sts
4th Ave
Franklin Ave
Nostrand Ave
7th Ave
Crown Hts - Utica Ave
New Lots Ave
15th St-Prospect Park
Prospect Park
36th St
Fort Hamilton Pkwy
Church Ave
Canarsie - Rockaway Pkwy
Church Ave
Newkirk Ave
Brooklyn College - Flatbush Ave
Ave H
62nd St
86th St
Bay Ridge - 95th St
Kings Hwy
Bay Pky
Sheepshead Bay
Coney Island - Stillwell Av
Brighton Beach
N

Staten Island

The Staten Island Rail Road travels north and south along the eastern side of Staten Island. Out of 22 stations along the Staten Island Rail Road, 14 stations were observed for this study. Fifty percent of the stations observed displayed signs of bicycle activity. There were eight bicycles found at the St. George Ferry terminal. (The actual number of cyclists that travel to the ferry terminal is unknown because many cyclists take their bicycles onto the ferry and continue their commute once they arrive in Manhattan.)

Unlike the other boroughs, Staten Island is a more suburban community where cars are the dominent mode of transportation, and the narrow roadways and topography can make it difficult to encourage cycling as a form of commuting. In order to increase the overall number of commuter cyclists in the borough, the proper bicycle infrastructure must be in place to allow people to feel safe while riding their bicycle on the roadway. Simultaneously, secure bicycle parking must be made available to cyclists at the rail stations once they arrive. Installing a standard inverted "U" bike rack at each station would meet existing and potential demand in the future, provide safe and secure parking, and encourage others to consider cycling as part of their commute to the station.

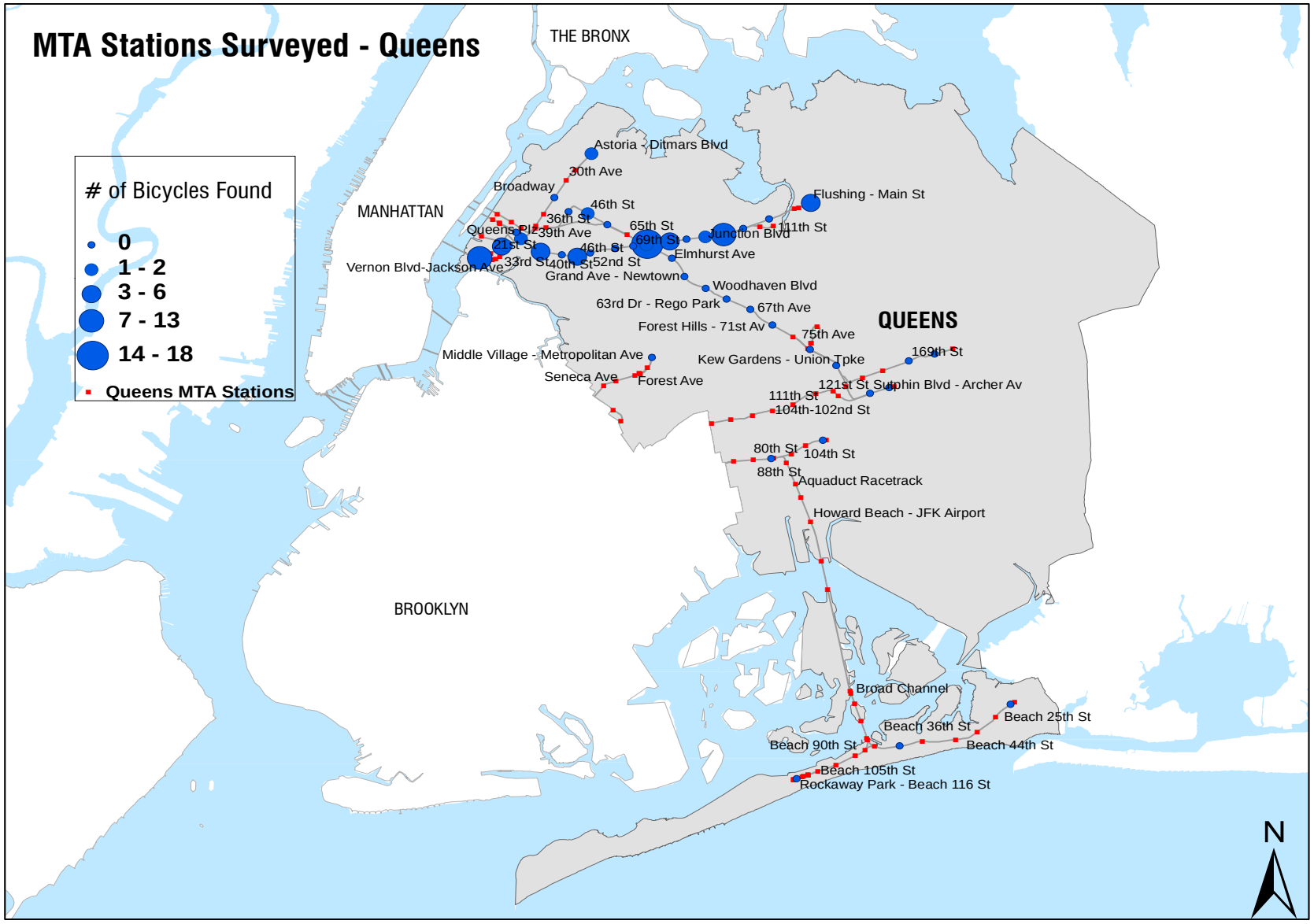

MTA Stations Surveyed - Staten Island
# of Bicycles Found
0
1
2 - 4
5 - 8
Staten Is. MTA Stations
STATEN ISLAND
St George
Clifton
Dongan Hills
Grant City
New Dorp
Oakwood Heights
Great Kills
Eltingville
Annadale
Huguenot
Prince's Bay
Nassau
Atlantic
Tottenville
N

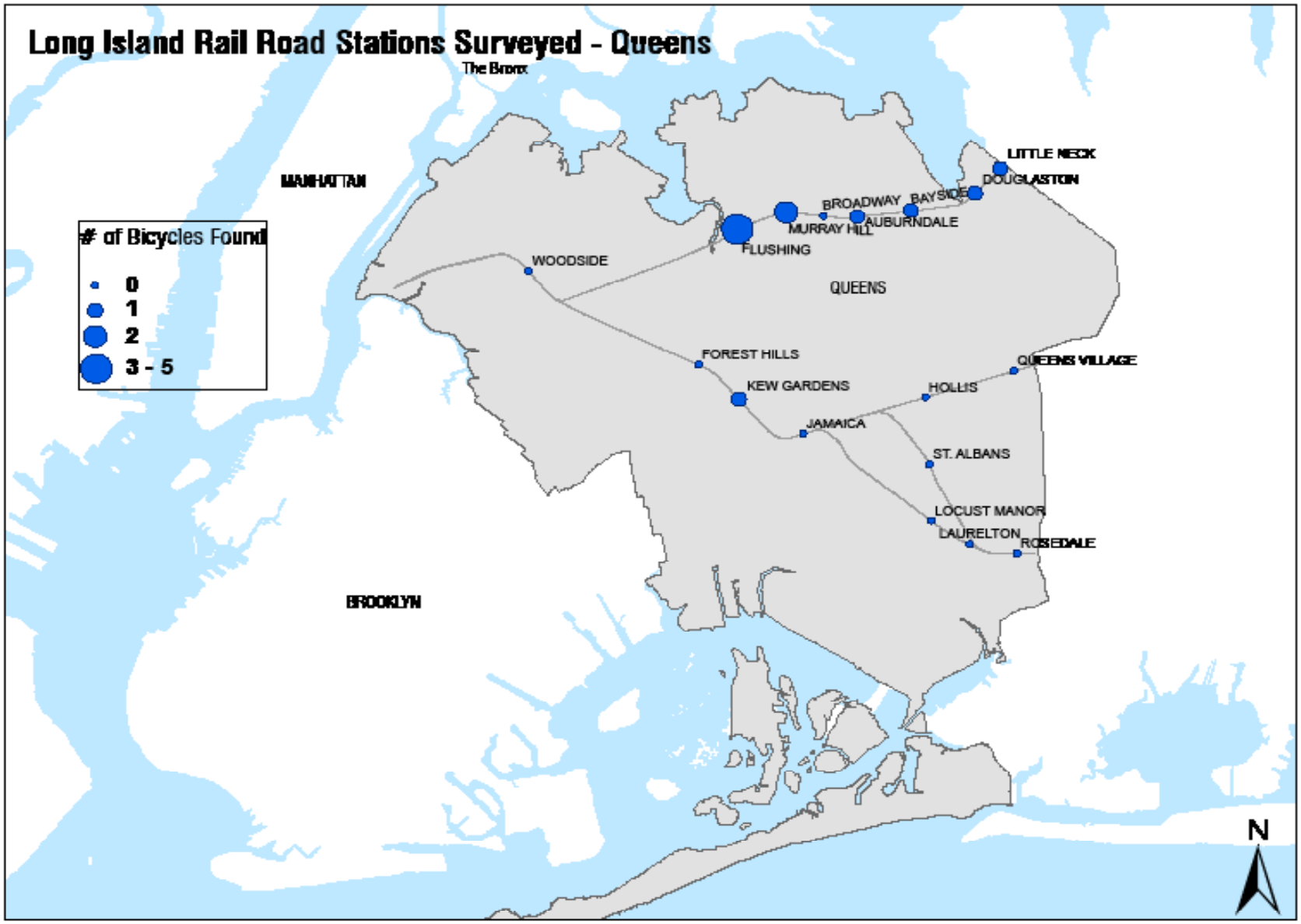

Station Priority Rating - Staten Island
Priority Level
1*
3*
STATEN ISLAND
St George
Clifton
Dongan Hills
Grant City
New Dorp
Oakwood Heights
Great Kills
Eltingville
Annadale
Huguenot
Prince's Bay
Nassau
Atlantic
Tottenville
N

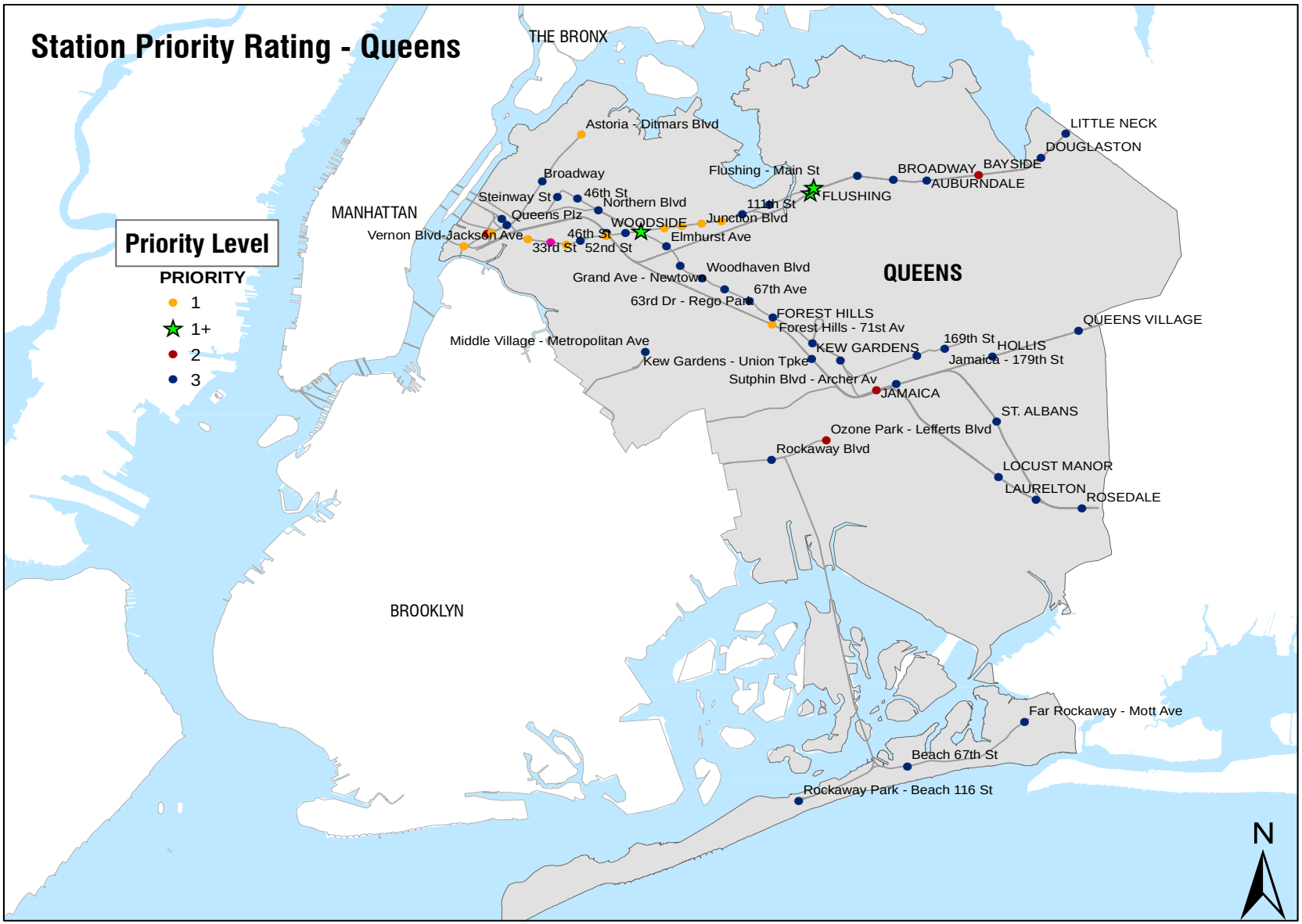
Queens

Based on surveys of over 60 stations in the borough of Queens, it was determined that stations with the highest number of parked bicycles were all located along the (7) subway line. In most cases there were *CityRacks* installed at these stations with very high counts of parked bicycles. However, the existing racks are not meeting the current demand. With such a high demand, *CityRacks* alone will not be able to quell the need for bicycle parking along the this subway line. It is recommended that the MTA and CDOT collaborate to analyze each individual station and evaluate the available space above and below ground, considering non-traditional methods of bicycle parking to meet existing and future demand.

Stations in Queens that are not located along the (7) subway line also displayed a demand for bicycle parking based on the number of parked bicycles observed during field visits. Many Queens residents do not live within walking distance of a subway station and require the use of the bus or commuter van to get to the subway. By providing adequate secure bicycle parking at the stations in Queens, residents will have the option of cycling to the subway avoiding overcrowded buses and congested roadways.

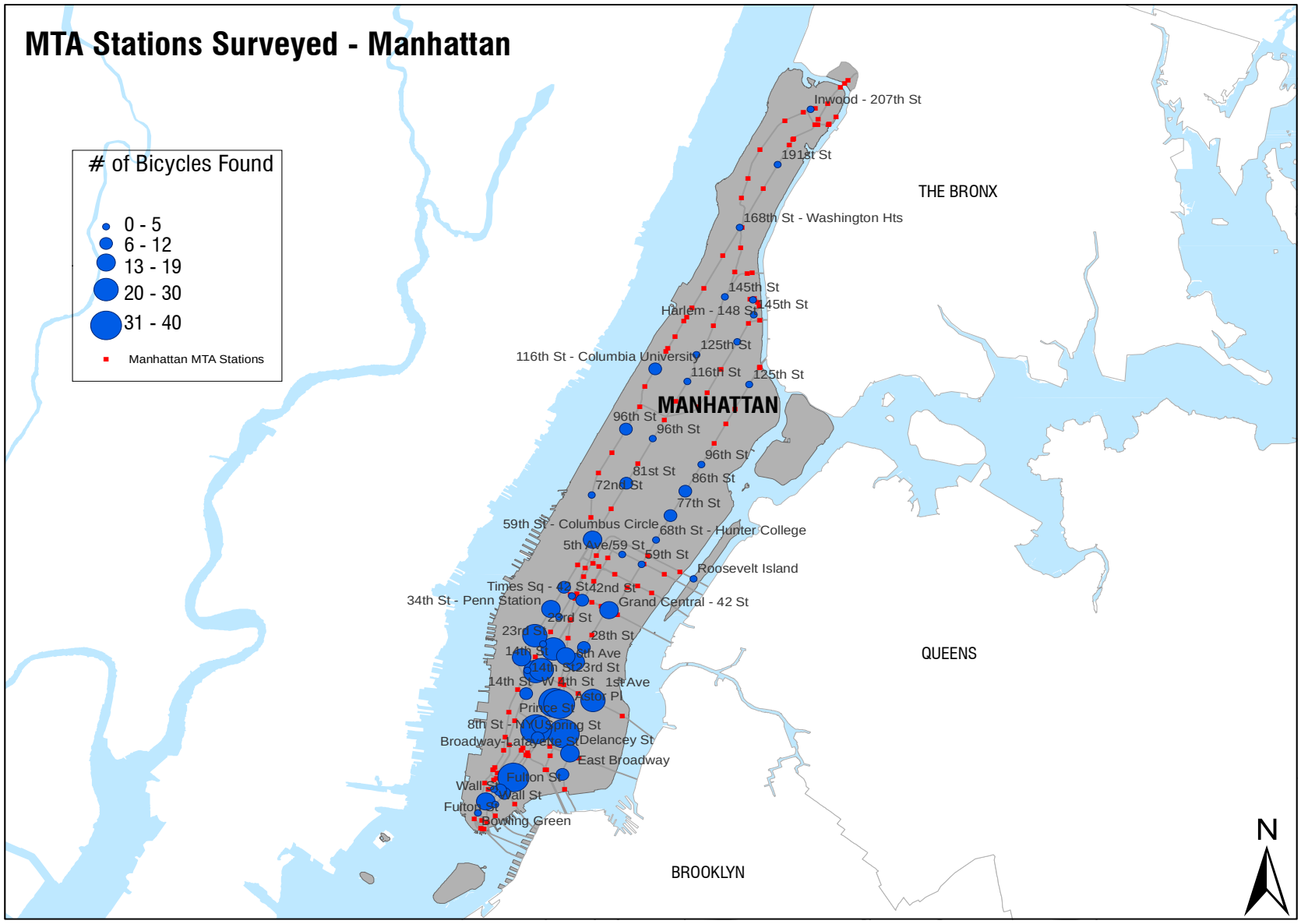

MTA Stations Surveyed - Queens
# of Bicycles Found
0
1 - 2
3 - 6
7 - 13
14 - 18
Queens MTA Stations
THE BRONX
MANHATTAN
BROOKLYN
QUEENS
Astoria - Ditmars Blvd
30th Ave
Broadway
46th St
36th St
39th Ave
Queens Plz
21st St
33rd St
40th St
46th St
52nd St
65th St
69th St
Junction Blvd
111th St
Flushing - Main St
Elmhurst Ave
Vernon Blvd-Jackson Ave
Grand Ave - Newtown
Woodhaven Blvd
63rd Dr - Rego Park
67th Ave
Forest Hills - 71st Av
75th Ave
Middle Village - Metropolitan Ave
Seneca Ave
Forest Ave
Kew Gardens - Union Tpke
169th St
121st St
Sutphin Blvd - Archer Av
111th St
104th-102nd St
80th St
104th St
88th St
Aquaduct Racetrack
Howard Beach - JFK Airport
Broad Channel
Beach 25th St
Beach 36th St
Beach 90th St
Beach 44th St
Beach 105th St
Rockaway Park - Beach 116 St
N

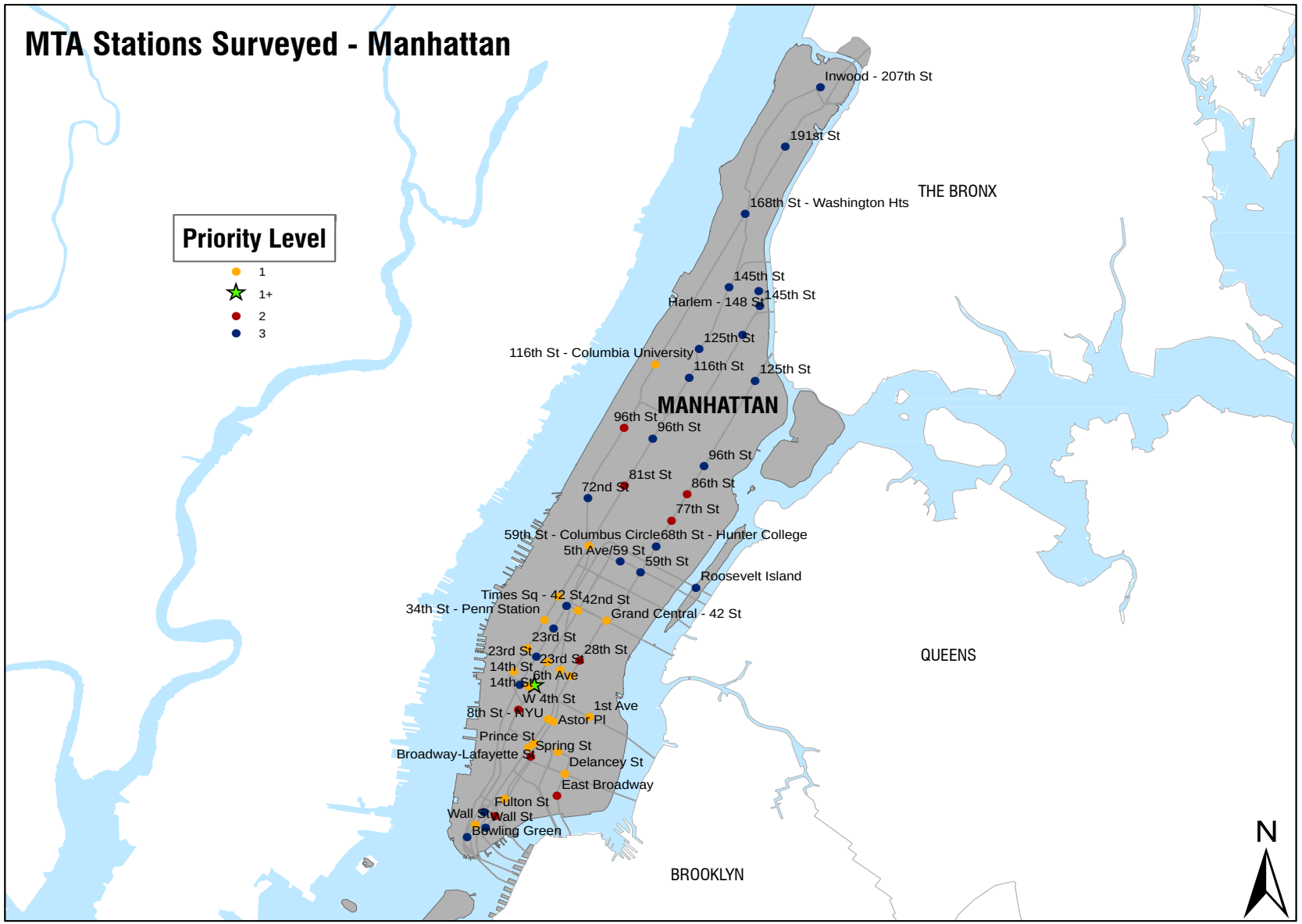

Long Island Rail Road Stations Surveyed - Queens
The Bronx
MANHATTAN
BROOKLYN
QUEENS
# of Bicycles Found
0
1
2
3 - 5
LITTLE NECK
DOUGLASTON
BAYSIDE
BROADWAY
AUBURNDALE
MURRAY HILL
FLUSHING
WOODSIDE
FOREST HILLS
KEW GARDENS
QUEENS VILLAGE
HOLLIS
JAMAICA
ST. ALBANS
LOCUST MANOR
LAURELTON
ROSEDALE
N


Station Priority Rating - Queens
THE BRONX
MANHATTAN
QUEENS
BROOKLYN
Priority Level
PRIORITY
1
1+
2
3
Astoria - Ditmars Blvd
LITTLE NECK
DOUGLASTON
BAYSIDE
BROADWAY
AUBURNDALE
Flushing - Main St
FLUSHING
Broadway
Steinway St
46th St
Northern Blvd
Queens Plz
111th St
Junction Blvd
WOODSIDE
Vernon Blvd-Jackson Ave
46th St
Elmhurst Ave
33rd St
52nd St
Woodhaven Blvd
Grand Ave - Newtown
67th Ave
63rd Dr - Rego Park
FOREST HILLS
Forest Hills - 71st Av
QUEENS VILLAGE
Middle Village - Metropolitan Ave
KEW GARDENS
169th St
HOLLIS
Kew Gardens - Union Tpke
Jamaica - 179th St
Sutphin Blvd - Archer Av
JAMAICA
ST. ALBANS
Ozone Park - Lefferts Blvd
Rockaway Blvd
LOCUST MANOR
LAURELTON
ROSEDALE
Far Rockaway - Mott Ave
Beach 67th St
Rockaway Park - Beach 116 St
N

Manhattan

From surveys of 60 stations in Manhattan, it was observed that almost 50 percent of the stations did not have bicycle parking available. At some of these stations without bicycle parking, bicycles could be found locked to the nearest available street furniture. This disorganized and informal system resulting from a lack of bicycle parking produces a safety concern for both pedestrians and passengers entering and exiting transit stations. To address this situation, it is recommended that secure bicycle parking be installed at all stations in Manhattan in relation to the documented demand. In addition to installing bicycle parking, a semi-annual observation period would help to determine if additional parking is needed to meet growing demand.


MTA Stations Surveyed - Manhattan
# of Bicycles Found
0 - 5
6 - 12
13 - 19
20 - 30
31 - 40
Manhattan MTA Stations
Inwood - 207th St
191st St
THE BRONX
168th St - Washington Hts
145th St
145th St
Harlem - 148 St
125th St
116th St - Columbia University
116th St
125th St
MANHATTAN
96th St
96th St
96th St
81st St
86th St
72nd St
77th St
59th St - Columbus Circle
68th St - Hunter College
5th Ave/59 St
59th St
Roosevelt Island
Times Sq - 42 St
42nd St
34th St - Penn Station
Grand Central - 42 St
28th St
23rd St
28th St
14th St
5th Ave
14th St
23rd St
14th St
W 4th St
1st Ave
Astor Pl
Prince St
8th St - NYU
Spring St
Broadway-Lafayette St
Delancey St
East Broadway
Fulton St
Wall St
Wall St
Fulton St
Bowling Green
QUEENS
BROOKLYN
N


MTA Stations Surveyed - Manhattan
Priority Level
1
1+
2
3
Inwood - 207th St
191st St
THE BRONX
168th St - Washington Hts
145th St
Harlem - 148 St
145th St
125th St
116th St - Columbia University
116th St
125th St
MANHATTAN
96th St
96th St
96th St
81st St
72nd St
86th St
77th St
59th St - Columbus Circle
68th St - Hunter College
5th Ave/59 St
59th St
Roosevelt Island
Times Sq - 42 St
42nd St
34th St - Penn Station
Grand Central - 42 St
23rd St
23rd St
28th St
23rd St
14th St
6th Ave
14th St
W 4th St
1st Ave
8th St - NYU
Astor Pl
Prince St
Spring St
Broadway-Lafayette St
Delancey St
East Broadway
Fulton St
Wall St
Wall St
Bowling Green
QUEENS
BROOKLYN
N

Bicycle Parking System Assessment

There are a large number of bicycle parking systems on the market today, each asserting that they are the best product. After extensive research, the following designs were selected because they met the basic safety standards set by CDOT and they were practical and implementable in New York City. Each selected design provides users with the opportunity to lock their bicycles to the rack at multiple points. They are constructed of durable, high quality materials and they are not easily compromised by pipe cutters and other hand tools. The cost of a product is also an important determining factor regarding implementation. However, this study looks at the rack design and not specific brands or manufacturers to determine feasibility. Many of the manufacturers provided price lists based upon the number of units purchased. In most cases, the greater the number of units purchased, the less expensive the cost per unit is.

The Bicycle Parking Systems evaluated were:

1. Inverted “U” Rack
2. Wave Rack
3. Multiple “U” Rack
4. X-Type Tree Guard
5. Spacepod Racks
6. Parking Meter Retrofitted Bicycle Racks
7. 2-Tier Racks
8. Bike Lockers
9. Curb Extensions & On-Street Bicycle Racks

Inverted "U" Rack

The inverted "U" rack became popular in the 1980's and remains one of the most widely used racks by cyclists today. The standard inverted "U" rack design is a minimum of 30 inches long and 36 inches in length. Smaller dimensions would not provide sufficient support to the bicycle. Typically, two bikes can be parked on opposite sides of the rack and will not create a problem for either the bicycle or its users. The inverted "U" rack provides sufficient stability to prevent the bicycle from tipping over, and allows the front and rear wheels to be locked separately or together to the rack using a U-lock or chain. Placement of the inverted "U" racks should provide easy and independent access to the bicycle. The inverted "U" is widely recommended as the standard rack in areas where space is limited. Because of its narrow design, the inverted "U" rack is ideal for sidewalk placements where bicycles can be parked securely in a uniform fashion and not impede pedestrian traffic. The rack should be placed along routes where they are clearly visible. The site should be frequented by moderate to heavy foot traffic to discourage theft and minimize vandalism. The most secure method of installation is in-ground where the rack is embedded into the surface and secured using metal bolts and concrete.

City Racks Inverted "U" rack located on a Manhattan sidewalk

CityRacks Inverted "U" rack located at the 7th Avenue subway station in Brooklyn

Wave Rack

The wave rack is designed to hold a large number of bicycles. The number of bicycles that each rack can accommodate depends on the specific dimensions. On average each wave rack can hold at least four bicycles. While the wave rack can feasibly accommodate at least four bicycles, the rack does not adequately support the bike frame and allows for only one wheel to be locked. Because the wave rack does not support the frame of the bicycle properly, many users have resorted to locking their bikes parallel to the wave rack as if it were an inverted "U" rather than perpendicular, thereby reducing the overall number of bikes each rack can hold.

The wave rack can be made with 2" square steel tubing to help reduce the possibility of theft unlike the round tubing. Many cycling organizations have complained that the wave rack does not accommodate as many bicycles as manufacturers claim, (five bikes on the standard wave rack). Despite misuse, the wave rack remains popular among municipalities because it is relatively inexpensive and require very little maintenance.

CityRacks Wave rack located at City Hall subway station in Manhattan

Wave rack located at the Douglaston LIRR station in Queens

Multiple "U" Rack

The multiple "U" rack is a series of inverted "U" racks fitted together along two parallel rails to provide parking for multiple bicycles in the same space. This "ganged" design is highly recommended because it accommodates several bikes and provides two points of contact for the bike to be locked. The rack offers protection and stability to the bicycle's frame and wheels. Multiple "U" racks can accommodate more bicycles per square foot than many other racks in an efficient manner.

There are two ways to install this rack, the surface mount and the in-ground mounting. The surface mount allows the rack to be secured to the surface to the using an anchor that is fastened using tamper resistant screws into cement. The in-ground installation is available in concrete, asphalt, or brick. The rack's tubing, depending on the manufacturer, can be either round or square. The rack is durable, inexpensive and requires little maintenance.

Welle Series Multiple "U" rack manufactured by Bikeparking.com

A Multiple "U" rack provided by DCAS for New York City employee use

The X-Type Tree Guard

In response to an international design competition sponsored by Trees New York to create a bicycle rack whose function was not only to store bicycles but to serve as a tree guard, the X-Type tree guard was invented in 1999. Created by James G. Smith, the X-Type tree guard was designed to offer both protection to the tree and provide bicycle parking on three of the four sides of a tree pit. The X-Type bicycle rack is made of steel and finished with a black powder coat to ensure that it can withstand heavy use and variable weather conditions. The rack promotes environmental responsibility by eliminating contact made with the tree by bicycles.

The X-Type rack is a simple arching form that can accommodate the commonly used U-lock of a chain. The base can be ordered with flanges that accommodate three drive screws, or without flanges (to be sunk into concrete footings). The X-Type tree guard is an innovative design that fits form and function. The drawback to this rack system is the required customization. Because the size of a tree pit may vary, it requires the unit to be made to fit each individual pit, resulting higher manufacturing costs. Because of the higher production costs, the manufacturer encourages bulk orders to control costs and maximize productivity.

Left: Front view of the X-Type Tree Guard rack;

Right: Side view of the X-Type Tree Guard rack

Vertical Bicycle Parking

Vertical bike parking is an innovative design that allows bicycles to be secured between a 70 and 90 degree angle depending on the model. This design is ideal for areas with limited available space and high demand for bicycle parking. The key concept of this bicycle parking system is to both support the bicycles vertically allowing bicycles to be stored in awkward or underutilized areas and making the best possible use of space. Depending on the manufacturer, bicycles locked vertically can be supported by its rear wheel or the frame of the bicycle. Most vertical bicycle parking systems can accommodate the U-lock or a chain. For proper installation vertical bicycle parking systems require a solid level concrete base of in-ground installation. If in ground installation is not available, some models can be wall mounted, requiring a structurally sound supporting wall.

The downside to vertically parking bicycles is having to lift the bicycle onto the rack. Many manufacturers have circumvented this issue by designing their racks with a lever system to raise the bicycle onto the rack or have designed the rack with a ramp allowing users to roll the bicycle into position. The vertical bicycle rack is a novel idea that would work well in New York City where space is limited. Regrettably, preparing locations for installation and the necessary maintenance of the racks make this system costly for widespread use.

Spacepod manufactured by Cyclepod:
www.cyclepods.co.uk/wallpods.htm

The Ultra Space Saver manufactured by Dero:
www.dero.com

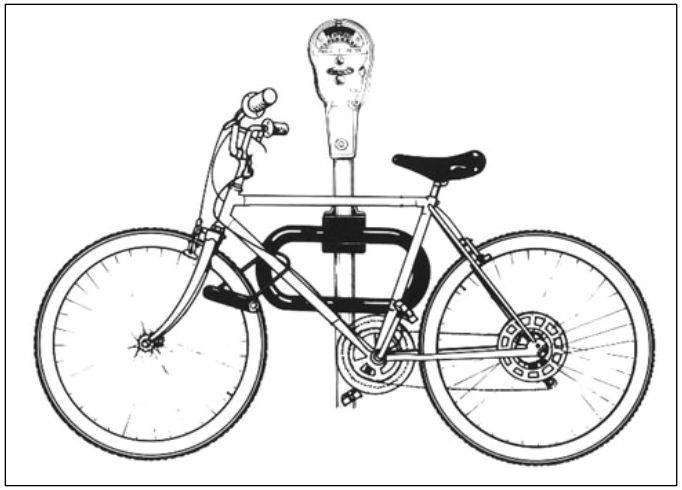
Parking Meter Retrofitted Bicycle Rack

Currently, New York is in the process of removing manual parking meters in neighborhoods throughout the city. The manual meter is being replaced by an electronic meter that accepts credit cards and requires one meter for multiple parking spaces.

Once the manual meters are out of service it is presumed that they will be removed from the sidewalk and disposed of. The parking meter bike rack reuses the post from the manual meter, and with minor alterations transforms an old parking meter into a bicycle rack. The concept of retrofitting a parking meter into a bicycle rack is innovative and makes use of existing street furniture. Each converted meter can accommodate two bicycles using a U-lock or chain. They are designed to allow clearance for car doors and should not obstruct the normal flow of pedestrian activity. Retrofitted parking meters are a fairly inexpensive option. According to a report from the City of Oakland, a retrofitted parking meter pole/bicycle rack costs about as much as installing a new, inverted "U" rack. It also requires little to no maintenance and should remain in working condition for at least 10 years.

Despite the feasibility of the converted parking meter, manufacturers are designing the bicycle racks with round tubing making the rack susceptible to pipe cutters. The alternative is to design the racks using square tubing, thereby increasing its security and compatibility to the CDOT *CityRacks* standards.

Meter Hitch manufactured by Dero: www.dero.com



Oval-Lok manufactured by Sunshine U-Lok Corporation

2 Tiered Rack Systems

The 2-tiered bicycle rack design is a feasible option when demand for bicycle parking is high, space is limited and there is ample height clearance. The major advantage to this rack is its space saving potential because the bicycles are stored in a bi-level system. This system is ideal for transit locations where high density bicycle parking is needed. There is little to no maintenance required. The ease of use depends on the cyclist's ability to lift the bicycle on to the rack to store it securely. Some designs come equipped with a lever that comes down to ground level. The bicycle is then rolled on to the lever and lever is pushed back into place. Other designs require users to lift the bicycle without any assistance, limiting the number of users who can utilize the parking. Another possible drawback of this design is that users can bump their heads on the upper racks. Once in place the user can lock the bicycle in place using a u-lock or chain.

The ideal placement for the double decker system is an indoor location, such as inside a subway station or in a covered area. These racks must be installed on a level, high-quality concrete floor/pavement, using expansion bolts. The 2 tiered bicycle system has been successfully installed in the Chicago Bikestation as well as the Seattle Bikestation.

Left: The Josta 2-Tiered bicycle parking system used for indoor bicycle parking: www.josta.de

Right: A 2-Tiered hydraulic bicycle rack at a transit station in Taipei, China: www.trtc.com.tw

Bicycle Lockers

Bike lockers are stand-alone enclosures, generally designed to hold one bicycle per unit. Bicycle lockers generally come in two types of configurations: horizontal and vertical. Lockers are possibly the most secure option for long-term bicycle parking and storage. Bicycle lockers are usually constructed of metal and/or high-strength plastic resin to protect bicycles from inclement weather conditions and vandalism. Users will not have to worry about returning to a wet seat, or a stolen bicycle after their commute. It also takes less time to place a bicycle in a locker than it does to lock a bicycle to a rack. One shortcoming of the locker system is that since it generally stores one or two bicycles, it is less efficient at saving space than other bicycle parking options.

Square shaped opaque bicycle locker

Due to growing security concerns, municipalities have become hesitant to install bicycle lockers. In some cases homeless people have been found sleeping inside of the lockers. Manufacturers as a result, have designed new bicycle lockers with transparent sides to allow security personnel to easily view the locker's contents and minimize security threats.

There are two types of bicycle lockers. There are coin operated lockers that are rented on a daily basis, and there are digital lockers that use a smart card and require a membership. Though reasonably secure, coin operated lockers can become a target of theft. Video surveillance can be installed at locker locations to mitigate this problem, but that would further increase the cost to maintain the lockers. When using a digital locker, the cost of locker is automatically debited from the card, eliminating the need for cash. The digital system is easier to use and has lower administrative costs because all repairs and servicing are done off site.

Wedge shaped See-Thru bicycle locker

Curb Extensions and On-Street Bicycle Racks

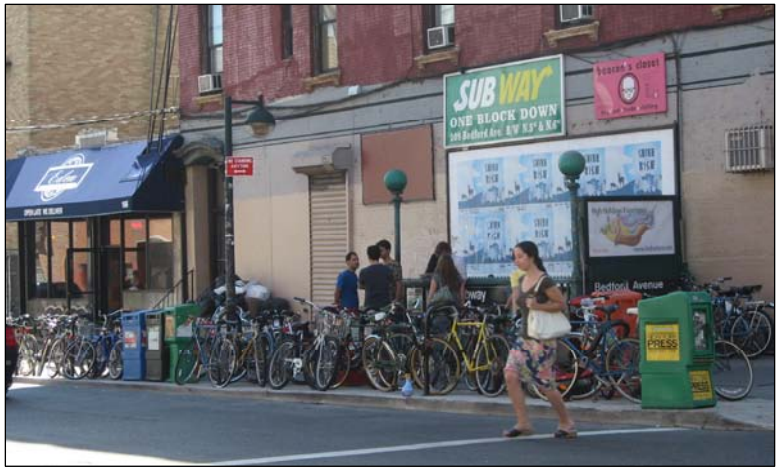
Curb extensions generally consist of widening an existing sidewalk at an intersection, which will reduce the roadway width and calm traffic while at the same time providing space for the installation of bicycle racks. Construction costs for curb extensions are rather high, ranging from $5,000 to $25,000 depending on the design and the need to reconfigure sewer drains and other infrastructure to accommodate the extended curb. An economical alternative to the curb extension is the on-street bicycle rack (bike oasis/corral) that is installed adjacent to the curb. This option uses the same concept as the curb extension but does not require major construction. To create a bike corral, a few on-street parking spaces are removed and replaced with bicycle racks. Bumpers, bollards/barriers, or even paint can be used to block off the designated on-street area for bicycles. This requires minimal construction and maintenance. Relocating drainage is no longer a concern, further minimizing the cost. The total cost for the installation of bike corral varies depending on the materials used as a buffer on the roadway. This concept has been used in several cities in California, including Berkeley and San Francisco.

Bicycle Oasis in Munich, Germany

Bike Oasis in Portland, Or.

In 2007, the L subway station at Bedford Avenue (and North 7th Street) became the first place in New York City where parking spaces were removed and the curb extended to accommodate bicycle racks. The Bedford Avenue station has become a popular park-and-ride location for numerous bike commuters in recent years. The bicycle rack curb extension at the Bedford Avenue L subway station was originally proposed in the 1999 *NYCDCP New York City Bicycle Parking Needs* report. In 2004, the city received numerous complaints of bicycles blocking the crowded, narrow sidewalks in Williamsburg. In addition, there were also numerous reports of bicycles being seized from street furniture by NYPD. The sidewalk on North 7th Street at the southeastern station entrance had limited circulation space for pedestrians. There were about 10 existing bicycle racks that lined the sidewalk on North 7th Street between Bedford and Driggs Avenues, but they were insufficient at meeting the demand for bicycle parking in the Williamsburg area.

In response, CDOT preformed a streetscape renovation and extended a 76' section of sidewalk by five feet and installed nine *CityRacks* at the southeast corner of the Bedford Avenue and North 7th Street. With the elimination of two or three parking spaces, the new racks created enough space to accommodate 32 bicycles and the racks are always full. There was little community opposition over the loss of the parking spaces. The entire project cost about $32,000.



Above & Below: Curb Extensions at Bedford Avenue (L) subway station in Brooklyn

Bicycle Parking Possibilities in NYC

The bicycle parking described in this section are innovative bicycle parking systems that can accommodate a large number of bicycles with integrated environmentally-friendly technology. These bicycle parking systems are practical and can be put to use in New York City as the popularity of cycling increases. The cost of each system varies based upon the type of installation and the needed maintenance. The following bicycle parking systems are intended for long term implementation with the potential to pay for itself over time.

Bicycle Cages

The bicycle cage is not a new concept, however in New York City where space is limited installing this type of bicycle parking can prove to be a very challenging task. The bicycle cage is a customizable bicycle parking enclosure designed to fit within the provided space. The number of bicycles and the type of bicycle parking that a cage can accommodate is dependent on the allowable space. Users simply access the cage using a smart card or key fob. Once inside the bicycle can be locked to an available rack using a standard U-lock or chain.

One of the first bicycle cages installed in the United States was at the Alewife Station in Cambridge, Massachusetts in the Fall of 2008. The bicycle cages can accommodate a total of 300 bicycles. The cage provides high security, sheltered bicycle parking all while remaining unattended. Equipped with closed circuit cameras, proper lighting, high security chain link fence and locks, users are made to feel confident that when they return their bicycle will still be there. To enter the cage users tap their Bike Charlie Carda card, similar the Metro card in New York City on a magnetic plate on the door. Payment is not required to enter the bicycle cage. However, once money is added to the Bike Charlie Card it doubles as a transit pass to access the subway station.

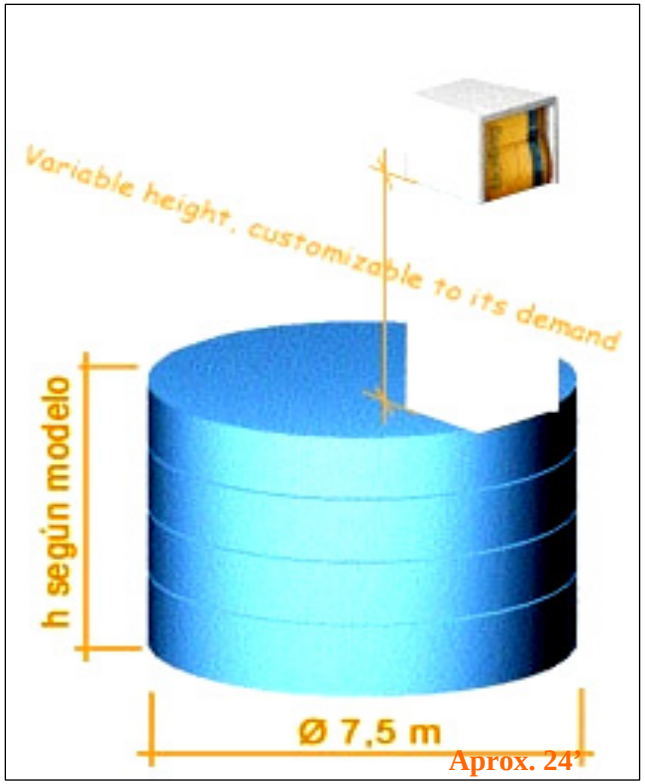
The advantage to the bicycle cage is that it requires very little maintenance and the turnover time between design and installation is very short. The disadvantage to the bicycle cage is the amount of space needed to get the maximum use. Although the bicycle cage is customized to fit any given space, the ultimate goal is to be able to store a large number of bicycles. If the size of the cage is not large enough, the cost of installation and land space will greatly outweigh the benefit of provide bicycle parking.

Above: The Alewife Station bicycle cage
Right: The *Bike Charlie Card* used to access the bicycle cage
(both images courtesy of www.MBTA.com)

Biceberg

The Biceberg is an underground automated bicycle parking system currently used in Barcelona, Amsterdam, and Copenhagen. The *Biceberg* is approximately 24ft in diameter and can accommodate up to 92 bicycles. The *Biceberg* is composed of disc shaped compartments, each designed to store 23 bicycles. Depending on the available space and the number of bicycles needed to be stored, the compartments are stacked on top of each other up to a maximum of four compartments. The *Biceberg* that holds up to 92 bicycles occupies the equivalent to about four car parking spaces on two floors. The advantage to the *Biceberg* being placed underground is that it occupies very little sidewalk space and minimizing potential conflicts with pedestrian traffic.

It takes less time to place a bicycle into Biceberg than locking a bicycle on a standard inverted "U" rack. A smart chip card is used to operate the *Biceberg.* All of the user's information and bicycle location is recorded and stored on the card eliminating the need to remember a password. After the user swipes the card, the door opens, the bicycle is placed into the *Biceberg*, the door then closes immediately and places the bicycle onto a lift, which lowers and places the bicycle in a storage compartment. The bicycle is then later retrieved by swiping the smart-chip card. It takes only 30 seconds for *Biceberg* to retrieve the bicycle. Bicycles are completely protected from vandalism, as well as poor weather conditions. *Biceberg* can also store additional items like helmets and backpacks.



Dimensions of the Biceberg; The height of the unit varies upon the available space and the number bicycles needed to accommodate

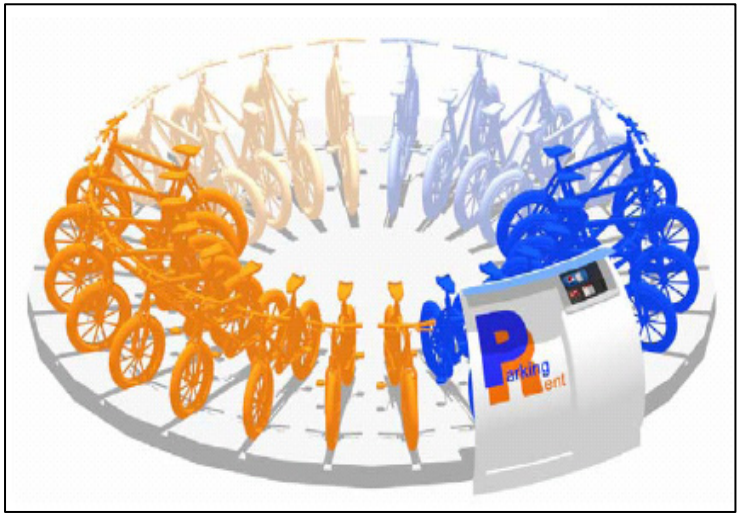
To install the *Biceberg,* excavation is needed to house each compartment and its electrical components. Once in place, the compartments are covered with soil and the surface is returned to it previous condition. The bicycle receiving room, similar to an elevator is installed at street level and the *Biceberg* is ready for use. The excavation process and the electrical connections are the most costly components of the Biceberg installation. The system could pay for itself in the long-term, since users would pay to store their bicycles. Biceberg can also be funded through advertisements on the surface infrastructure. Biceberg is one of the most secure options for future, long-term bicycle parking and storage. The cost of operation and maintenance on the *Biceberg* would minimal with proper use particularly since the system is completely automated. The drawback to this long-term option is the high installation costs.

In the long term the Biceberg would be considered to be a viable bicycle parking system in New York City because it occupies a minimum amount of sidewalk space while maintaining a high capacity of bicycle storage. The under utilized mezzanine space found in many subway stations throughout the city would be an ideal site to place the Biceberg. Because the space is already hollowed out, excavation would be limited. A transparent cover could be built to store the pods and passengers could watch as users on the street level deposit and retrieve their bicycles. If installed in New York City sufficient signage and educational campaigns would be needed for the successful implementation of this bicycle parking system.

Street view of the Biceberg

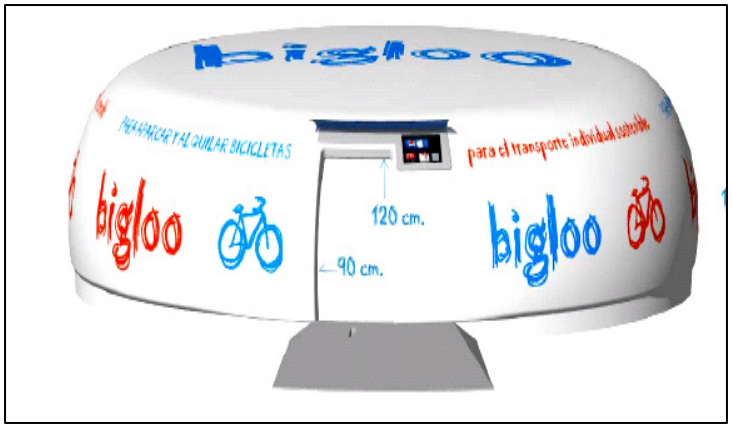
Bigloo

Bigloo is a sustainable, secure parking and rental system for bicycles. It is an automated system, similar to *Biceberg* and is in use in several European cities. Like *Biceberg*, the system is very easy to use, but in the United States may not be easily recognized as bicycle parking. Adequate signage and education campaigns would be needed for successful implementation of this option. It takes even less time to deposit and retrieve a bicycle from *Bigloo* than *Biceberg*. *Bigloo* can store and return bikes to street level in under 10 seconds. One of the advantages of the *Bigloo* is that the user does not need to remember where they parked their bicycle. *Bigloo* is an intelligent system that also uses a smart chip card that stores user's information. The system is equipped with a radar systems and artificial vision which it uses to park and retrieve bicycles. Bicycles are protected from vandalism, and inclement weather conditions. Additional items like helmets can also be stored in the *Bigloo*.



Above: Interior view of the B-igloo

Below: Exterior view of the B-igloo



The disadvantages of *Bigloo* are that it occupies a great deal of space and it is very expensive. *Bigloo* can be equipped with components that allow it to use solar and wind energy, making it one of the most sustainable and secure bicycle parking systems. This sustainable technology will also help minimize operational costs. In addition, the *Bigloo* can also be funded through advertisements. The *Bigloo* can store up to 24 bicycles. The basic dimensions of the installation are 23ft in diameter and a maximum height of 6.2ft. The access space and the level floor of the platform allow bicycles of up to 4ft in height and handlebars of 3ft wide to be parked.

Case Studies – Existing Conditions & Recommendations

In order to convey the benefits of using site specific bicycle parking to meet the needs of its users within variable conditions, this report includes nine case studies to help visualize the existing conditions and see how the space would look and function with the recommended bicycle parking. These nine cases studies were selected from the 239 transit station surveyed for this study. In some cases, few changes were needed to meet existing bicycle parking needs. There were some locations that provided opportunities for more innovative and creative approaches to bicycle parking within the constraints of subway station structures. In addition to the recommended bicycle parking systems, each station should be outfitted with signs directing cyclists to the parking location, an illustration showing how to properly use each bicycle parking system, and signage that absolves the managing agency from litigation in the event a bicycle is damaged or stolen. Where possible, the stations recommended for indoor bicycle parking should also be equipped with cameras that are linked to the MTA's existing security system for the monitoring of the bicycle parking areas. Signs should be posted to reassure users that their property is safe. Finally, at the Spuyten Duyvil station along the Metro North in the Bronx where cyclists will be sharing the road with drivers, "Share the Road" signs should be posted to make drivers more aware of cyclists' presence. *(See Appendix E)*

*The drawings used in this section are to illustrate the placement of each bicycle parking system and are not to scale

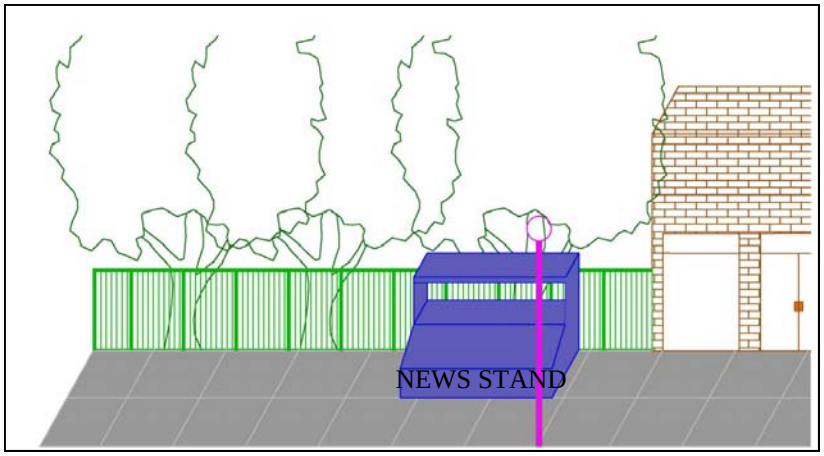
Fordham Station, Metro North, The Bronx - The Multiple "U" Rack

Fordham, a Metro North station in The Bronx, was chosen as a candidate for the installation of a Multiple "U" Rack. This location had three parked bicycles present during the field visit. The station is adjacent to a bus depot and a public plaza with vendors and heavy pedestrian traffic. Outside of the station, the westbound side of Fordham Road can accommodate bicycle racks on the left side of the newspaper stand to avoid conflict with passengers waiting for the bus at the bus stop. The Multiple "U" rack is proposed for this station because there isn't any bicycle parking available to meet the existing demand. There is also sufficient space to install the rack without interfering with the flow of pedestrian traffic. Installing a Multiple "U" rack that holds at least six bicycles at this station will not only meet the needs of the existing cyclists, it will encourage other cyclists to commute to the rail station via bicycle.

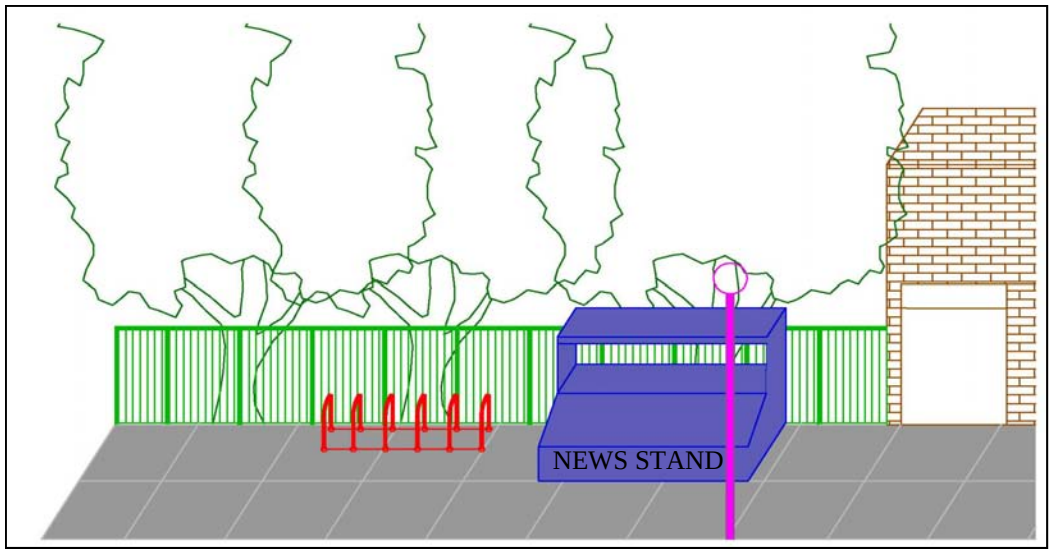
Above: Vacant space to the left of a newspaper stand at the Fordham station;

Right: An example of a Multiple "U" rack proposed for this station

A bicycle chained to the bus stop at the Fordham station



Existing Fordham Station without bicycle parking

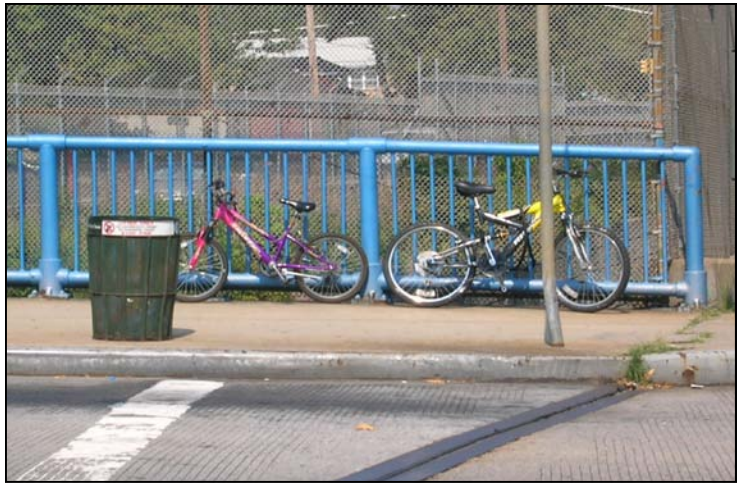


Fordham Station after Inverted "U" racks are installed

Grant City, Staten Island Rail Road, Staten Island - Inverted "U" Rack (CityRack)

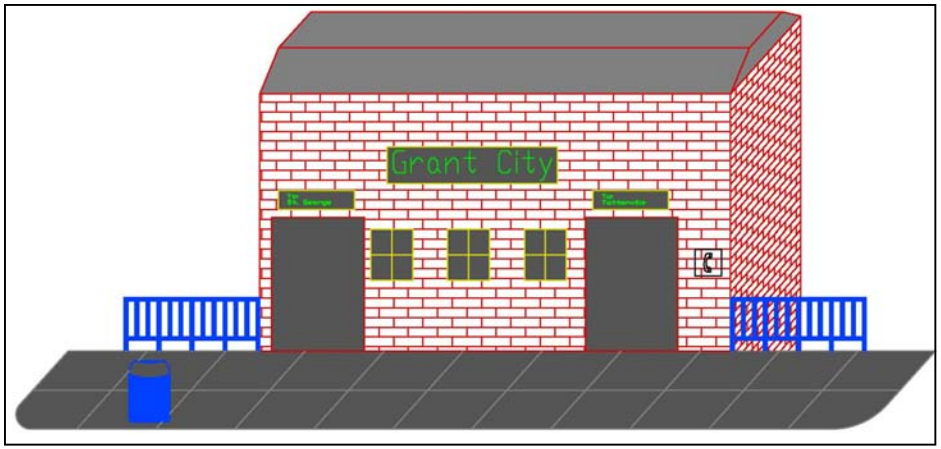
The Grant City station, along the Staten Island Railway, lacks bicycle parking. The station is along a neighborhood commercial corridor in a primarily residential area. During the field visit, four bicycles were locked to a railing across the street from the Staten Island Railway entrance at a bus stop.

Two inverted "U" racks are being proposed for this station to accommodate existing bicycle users and encourage cycling as an alternate mode of transportation. The waiting area at the station was under consideration for use as covered bicycle parking, but the space is too narrow to park bicycles and provide safe access to the platform. The alternative is to install the bicycle racks on the sidewalk directly in front of the station at opposite corners to ensure that MTA staff has access to the station for maintenance. The sidewalks were recently re-built therefore, no additional construction is needed to ensure proper installation of the racks.

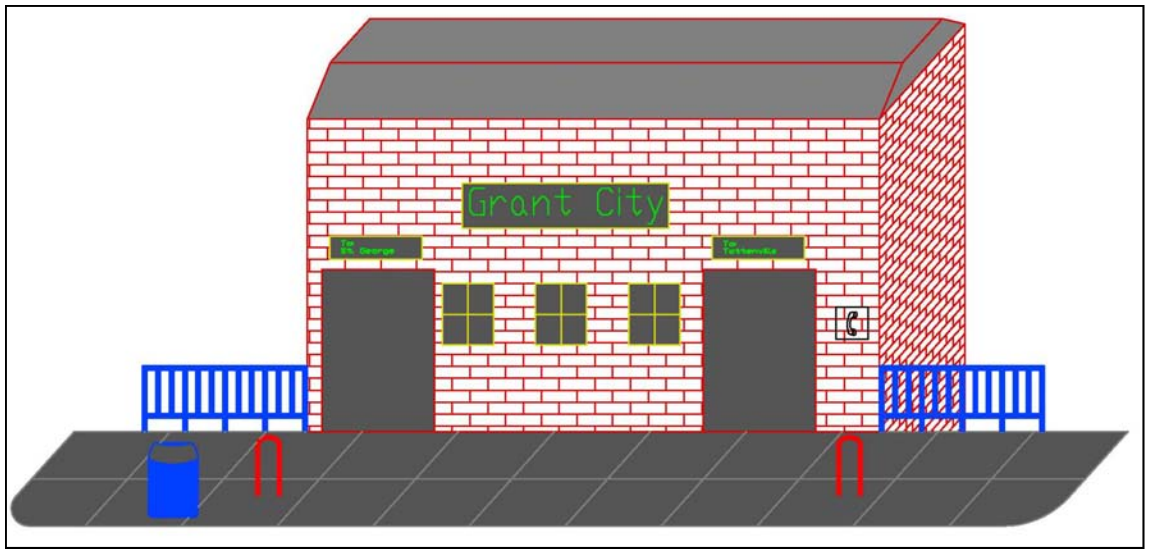


Bicycles found locked at the bus stop across from the Grant City rail station

Available space in front of the Grant City rail station to accommodate bicycle parking Grant City rail station



Existing Grant City station without bicycle parking



Grant City station after inverted "U" racks are installed

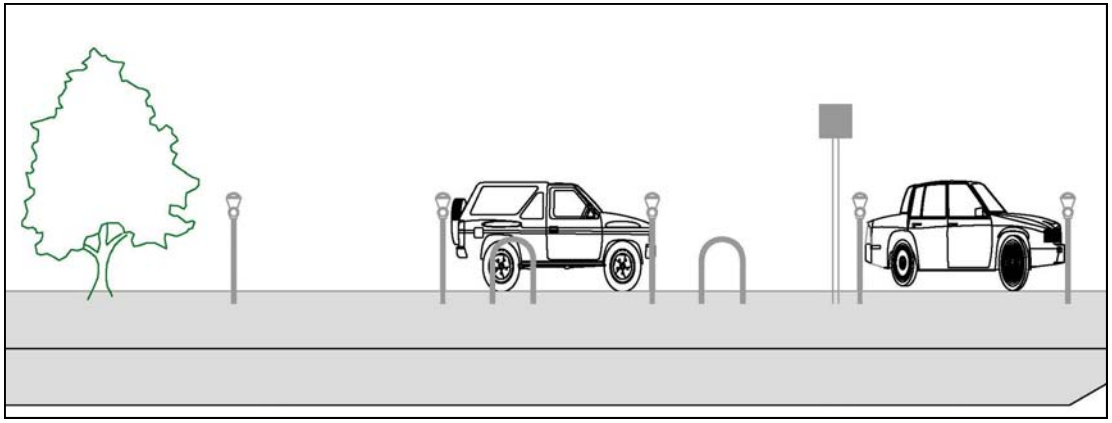
Graham Avenue Station, L, Brooklyn - Retrofitted Parking Meters

The Graham Avenue station is located along the (L) subway line in Brooklyn. There were over 25 bicycles found parked in the vicinity of the Graham Avenue station, with only a few inverted "U" racks to lock them to. Most of the racks held more bicycles than they could support and additional bicycles were locked to adjacent bus stop posts and parking meters.

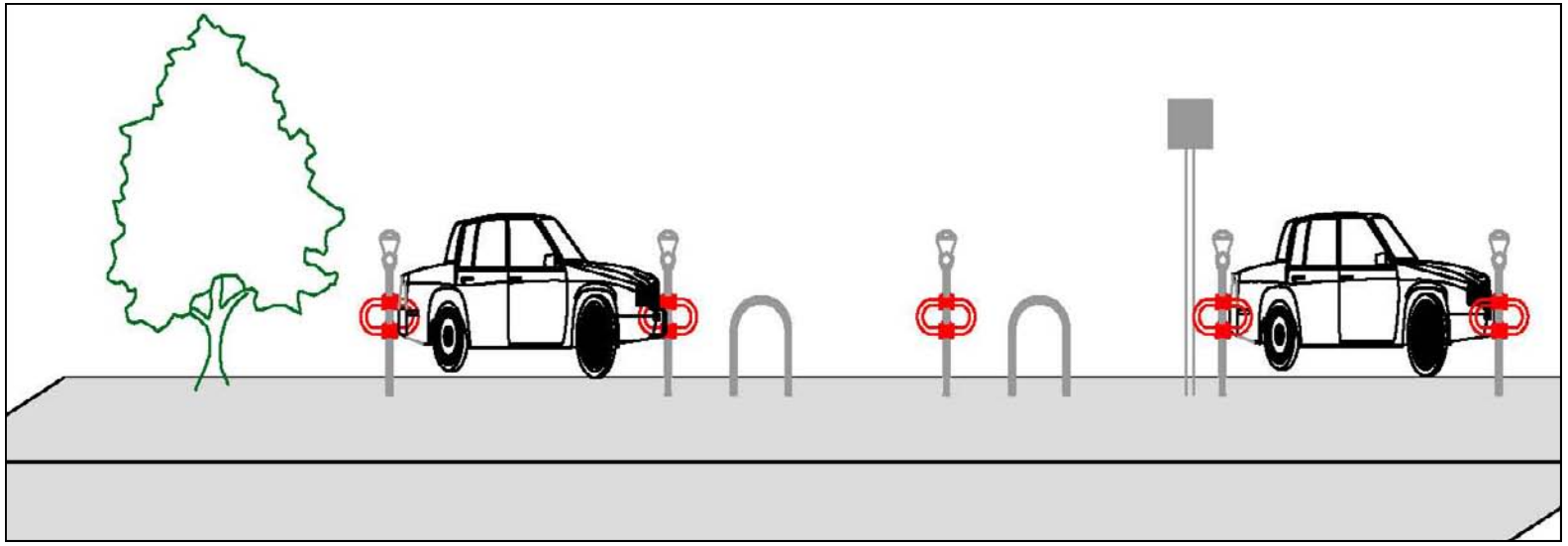
To meet this high demand for bicycle parking, the suggested site specific solution to the bicycle parking shortage is the retrofitted parking meter. There are many parking meters that can be retrofitted to double as bicycle parking in the area. This treatment was chosen to maximize sidewalk space and use existing street furniture. While many bicycles are already being locked to parking meters, retrofitting the meters will formalize an existing informal activity and will encourage proper bicycle parking technique. The image on the bottom right shows a bicycle locked to a parking meter facing perpendicular to the street. Bicycles should be locked parallel to the street for the safety of the cyclists and drivers. In the future, if the manual meters are replaced by electronic Muni-Meters, the heads of the meters can be removed and replaced by a sign illustrating how to properly lock a bicycle to the rack.

Bicycle locked to a parking meter perpendicular to the sidewalk creating a hazard

Bicycle locked to a parking meter parallel to the sidewalk



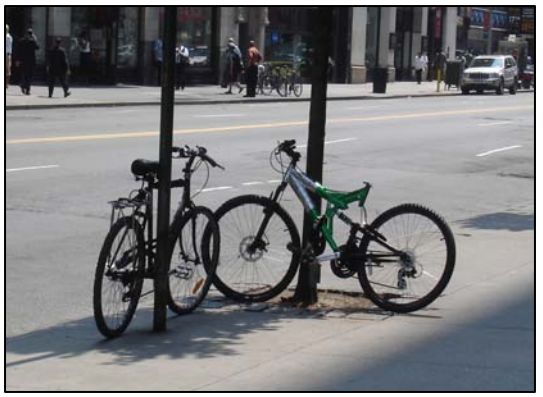
Existing Graham Avenue station with CityRacks and parking meters



Graham Avenue station with existing CityRacks and parking meter converted bicycle racks

X-Type Tree Guard Racks proposed at the 23rd Street, F,V, Manhattan

The 23rd Street station along the F, V line in Manhattan had approximately 27 bicycles with 8 wave racks on the first field visit. On the second visit, a Cemusa bicycle shelter was installed at the southeast corner, next to the PATH station entrance. It also appears that traditional tree guards were installed around tree pits to protect the trees from bicycles being locked to them as seen in the picture below taken on the first visit.



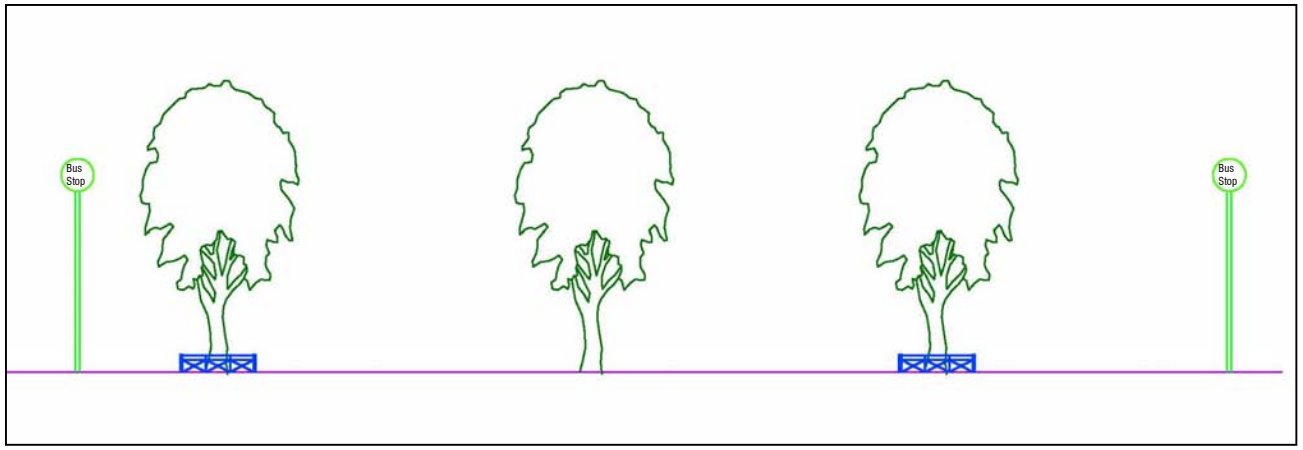
Bicycles locked to a tree and a bus stop at 23rd Street station

Despite the newly installed bicycle parking, some cyclists have continued to lock their bicycles to trees and tree guards. Traditional tree guards are inappropriate for bicycle parking because they do not have the proper height to adequately support the weight and size of a bicycle.

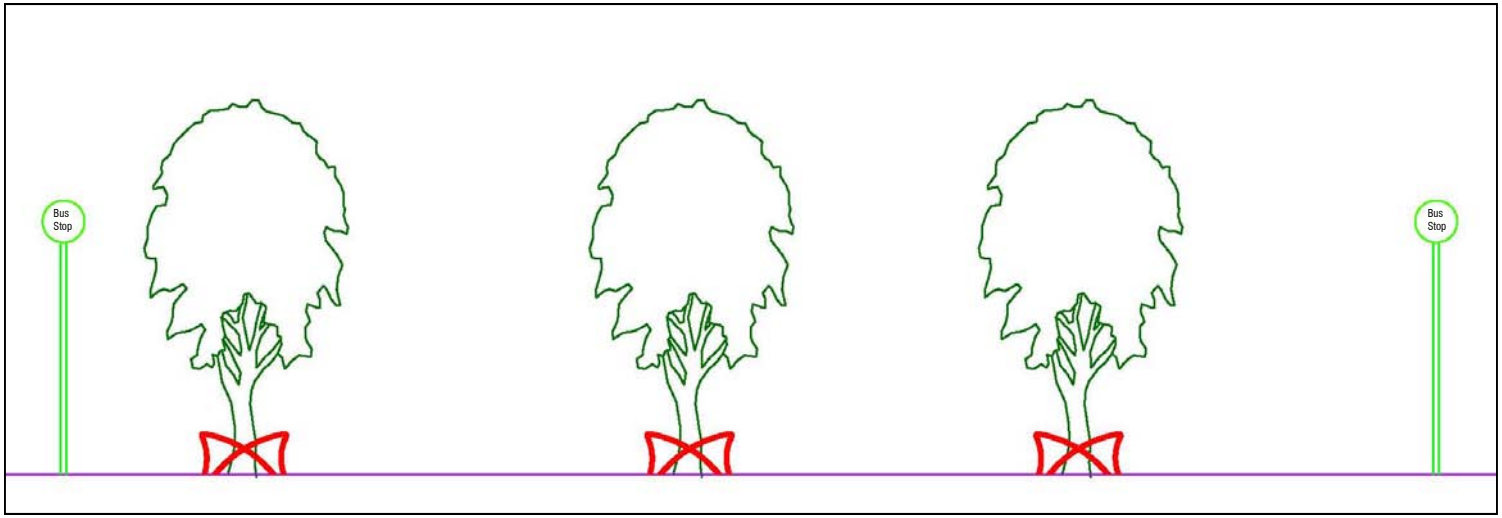
The suggested site specific bicycle parking system for this location is the X-Type Tree Guard bicycle rack. This bicycle parking system fits in with the existing environment and does not occupy any additional sidewalk space. It protects the street trees while at the same time meets the need for additional bicycle parking in the area. The trees that are proposed to receive the X-Type Tree Guard are located near the M23 bus stop at the south-east corner of 23rd Street between 5th Avenue and 6th Avenue. There was an initial concern that any bicycles locked to a proposed tree pits would block passengers from entering and exiting the bus. However, after monitoring three buses load and unload passengers, it was observed that the tree pit bicycle racks will not impede bus traffic because the bus doors open between the tree pits.

Above: A bicycle found chained to a tree on the second field visit

Right: A bicycle chained to a bus stop post



Existing tree guard not designed to accommodate bicycles



The X-Type Tree Guard installed to protect both the tree and park bicycles

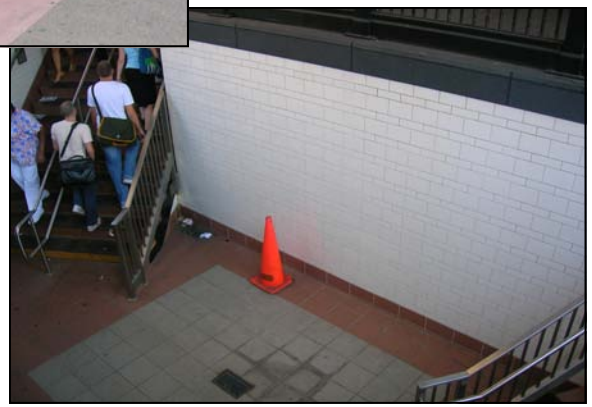
DeKalb Avenue, B,Q,R,M, Brooklyn - Vertical Bicycle Parking

The DeKalb Avenue station in Brooklyn has a high demand for bicycle parking. There are 4 wave racks and a Cemusa bicycle shelter near the station's entrance, all of which are at maximum capacity. Cyclists have resorted to chaining their bicycles to the subway entrance railing because there is no additional space to park a bicycle. At the time of the field visit, 30 bicycles were parked near this station. To create more bicycle parking in an area with little available sidewalk space, it is recommended that a vertical bicycle parking system be used at this subway station. The proposed location for the rack placement is on the open mezzanine area of the station. This area is sheltered from variable weather conditions and utilizes unused space. The available area provides adequate space for the installation of a minimum of 7 bicycle parking spaces depending on the model chosen.

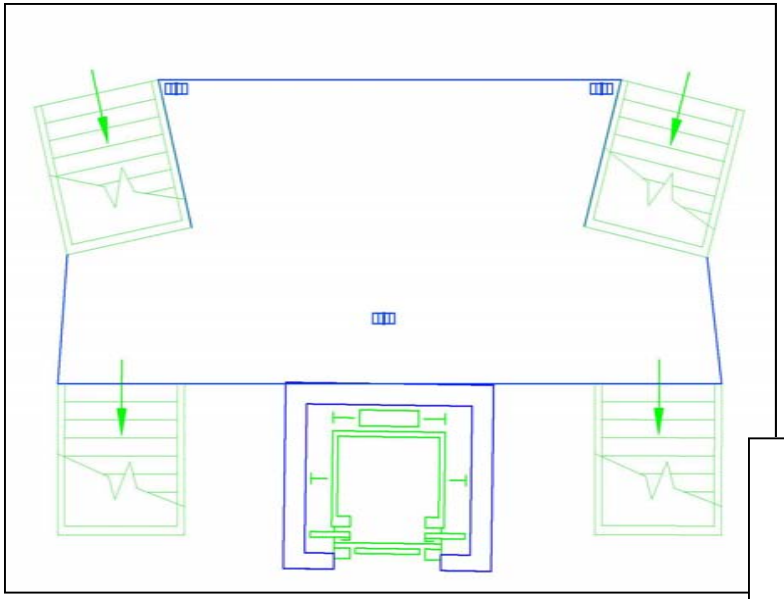
The rack would be securely anchored to the wall and the floor of the proposed area. This bicycle parking system stores the bicycles vertically, thereby occupying a smaller footprint and reducing possible pedestrian circulation conflicts. The rack would be placed out of the way of the drains found at both sides of the staircases to minimize any future flooding concerns. In addition to the vertical rack, the installation of a bike rail is proposed for the inside of both staircases that lead to the mezzanine area. This will allow cyclists to safely roll their bicycles along the stairs without causing injury to other passengers entering or exiting the station. The bike rail is approximately four inches in width depending on the model selected and will have minimal impact on pedestrian traffic along the stairs.

The recommendation for indoor bicycle parking does not comply with the MTA's current policy. However, proposed indoor bicycle parking may be kept under consideration by the MTA if the selected station exhibits a high enough demand for parking and the proposed parking system met their specifications.

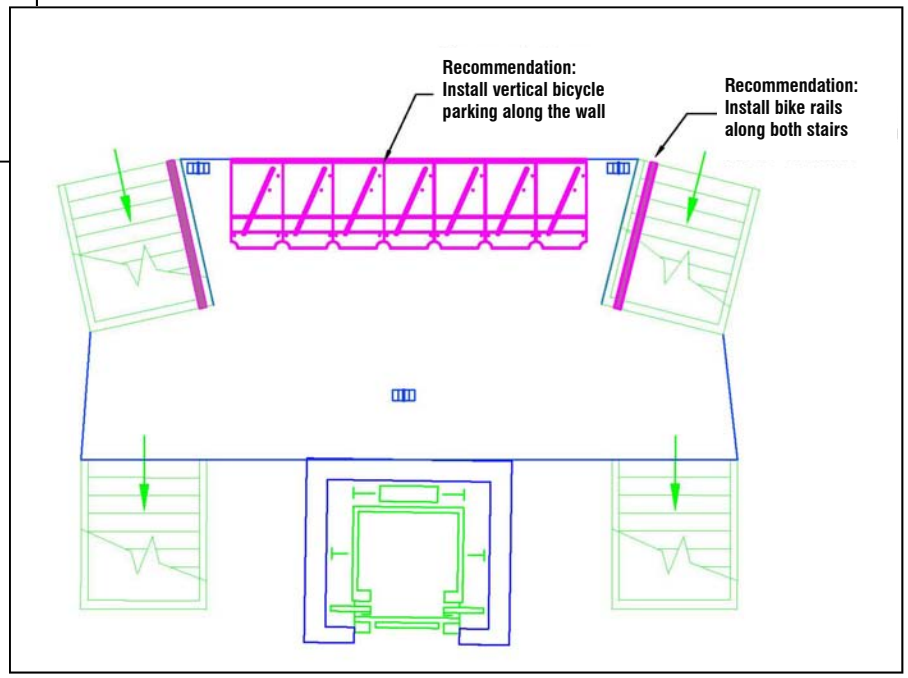
Left: Cemusa bicycle shelter, DeKalb Avenue station at maximum capacity



Right: Available space for additional bicycle parking on the mezzanine level of DeKalb Avenue station



Left: An example of a bike rail in use.



Above: Drawing of the existing layout of the mezzanine area of the station;

Right: Drawing of the mezzanine area with Vertical racks installed and the bike rails installed on both staircases.

Spuyten Duyvil, Metro North, The Bronx - Bike Lockers

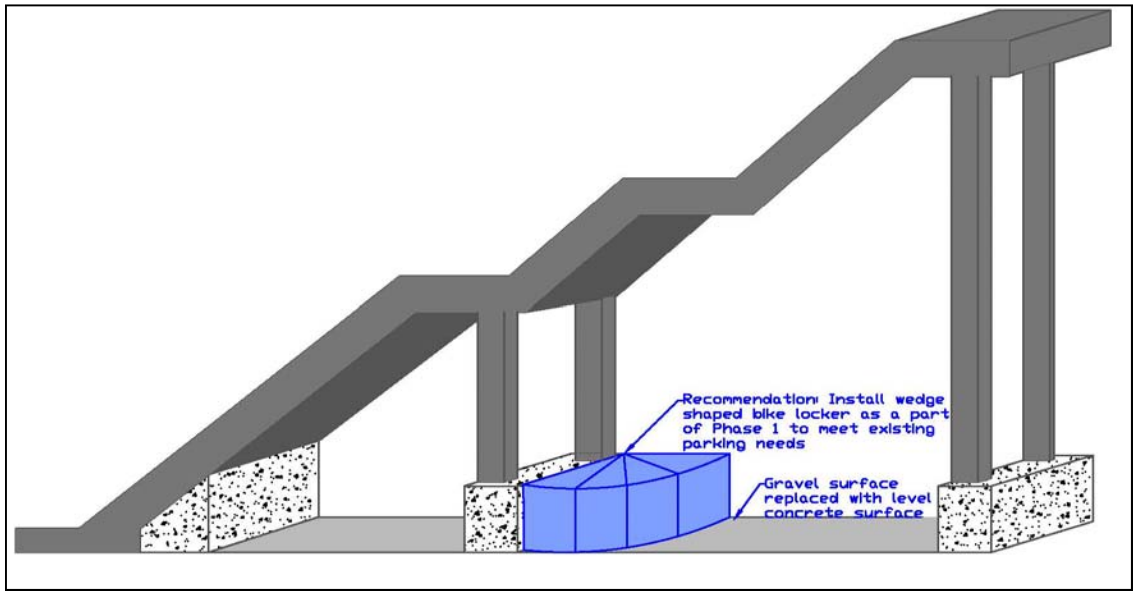
The Spuyten Duyvil Metro North station is located in the Riverdale section of The Bronx. Most of the passengers at this station park their cars in the station parking lot or along the road leading to the stations elevated entrance and take the commuter train into New York City. At the time of the field visit, there were three bicycles found parked at the station. Because bicycle parking is not available at this station, the bicycles were locked to rails at the top of the stairway near the station entrance and inside of the station's waiting area. This station has an abundance of space, unlike many of the stations found in other parts of the city. The available space provides the opportunity to explore non-traditional methods of bicycle parking. The site specific bicycle parking system selected for this station is the bicycle locker, to be located in the unutilized space beneath the station stairs. There is currently a demand for bicycle parking, therefore ensuring that the lockers will be used immediately after installation. Compared to some of the stations within the city, the number of bicycles found at the Spuyten Duyvil station was low. The placement of the lockers will encourage others to use cycling as a viable mode of transportation.

Bike lockers are a costly investment, particularly at locations that do not demonstrate a very high demand for bicycle parking. With this in mind, a phasing process is proposed in which four lockers are immediately installed as a part of the initial phase. Post-installation analysis is recommended 6 months to a year after installation to determine if the demand has increased or remained the same. If the demand for bicycle parking increases, during the second phase additional lockers would be installed within the same space to meet the growing and future demand for bicycle parking.

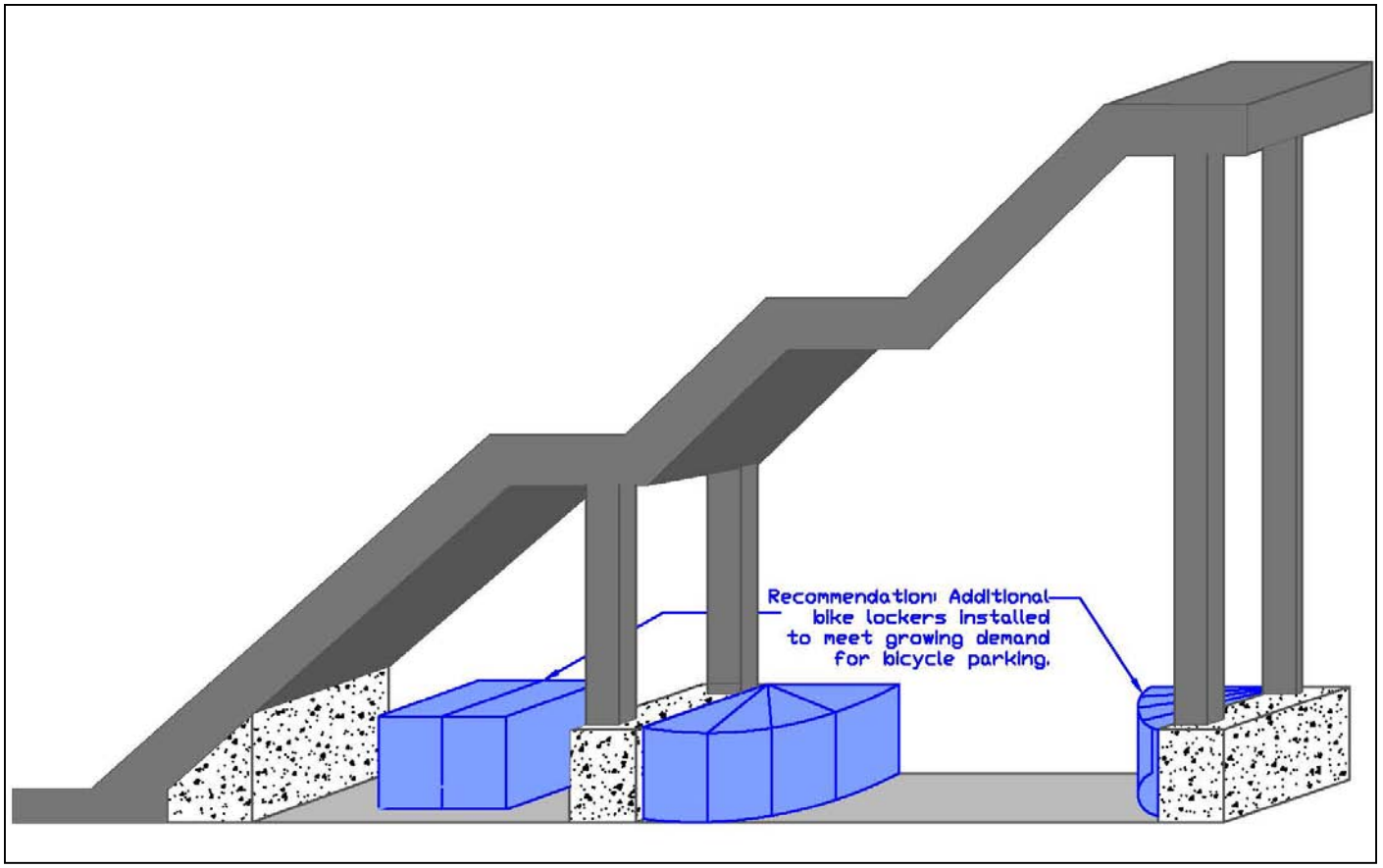
The bicycle lockers come in various shapes and sizes to best fit the available space. The wedge configuration of bicycle lockers provides a flexible arrangement for the area underneath stairs and can be easily adjusted or expanded upon as demand for bicycle parking increases. Minimal construction is needed for the installation of the bicycle lockers. The existing space has a gravel base, that will require resurfacing with a solid concrete slab to properly secure the bicycle lockers.

Above: Bicycles found locked to the railings inside and outside of the Spuyten Duyvil, Metro North Rail station

Existing Spuyten Duyvil station with available space beneath the stairs for bicycle parking



Phase I of the bicycle locker installation beneath the station stairs



The final phase of bicycle parking installation as the demand for parking increases

2-Tier Bicycle Rack proposed at the Brooklyn Bridge/City Hall, 4,5,6, Manhattan

The Brooklyn Bridge/City Hall station in lower Manhattan has 4 entrances. At the time of the field visit, there were a total of 33 bicycles parked in close proximity to the station. Many bicycles were locked to the railing of the subway entrances or locked to nearby posts. Two extended wave racks and a "wheel bender" rack that only supports the bicycle by the front wheel were found at the station entrance of the Municipal Building. This area is completely covered, providing sheltered bicycle parking. The bike racks were installed by the Department of Citywide Administrative Services (DCAS) and were intended primarily for city employee use, but are now available to the public. At the time of the first field visit, the existing demand was being met by the offered bicycle parking, however the configuration of the racks did not allow for the most efficient use of the space. DCAS, with the help of CDOT, has since reconfigured the area to increase the capacity from 24 to 52 bicycle parking spaces using inverted "U" racks and multiple "U" racks.

During the first field visit prior to the reconfiguration, this station's existing conditions were well suited for the installation of a 2-tiered bicycle rack. The available height clearance and the unobstructed wall space of the covered area made this station an ideal candidate for the proposed bicycle parking system. The recommended location for the rack would be along the wall away from pedestrian traffic. This will allow users to raise and lower their bicycles without possible injury to other cyclists or passengers. The constant presence of security and pedestrians around the perimeter of the building reduces the possibility of bicycle theft.

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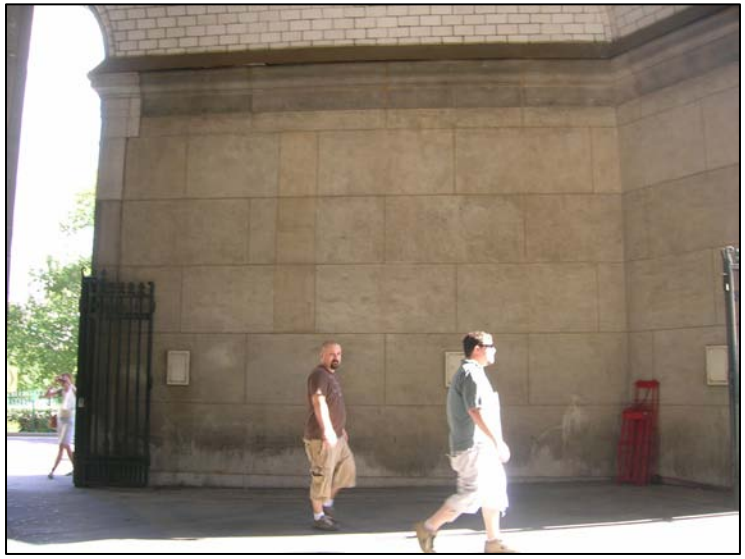
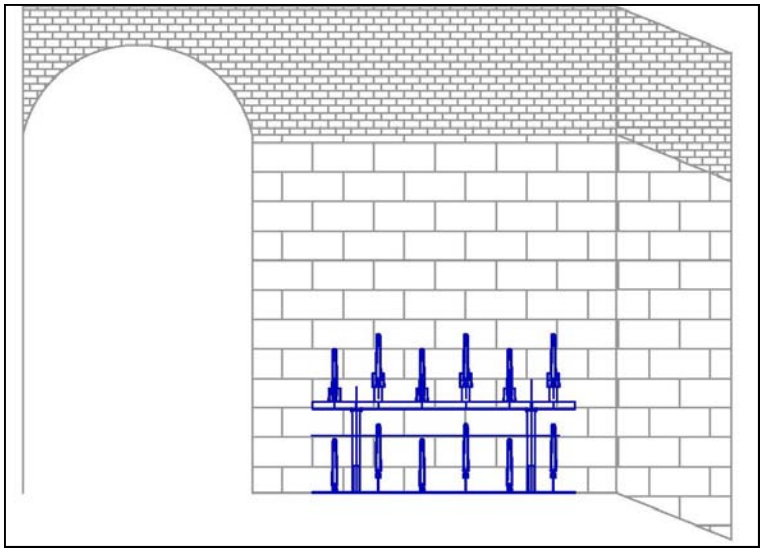
The original configuration of the bicycle parking area at the Municipal Building

A snap shot of the reconfigured bicycle parking area at the Municipal Building





Above Left: Covered space at the Brooklyn Bridge/City Hall station available for 2-tiered bicycle parking;
Above Right: Drawing of 2-tiered bicycle parking at the Brooklyn Bridge/City Hall station;
Right: Example of the a 2-tiered bicycle rack in a space similar to the Brooklyn Bridge/City Hall station

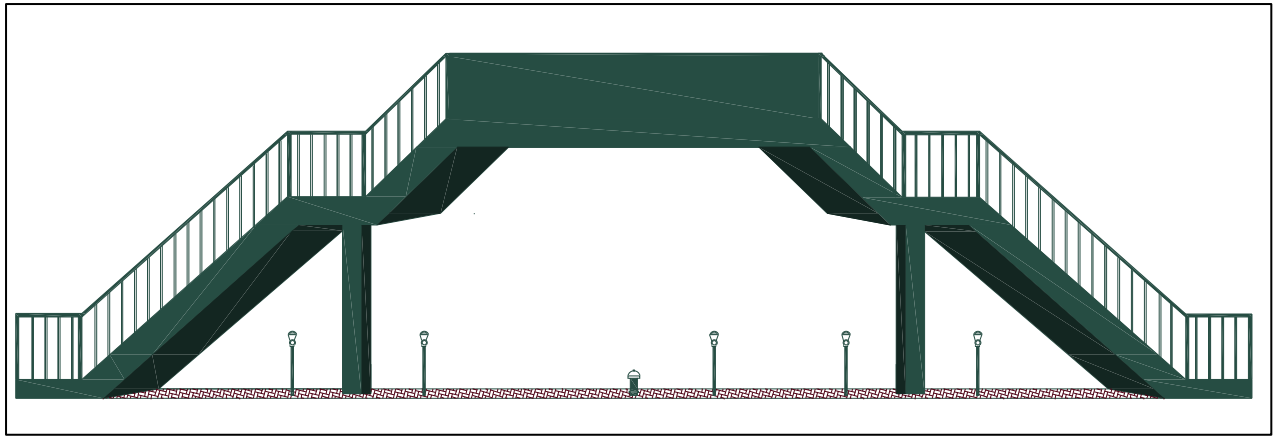
Multiple "U" Racks proposed at the Astoria-Ditmars Boulevard, N, W, Queens

The Astoria-Ditmars Boulevard station is along the (N, W) lines in Queens. At the time of the field visit, there were 35 bicycles in the vicinity of the station, and only 2 bicycle racks; a wave rack and a "wheel bender" bike rack that only supports the bicycle by the front wheel. At over 20 feet wide on either side, the sidewalks are wide enough to accommodate additional bicycle racks. There is a high demand for bicycle parking and limited placement options due to significant pedestrian traffic.

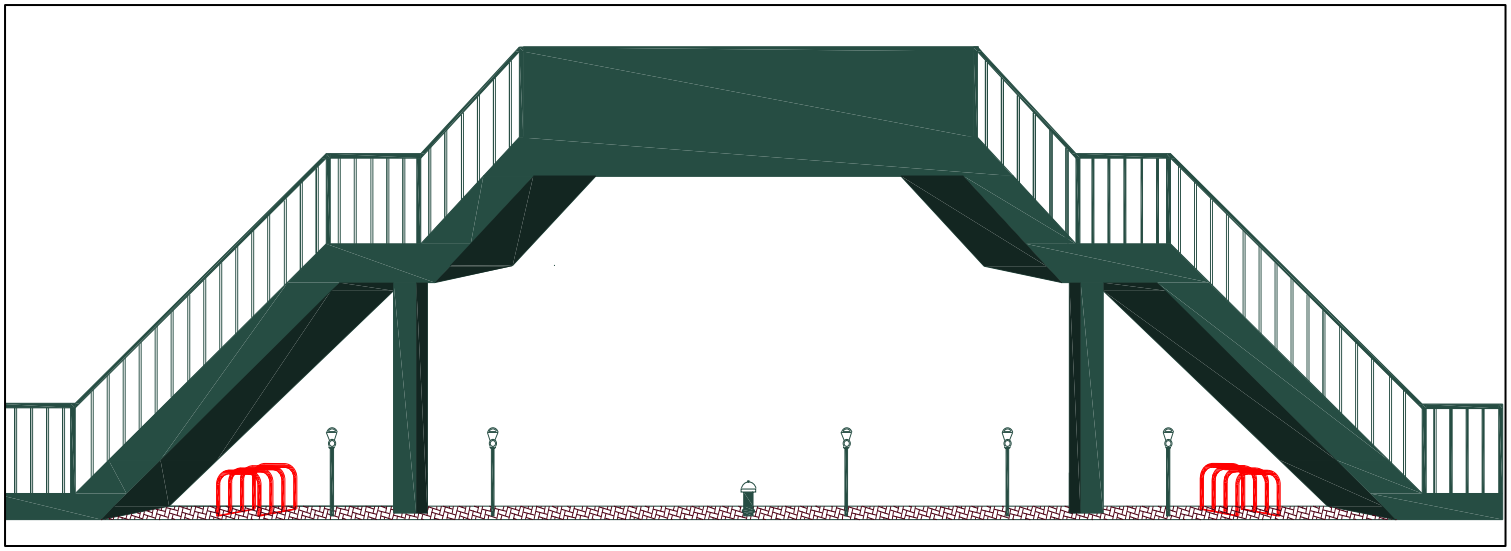
The subway station is elevated and the space underneath the stairs is not being utilized. The multiple "U" rack is the site specific bicycle parking system recommended for this station. Located beneath the stairs, the bicycle racks will be protected from the weather and they will be positioned away from pedestrian traffic. With the Multiple "U" racks in place, bicycles can be parked in an organized manner. The drawback to the installation of the multiple "U" racks at this station is that some of the bricks embedded into the sidewalk would have to be removed to allow for proper in-ground installation. To offset this concern, it is also recommended that the concrete used during the installation be dyed the color of the existing brick in order to maintain the appearance of continuity.

Because the demand for bicycle parking is so high in this area, a phasing component is suggested to allow for additional bicycle parking if demand increases. After the multiple "U" racks have been installed post-installation analysis should be conduct with six months to determine whether demand has increased or remained the same. If demand increases, phase II of this project would retrofit the parking meters that are in close proximity to the subway entrances with bicycle racks. Phase II will increase the amount of available bicycle parking for the future.

Left: Bicycles locked to parking meters along the sidewalk
Right: Sidewalk view of the available space beneath the subway entrance stairs;



Drawing of the existing area beneath the subway entrance stairs



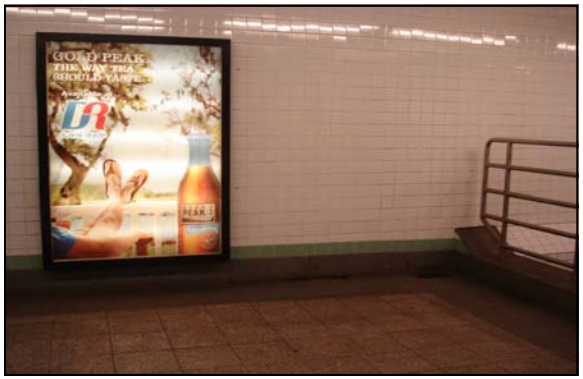
Drawing of the area beneath the subway entrance stairs fitted with bicycle parking

Metropolitan Avenue, G, Brooklyn - Indoor Multiple "U" Racks

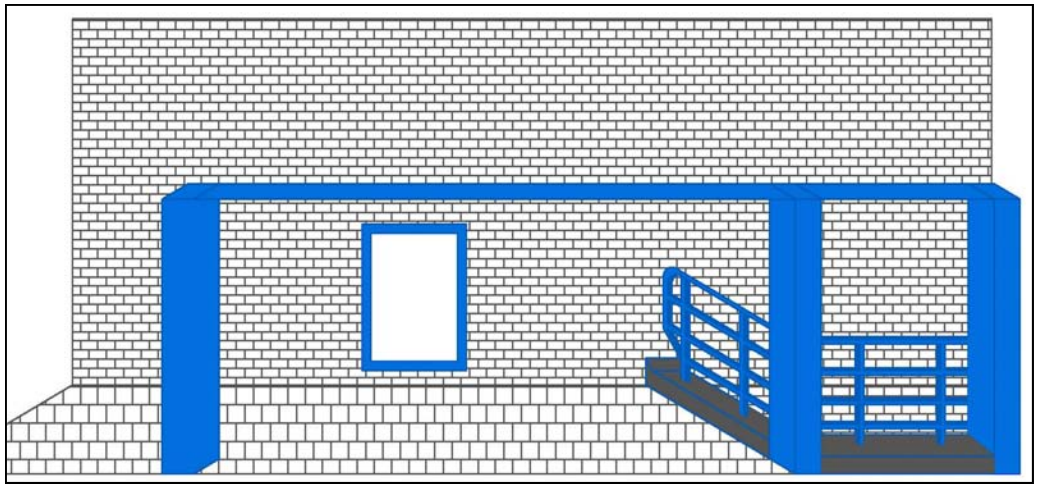
The Metropolitan Avenue station on the (G) line in Brooklyn, has a reasonably high demand for bicycle parking with limited space on the street level at the station's entrances. At the time of the field visit, 16 bicycles were locked to one wave rack and two inverted "U" racks. A few bicycles were also attached to nearby utility posts. With limited sidewalk space, alternative methods of bicycle parking were explored when deciding on a site appropriate design for bicycle parking. The vast amount of space on the mezzanine level of the subway station provides an opportunity for indoor bicycle parking.

Bicycles will be protected from inclement weather and the otherwise underutilized space in the station will serve a function. In addition to the bicycle racks, a bike rail is also proposed to be installed at the access points closest to the location of the racks to allow cyclists to safely roll bicycles along the stairs without causing injury to other passengers entering or leaving the station. In the event demand for indoor parking increases beyond the capacity of the multiple "U" rack, it is recommended that the racks be removed and replaced with a 2-tier rack system to meet increased demand. The height and available space within the station can easily accommodate the changes.

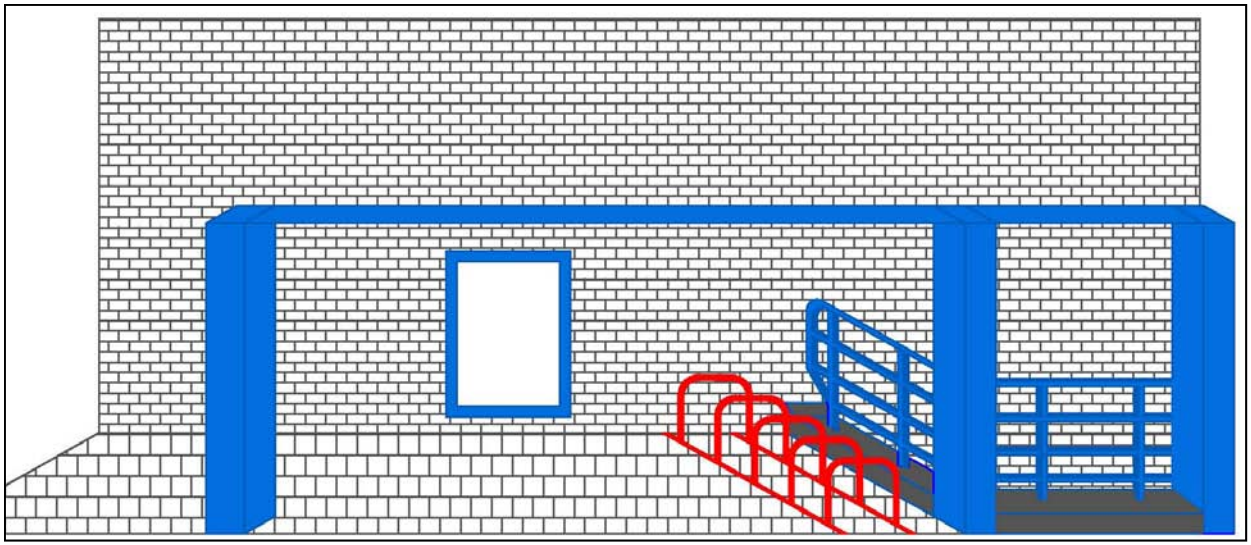
Above: Inside the paid zone of the Metropolitan Avenue subway station on the mezzanine level



Above: Area on the mezzanine level available for bicycle parking avoiding pedestrian conflicts



Drawing of area proposed for indoor bicycle parking



Drawing of area proposed for indoor bicycle parking after the bicycle racks are installed

Post-installation Management

Once installed, it is important that a management program be put in place to monitor the usage and condition of the bicycle racks regardless to the type of rack used. An integral part of a bicycle parking management program is controlling the number of abandoned bicycles left locked to racks. With an increase in bicycle parking citywide, abandoned bicycles are going to become a larger concern for the *CityRacks* program. Not only are abandoned bicycles an eyesore, they occupy bicycle parking spaces and prevent others from making use of the bicycle racks. This was the case when conducting a field visit to the Bedford Avenue station along the (L) line in Brooklyn. Abandoned bicycles and bicycle parts were chained to a *CityRack* preventing the proper parking of two bicycles. To control the abandoned bicycle problem, the agency responsible for maintaining the bicycle racks could implement a maintenance system in order to better track the usage of the racks. Currently, various agencies including the Police, Sanitation and Parks Departments periodically clip abandoned bicycles without notice (occasionally confusing them with legitimately locked bicycles).

In 2006, the City Council introduced legislation (Int.234) to amend New York City Administrative Code section 16-122 to include non-motorized vehicles as the definition of an abandoned bicycle and the procedure by which a violation can be issued and responded to prior to the disposal of the abandoned bicycle. This legislation was not passed into law and bicycles continue to be seized without clear guidance from the law.

In addition to managing the quality of bicycle parking, it is important to keep the public informed on where bicycle parking is located and allow them to locate bicycle parking along major routes and near points of interest.

Abandoned bicycle and bicycle parts found at Bedford Avenue Station (L) in Brooklyn

Abandoned bicycles chained to a post near the Clinton- Washington Station (G) in Brooklyn

CityRacks Tracking and Maintenance System

The first step in maintaining *CityRacks* would be to create an inventory tracking system. Currently, CDOT maintains a database of *CityRacks* that are identified by location (i.e. the northeast corner of 59th Street and 8th Avenue, with an "in front of" address). This system can be confusing when there are several *CityRacks* in one location. Alternatively, each *CityRack* could be assigned GPS coordinates to simplify the process of identifying individual racks. This should be done during the installation process. Under this proposal, each rack would also be assigned an ID number to be used to track it throughout the entire process, from installation to maintenance.

As part of this new program, regular maintenance would need to be scheduled, either by borough, neighborhood or community board. Additionally, under this program, requests for maintenance or removal of abandoned bicycles could be made based on calls to 311 or from the community boards. As part of the program, rack usage should be documented and analyzed. During maintenance, it should be noted whether the racks are being used, if there are enough racks to meet the demand, and requests should be submitted if additional racks are needed. The condition of the racks should also be documented and notes made indicating whether the racks are in need of repair and if there were any abandoned bicycles found locked to the racks. A notification system could be added to the maintenance regimen to inform owners of bicycles that appear to be abandoned that their bicycles will be removed within a pre-determined amount of time if the bicycle is not claimed. This is currently the practice in Copenhagen and on many college campuses including New York University. In Copenhagen, a bright colored tape is wrapped around part of the bicycle. If the tape is not broken after a certain period of time, the bike is presumed abandoned and will be removed. In the case that bicycles are removed in error, they should be kept for a two week period at a storage facility where users could go to retrieve them. A storage facility could be located in each borough for easy retrieval. This proposed maintenance program is an essential component to maintaining a successful *CityRacks* program. It ensures that all cyclists will have access to secure bicycle parking.

Interactive Website for Bicycle Parking Users

Working towards an efficient and comprehensive citywide bicycle parking program, the CDOT has launched a mapping application on their website that allows cyclists to locate the CityRack nearest to where they are going. This new application allows users to zoom-in and select the bicycle icon closest to their destination. Once selected, a pop-up box is displayed with the address of the rack, the type of rack and the number of racks available at that location.

Building off the CDOT bicycle parking locator website, the NYCDCP/TD in collaboration with CDOT is in the process of creating an interactive website that will provide cyclists in NYC with a step-by-step bicycle routing and bicycle parking location query ability. The purpose of the project is to make available to cyclists a comprehensive trip planning website that includes up-to-date bicycle facility data and a routing application, together with information on the location of safe and secure bicycle parking. The website would include: a search page with options to search by address, intersection, point of interest, or a user-defined point on a citywide map; a dynamic map of the search results for routing and parking; and the tabular information associated with the bicycle parking facilities shown on the map. The routing feature will include step-by-step written instructions that corresponds to a map displaying the route. Information would include streets, bicycle routes and public transportation facilities.

In addition to allowing users to view current information relating to the locations and types of bicycle parking facilities throughout the city, the application would also allow users to provide feedback such as data errors, report damaged racks, additional bicycle parking facilities not in the database, and potential sites where a bicycle parking facility is desired to the planning and operating agencies. This will allow users to communicate up-to-date information on problematic bicycle parking conditions with city agencies responsible for maintaining them.

Recommended Next Steps

This study lays the groundwork for the development of a comprehensive bicycle parking network. The 239 stations surveyed during this study represents a portion of the total transit stations citywide. Following the methodology used for this study a complete matrix can be created to include all transit stations citywide to determine the bicycle parking demand as well as the type and number of racks needed to meet the demand for each station. In the long term, it is suggested that a study be conducted for each borough to evaluate each transit station on an individual basis and analysis be conducted to determine the appropriate bicycle parking for current and future demand.

Interagency Coordination

There are many agencies involved in the implementation process of bicycle parking at transit stations. With improved coordination between agencies, data collection and implementation can be processed quickly and more efficiently producing a high quality bicycle parking network. With coordinated efforts between NYCDCP/TD and CDOT, recommendations for *CityRacks* placement generated by this study have been provided to CDOT for immediate and future installation. The data collected regarding the stations in Queens along the (7) subway line is now being used by CDOT to site bicycle parking for immediate installation of *CityRacks*. At the same time, the other stations surveyed in this study are being evaluated for future bicycle parking installation. The information gathered during this study could be very useful to the MTA to incorporate bicycle parking when planning station improvements and renovations. Continued collaborative efforts among agencies are recommended to ensure a comprehensive network for bicycle parking and other bicycle related initiatives, particularly at intermodal transportation hubs and stations located within future growth areas. Open communication among agencies allows for data sharing and reduces redundancy in planning and data collection.

Public Education

The next step in developing a bicycle parking network is educating the public on how to properly use the provided bicycle racks. While this study highlights different types of bicycle parking systems, one commonality is the need for user education. To ensure the public is being made aware of proper bike locking technique, a picture diagram could be included on a panel of the Cemusa bicycle shelters. Similar to the “LOOK” campaign designed by CDOT to make drivers more aware of cyclists on the road, a campaign can be created to educate existing and potential cyclists on how to properly use *CityRacks*. With correct use of *CityRacks*, the number of bicycle thefts citywide will decrease.

Conclusion

The bicycle parking systems highlighted in this study showcase the many possibilities available when considering bicycle parking at transit stations. Using a standard inverted "U" bicycle rack is the most cost effective approach when considering bicycle parking. It provides a uniform and cohesive streetscape with little maintenance required. This works well when all stations are the same and have equal demand. The case studies show that all stations are not alike and that demand is not equal across the city. Special situations will arise when a standard system will not yield the most efficient use of the available space. For certain locations, standard *CityRacks* are not sufficient, and site-specific solutions must be created. Fieldwork conducted in this study shows the citywide need for increased bicycle parking near transit, and describes a methodology for selecting locations for specific bike parking systems. This study shows that secure bicycle parking can be provided at any transit station regardless of its location or available space whether it is to meet existing demand, or to encourage cycling to transit as a viable mode of transportation.

Appendix

Literature Review

New York City Bicycle Survey, 2007
NYC Department of City Planning, Transportation Division

The purpose of this report is to document New York City cyclists' trends, preferences and criticisms. The Department of City Planning's Transportation Division received feedback from over 1,000 cyclists. Of the responses received, 64% of respondents park their bicycles on CDOT issued CityRacks and 95% of the respondents would like to see more bike racks located throughout the city. However, the majority of cyclists prefer off-street bicycle parking facilities to on-street (76%).

For those respondents not commuting to work by bicycle, approximately 50% cited too much traffic/driver behavior and no safe storage facility as reasons for not commuting by bicycle. The three most popular requested locations for additional CityRacks indicated by this survey were curbside (80%), the workplace (72%) and subway stations (67%). 29% of commuting cyclists connect to other modes of transportation in order to reach their destination and 19% connect to the subway system.

Bicycle Parking Needs, 1999
NYC Department of City Planning, Transportation Division

The New York City Department of City Planning's Transportation Division (NYCDCP-TD) reports on the existing bicycle parking facilities and parking ordinances in New York City. The purpose of this study was to assess the need for bicycle parking facilities and make recommendations for enhancement. In order to assess the need for bicycle parking in specific locations, the NYCDCP-TD conducted a survey of cyclists to recommend locations for and preferred types of bicycle parking facilities. The three most frequently recommended categorical locations for bicycle parking included Parks, Non-specific Sites (Midtown, Broadway, Brooklyn) and Transit Hubs (bus stops, subway stations, major transit terminals).

In terms of parking facility types, just under half of the survey responses recommended lockers at transit hubs, 28% for racks and 22% for bike stations. Transit hubs are the only category in which the survey indicates cyclists prefer bike lockers. This report also includes a preliminary outline for a campaign to encourage private building owners and management companies to provide off-street bicycle parking.

PlaNYC, 2007
New York, NY

The City Department of Transportation (DOT) bicycle data shows bicycling increased in the last 27 years. To accommodate the increasing number of people who choose to bike in the city and promote bicycling as part of the transportation network, bicycle parking is required.

PlaNYC states that cycling in the city has increased by 75% from 2000 to 2006. However, traffic congestion, clean air and greenhouse gas concerns also continue to grow. PlaNYC therefore encourages the implementation of the 1,800 mile bike lane, which includes 504 miles of separated bike paths and 1,296 miles of striped bicycle lanes or markings on shared roads.

NYC will also continue to encourage cycling through public education and providing necessary infrastructure. City DOT's CityRacks program will install 1,200 additional on-street bicycle racks by 2009.

Additionally, City DOT's Strategic Plan has the following goals to achieve by 2009, as outlined in the 2008 Strategic Plan:
Test new lane designs and explain implementation of designs that work
Install 37 bicycle parking shelters and 800 City Racks
Complete installation of 200 bicycle lane miles by 2009
Install 15 additional miles of protected on-street bike lanes
Pursue indoor bicycle parking legislation at City level
Install 5000 City Racks (1600 annually)

This report identifies what comparable cities have done to provide or upgrade their bicycle parking and its impact on potential bike-to-transit riders. The report will further identify sites in New York City that are appropriate for bicycle parking.

Caltrain
Bay Area, CA

Caltrain provides commuter rail service primarily between San Francisco and San Jose. Caltrain does allow bicycles on board on a first come first serve basis. There are two types of trains: the Gallery and the Bombardier. Gallery cars can accommodate 32 bicycles while the Bombardier can hold 16. Caltrain has a long term goal of purchasing more Gallery cars, but in the mean time are trying to accommodate bicyclists with greater frequency in service. One car on each train is dedicated for bicyclists and their bikes.

For commuters who do not wish to travel with their bicycles, bike racks are also provided at all stations except four. Bicycle lockers, bike stations, and attendant bicycle parking is also available and administered by various agencies. Users must sign up for a key and pay a fee prior to using a bike locker. Bicycle tags are also available for bicyclists to affix to their bikes, on the rack. This simplifies the process of tying bikes with a similar destination to the same rack and expedites getting on and off the train.

A new bicycle valet service recently opened at the San Francisco Caltrain station at 4th and Townsend. Since its opening January 9, 2008, the service averages about 82 bicycles a day, with peaks of over a 100 bicycles. Warm Planet Bikes operates the service and is mandated to provide at least 100 spaces for bicycles, but actually have 130 spaces to meet peak demand. The free service connects Caltrain riders to and from the station, while providing secure bicycle parking, repairs, and sales.

Bike Plan 2015, 2005
Chicago, IL

The Chicago Transit Authority wants to improve bicyclists' access to transit. The five main objectives to achieve this goal are:

Encourage bicycling and increase transit use
Permit bicycles on Metra, Chicago's commuter rail system
Install bike racks on CTA and Pace buses and publicize these programs
Provide secure bike parking at train stations
Market the bike-transit incentives by informing the public and providing incentives

Encourage bicycling and increase transit use
The City of Chicago plans to publicize the bike-transit connection. As their report states, "[The Agency will] show the best routes to bike to the station, where to park bikes, nearby bicycle shops, popular destinations, and how to bring bicycles on trains" They will begin with stations with the greatest potential for bike-transit use."

Permit bicycles on Metra trains
The City of Chicago aims to encourage Metra to make their trains more bike-friendly. Bikes are currently allowed onboard only between the June and October. Allowing bikes year round will further encourage bicycling. Metra is also encouraged to be plan for and increase the capacity of bicycle storage onboard on new and refurbished trains as well as publicize the bike-transit connection.

Install bike racks on CTA and Pace buses and publicize these programs
The City of Chicago encourages CTA and Pace buses to continue affixing their fleet with bike racks and maintaining them in good condition. The front-mounted bike racks enable cyclists to easily load their bike on the bus without disturbing other passengers onboard.

Provide secure bike parking at train stations
CTA has a high number of bicycle parking facilities present at many of their stations. Their goal is to increase this fleet and include additional, indoor parking for weather protection and greater security. Currently, bike parking is available at 110 of the 124 CTA stations in Chicago and 50 of the 76 Metra stations. Indoor bike parking is available at 66 CTA stations in Chicago, more than any other transit agencies in the United States. CTA wants bike parking to be covered, illuminated, and in high visible locations, whenever possible, to

encourage use and reduce the likelihood of theft. Additionally, bicycle parking should be included, and remain open, for all future upgrades and remodeling of train stations. The agency aims to provide at least 5 indoor bicycle parking spaces per station. More bicycle stations, such as the successful Millennium Park, are proposed for encouraging bike-transit use. Millennium Park provides day and overnight parking, showers and/or changing facilities, lockers, bicycle rentals, repairs, and sales..

Market the bike-transit incentives by informing the public and providing incentives
The City of Chicago plans to promote bike-transit in the following ways: "distributing maps that identify bikeways to train stations; identifying bike trail locations on the CTA's Bus and Rail Map; advertising in stations, buses, and trains; and educational video clips on the CTA and Pace web sites that demonstrate how to load/unload bicycles from bus racks." They also plan to promote bicycling at the annual Bike Chicago Festival and partner with the Safe Routes to School and Bike to Campus programs to encourage high school and university students to bike.

In August 2008, The City of Chicago began construction for 382 sheltered bicycle parking spaces in four CTA stations:

- Midway Orange Line (112 bike parking spaces)
- Sox 35th/Red Line Station (42 bike parking spaces inside the station)
- Jefferson Park Blue Line Station (120 bike parking spaces)
- Damen Blue Line Station (108 bike parking spaces inside the station)

All stations will have double-deck bike racks and all facilities will be well-lit, covered, and located in highly visible areas.

Appendix B

Sample Field Sheet

Station Name: _____

Station Type: _____

Date: _____

Weather Conditions: _____

		Yes	No
# of Bus Stops	☐		
# of Parking Meters	☐		
# of Subway Entrances	☐		
Pedestrian Traffic (light=1 average=2 heavy=3)	☐		
Sidewalk Conditions (Good=1 Fair=2 Poor=3)	☐		
Roadway Conditions (Good=1 Fair=2 Poor=3)	☐		
Adequate Lighting		☐	☐
Can the area accommodate a City Rack?		☐	☐
Can the roadway accommodate a curb extension?		☐	☐
Would you leave your bicycle here for 5 hours or more?		☐	☐

Notes: _____

Appendix C

List of Stations

Borough	Station Name	Subway Lines	# of Bicycles	# of Racks	Type of Rack	Is Demand >/< Supply
Bronx	Marble Hill/225th Street	1	0	0	N/A	N/A
Bronx	Van Cortlandt Park/242nd Street	1	1	0	N/A	N/A
Bronx	Wakefield/241st Street	2	2	0	N/A	>
Bronx	Woodlawn	4	0	0	N/A	Equal
Bronx	Burnside Avenue	4	0	0	N/A	Equal
Bronx	Kingsbridge Road	4	3	0	N/A	>
Bronx	Eastchester/Dyre Ave	5	1	0	N/A	N/A
Bronx	Pelham Bay Park	6	1	0	N/A	>
Bronx	Westchester Square / East Tremont Ave	6	0	0	N/A	N/A
Bronx	Parkchester	6	1	0	N/A	>
Bronx	Hunts Point Avenue	6	0	0	N/A	N/A
Bronx	Castle Hill Avenue	6	0	0	N/A	N/A
Bronx	149th -Grand Concourse	2,4,5	3	0	N/A	>
Bronx	Simpson Street	2, 5	0	0	N/A	N/A
Bronx	Nereid Ave	2, 5	1	0		Equal
Bronx	3rd Avenue/149th Street	2, 5	2	4	(1) Wave & (3) Single	<

Bronx	Tremont Avenue	D	0	0	N/A	N/A
Bronx	Norwood/205th Street	D	0	0	N/A	N/A
Bronx	Fordham	Metro North-e	3	0	N/A	N/A
Bronx	Williams Bridge	Metro North-e	0	0	N/A	N/A
Bronx	Botanical Garden	Metro North-e	0	0	N/A	N/A
Bronx	Tremont	Metro North-e	0	0	N/A	N/A
Bronx	Melrose	Metro North-e	0	0	N/A	N/A
Bronx	Woodlawn	Metro North-e	0	0	N/A	N/A
Bronx	Riverdale	Metro North-w	0	0	N/A	N/A
Bronx	Spuyten Duyvil	Metro North-w	3	0	N/A	>
Bronx	University Heights	Metro North-w	0	0	N/A	N/A
Bronx	Morris Heights	Metro North-w	0	0	N/A	N/A
Bronx	Pelham Parkway	5	0	0	N/A	N/A
Bronx	East 180th Street	2, 5	1	0	N/A	>
Bronx	Pelham Parkway	2, 5	2	1	?	Equal
Bronx	Baychester Avenue	5	0	0	N/A	N/A
Bronx	Gun Hill Road	5	1	0	N/A	>
Bronx	Morrison-Sound View Avenues	6	0	0	N/A	N/A
Bronx	East 149th Street	6	0	0	N/A	N/A

Bronx	Bedford Park Blvd-Lehman College	4	4	0	N/A	N/A
Bronx	Bedford Park Blvd	D	1	0	N/A	>
Bronx	Fordham Road	D	0	0	N/A	N/A
Bronx	Fordham Road	4	1	0	N/A	>
Bronx	161st Street-Yankee Stadium	4, D	0	0	N/A	N/A
Bronx	Morris Park	5	0	0	N/A	N/A
Bronx	3 Avenue / 138th Street	6	3	0	N/A	>
Bronx	Wakefield	Metro North-e	0	0	N/A	N/A
Bronx	Marble Hill	Metro North-w	0	0	N/A	N/A

Borough	Station Name	Subway Lines	# of Bicycles	# of Racks	Type of Rack	Is Demand >/< Supply
Brooklyn	New Lots Avenue	3	1	0	N/A	>
Brooklyn	Nostrand Avenue	3	0	3	(2) Wave & (1) Single	<
Brooklyn	Eastern Parkway	2, 3	1	3	Custom Design	<
Brooklyn	Bergen Street	2, 3	11	3	Wave	Equal
Brooklyn	Clark Street	2, 3	6	3	Wave	<
Brooklyn	Hoyt Street	2, 3	2	0	N/A	>
Brooklyn	Nevins Street	2, 3, 4, 5	4	4	Wave	<
Brooklyn	Brooklyn College/Flatbush Ave	2, 5	0	0	N/A	N/A
Brooklyn	Grand Army Plaza	2,3	10	3	Wave	<
Brooklyn	Crown Heights/Utica Ave	3, 4	1	1	Wave	<
Brooklyn	Franklin Ave	2, 3, 4, 5	2	0	N/A	>
Brooklyn	Euclid Avenue	A, C	1	0	N/A	>
Brooklyn	Jay Street	A, C, F	0	0	N/A	N/A
Brooklyn	Hoyt Schermerhorn	A, C, G	2	1	Wave	<
Brooklyn	Broadway Junction	A, C, J, L, Z	0	0	N/A	N/A
Brooklyn	Church Ave	B, Q	0	0	N/A	N/A

Brooklyn	7th Ave	B, Q	44	7	(2) Wave & (8) Single	>
Brooklyn	Kings Highway	B, Q	0	0	N/A	N/A
Brooklyn	Sheepshead Bay	B, Q	0	0	N/A	N/A
Brooklyn	Brighton Beach	B, Q	4	0	N/A	>
Brooklyn	Newkirk Avenue	B, Q	10	0	N/A	>
Brooklyn	Atlantic Ave	B, Q, 2, 3, 4, 5, LIRR	4	7	Wave	<
Brooklyn	Dekalb Ave	B, Q, R, M	30	4	Wave	>
Brooklyn	Prospect Park	B, Q, S	5	0	N/A	>
Brooklyn	Lafayette Ave	C	>16	8	wave	Equal
Brooklyn	Coney Island/Stillwell Ave	D, F, N, Q	0	0	N/A	N/A
Brooklyn	62 Street	D, M	10 (delivery bikes)	0	N/A	N/A
Brooklyn	Bay Parkway	D, M	6	0	0	>
Brooklyn	36th Street	D, M, N, R	14	3	Inverted U	>
Brooklyn	Atlantic Ave/Pacific Street	D, M, N, R, LIRR	3	0	N/A	>
Brooklyn	7th Ave	F	2	2	Inverted U	Equal
Brooklyn	15th Street/Prospect Park	F	1	2	Wave	<
Brooklyn	Church Ave	F	1	1	Inverted U	>
Brooklyn	4th Ave-9th Street	F, M, R	2	0	N/A	>
Brooklyn	Fort Hamilton Pkwy	F	1	0	N/A	>

Brooklyn	Carroll Street	F, G	12	5	(2) Wave & (3) Single	Equal
Brooklyn	Smith Street/9th Street	F, G	3	2	(1) Wave & (2) Single	<
Brooklyn	Metropolitan Ave	G	16	3	(1) Wave & (2) Single	>
Brooklyn	Nassau Ave	G	11	0	N/A	>
Brooklyn	Clinton/Washington Ave	G	2	2	Wave	<
Brooklyn	Fulton Street	G	9	2	Wave	>
Brooklyn	Kosciusko Street	J	1	1	Wave	<
Brooklyn	Lorimer Street	J, M	4	0	N/A	>
Brooklyn	Hewes Street	J, M	2	0	N/A	>
Brooklyn	Flushing Avenue	J, M	6	0	N/A	>
Brooklyn	Marcy Avenue	J, M, Z	17	6	(2) Wave & (4) Single	>
Brooklyn	Myrtle Avenue	J, M, Z	2	2	Wave	<
Brooklyn	Graham Ave	L	>25	2	Inverted U	>
Brooklyn	Lorimer Street	L	4 (2 abandoned)	1	Inverted U	Equal
Brooklyn	Canarsie/Rockaway Pkwy	L	1	0	N/A	>
Brooklyn	Bedford Avenue	L	>25	6	(4) Wave & (2) Single	>
Brooklyn	Grand Street	L	5	0	N/A	>
Brooklyn	Halsey Street	L	1	0	N/A	>
Brooklyn	Montrose Avenue	L	3	0	N/A	>

Brooklyn	Myrtle Ave/Wyckoff Ave	L, M	4	0	N/A	N/A
Brooklyn	Court Street/Borough Hall	M, R, Z, 3, 4, 5	12	4	wave	Equal
Brooklyn	Avenue H	Q	2	0	N/A	>
Brooklyn	Bay Ridge/95th Street	R	5	0	N/A	>
Brooklyn	86th Street	R	4	0	N/A	>
Brooklyn	Park Place	S	0	0	N/A	Equal

Borough	Station Name	Subway Lines	# of Bicycles	# of Racks	Type of Rack	Is Demand >/< Supply
Staten Island	Huguenot	SIRR	1	2	Inverted U	<
Staten Island	Annadale	SIRR	1	0	N/A	>
Staten Island	Great Kills	SIRR	0	2	Inverted U	<
Staten Island	Dongan Hills	SIRR	0	3	Inverted U	<
Staten Island	Clifton	SIRR	1	0	N/A	>
Staten Island	Grant City	SIRR	4	0	N/A	>
Staten Island	Oakwood Heights	SIRR	0	0	N/A	N/A
Staten Island	Prince's Bay	SIRR	0	0	N/A	N/A
Staten Island	Nassau	SIRR	1	0	N/A	>
Staten Island	Atlantic	SIRR	0	0	N/A	N/A
Staten Island	Tottenville	SIRR	0	0	N/A	N/A
Staten Island	St. George	SIRR	8	2	Wave	Equal
Staten Island	Eltingville	SIRR	1	1	Inverted U	Equal
Staten Island	New Dorp	SIRR	1	0	N/A	N/A

Borough	Station Name	Subway Lines	# of Bicycles	# of Racks	Type of Rack	Is Demand >/< Supply
Queens	Flushing Main Street	7	76	4	wave	>
Queens	Vernon Blvd/Jackson Ave	7	48	13 racks & bike	U racks, Wave racks,	>
Queens	74 Street-Broadway	7, E, F, V, R, G	51	18	U racks, and 2 wave	>
Queens	40th Street Lowery Street	7	N/A	N/A	N/A	N/A
Queens	45 Rd/Court House Square	7	7	5	U racks and Wave racks	<
Queens	Ozone Park/Lefferts Blvd	A	6 (delivery bikes)	0	N/A	>
Queens	Beach 67th Street	A	1	0	N/A	>
Queens	Far Rockaway/Mott Avenue	A	0	0	N/A	N/A
Queens	Rockaway Blvd	A	3 (delivery bikes)	0	N/A	>
Queens	Rockaway Park/Beach 116 Street	A, S	2	0	N/A	>
Queens	Briarwood/Van Wyck Blvd	E, F	2	0	N/A	>
Queens	Kew Gardens/Union Turnpike	E, F	0	0	N/A	N/A
Queens	Jackson Heights/Roosevelt Ave	E, F, G, R, V	17	2	Wave	>
Queens	Forest Hills/71st Ave	E, F, G, R, V	1	0	N/A	>
Queens	Queens Plaza	E, G, R, V	0	2	Wave	<
Queens	Jamaica Center/ Parsons Blvd/Archer Ave	E, J, Z	1	0	N/A	>

Queens	Sutphin Blvd/Archer Ave	E, J, Z, LIRR	6	0	N/A	>
Queens	169th Street	F	0	0	N/A	N/A
Queens	Jamaica/179th Street	F	4	0	N/A	>
Queens	LIC/Court Square	G	17	2	wave	Equal
Queens	46th Street	G, R, V	2	1	Inverted U	>
Queens	67th Avenue	G, R, V	0	0	N/A	N/A
Queens	63rd Drive Rego Park	G, R, V	0	0	N/A	N/A
Queens	Grand Avenue/Newtown	G, R, V	0	0	N/A	N/A
Queens	Elmhurst Avenue	G, R, V	0	0	N/A	N/A
Queens	Northern Blvd	G, R, V	1	0	0	>
Queens	Steinway Street	G, R, V	5	0	0	>
Queens	Woodhaven Blvd	G, R, V	1	0	N/A	>
Queens	Queens Village	LIRR	0	0	N/A	N/A
Queens	Hollis	LIRR	0	0	N/A	N/A
Queens	Woodside	LIRR	0	0	N/A	N/A
Queens	Little Neck	LIRR	4	1	wave	Equal
Queens	Douglaston	LIRR	2	1	wave	<
Queens	Bayside	LIRR	9	1	wave	>
Queens	Auburndale	LIRR	3	1	wave	<

Queens	Broadway	LIRR	1	0	N/A	>
Queens	Murry Hill	LIRR	2	2	wave	<
Queens	St. Albans	LIRR	0	0	N/A	N/A
Queens	Rosedale	LIRR	0	0	N/A	N/A
Queens	Laurelton	LIRR	0	0	N/A	N/A
Queens	Locust Manor	LIRR	0	0	N/A	N/A
Queens	Flushing	LIRR	56	5	N/A	N/A
Queens	Forest Hills	LIRR	11	0	N/A	>
Queens	Jamaica	LIRR	?	?	?	?
Queens	Kew Gardens	LIRR	2	1	wave	Equal
Queens	Middle Village/Metropolitan Ave	M	2	0	N/A	N/A
Queens	Astoria/Ditmars Blvd	N, W	35	2	wave, and a private	>
Queens	Astoria Blvd	N, W	10	1	Inverted U	>
Queens	Queensboro Plaza	N, W, 7	3	0	N/A	>
Queens	Willets Point-Shea Stadium	7	0	0	N/A	N/A
Queens	111th Street	7	5	0	N/A	>
Queens	103 Street-Corona Plaza	7	30	9	(1) Wave & (8) Single	>
Queens	Junction Blvd	7	20	1	Inverted U	>
Queens	90th Street-Elmhurst Ave	7	26	0	N/A	>

Queens	82nd Street-Jackson Heights	7	35	5	(1) Wave & (1) Single	>
Queens	69th Street	7	5	0	N/A	>
Queens	Woodside-61st Street	7	19	0	N/A	>
Queens	52nd Street	7	2	0	N/A	>
Queens	46th Street	7	25	4	(1) Wave & (2) Single	>
Queens	33 Street	7	13 & (1 abandoned	6	(4) Wave & (2) Single	Equal
Queens	Hunter Point Avenue	7, LIRR	0	0	N/A	N/A

Borough	Station Name	Subway Lines	# of Bicycles	# of Racks	Type of Rack	Is Demand >/< Supply
Manhattan	191st Street	1	0	0	N/A	N/A
Manhattan	23rd Street	1	0	0	N/A	N/A
Manhattan	116th Street-Columbia University	1	12	4	wave	>
Manhattan	Harlem/148th Street	3	0	0	N/A	N/A
Manhattan	145th Street	3	0	0	N/A	N/A
Manhattan	68th Street/Hunter College	6	4	1	wave	>
Manhattan	96th Street	6	1	0	N/A	>
Manhattan	Astor Place	6	31	3	(?) Wave & (?) Single	>
Manhattan	28th Street	6	10	2	inverted U	>
Manhattan	Spring Street	6	6	1	inverted U	>
Manhattan	23rd Street	6	17	2	(1) Wave & (1) Single	>
Manhattan	72nd Street	1, 2, 3	4	0	N/A	>
Manhattan	14th Street & 7th Ave	1, 2, 3	4	1	Inverted U	>
Manhattan	Fulton Street	2, 3	10	0	N/A	N/A
Manhattan	96th Street	1, 2, 3	9	1	wave	>
Manhattan	Fulton Street	4, 5	1	0	N/A	N/A

Manhattan	135th Street	2, 3	1	3	wave	<
Manhattan	Wall Street	2, 3	4	0	N/A	N/A
Manhattan	Wall Street	4, 5	18	3	inverted U provided by	>
Manhattan	Bowling Green	4, 5	5	0	N/A	>
Manhattan	86th Street	4, 5, 6	7	1	Inverted U	>
Manhattan	125th Street	4, 5, 6	0	1	wave	<
Manhattan	Brooklyn Bridge/City Hall	4, 5, 6	33	See Notes	wave	>
Manhattan	59th Street	4, 5, 6	3	1	wave	>
Manhattan	Inwood 207th Street	A	3	0	N/A	>
Manhattan	145th Street	A, B, C, D	2	0	N/A	>
Manhattan	125th Street	A, B, C, D,	2	0	N/A	>
Manhattan	Columbus Circle	A, B, C, D, 1	15	0		>
Manhattan	West 4th Street/Washington Sq	A, B, C, D, E, F, V	10	3	(3) Wave	Equal
Manhattan	168th Street	A, C, 1	3	4	(1) Wave & (3) Single	Equal
Manhattan	14th Street & 8th Ave	A, C, E, L	18	0	N/A	>
Manhattan	34th Street/Penn Station	A, C, E, LIRR	19	2	(2) Single	>
Manhattan	81st Street/Museum of Nat His.	B, C	7	0	N/A	>
Manhattan	116th Street	B, C	2	0	N/A	Equal
Manhattan	96th Street	B, C	0	0	N/A	N/A

Manhattan	42nd Street/Bryant Park	B, D, F, V	12	13	Inverted U	<
Manhattan	Broadway Lafayette,Bleecker St	B, D, F, V, 6	19	3	Inverted U	>
Manhattan	23rd Street	C, E	25	4	(2) Wave, (1) Single,	>
Manhattan	World Trade Center/Path Station	E, Path Train	26	8	3 Inverted U, 5 wave	>
Manhattan	Roosevelt Island	F	0	0	N/A	N/A
Manhattan	East Broadway	F	7	0	N/A	>
Manhattan	Delancey Street-Essex Street	F, J, M, Z	16	2	Wave	>
Manhattan	23rd Street	F, V	27	8	Wave	>
Manhattan	2nd Ave/Lower East Side	F, V	35	12	6 Wave, 6 Inverted U	>
Manhattan	14th Street & 6th Avenue	F, V	27	3	2 Wave and 1 wheel	>
Manhattan	Fulton Street	J, M, Z	>10 (delivery bikes)	0	N/A	N/A
Manhattan	1st Avenue	L	24	0	N/A	N/A
Manhattan	6th Avenue	L	30	5	(1) Wave & (5) Single	
Manhattan	34th Street-Penn Station	1, 2, 3, LIRR	1	0	N/A	N/A
Manhattan	14th Street-Union Square	L, N, R, W, Q, 4, 5, 6	59	16	(1) Cemusa Shelter	
Manhattan	Times Square	N, Q, R, S, W, 1, 2, 3, 7	0	0	N/A	N/A
Manhattan	Prince Street	N, R, W	33	7	(?) Wave & (?) Single	Equal
Manhattan	5th Ave/59th Street	N, R, W	1	0	N/A	>
Manhattan	8th Street	N, R, W	40	19	(?) Wave & (?) Single	<

Manhattan	Lexington Avenue/59th Street	N, R, W	6	2	Inverted U	>
Manhattan	Roosevelt Island Tramway	N/A	0	2	Wave	<
Manhattan	23rd Street	R, W	14	3	(?) Wave & (?) Single	Equal
Manhattan	Grand Central Station	S, 4, 5, 6, 7, Metro North	19	1	inverted U provided by	>
Manhattan	77th Street	6	9	0	N/A	N/A
Manhattan	Port Authority Bus Station	A, C, E	12	0	N/A	>

Appendix D

Priority Rating used for the Bronx and Staten Island

# of Bicycles	Priority Level
1-4	1*
0	3*

List of Stations with Priority Rating

Borough	Station Name	Subway Lines	# of Bicycles	Priority
Bronx	Van Cortlandt Park/242nd Street	1	1	1*
Bronx	Wakefield/241st Street	2	2	1*
Bronx	Pelham Bay Park	6	1	1*
Bronx	149th -Grand Concourse	2,4,5	3	1*
Bronx	Fordham	Metro North	3	1*
Bronx	Spuyten Duyvil	Metro North	3	1*
Bronx	East 180th Street	2, 5	1	1*
Bronx	Pelham Parkway	2, 5	2	1*
Bronx	Gun Hill Road	5	1	1*
Bronx	Bedford Park Blvd	D	1	1*
Bronx	Marble Hill/225th Street	1	0	3*
Bronx	Woodlawn	4	0	3*
Bronx	Burnside Avenue	4	0	3*
Bronx	Kingsbridge Road	4	3	1*
Bronx	Eastchester/Dyre Ave	5	1	1*
Bronx	Westchester Square / East Tremont Ave	6	0	3*
Bronx	Parkchester	6	1	1*
Bronx	Hunts Point Avenue	6	0	3*
Bronx	Castle Hill Avenue	6	0	3*

Bronx	Simpson Street	2, 5	0	3*
Bronx	Nereid Ave	2, 5	1	1*
Bronx	3rd Avenue/149th Street	2, 5	2	1*
Bronx	Tremont Avenue	D	0	3*
Bronx	Norwood/205th Street	D	0	3*
Bronx	Williams Bridge	Metro North	0	3*
Bronx	Botanical Garden	Metro North	0	3*
Bronx	Tremont	Metro North	0	3*
Bronx	Melrose	Metro North	0	3*
Bronx	Woodlawn	Metro North	0	3*
Bronx	Riverdale	Metro North	0	3*
Bronx	University Heights	Metro North	0	3*
Bronx	Morris Heights	Metro North	0	3*
Bronx	Pelham Parkway	5	0	3*
Bronx	Baychester Avenue	5	0	3*
Bronx	Morrison-Sound View Avenues	6	0	3*
Bronx	East 149th Street	6	0	3*
Bronx	Bedford Park Blvd-Lehman College	4	4	1*
Bronx	Fordham Road	D	0	3*
Bronx	Fordham Road	4	1	1*
Bronx	161st Street-Yankee Stadium	4, D	0	3*

Bronx	Morris Park	5	0	3*
Bronx	3 Avenue / 138th Street	6	3	1*
Bronx	Wakefield	Metro North	0	3*
Bronx	Marble Hill	Metro North	0	3*

Priority Rating used for Brooklyn, Manhattan and Queens

# of Bicycles	Priority Level
>50	1+
11-49	1
6-10	2
0-5	3

Borough	Station Name	Subway Lines	# of Bicycles	Priority
Brooklyn	Hoyt Street	2, 3	2	3
Brooklyn	Crown Heights/Utica Ave	3, 4	1	3
Brooklyn	Franklin Ave	2, 3, 4, 5	2	3
Brooklyn	Euclid Avenue	A, C	1	3
Brooklyn	Brighton Beach	B, Q	4	3
Brooklyn	Newkirk Avenue	B, Q	10	2
Brooklyn	Prospect Park	B, Q, S	5	3
Brooklyn	Bay Parkway	D, M	6	2
Brooklyn	36th Street	D, M, N, R	14	1
Brooklyn	Atlantic Ave/Pacific Street	D, M, N, R, LIRR	3	3
Brooklyn	4th Ave-9th Street	F, M, R	2	3
Brooklyn	Fort Hamilton Pkwy	F	1	3
Brooklyn	Lorimer Street	J, M	4	3
Brooklyn	Hewes Street	J, M	2	3
Brooklyn	Flushing Avenue	J, M	6	2
Brooklyn	Marcy Avenue	J, M, Z	17	1
Brooklyn	Grand Street	L	5	3
Brooklyn	Halsey Street	L	1	3
Brooklyn	Montrose Avenue	L	3	3

Brooklyn	Myrtle Ave/Wyckoff Ave	L, M	4	3
Brooklyn	Court Street/Borough Hall	M, R, Z, 3, 4, 5	12	1
Brooklyn	Bay Ridge/95th Street	R	5	3
Brooklyn	86th Street	R	4	3
Brooklyn	New Lots Avenue	3	1	3
Brooklyn	Nostrand Avenue	3	0	3
Brooklyn	Eastern Parkway	2, 3	1	3
Brooklyn	Bergen Street	2, 3	11	1
Brooklyn	Clark Street	2, 3	6	2
Brooklyn	Nevins Street	2, 3, 4, 5	4	3
Brooklyn	Brooklyn College/Flatbush Ave	2, 5	0	3
Brooklyn	Grand Army Plaza	2,3	10	2
Brooklyn	Jay Street	A, C, F	0	3
Brooklyn	Hoyt Schermerhorn	A, C, G	2	3
Brooklyn	Broadway Junction	A, C, J, L, Z	0	3
Brooklyn	Church Ave	B, Q	0	3
Brooklyn	7th Ave	B, Q	44	1
Brooklyn	Kings Highway	B, Q	0	3
Brooklyn	Sheepshead Bay	B, Q	0	3
Brooklyn	Atlantic Ave	B, Q, 2, 3, 4, 5, LIRR	4	3
Brooklyn	Dekalb Ave*	B, Q, R, M	30	1

Brooklyn	Lafayette Ave	C	>16	1
Brooklyn	Coney Island/Stillwell Ave	D, F, N, Q	0	3
Brooklyn	62 Street	D, M	10 (delivery bikes)	2* (delivery)
Brooklyn	7th Ave	F	2	3
Brooklyn	15th Street/Prospect Park	F	1	3
Brooklyn	Church Ave	F	1	3
Brooklyn	Carroll Street	F, G	12	1
Brooklyn	Smith Street/9th Street	F, G	3	3
Brooklyn	Metropolitan Ave	G	16	1
Brooklyn	Nassau Ave	G	11	1
Brooklyn	Clinton/Washington Ave	G	2	3
Brooklyn	Fulton Street	G	9	2
Brooklyn	Kosciusko Street	J	1	3
Brooklyn	Myrtle Avenue	J, M, Z	2	3
Brooklyn	Graham Ave	L	>25	1
Brooklyn	Lorimer Street	L	4(2 abandoned)	3
Brooklyn	Canarsie/Rockaway Pkwy	L	1	3
Brooklyn	Bedford Avenue *	L	>25	1
Brooklyn	Avenue H	Q	2	3
Brooklyn	Park Place	S	0	3

Priority Rating used for the Bronx and Staten Island

# of Bicycles	Priority Level
1-4	1*
0	3*

Borough	Station Name	Subway Lines	# of Bicycles	Priority
Staten Island	Grant City	SIR	4	1*
Staten Island	New Dorp	SIR	1	1*
Staten Island	Huguenot	SIR	1	1*
Staten Island	Annadale	SIR	1	1*
Staten Island	Great Kills	SIR	0	3*
Staten Island	Dongan Hills	SIR	0	3*
Staten Island	Clifton	SIR	1	1*
Staten Island	Oakwood Heights	SIR	0	3*
Staten Island	Prince's Bay	SIR	0	3*
Staten Island	Nassau	SIR	1	1*
Staten Island	Atlantic	SIR	0	3*
Staten Island	Tottenville	SIR	0	3*
Staten Island	St. George	SIR	8	1*
Staten Island	Eltingville	SIR	1	1*

Priority Rating used for Brooklyn, Manhattan and Queens

# of Bicycles	Priority Level
>50	1+
11-49	1
6-10	2
0-5	3

Borough	Station Name	Subway Lines	# of Bicycles	Priority
Queens	Queensboro Plaza	N, W, 7	3	3
Queens	Astoria/Ditmars Blvd	N, W	35	1
Queens	Astoria Blvd	N, W	10	2
Queens	Middle Village/Metropolitan Ave	M	2	3
Queens	Flushing	LIRR	56	1+
Queens	Queens Village	LIRR	0	3
Queens	Hollis	LIRR	0	3
Queens	Woodside	LIRR	0	3
Queens	Little Neck	LIRR	4	3
Queens	Douglaston	LIRR	2	3
Queens	Bayside	LIRR	9	2
Queens	Auburndale	LIRR	3	3
Queens	Broadway	LIRR	1	3
Queens	Murry Hill	LIRR	2	3
Queens	St. Albans	LIRR	0	3
Queens	Rosedale	LIRR	0	3
Queens	Laurelton	LIRR	0	3
Queens	Locust Manor	LIRR	0	3
Queens	Forest Hills	LIRR	11	1

Queens	Jamaica	LIRR	N/A	N/A
Queens	Kew Gardens	LIRR	2	3
Queens	Woodhaven Blvd	G, R, V	1	3
Queens	Elmhurst Avenue	G, R, V	0	3
Queens	Steinway Street	G, R, V	5	3
Queens	46th Street	G, R, V	2	3
Queens	67th Avenue	G, R, V	0	3
Queens	63rd Drive Rego Park	G, R, V	0	3
Queens	Grand Avenue/Newtown	G, R, V	0	3
Queens	Northern Blvd	G, R, V	1	3
Queens	LIC/Court Square	G	17	1
Queens	Jamaica/179th Street	F	4	3
Queens	169th Street	F	0	3
Queens	Sutphin Blvd/Archer Ave	E, J, Z, LIRR	6	2
Queens	Jamaica Center/Parsons Blvd/ Archer Ave	E, J, Z	1	3
Queens	Queens Plaza	E, G, R, V	0	3
Queens	Jackson Heights/Roosevelt Ave	E, F, G, R, V	17	1
Queens	Forest Hills/71st Ave	E, F, G, R, V	1	3
Queens	Kew Gardens/Union Turnpike	E, F	0	3
Queens	Briarwood/Van Wyck Blvd	E, F	2	3
Queens	Rockaway Park/Beach 116 Street	A, S	2	3

Queens	Rockaway Blvd	A	3 (delivery bikes)	3* (delivery)
Queens	Ozone Park/Lefferts Blvd	A	6 (delivery bikes)	2* (delivery)
Queens	Beach 67th Street	A	1	3
Queens	Far Rockaway/Mott Avenue	A	0	3
Queens	Hunter Point Avenue	7, LIRR	0	3
Queens	74 Street-Broadway	7, E, F, V, R, G	51	1+
Queens	Vernon Blvd/Jackson Ave	7	48	1
Queens	111th Street	7	5	3
Queens	103 Street-Corona Plaza	7	30	1
Queens	Junction Blvd	7	20	1
Queens	90th Street-Elmhurst Ave	7	26	1
Queens	82nd Street-Jackson Heights	7	35	1
Queens	69th Street	7	5	3
Queens	Woodside-61st Street	7	19	1
Queens	52nd Street	7	2	3
Queens	46th Street	7	25	1
Queens	Flushing Main Street	7	76	1+
Queens	40th Street Lowery Street	7	N/A	N/A
Queens	45 Rd/Court House Square	7	7	2
Queens	Willets Point-Shea Stadium	7	0	3
Queens	33 Street	7	13 & (1 abandoned)	1

Priority Rating used for Brooklyn, Manhattan and Queens

# of Bicycles	Priority Level
>50	1+
11-49	1
6-10	2
0-5	3

Borough	Station Name	Subway Lines	# of Bicycles	Priority
Manhattan	191st Street	1	0	3
Manhattan	23rd Street	1	0	3
Manhattan	116th Street-Columbia University	1	12	1
Manhattan	Harlem/148th Street	3	0	3
Manhattan	145th Street	3	0	3
Manhattan	68th Street/Hunter College	6	4	3
Manhattan	96th Street	6	1	3
Manhattan	Astor Place*	6	31	1
Manhattan	28th Street	6	10	2
Manhattan	Spring Street	6	6	2
Manhattan	23rd Street	6	17	1
Manhattan	72nd Street	1, 2, 3	4	3
Manhattan	14th Street & 7th Ave	1, 2, 3	4	3
Manhattan	Fulton Street	2, 3	10	2
Manhattan	96th Street	1, 2, 3	9	2
Manhattan	Fulton Street	4, 5	1	3
Manhattan	135th Street	2, 3	1	3
Manhattan	Wall Street	2, 3	4	3
Manhattan	Wall Street	4, 5	18	1

Manhattan	Bowling Green	4, 5	5	3
Manhattan	86th Street	4, 5, 6	7	2
Manhattan	125th Street	4, 5, 6	0	3
Manhattan	Brooklyn Bridge/City Hall	4, 5, 6	33	1
Manhattan	59th Street	4, 5, 6	3	3
Manhattan	Inwood 207th Street	A	3	3
Manhattan	145th Street	A, B, C, D	2	3
Manhattan	125th Street	A, B, C, D,	2	3
Manhattan	Columbus Circle	A, B, C, D, 1	15	1
Manhattan	West 4th Street/Washington Sq	A, B, C, D, E, F, V	10	2
Manhattan	168th Street	A, C, 1	3	3
Manhattan	14th Street & 8th Ave	A, C, E, L	18	1
Manhattan	34th Street/Penn Station	A, C, E, LIRR	19	1
Manhattan	81st Street/Museum of Nat His.	B, C	7	2
Manhattan	116th Street	B, C	2	3
Manhattan	96th Street	B, C	0	3
Manhattan	42nd Street/Bryant Park	B, D, F, V	12	1
Manhattan	Broadway Lafayette, Bleecker St	B, D, F, V, 6	19	1
Manhattan	23rd Street	C, E	25	1
Manhattan	World Trade Center/Path Station	E, Path Train	26	1
Manhattan	Roosevelt Island	F	0	3

Priority Rating used for Brooklyn, Manhattan and Queens

# of Bicycles	Priority Level
>50	1+
11-49	1
6-10	2
0-5	3

Manhattan	East Broadway	F	7	2
Manhattan	Delancey Street-Essex Street	F, J, M, Z	16	1
Manhattan	23rd Street	F, V	27	1
Manhattan	2nd Ave/Lower East Side	F, V	35	1
Manhattan	14th Street & 6th Avenue	F, V	27	1
Manhattan	Fulton Street	J, M, Z	>10 (delivery bikes)	2* (delivery)
Manhattan	1st Avenue	L	24	1
Manhattan	6th Avenue	L	30	1
Manhattan	34th Street-Penn Station*	1, 2, 3, LIRR	1	3
Manhattan	14th Street-Union Square*	L, N, R, W, Q, 4, 5, 6	59	1+
Manhattan	Times Square	N, Q, R, S, W, 1, 2, 3, 7	0	3
Manhattan	Prince Street	N, R, W	33	1
Manhattan	5th Ave/59th Street	N, R, W	1	3
Manhattan	8th Street	N, R, W	40	1
Manhattan	Lexington Avenue/59th Street	N, R, W	6	2
Manhattan	Roosevelt Island Tramway	N/A	0	3
Manhattan	23rd Street	R, W	14	1
Manhattan	Grand Central Station*	S, 4, 5, 6, 7, Metro North	19	1
Manhattan	77th Street	6	9	2
Manhattan	Port Authority Bus Station*	A, C, E	12	1

Appendix E

CityRacks Bicycle Rack Clearance Standards 12/1/99

CityRacks are sited to avoid interference with normal pedestrian flow and normal street activities. The bike-box is the footprint of the area within which a rack **with bicycles attached** can fit.

Bike Box Proximity to Adjacent Street Fixtures/Uses[1]
There are 4 main levels of clearance restricting bike box proximity to other sidewalk structures and uses.

A. Most Restrictive – 15'
   1. fire hydrants
   2. curb regulated as a bust stop, taxi stand, or hotel loading zone
   3. major structure: franchised structure (shelters, newsstands, toilets, sidewalk cafés), mouth of subway stairs & elevators

B. Moderately Restrictive – 10'
   1. corner quadrants (property lines across intersections)
   2. driveways
   3. building entrances (building line installations only)

C. Mildly Restrictive – 5'
   1. standpipes
   2. minor above ground structures (signs, meters, lights, mailboxes, planters, phones)
   3. building entrances (curb line installations only)

D. Least Restrictive – 3'
   1. surface hardware (grates, hatches, utility covers)
   2. tree pit edges (flush with sidewalk)

Bike Box Clearance From Sidewalk Edge
A bike box should not reduce pedestrian clear path to less than the greater of 8 feet or one half of the sidewalk width. Determination of a particular sidewalk's eligibility to meet this criterion is made by use of the following information:

Curb line installations: Bike box distance from curb – 1.5'-2'
Building line installations: Bike box distance from building - .5'

Bike Box Sizes	Box Width	Curb Clearance	Clear Path	Minimum Sidewalk Width	
				Installation at Curb	Installation at Building[2]
2 Parallel 3'x7'	3'	1.5'	8'	12.5'	11.5'
2 Perp. 5'x9'	5'	2'	8'	15'	13.5'
5 Perp. 6'x9'	6'	2'	9'	17'	14.5'

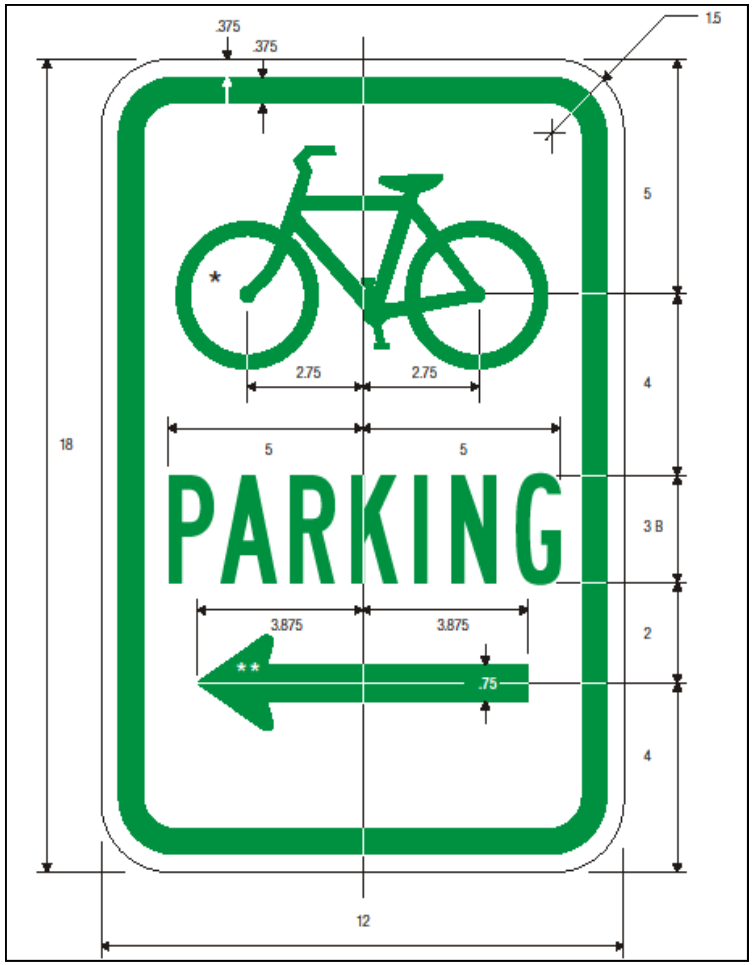
[1] Measurements are standards used for first field inspection. Sites rejected due to minor violations of standards will be revisited. Standards may be waived at the discretion of DOT depending on local conditions.

[2] Permitted if rack is in-line with other building line obstructions and 8'-9' clear path continues to 15' on either side of bike box to avoid "obstacle course" effect on pedestrians.

Appendix F

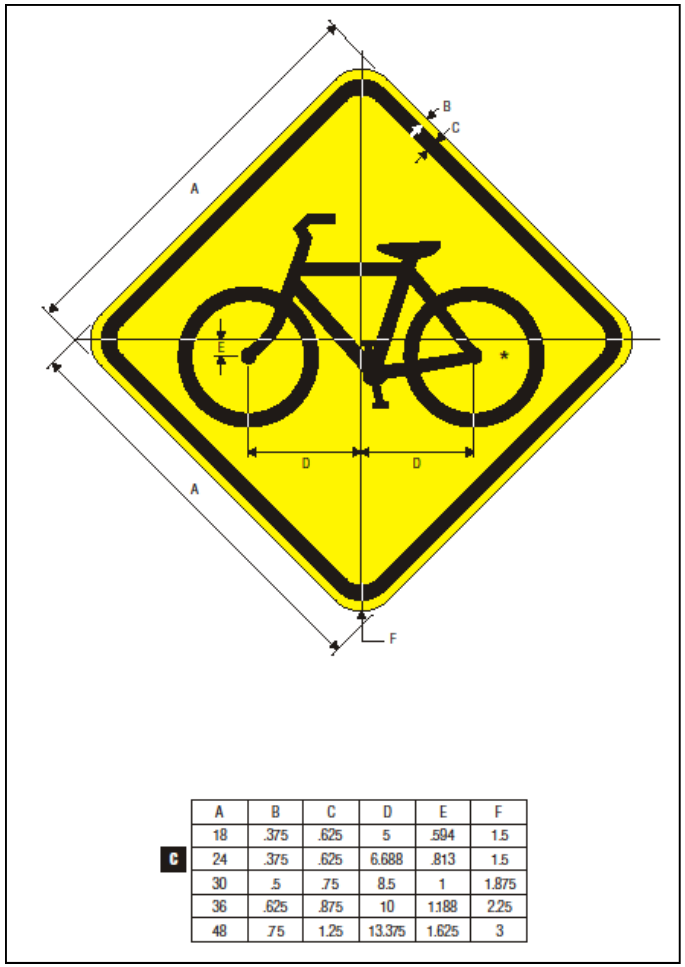
Manual on Uniform Traffic Control Devices (MUTCD) Signage

D4-3



D4-3:
The Bicycle parking Area sign may be installed where it is desirable to show the direction to a designated bicycle parking area. The arrow my be reversed as appropriate.

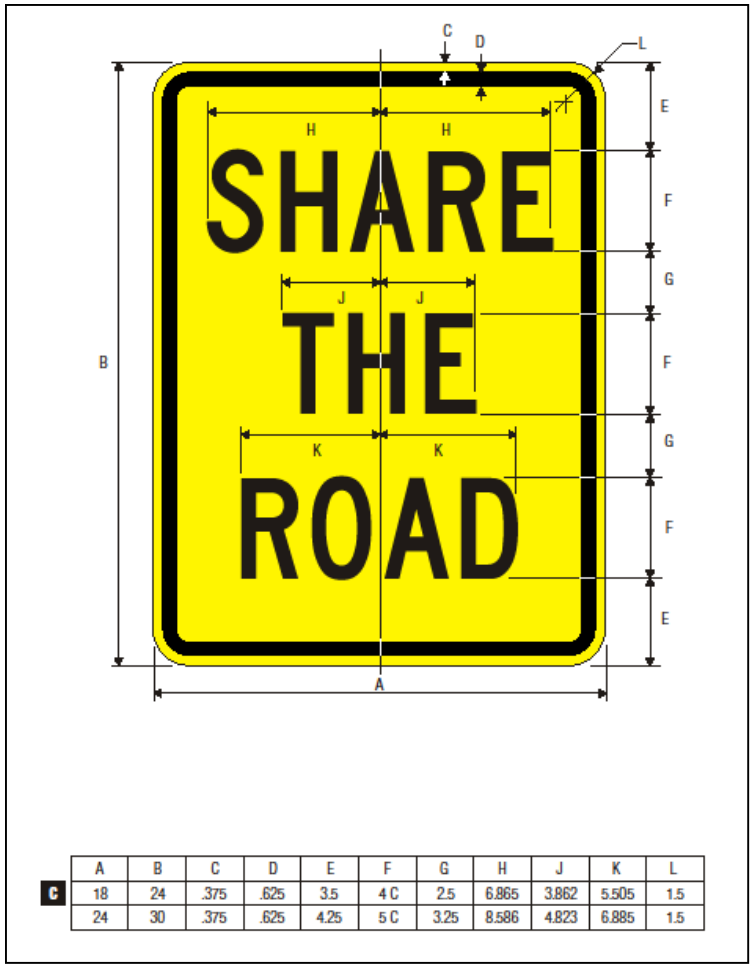
W11-1



	A	B	C	D	E	F
C	18	.375	.625	5	.594	1.5
	24	.375	.625	6.688	.813	1.5
	30	.5	.75	8.5	1	1.875
	36	.625	.875	10	1.188	2.25
	48	.75	1.25	13.375	1.625	3

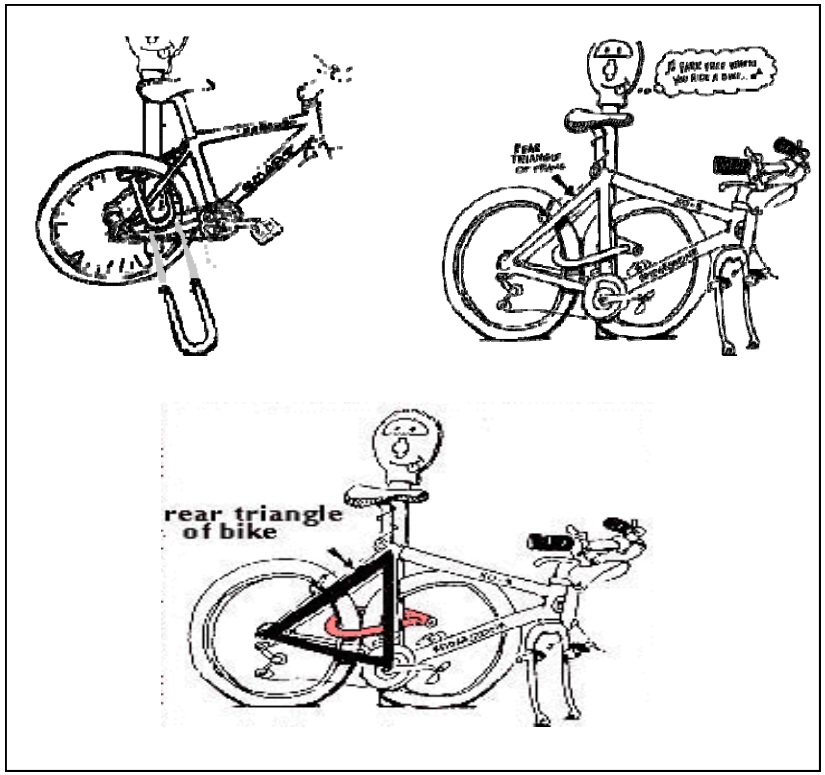
W11-1:
Vehicular Traffic signs should be used only at locations where the road user's sight distance is restricted, or the condition, activity, or entering traffic would be unexpected

W16-1



	A	B	C	D	E	F	G	H	J	K	L
C	18	24	.375	.625	3.5	4 C	2.5	6.865	3.862	5.505	1.5
	24	30	.375	.625	4.25	5 C	3.25	8.586	4.823	6.885	1.5

W16-1:
In situations where there is a need to warn drivers to watch for other slower forms of transportation traveling along the highway, such as bicycles, golf carts, horse-drawn vehicles, or farm machinery, a SHARE THE ROAD plaque may be used



How to properly lock your bicycle courtesy of missinglink.org

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